D4.2 – First version of the Online Competence Centre platform

Deliverable Report n. 4.2:	final version, issue date on 31/01/2026
Grant Agreement number:	101004468
Project acronym:	3D-4CH
Project title:	Online competence centre in 3D for Cultural Heritage
Funding programme:	Digital Europe
Project coordinator:	Marco Medici, INCEPTION
E-mail:	marco.medici@inceptionspinoff.com
Project website address:	www.3d4ch-competencecentre.eu

Title:	D4.2 – First version of the Online Competence Centre platform
Issue Date:	31/01/2026
Produced by:	ARCTUR
Main author:	Ambrož Černe (ARCTUR), Matevž Straus (ARCTUR)
Co-authors:	-
Version:	v1.0
Reviewed by:	Anestis Koutsoudis, ATHENA Research Centre Sebastian ter Burg, Europeana Foundation Roberto Di Giulio, INCEPTION (Ethics Mentor)
Approved by:	Marco Medici, INCEPTION
Dissemination:	Public

Colophon

3D-4CH is a Digital Europe project co-funded by the European Union under Grant Agreement n. 101195149.

Co-funded by the European Union

Document History

- 22.12.2025: v0.1 – first draft
- 27.01.2026: v0.2. – document for review
- 29.01.2026: v1.1. – final document

Table of Abbreviations and Acronyms

Acronym	Meaning
3D	Three-dimensional form
AI	Artificial Intelligence
API	Application Programming Interface
CHIs	Cultural Heritage Institutions
DEP	Digital Europe Programme
EU	European Union
LMS	Learning Management System
MOOC	Massive Open Online Course
NeRF	Neural Radiance Field
OCC	Online Competence Centre
XR	Extended Reality

Table of Contents

Executive Summary

The 3D-4CH Platform is established as a pivotal Online Competence Centre (OCC) dedicated to empowering the cultural heritage sector through advanced 3D technologies, aligning with the Grant Agreement's strategic aims. Addressing the increasing demand for digital transformation, particularly for 3D digitisation, virtual museums, and immersive experiences, the platform provides solutions by offering structured, high-quality training, standardised practices, and specialised tools.

Its core offerings are comprehensive:

1. A centralised Knowledge Base serves as a go-to repository for good practices and technical standards.
2. a Training Hub provides learning opportunities, including 3D-4CH online courses and interactive modules;
3. and a Tools Library offers access to cutting-edge AI, XR, and NeRF reconstruction methods.

Architecturally, it is built on a modular, scalable, and secure cloud-hosted infrastructure, engineered for high performance and integration with the Common European Data Space for Cultural Heritage.

1. Introduction

The 3D-4CH project is developed under the framework of the Digital Europe Programme (DEP), specifically contributing to the goal of reinforcing Europe's digital capacities through the creation of the Online Competence Centre Platform. As a central hub for 3D in the cultural heritage domain, the platform serves as a critical infrastructure within the digital transformation of the sector. By aligning with the strategic objectives of the DEP, 3D-4CH addresses the "digital gap" in heritage institutions, ensuring that high-end technologies such as 3D digitisation, Artificial Intelligence, and Cloud computing are accessible to all entities, regardless of size.

1.1 The Demonstrator's Goal: A Centralised Competence Centre

The primary goal of this demonstrator is to prove the operational viability of a centralised 3D Competence Centre. Designed with a user-centric approach, the platform serves to:

- **Clarify potential workflows:** Provide practical resources for capacity-building when applying 3D digitisation workflows, from data capturing and processing to archiving and preservation.
- **Standardise practices:** Harmonise fragmented efforts across Europe through common technical standards, guidelines, and good practices for creating and aggregating high-quality 3D content.
- **Bridge Theory and Practice:** Offer a comprehensive resource for professionals to develop skills, access training, and connect directly with experts and consultants, moving beyond academic research.

1.2. Project Scope and Strategic Aims

The 3D-4CH platform focuses on the creation of a sustainable ecosystem for 3D cultural heritage. The scope encompasses the entire lifecycle of 3D assets - from raw capture using advanced methods like NeRF to long-term archiving and integration with the Common European Data Space for Cultural Heritage.

