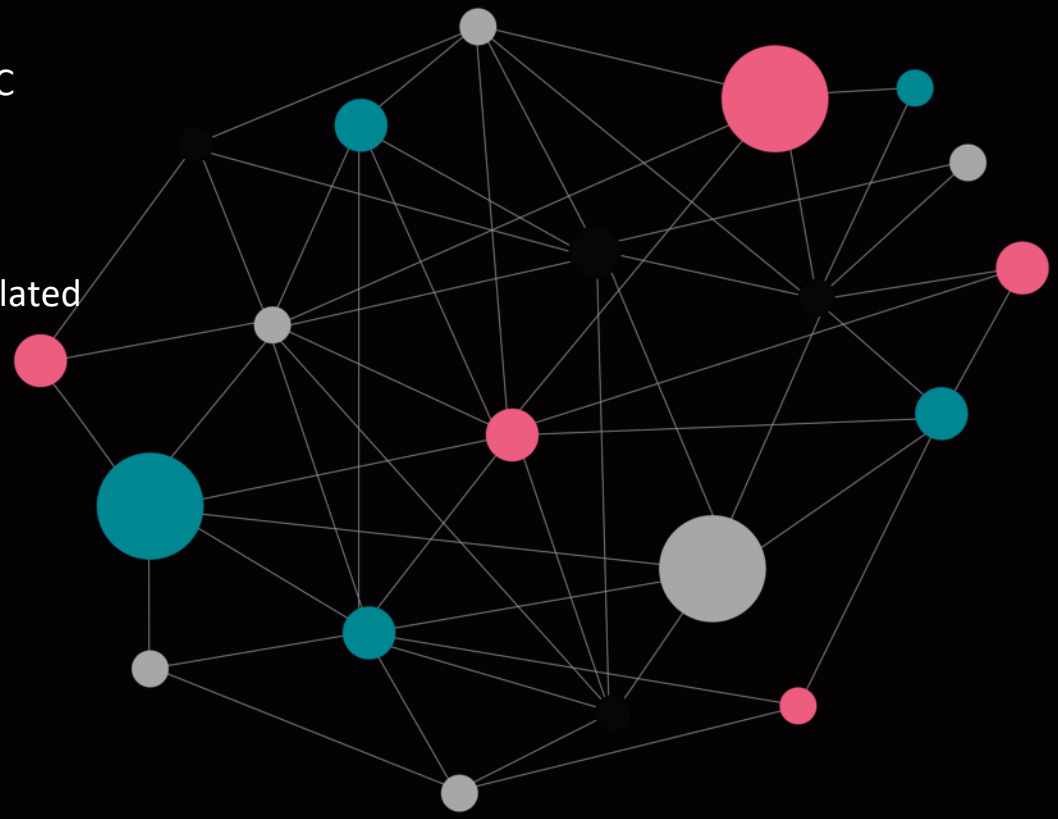
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Semantic interoperability in the EOSC Federation

From landscape to practical recommendations, and their application on the EOSC Nodes

Michal Med · CESNET

EOSC Symposium 2026, Florence · EOSC Federation IF, architecture and data-related policies



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What is sent is what is understood

One of four layers of the EOSC Interoperability Framework

Technical	**Semantic**	Organisational	Legal

1 Conceptual level

The meaning of concepts, their properties and relationships is interpreted consistently across disciplines and organisations.

2 Technical level

That meaning is machine-actionable: semantic artefacts in RDF, IRI-identified vocabularies instead of free-text keywords.

Goal: preserve the precise meaning of digital objects, for humans and machines, across the research lifecycle.

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Landscape 2025

TF deliverable 1 - Standards exist, coordination doesn't ·

In place

- **Standards widely used:** DCAT, Dublin Core, Schema.org, PROV-O
- **Catalogues in use:** OntoPortal, LOV
- **High engagement:** benefits mainly in data discovery

Missing

- **Governance and planning:** lack of coordination, bottom-up, project-level solutions; governance body
- **Artefacts in EOSC core:** Agreed top-level vocabularies, SACs as core infrastructure, shared controlled vocabularies
- **Alignment with Data Spaces:** FAIR, reusable mappings and crosswalks

Three pillars for action: governance body for interoperability, core level registries for semantic artefacts, controlled vocabularies and mappings, alignment with Data Spaces

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Practical recommendations

TF deliverable 2 · built on the landscape

For EOSC Nodes

1 Build on DCAT

Reuse existing application profiles: DCAT-AP, GeoDCAT-AP, HealthDCAT-AP

2 RDF and IRIs

Explicit semantics; identifiers instead of strings

3 Reuse vocabularies

ROR, ORCID, SPDX, EuroSciVoc before creating new ones

For the EOSC Federation

4 Governance body

Coordinates semantic interoperability across Nodes

5 Shared registers

For semantic artefacts, including mappings

29 recommendations

Areas: data, metadata, mappings, catalogues, validation, governance

Priorities: critical, important, useful

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EOSC United D3.3

Interoperability Validation Report 1

What	First Interoperability Validation Report, EOSC United T3.2
Why	Turn the 2021 EOSC IF into an operational, validated property of the Federation
When	Draft August 2026, due January 2027

