



Relevant standardization activities for 3D data and visualizations

Why OGC Standards matter to the EuroSDR community - interoperability across semantic, visual, and digital twin workflows

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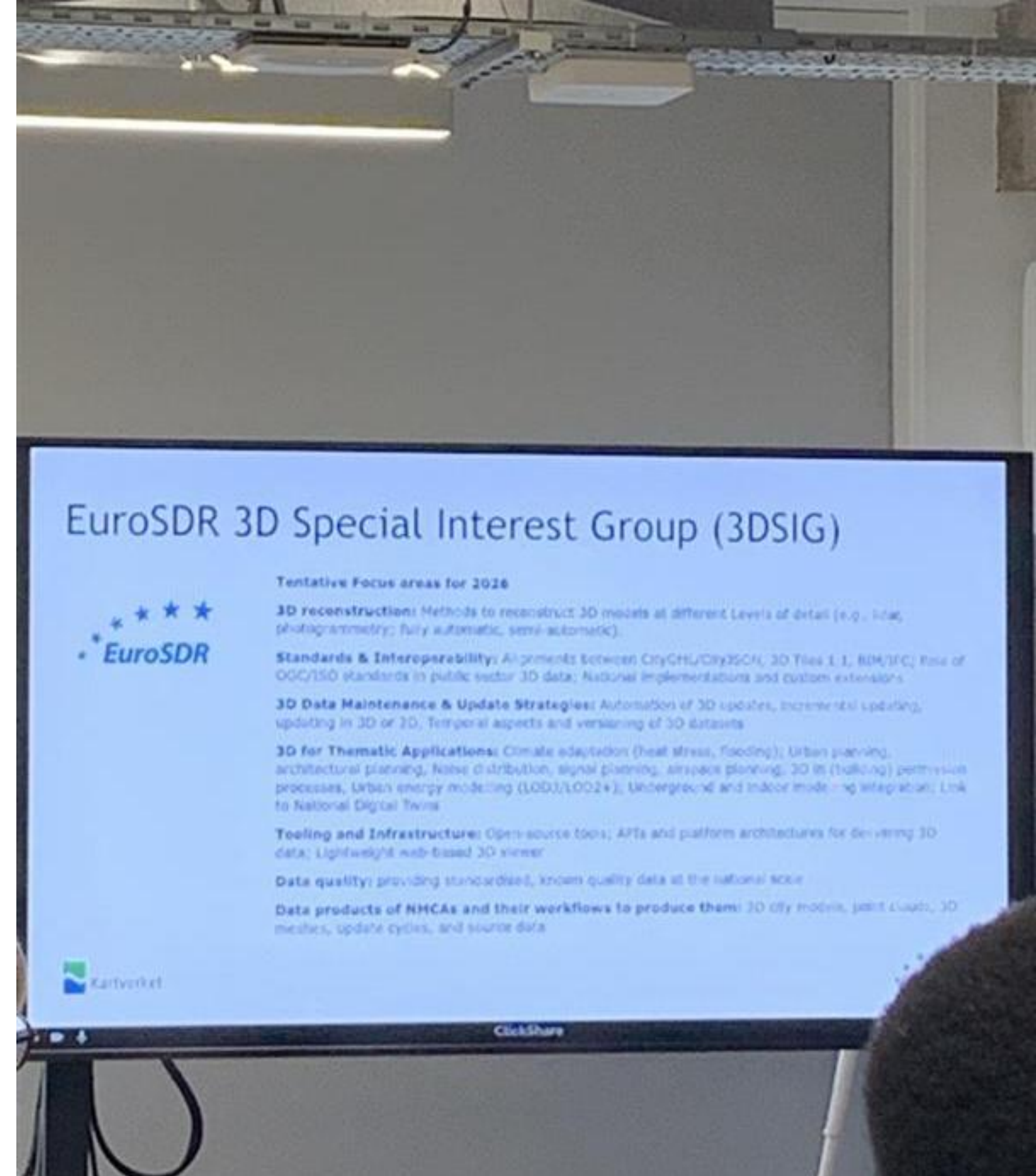
Europe's 3D landscape is diversifying