1.3. Target Groups

To ensure maximum impact and practical utility, the platform provides tailored benefits to a broad spectrum of stakeholders:

- **Cultural Heritage Institutions (CHIs):**
    - Access a curated set of standards and tools developed through ongoing 3D and XR projects.
    - Benefit from capacity building in 3D digitisation, metadata creation, and storytelling through XR.
    - Utilise formal certification processes to validate staff expertise.
    - Access specialised services for preservation, restoration, and large-scale digitisation management.

- **Technology, Creative Industries, and Professionals:**
  - Engage in a collaborative environment exploring innovation in 3D, XR, and AI.
  - Access high-quality infrastructure and datasets to support the development of heritage-based apps, games, and tourism services.
  - Form strategic partnerships with CHIs and public bodies on digital transformation initiatives.
- **Researchers:**
  - Collaborate and co-create using datasets and methodologies from leading 3D projects.
  - Follow certification pathways aligned with academic standards.
  - Contribute to the evolution of good practices and the documentation of pilot activities.
- **Educators and Students:**
  - **Educators:** Access innovative pedagogical training resources based on 3D/XR for immersive learning in archaeology, history, and art, supported by professional development certifications.
  - **Students:** Explore interactive cultural content that enhances understanding and builds digital competencies, while also supporting employability and career development through recognised certification pathways.
- **Citizens and Tourists:**
  - Access rich storytelling and educational materials that enhance cultural understanding and digital literacy.
  - Discover diverse cultural narratives and heritage assets that may otherwise be physically or geographically inaccessible.
- **Policy and Governance Stakeholders:**
  - Leverage a centralised Knowledge Base for digitisation guidelines and technical standards to develop national or regional conservation strategies.
  - Access comparative tools and good practices tailored to various scales of heritage contexts to support smart cultural investment and digital infrastructure.

2. Scope and implementation approach

2.1 Collaborative Design Process

The design of the 3D-4CH platform followed a highly collaborative and iterative workflow, ensuring alignment with foundational project goals while responding dynamically to user insights. The process began with the Project Work Plan, which established the strategic direction and primary content types (Training, Knowledge Base, and Tools).

A pivotal milestone was the 3D-4CH Workshop on User Requirements held on February 20, 2025, in Trento, Italy. This intensive session allowed project partners to translate high-level objectives into concrete, user-centric requirements through direct stakeholder engagement.

Following this, the design was further refined in July 2025 through consultation with the 3D-4CH Advisory Board and Stakeholder Panel, whose proposals were integrated into the final architecture.



Figure 1 - Impressions from the co-design workshop during the Trento meeting

2.2 Iterative Development & Cross-WP Synergy

The platform was developed through several distinct design sprints over a five-month period, enabling continuous cycles of design, discussion, validation, and refinement (see D4.1 Design of the Online Competence Centre platform). This iterative approach ensured that technical development progressed in parallel with content definition and user-oriented adjustments.

A critical component of this phase was close cross-Work Package collaboration:

- **WP2 (Training & Capacity Building)** contributed to defining and validating the structure, pedagogical relevance, and quality criteria for content in the Training Hub and Knowledge Base.
- **WP3 (Adoption of R&D Advances)** supported the identification, selection, and structured presentation of advanced 3D tools, ensuring their technical relevance and consistency with research and innovation objectives.

In parallel, content sourcing and curation procedures were established and applied. Platform content was primarily collected from project partners using structured RECIPE templates for Knowledge Base entries, Tools, and Online Courses. These templates ensured consistency, metadata completeness, and alignment with the platform's filtering and navigation logic. Submitted content was reviewed and curated by the WP4 team before publication, while sections such as News and Events follow a coordinated editorial process to ensure relevance and quality. This approach provided a controlled yet scalable mechanism for populating the platform in its first release and laid the groundwork for future content expansion.

2.3 Phased Implementation Strategy

The 3D-4CH consortium adopted a gradual implementation strategy to account for the evolving nature of the platform's content.

