

### Contributions to ESA Earth Explorer missions



## Current use cases and references



Werum has been contributing to data archiving and reprocessing of SMOS as one of the first Earth Explorer missions.

Using the Multi-mission Facility Infrastructure (MMFI), Werum has been contributing to system design and development of the SMOS Long-Term Archive solution.

Since the launch of the Swarm mission in 2013, the Swarm mission data has been systematically



produced up to Level 2 within the ESA Archiving and Payload Data Facility. Werum's processing software is equipped with scalable processing nodes in a cluster that is optimized for high load with parallel processing of the IPFs and allows fast reprocessing of several years of mission data.









The Core Processing Facility (CPF) for the EarthCARE, BIOMASS and the FLEX payload data ground segment is being developed by Werum. The software shares components across the different missions and is based on Werum's scalable, cloud-ready Olib

framework. In addition, Werum is providing the processor test bed infrastructure in the EarthCARE science cluster (DISC). Since the EarthCARE launch, Werum supports the CPF operations as a consortium partner.



### Generic Processing Software

Based on the existing Olib framework, Werum is developing a new generic processing orchestration system for the Earth Explorer missions. The new multimission system is cloud- ready and provides a rich feature set for operators to control, monitor and analyse the payload data processing.

rum Software & Systems AG					Signed in as	coperator torben_ke	issuur log
werum						PROCESS	ING /ICE
		Docu	umentation	Data Catalog	Processing Sy	stem Config	uration
	Inbox Outbox Production	Nodes Agen	nte Circula	tion Rules Use	rs Prip-Reposit	tory Alp-Re	positor
Agents							
Data Transferin Agent 0/0 Data TransferDut Agent 10/10	DataTransferOutAgent_alp 0/15 EndpointNotificationAgent 0/15	GaelDeleteData Tra GenerataHashesAp	oceAgent 0/1 gent 0/35	GenerateHashesA HttpDownloadAg	Agent_alp 0/25 ent_alp-acri 0/0	HttpDownloadAg HttpDownloadAg	pent_alp-o pent_alp-o
Agent Type 💛 Host							
c < Page 1/2 × 3  Results 3	1					Page 528	20 ¥
ic < Page 1/2 × 3[ Results 3 A AGENT TYPE	1007		MAX	AGDIT COUNT	REACHABILITY	Page son	20 -
c ≤ Page 1/2 ≥ ≥[ Result: 3 ▲ AGDYT THE DataTrans FerInAgent	n HOST Tta-Sef-sork	er-01	MAX 1000	AGDIT COUNT	REACHABILITY ONLINE	Page son	20 -
c < Page 1/2 > >  Result: 3 A AGONT THE DataTrians FerEnAgent DataTrians FerOutAgent	n HOST Ita-inf-spris Ita-inf-spris	er-01 er-01	MAX 1000 1000	AGDIT COUNT 0 10	REACHABILITY ONLINE ONLINE	Page son ##CTINE IND 0 10	20 V
ic < Page 1/2 > >( Result: 3 <b>A AGONT THE</b> DataTransferDutagent DataTransferOutAgent_alip	1 1057 11a - Inf - sprik 11a - Inf - sprik 11a - Inf - sprik	er-01 er-01 er-11	AMX 1000 1000 1000	AGDIT COUNT 0 10 15	READINGLITY ONLINE ONLINE ONLINE	Page star # ACTIV( H67 0 10 0	20 v
ic < Page 1/2 > > Result 3 A AGONT THE DataTrans FerDinAgent DataTrans FerDinAgent DataTrans FerDinAgent EndpoIntNet (FicationAgent	noor Tai-fof-opti Tai-fof-opti Tai-fof-opti Tai-fof-opti Tai-atp-serv	er-01 er-01 er-11	MAX 1000 1000 1000 100	AGDIT COUNT 0 10 15 5	READHABLITY ONLINE ONLINE ONLINE ONLINE	Page son 0 10 0 0	DINCES
k < Page 1/2 > > > Pesuits 3 A AGUT THE DataTrans FerUnAgent DataTrans FerUnAgent DataTrans FerUnAgent, alp Endpointmust (Ficat Lonagent Indpointmust (Ficat Lonagent	HOST Title forf-sprice Title forf-sprice Title for sprice Title for sprice Title for sprice	er-01 er-01 er-11 -05 er-01	366X 1000 1000 1000 100 1000	AGDIT COUNT 0 10 15 5 10	REACHADUTY ONUINE ONUINE ONUINE ONUINE ONUINE	Page son 0 10 0 0 0 0 0 0 0	DINCES
Is < Page 1/2 > 2  Results 3 > ACOUT THE DataTrans FerEndgent DataTrans FerOutAgent_ DataTrans FerOutAgent_ EndpoIntNetFfCatEcondgent IndpoIntNetFfCatEcondgent IndpoIntNetFfCatEcondgent	HOLT Taa- linf - aprile Taa- linf - aprile Taa- linf - aprile Taa- linf - aprile Taa- linf - aprile	er-02 er-03 er-11 -05 er-03 er-31	AUX 1000 1000 1000 1000 1000 1000	AGDIT COUNT 0 10 15 5 5 10 0	REACHADEJTY ORE, THE ORE, THE ORE, THE ORE, THE ORE, THE	Page son # ACTIVE HGT 0 10 0 0 0 0 0 0 0	TUNCES
Ic < Page 1/2 > 2  Results 3 A ADDT TIPE Obstafrans FerDinkent Datafrans FerDinkent Datafrans FerDinkent Endpointbust (Ficat Sonapert Endpointbust (Ficat Sonapert Gallos Hestbusta FraceApert	HOLT Taja Janf-sapria Taja Janf-sapria Taja Janf-sapria Taja Janf-sapria Taja Janf-sapria Taja Janf-sapria	er-00 er-00 er-01 er-00 er-00 er-00	MAX 1000 1000 1000 1000 1000 1000 200	AGDIT COUNT 0 10 15 5 5 10 0 1	REACHADEJTY ORE, INE ORE, INE ORE, INE ORE, INE ORE, INE ORE, INE	Page too 2 #ACTINE HO 0 10 0 0 0 0 0 0 0 0 0 0 0	DINCES
IS < Page 172 > 24 Routs 3 A solar Trinc DataTrans forOxAgent DataTrans forOxAgent, alg Endpointmust (Ficat InAgent IndioIntmust (Ficat InAgent IndioIntmust (Ficat InAgent Casi DataTataTacAgent Gas DataTataTacAgent	HOLT Tap- for averts Tap- for averts	er-01 ar-11 -01 er-01 ar-11 -02 ar-01 ar-01	MAX 1000 1000 1000 1000 1000 1000 1000 10	AGDIT COUNT 0 10 15 5 5 10 0 1 0	REACHADELITY ORLINE ORLINE ORLINE ORLINE ORLINE ORLINE ORLINE	Page 528 2 # ACTING HOT 0 10 0 0 0 0 0 0 0 0 0 0	DINCES
Ic < Page 1/2 > 2  Routs 3 A ADDITING DataFrans for Unigent DataFrans for Unigent DataFrans for Unigent Lip Endpointstor (FicationApent Indio)InstatificationApent DataFrans for Unigent Lip DataFrans for Unigent Lip DataFrans for Unigent DataFrans for Unigent DataFrans DataFr	1 1007 11a-147-august 11a-147-august 11a-147-august 11a-147-august 11a-147-august 11a-147-august 11a-147-august	er-01 er-04 er-04 er-01 er-01 er-01 er-04 er-11	NUX 1000 1000 1000 1000 1000 1000 1000 10	AGENT COUNT 0 10 15 5 5 10 0 1 0 0 0	REACHABLITY ORLINE ORLINE ORLINE ORLINE ORLINE ORLINE ORLINE ORLINE ORLINE	Page 528 2 # ACTING HOT 0 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0	DINCES
A ADDR 172 ≥ 2  Routh 3 A ADDR THY DataFrain (ForbApert, DataFrain (ForbApert, Alg DataFrain (ForbApert, Alg DataFrain (ForbApert, Alg DataFrain (ForbApert, Alg DataFrain (ForbApert, Alg DataFrain (ForbApert, Alg DataFrain (ForbApert, Alg DataFrain), Forbapert DataFrain (ForbApert, Alg DataFrain), Forbapert DataFrain(ForbApert, Alg DataFrain(ForbApert, Alg DataFrai	I FOLT Tas information Tas information Tas information Tas information Tas information Tas information Tas information Tas information Tas information Tas information	er-01 er-04 er-04 er-01 er-01 er-01 er-01 er-01	AUX 1000 1000 1000 1000 1000 1000 1000 10	AGUIT COUNT 0 10 15 5 5 10 0 1 0 0 0 0 25	85404480,17Y 041,1745 041,1745 041,1745 041,1745 041,1745 041,1745 041,1745 041,1745 041,1745 041,1745	Page 525 2 #ACTINE HOL 0 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	QQ → DANCES
K < Page 1/2 S SI Result 3 A ADDI TINC DetaThrans for Undget DataThrans for Undget DataThrans for Undget Lalg Endpointment (Ficat Ionagent Candio Instruction Company) Candio Instruction Company Candio Instruction Candio Can	1001 Too information Too information	er-01 er-04 er-04 er-01 er-01 er-01 er-01 er-01 er-01 er-01 er-01	AWAX 10000 10000 10000 10000 10000 10000 10000 10000 10000	AGUNT COUNT 0 10 15 5 10 0 1 10 0 1 0 25 25	ESACHABLITY ONLINE	Page 525 2 #ACTING IND 0 10 0 0 0 0 0 0 0 0 0 0 0 0 0	DINCES