- Operational 3D is now real
- Semantic, mesh, and hybrid approaches coexist
- Interoperability is now the core issue
- OGC helps connect, not prescribe



EuroSDR Production Reality

- Periodic aerial and LiDAR capture
- CityGML used in many NMCA workflows
- Mesh and hybrid pipelines also used
- Levels of maturity vary



Why standards matter in 3D

- Geometry is only part of the problem
- Semantics, LoD, appearance, and time all add complexity
- Cross-border reuse needs shared rules
- Machine-readable requirements and validation matter

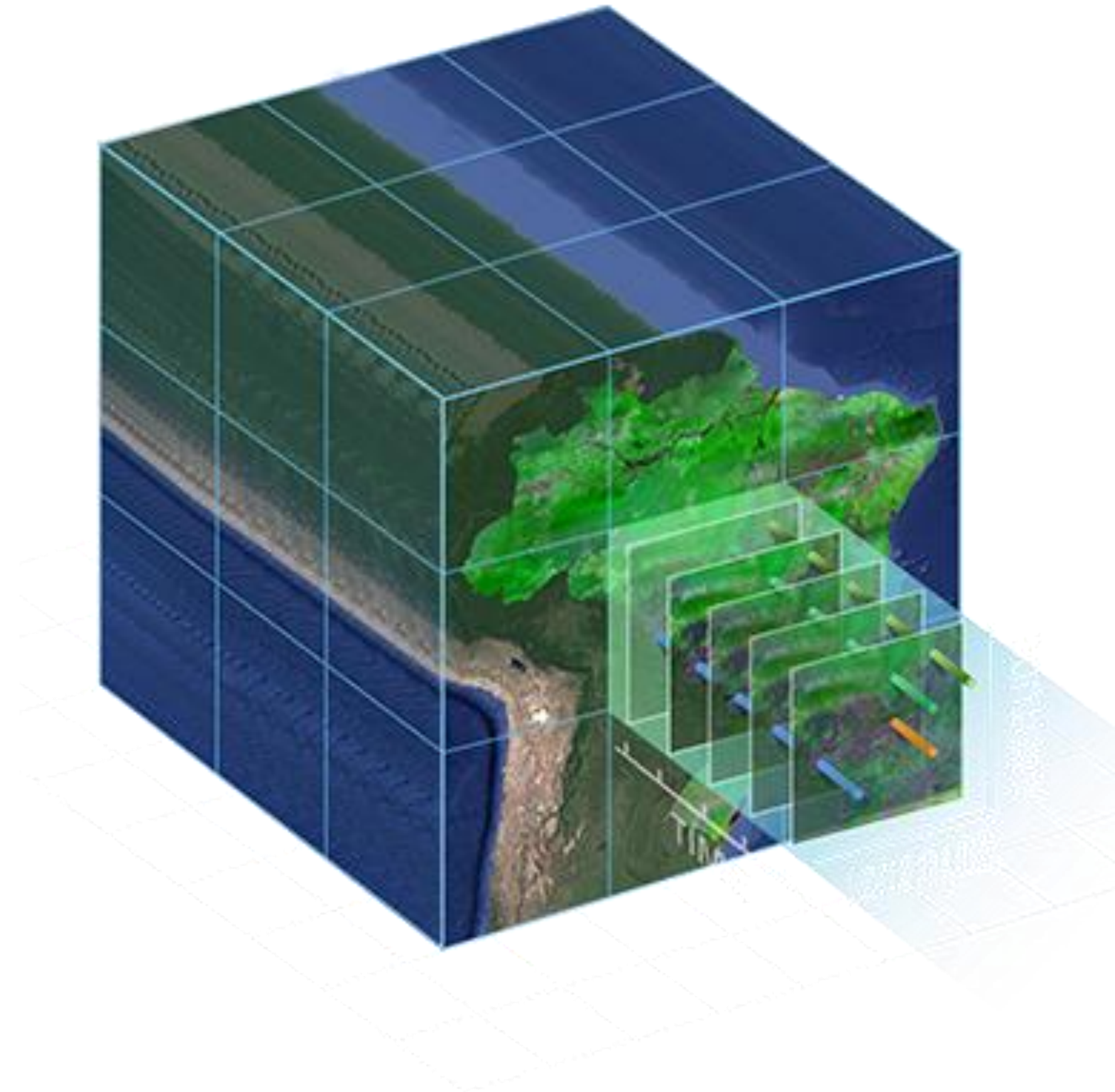


3D is not just about the built environment

- Meteorology and environmental science depend on inherently 3D data
- Datacubes help organize variables across area, height, and time
- Not all 3D is object-based; some of it is continuous field data
- Standards need to support both built and non-built workflows

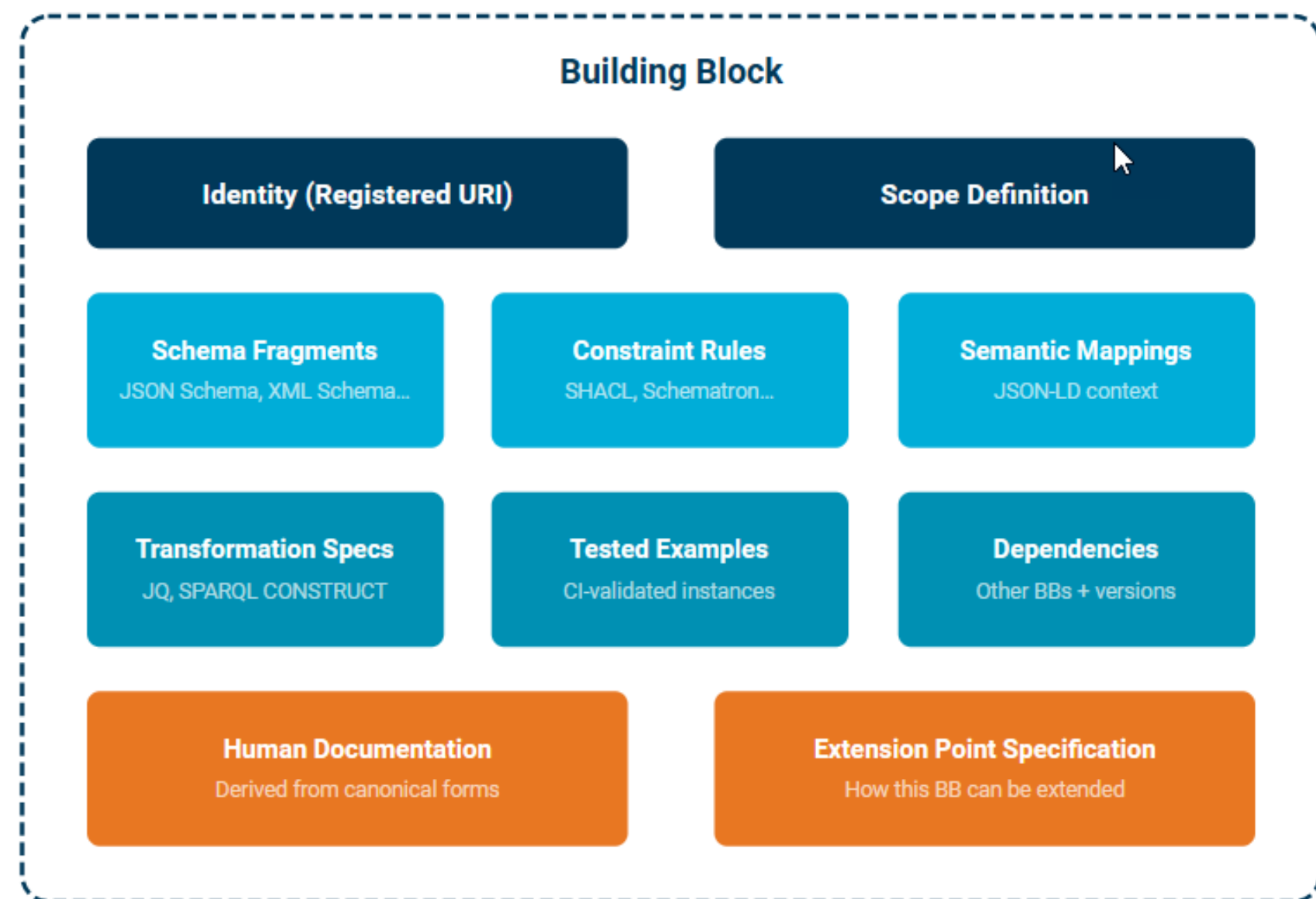
OGC API – Environmental Data Retrieval (EDR) Standard provides lightweight access to subsets of these datacubes