- **First Release (Month 12, February 2026)**: As specified in the Grant Agreement, this initial deployment delivers the core infrastructure and essential functionalities (Knowledge Base, Tools section, and initial Course listings).
- **Progressive Rollout:** Subsequent releases will introduce new features and content in tandem with the ongoing preparation of training materials and advanced R&D tools. This phased

approach ensures the platform remains responsive to user feedback and remains a high-value resource throughout its lifecycle.

3. Technical Specifications

3.1. Purpose and scope

This section defines the technical characteristics, architecture, and operational setup of the platform delivered within the project. The platform is already implemented, deployed, and hosted in a production environment. The purpose of this specification is to formally document the as-built state of the system as part of the project deliverables.

The platform represents a unified implementation aligned with established architectural principles, technologies, and operational standards, with configuration adapted to the specific requirements of the project.

3.2. Platform Architecture Overview

The platform is based on a modular, service-oriented architecture composed of clearly separated functional layers. Each layer is designed to operate independently while maintaining seamless integration with the rest of the system, ensuring reliability, scalability, and maintainability.

Key architectural layers include:

- **Application Layer** – responsible for business logic, content management, and API exposure
- **Data Layer** – provides structured and persistent data storage
- **Caching Layer** – improves performance and response times
- **Authentication and Authorisation Services** – central identity and access management
- **Supporting and Integration Services** – extend platform functionality and operational robustness

Inter-service communication is optimised for low latency and high availability. The platform exposes functionality primarily via REST-based APIs.

3.3. Core Technologies

3.3.1. Programming Languages

- PHP 8.4 for backend and business logic
- JavaScript for frontend behaviour and interactive functionality

3.3.2. Framework and Supporting Tools

- OpenAPI for formal API documentation and integration transparency

- Varnish for frontend HTTP caching
- MinIO for S3-compatible object storage

3.3.3. Databases

- MariaDB is the primary relational database
- Support for PostgreSQL and in-memory databases for auxiliary and external services

3.3.4. Authentication and Authorisation

- Keycloak is used as a centralised identity provider
- Role-based access control is enforced across the platform
- Secure token-based authentication is applied for API access

3.3.5. CI/CD and Deployment

- Automated CI/CD pipelines are used for build, testing, and deployment processes
- Multiple internal services support versioning, validation, and controlled rollouts

3.4. Content Management

The platform includes an advanced content management system, ACM (Arctur Content Management), designed for efficient, secure, and flexible content administration within the Web Information System (SIS).

ACM enables comprehensive management of all content types, including text, images, videos, links, tables, and other structured elements. Content editing and organisation are performed through an intuitive user interface that supports efficient workflows even for users without advanced technical knowledge.

The system is based on a headless architecture, meaning that content is accessed and delivered via APIs. This approach enables seamless integration with external applications, services, and frontend layers, while ensuring long-term flexibility and scalability of the platform.

ACM incorporates a range of advanced features, including:

- User authentication and authorisation based on OAuth 2.0
- Role-based access control aligned with defined user profiles
- Version history and change tracking for all content elements
- Structured workflows for content creation, modification, approval, and publication
- Support for multilingual content management
- Advanced search functionality across all content types

To support content quality and performance, the CMS includes integrated tools for search engine optimisation (SEO), content analytics, and monitoring of user engagement. Accessibility support tools assist editors in preparing content compliant with WCAG guidelines. Additional features include form creation, page structuring, and subscriber notification mechanisms for newly published content.

User permissions are managed centrally, ensuring that access to CMS functionalities is strictly aligned with assigned roles. This guarantees controlled content governance, consistency, and security across the platform.

3.5. Hosting and Infrastructure

3.5.1. Hosting Environment

The platform is hosted within a dedicated data centre environment and operates across multiple isolated environments:

- Development/Test Environment – development, testing, and onboarding
- Production Environment – live system usage

The infrastructure supports automated application deployment, scaling, and lifecycle management.

