Whitepaper: Ouranos Ecosystem Dataspaces Reference Architecture Model

Cover	Summary			
	About	A reference document presenting the technical paradigm, including the hierarchical structure model of dataspaces, and future perspectives for participants in the Ouranos Ecosystem Dataspaces		
	Purpose	Aims to provide an open opportunity for constructing service-driven dataspaces to address societal issues and create value within the Ouranos Ecosystem and establishes a technical paradigm for future system implementations, fostering the participation of various entities while ensuring interoperability		
Whitepaper: Ouranos Ecosystem Dataspaces	Readers	Targets a broad spectrum of industries in Japan and abroad that support the Ouranos Ecosystem Initiative, particularly those responsible for designing architectures for data interoperability within the enterprise domain.		
Reference Architecture Model Ministry of Economy, Trade and Industry, Japan: Information-technology Promotion Agency Digital Architecture Design Center, Japan	Scope	Covers dataspaces, a key pillar of the Ouranos Ecosystem—an ecosystem that creates value through new industry collaboration by developing and providing business-digital collaborative domains that connect companies, with digitalization as the enabler.		
	Publisher & Editor	 Ministry of Economy, Trade and Industry, Japan Digital Architecture Design Center (DADC), Information- technology Promotion Agency, Japan 		

Scope of the document

Scope	This document covers dataspaces, a key pillar of the Ouranos Ecosystem Initiative, and focuses on the following three topics: *Note that the comprehensive overview of activities, strategies, use cases, and community building related to the Ouranos Ecosystem Initiative falls outside the scope of this document; these aspects will be disclosed in the future.			
1 ODS-RAM	Ouranos Ecosystem Dataspaces Reference Architecture Model (ODS-RAM) is a service- oriented architecture model designed to expedite the societal implementation of dataspaces within the industry. While maintaining a certain level of logical compatibility with the International Dataspaces Reference Architecture Model (IDS-RAM), this document presents a technical paradigm that allows for more flexible adaptation to the characteristics of industry and market structures, and commercial practices. The ODS-RAM encompasses a technology- agnostic specification and other conceptual levels, structured into four loosely coupled Layers and four Perspectives, each with corresponding roles, protocols, and service models.			
Building- Block Portfolio	Building-Block Portfolio is an open-source software specification currently available as a reference implementation of the ODS Protocol.			
Context Catalog	Context Catalog is a collection of case studies on the design of the ODS-RAM (V1), where simulations of data interoperability and utilization were conducted in parallel with business development to establish a variety of dataspaces and abstract the necessary functions for each. This document presents the current information and future perspectives on the ODS-RAM (V1) design.			

13 Structural Issues

in the five processes of data interoperation and utilization

Pr	ocesses	Data users	Data providers	Type of issues			
	Exploration	Unclear	 Data cannot be easily discovered. Desirable to define the meaning of data relationships for own needs. 	a Endpoint	Governance	Security	Trust
				b Meaning			
	Confirmation	C Unable to authenticate own identity, resulting in I restricted access to data.	CUser authenticity is indiscernible. Managing individual access permissions incurs high costs.	C Authentication			
				d Authorization			
	Transfer	Diverse data formats, request methods and protocols results in high transfer costs.	Own way of data providing methods and protocols demotivates users. High cost of standardizing format leads to data being unutilized.	e Format			
				f Query			
				g Protocol			
	Use/Disposal	Difficult to assess the integrity and i quality of accessed data. Indeterminable whether the data usage complies with the conditions set by the data provider.	Unable to ensure the integrity and quality of the providing data. Difficult to enforce compliance with self-determined data usage conditions by data users.	h Tampering			
				i Quality			
				j Sovereignty			

7 Principles of Ouranos Ecosystem Dataspaces

enables data interoperation and utilization that accommodates diverse service models and data while ensuring data sovereignty.



Ouranos Ecosystem Dataspaces promote hybrid service ecosystem

with a variety of service interfaces while ensuring data sovereignty.



Reference Architecture Model consists of four layers and four perspectives to reflect the 7 Principles

focusing on the service life cycle to expedite the social implementation of dataspaces within the industrial sector.



Layers and perspectives of the ODS-RAM target each of the 13 issues of data interoperability and utilization

with the relationships shown below.