Four layers × federating capabilities

	Legal	Organis.	Semantic	Technical
Federated AAI	●	●	●	●
Research product catalogues	●	●	●	●
Service catalogues	●	●	●	●
Helpdesk	●	●	●	●
Service monitoring	●	●	●	●
Service management	●	●	●	●

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Semantic status of federating capabilities

D3.3 · current situation in the Federation

Capability	Semantic status	Gap / next step
Federated AAI M	AARC, REFEDS, eduPerson	Map home-organisation attributes to EOSC model
Research product catalogues M	DCAT-AP … Schema.org, ISO 19115, EuroS…	Schem… …eity; crosswalks into DCA…
Service catalogues M	EEN, DCA… …rvice vocabulary	Mi… …N-to-DCAT mapp…
Helpdesk R*	Draft ticket states…	Unified voca…
Service monitoring R*	ARGO status values; avail… …uptime	Unified vocabulary; l…
Service management R*	FitSM vocabulary	Semantics still to be specifie…

Standardization exists!!!

Coordination, mappings, unified vocabularies

M = mandatory, R* = recommended, mandatory in 2026 · Source: EOSC United D3.3 (draft), Table 3

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D3.3 confirms the landscape

Recommendations are being followed; governance is missing

On track

- DCAT adopted as the exchange model for catalogues
- Controlled vocabularies approved for services and domains
- Mappings instead of uniformity: Nodes keep local models

Missing

- Coordination and governance of semantics
- Shared vocabularies across capabilities
- A register for mappings; DCAT-AP conformance test

Tested in hackathons: two Nodes federated 33 services with independently built EEN-to-DCAT mappings; a second round found an 8-field common core across 239 service records

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Takeaways

From recommendations to federated practice

1

Reuse

DCAT, RDF, IRIs and existing vocabularies; Nodes self-assess against the **recommendations**

2

Coordinate

A governance body for semantics at **Federation level**; new EOSC-A SI Task Force 2027–2028

3

Share

Registers for semantic artefacts and mappings, reusable across Nodes; Semantic Artefact Catalogues

Landscape overview for the EOSC Federation Semantic Interoperability in 2025: doi.org/10.5281/zenodo.19134873

Practical Semantic Interoperability recommendations for the EOSC Federation: doi.org/10.5281/zenodo.22831063

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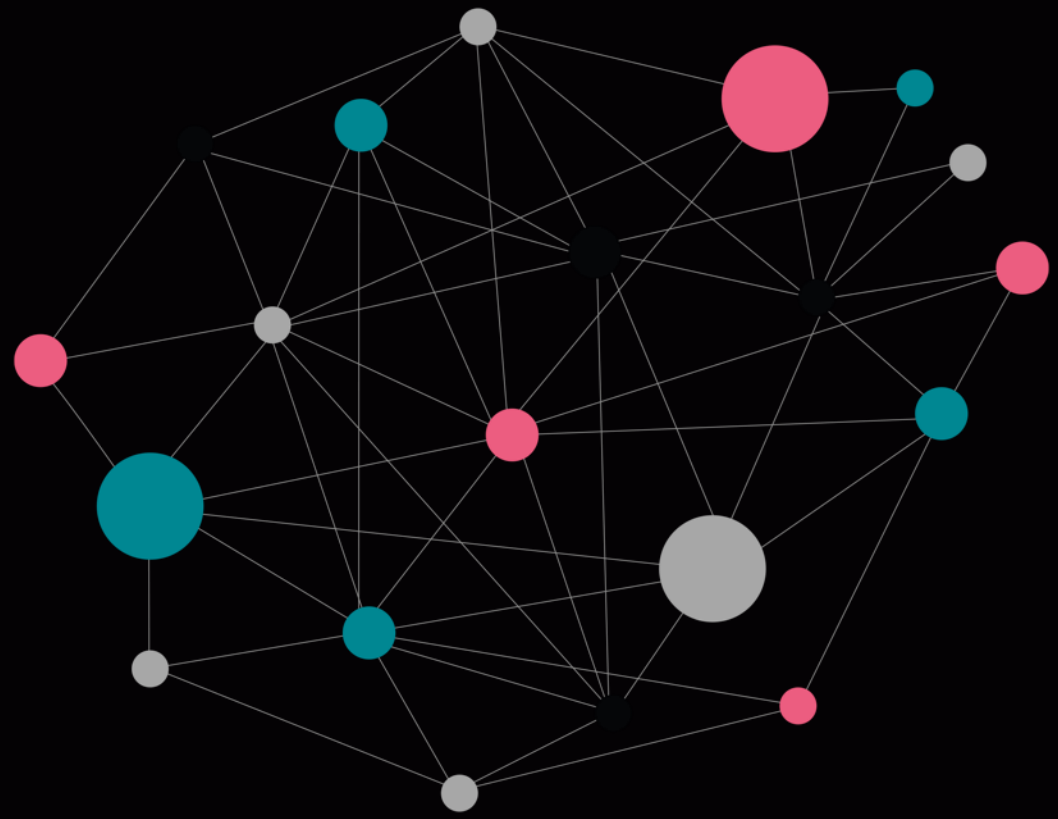
Thank you

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