3.5.2. Scalability and Availability

- Automatic horizontal and vertical scaling based on system load
- High availability is maintained during deployments
- Load balancing across applications and HTTP servers
- Support for more than 5,000 concurrent users

3.6. Data Management and APIs

- Core data is stored in MariaDB with transactional reliability
- External services may use dedicated databases based on functional requirements
- Data access is provided via REST APIs
- All endpoints are documented using OpenAPI specifications

3.7. Performance and Caching

- Varnish is used to cache frontend responses
- Caching strategies reduce backend load and improve response times
- Service communication is optimised within a single data centre to minimise latency

3.8. Security

Security is implemented according to the principle of security by design:

- HTTPS is enforced for all external communication
- Centralised SSO via Keycloak
- Role-based module access for authenticated users
- Optional additional authentication constraints
- Controlled access request and approval mechanisms

3.9. Accessibility

Accessibility compliance is an integral part of platform maintenance:

- Accessibility requirements are reviewed during development and after feature releases
- Editorial tools support WCAG-compliant content preparation
- The platform promotes inclusive access for all users

3.10. Backups and Disaster Recovery

- Automated daily backups of all critical data
- Backup integrity ensured via checksum validation
- Backups executed during off-peak hours
- Replicated backups are stored at a geographically separate location

In case of a critical failure, the platform supports recovery to the latest valid backup with a maximum recovery time of 24 hours.

3.11. Data Centre Standards

The platform is hosted in a certified data centre environment with robust physical, technical, and organisational security measures.

Security Standards

- ISO 27001-certified Information Security Management System
- Dual physical access control:
    - Alarm system with PIN codes
    - RFID access control cards
- Access to administrative areas is permitted only when accompanied by authorised personnel

Multi-Zone Protection System

- Intrusion detection using infrared and microwave sensors

- Continuous video surveillance
- Environmental monitoring including temperature, humidity, leak, and smoke detection

Power Infrastructure

- Continuous power supply ensured by a 2N redundant UPS system
- Diesel generator for extended power outages

Cooling System

- Minimum N+1 redundancy
- Controlled temperature range between 21°C and 24°C
- Humidity maintained between 40% and 60% RH

Network Connectivity

- 1 Gbps symmetric internet connection
- At least two independent internet service providers (BGP)
- Two independent optical routes
- Guaranteed service availability with a 99.98% SLA

3.12. Monitoring and Operations

- Continuous 24/7 system monitoring
- Active alerting linked to a security operations centre
- Regular system updates and security patches
- Ongoing performance and availability checks

3.13. Conclusion

The platform is implemented as a robust, secure, and scalable solution aligned with modern architectural and operational standards. Its modular structure, standardised integrations, and automated infrastructure management ensure long-term maintainability and readiness for future enhancements.

4. The 3D-4CH platform (first release) architecture

4.1 Overview of Platform Architecture

The 3D-4CH platform is engineered as a high-performance, modular ecosystem designed to bridge the gap between complex 3D research and practical cultural heritage applications. The architecture is built on a Cloud-Native foundation, utilising modern hosting solutions to ensure 99.9% uptime and low-latency access to data-heavy 3D assets.

The platform is accessible at: 3d4ch-competencecentre.eu

With the move of the new platform to 3D4CH-competencecentre.eu, the previous project webpage has been moved to old.3d4ch-competencecentre.eu.