<https://www.ogc.org/standards/ogcapi-edr/>



What OGC is doing

- Semantic models: CityGML
- Lightweight encoding: CityJSON
- Visual delivery: 3D Tiles and I3S
- Interfaces: OGC APIs
- Implementation support: Building Blocks, profiles, and validation



An OGC Building Block is a **reusable, standards-based component** that packages the specification and supporting elements needed to implement semantic interoperability — in one versioned, referenceable place <https://ogcincubator.github.io/rainbow-docs/docs/building-blocks>

Semantic models: strong on meaning (CityGML)

- Rich semantics for urban objects and context
- Multiple levels of detail
- Strong fit for analysis and governance
- Implementation complexity remains a challenge

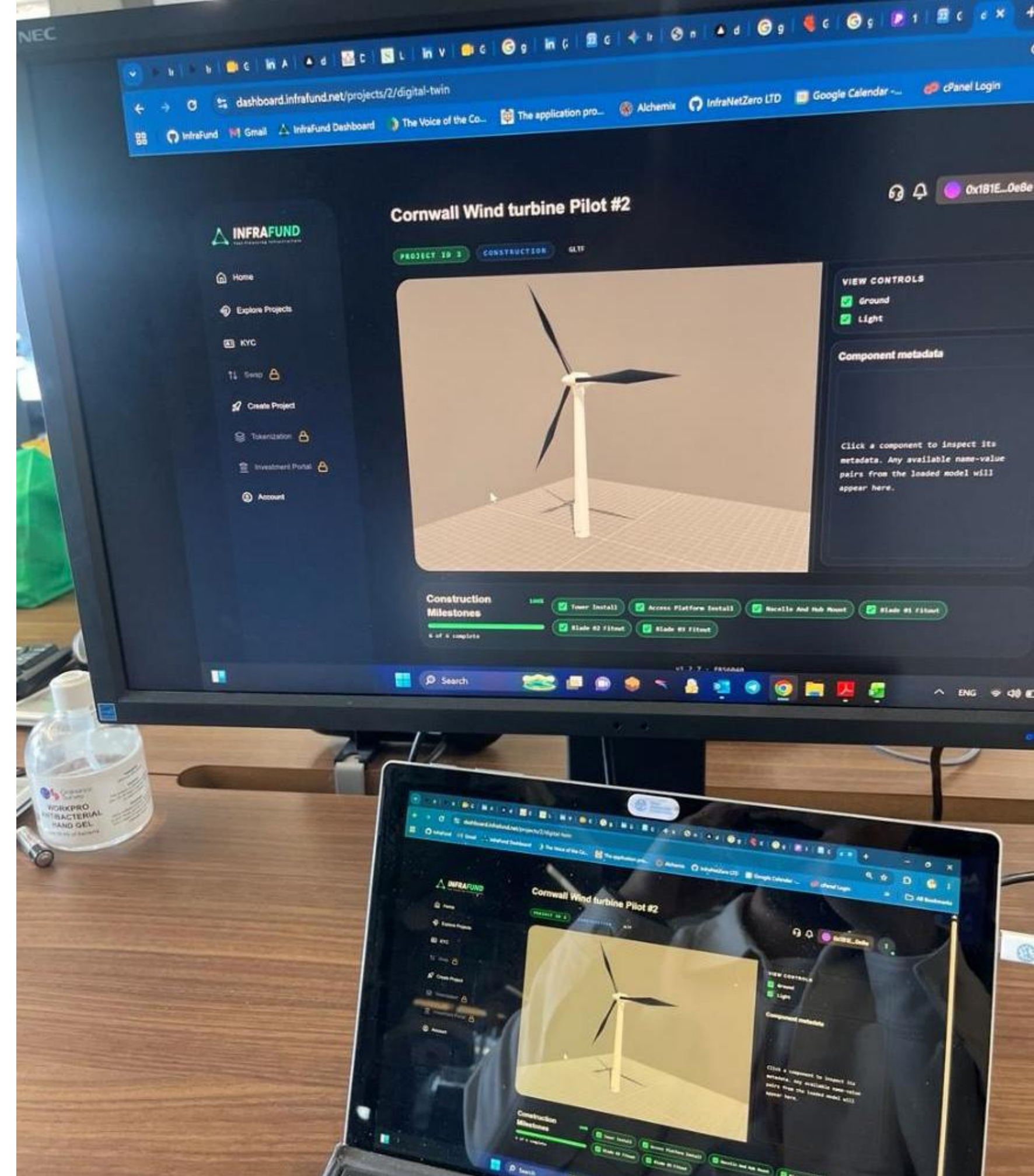


CityGML

Visual delivery: strong on performance (3D Tiles & I3S)

- Efficient streaming of large 3D scenes
- Good fit for web, digital twins, and interaction
- Scales well for end-user consumption
- Limited native semantics for analysis

Source: Infracfund, OGC London Code Sprint, May 2026



The core challenge: meaning and performance together

- Semantic and visual layers serve different needs
- Interoperability is more useful than format competition
- APIs and transformations are part of the answer
- Hybrid ecosystems are becoming normal

OGC's GeoSPARQL Standard has the potential to become the semantic query layer that connects rich 3D models like CityGML with high-performance visualisation frameworks like 3D Tiles.

OGC GeoSPARQL

- A Geographic Query Language for
RDF Data



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Making Standards Operational