# Contributions to ESA Earth Explorer missions

### Interactive Development Testbed

The generic processing framework (Olib) is extended by a testbed mode for interactive development of data processors, data analytics or data and workflow visualization, known from the EarthCARE Level-2 Testbed and ready for use on other missions.

The processor testbed is equipped with a graphical workflow editor and a comprehensive Jupyter Notebook environment with community tools for sharing data and tools.



Jupyter Notebooks offer a powerful and flexible environment for interactive computing, code reproducibility, data visualization and collaboration. Their versatility, ease of use and extensive ecosystem make them an indispensable tool for data scientists, researchers, and developers.

Contributions to ESA Earth Explorer missions

#### **About Werum**

With a workforce of over 140, Werum Software & Systems AG is one of the largest independent employers for IT professionals in Germany. For more than 50 years, we have been implementing sophisticated software and systems for customers all over the world, among them many renowned companies from the automotive and aerospace industry as well as scientific institutions and public authorities.

Our activities focus on the support of customerspecific processes in the core areas of test data and information management, Earth Observation, eGovernment and enterprise information management. The software solutions are based on platforms specially developed for these areas.

In the field of Earth Observation, Werum provides solutions for the data processing, archiving and dissemination of, among others, Copernicus Sentinel satellites and ESA Earth Explorer missions like SWARM, EarthCARE, Biomass or FLEX.



www.werum.de



Werum Software & Systems AG Anna-Vogeley-Str. 20 21337 Lueneburg, Germany Tel.: +49 4131 8307-0

© 2024 Werum Software & Systems AG. All rights reserved. Werum and HyperTest are registered trademarks of Werum Software & Systems AG. All other names of products and services are trademarks of the respective companies.