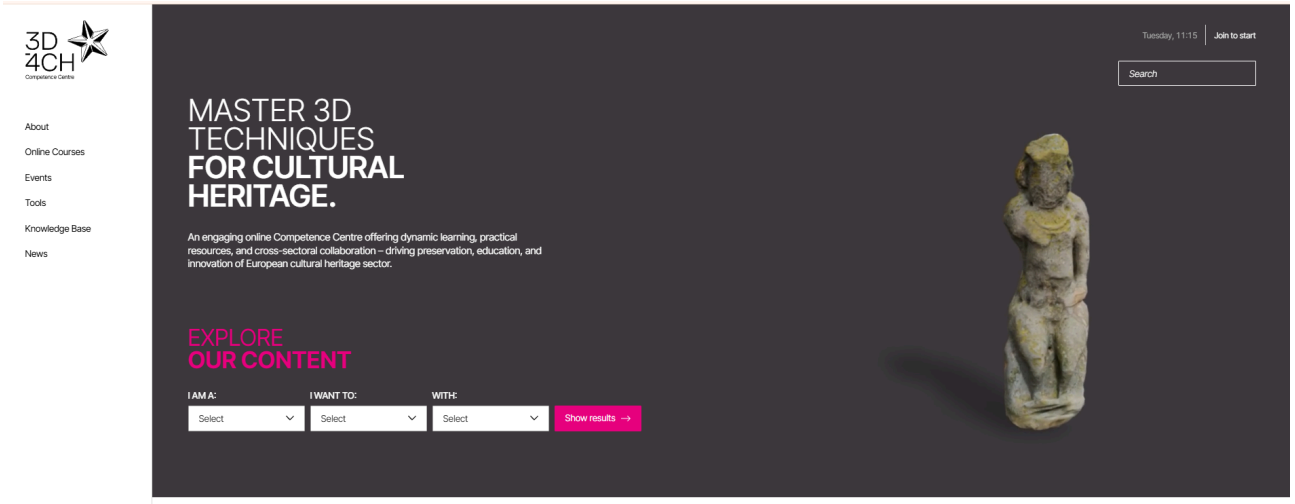

Figure 2 - screenshot of the 3D-4CH platform at launch

Core Infrastructure and Scalability

- **Microservices & Containerization:** The platform utilises Docker and Kubernetes for container orchestration. This modular approach allows the "Training Hub," "Knowledge Base," and "3D Viewer" services to scale independently. During peak training events or high-volume 3D processing tasks, the system dynamically allocates resources to maintain performance.
- **Storage Layer:** A hybrid storage strategy combines high-speed SSD blocks for active database queries with scalable object storage for large-scale 3D datasets (e.g., photogrammetry bundles and raw point clouds).

Security and Data Sovereignty

- **Advanced Authentication:** The platform implements a secure identity management system, supporting both dedicated accounts and authorisation of other services through OAuth for streamlined access.
- **GDPR Compliance:** Built-in data protection mechanisms ensure that user data and institutional digital assets are managed with the highest security standards, incorporating end-to-end encryption for sensitive metadata.

- **Role-Based Access Control (RBAC):** Access is governed by five distinct profiles (Visitors, Interactive Users, Content Managers, Administrators, and Super Administrators), ensuring that only authorised personnel can modify critical training frameworks or institutional records.

Interoperability and API Layer

A foundational technical component of the architecture is the API Layer, which facilitates seamless communication with the broader European digital landscape:

- **Europeana Integration:** Robust APIs enable the sourcing of content from the Common European Data Space for Cultural Heritage, allowing users to discover high-quality examples directly through the 3D-4CH interface.
- **Metadata Interoperability:** All resources are indexed using standardised schemas, ensuring that 3D-4CH content can be harvested by other cultural heritage aggregators. The resources' metadata are built on top of primarily the Research Data Alliance (RDA) metadata schema, taking into consideration also other schemas (DARIAH campus, Europeana training development template, CLARIN Learning Hub, H2IOSC, OSTrails, Atrium, ARIADNE ...).

4.2 Core Modules

- **The Knowledge Base:** A centralised repository utilising a custom Metadata Management System. It supports diverse formats (PDFs, datasets, web links) and ensures high discoverability through a powerful search and indexing engine.
- **The Training Hub:** Integrated with a modern Learning Management System (LMS), this module tracks user journeys through "My Ongoing Courses." It supports interactive educational materials like quizzes, video lectures, and practical 3D exercises.
- **3D Content Management (ACM CMS):** Our in-house CMS enables administrators to manage the platform's primary content. It includes version control, multi-language support, and automated workflows for content review and approval.

4.3 Accessibility and Responsive Design

Adhering to the principle of inclusivity, the platform's technical implementation strictly follows **WCAG 2.1 (Web Content Accessibility Guidelines)**.