- Building Blocks package schemas, semantics, transforms, docs, examples, and validation
- Profiles express use-case requirements
- Requirements and validation approaches (e.g. VERS) improve trust and reuse

The screenshot shows the 'CHEK data completeness validator' web interface. It is divided into three main sections: 'Backend service', 'Validation data', and 'Parameters'. The 'Backend service' section has a 'Service URL' field with the value 'http://localhost:8000/' and 'Edit' and 'Reload' buttons. The 'Validation data' section includes a 'Select a profile for validation' dropdown menu with 'Ascoli Piceno profile for CHEK (chek-ascoli-piceno)' selected, a 'General profile for the city of Ascoli Piceno' label, and two 'File to validate' input fields. The first file input field has a file named 'sample.city.json' selected, while the second is empty with the text 'No se ha seleccionado ningún archivo.' The 'Parameters' section has a 'buildingOfInterest' field with the value 'ID_04030100_619' and a 'Validate' button at the bottom.

The VERS — Validation & Requirements Specification (developed under the EU CHEK project for building permit automation) provides a practical way to ensure that 3D data is not just standardised, but usable and interoperable in real workflows.



Why this matters to EuroSDR

- No single national path needs to win
- Repeatable interoperability matters more
- EuroSDR can help test production patterns
- OGC and EuroSDR are natural partners

From data production → interoperable, operational 3D systems





Thank You

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