- **Responsiveness:** The UI is fully adaptive, ensuring a consistent experience across desktops, tablets, and mobile devices.
- **Inclusivity Features:** Design choices include high-contrast ratios, keyboard navigation support, alternative text for visual assets, and compatibility with screen readers, ensuring the Competence Center is accessible to all users.

4.4 User experience and navigation structure

User experience in the first platform release is guided by principles of clarity, accessibility, and intuitive navigation. The platform's layout prioritises ease of discovery and relevance to the user's goals. To achieve this, the navigation system was structured with multiple entry points and filters that support both browsing and targeted search.

Key user experience features include:

- Homepage - serves as the entry point to all main sections with clear calls to action and featured content.
- Multi-layered search and filter mechanisms - enabling users to explore content by role ("I am a…"), intent ("I want to…"), and technology/process categories ("With…"). These filters help users find tools, courses, and resources relevant to their immediate interests or tasks.
- Consistent layout and metadata cues - resources are presented with clear titles, short descriptions, tags (e.g., theme, process category, license), and intuitive grouping to enhance findability.

The navigation design supports diverse users - from cultural heritage professionals seeking best practices to researchers exploring specific technologies - ensuring that each group can tailor their path through the platform's content. This structure reflects the user requirements and functional goals outlined in D4.1 and demonstrates a coherent approach to usability in the first release.

4.5 Platform modules (content sections)

First Page (Homepage)

The Homepage serves as the main entry point to the 3D-4CH Online Competence Centre, providing a clear overview of the platform's purpose and core content areas. It highlights featured resources, tools, and initiatives, guiding users toward key sections of the platform through prominent navigation elements. The homepage is designed to immediately communicate the platform's role as a competence centre for 3D cultural heritage.

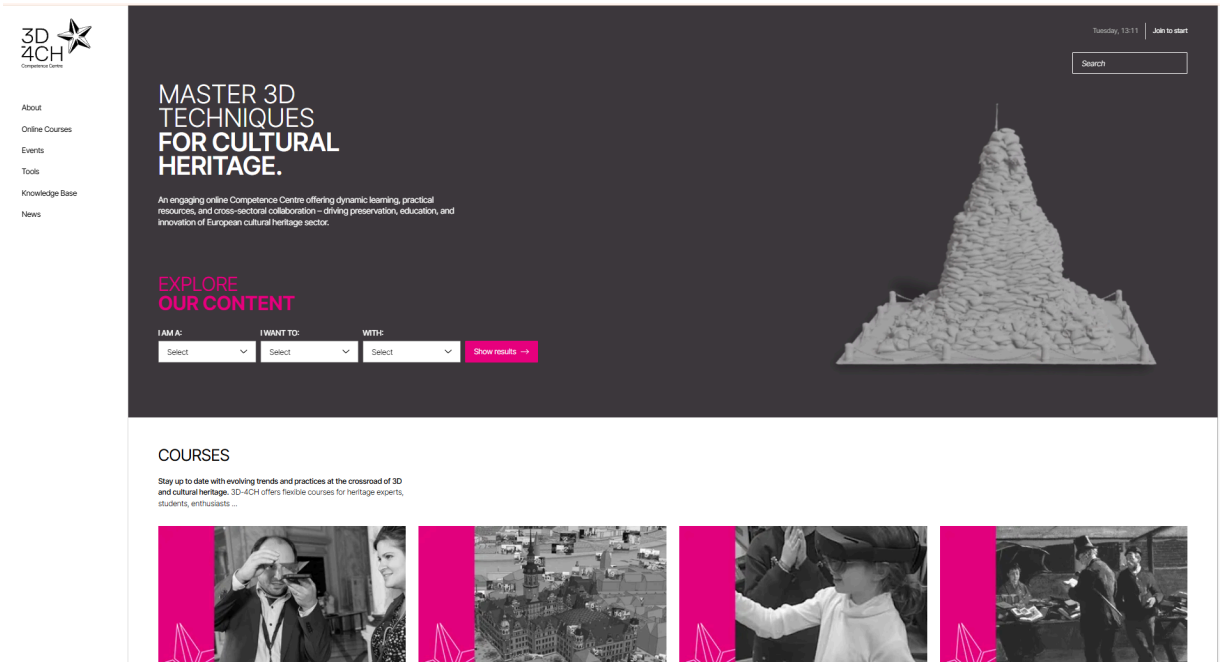

Figure 3 - screenshot of homepage of the 3D-4CH platform

About

This subsection introduces the 3D-4CH project, outlining its goals, target groups, and alignment with European strategies for 3D digitisation of cultural heritage. It provides a concise narrative explaining why the platform exists and what problems it aims to address.

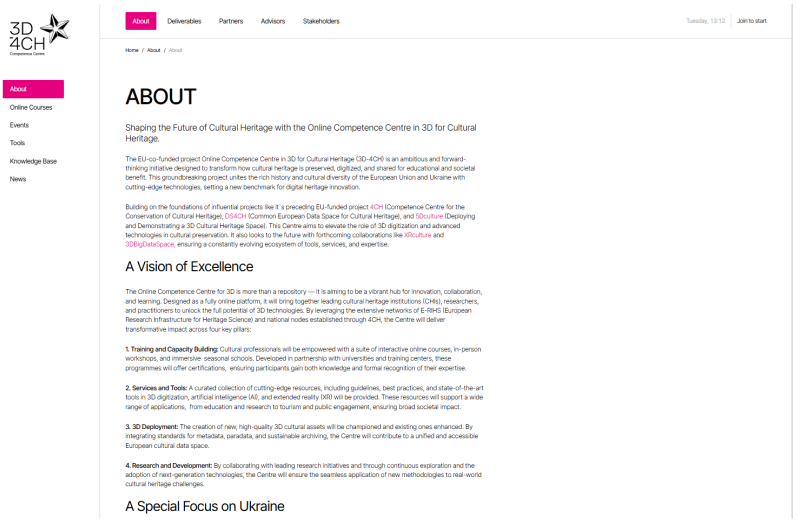

Figure 4 - screenshot of the About section

Deliverables

The Deliverables subsection offers structured access to key project outputs produced within 3D-4CH. It enables users to consult official reports, documents, and demonstrators, ensuring transparency and traceability of project results.

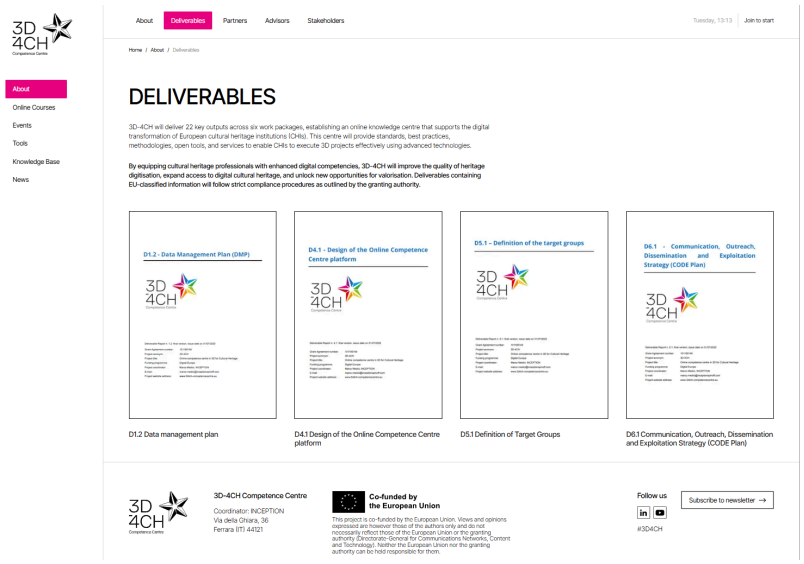

Figure 5 - screenshot of the Deliverables subsection

Partners

This subsection presents all project partners involved in 3D-4CH, highlighting the diversity of institutions contributing expertise across cultural heritage, research, technology, and education. It reinforces the collaborative nature of the project and provides visibility to participating organisations.

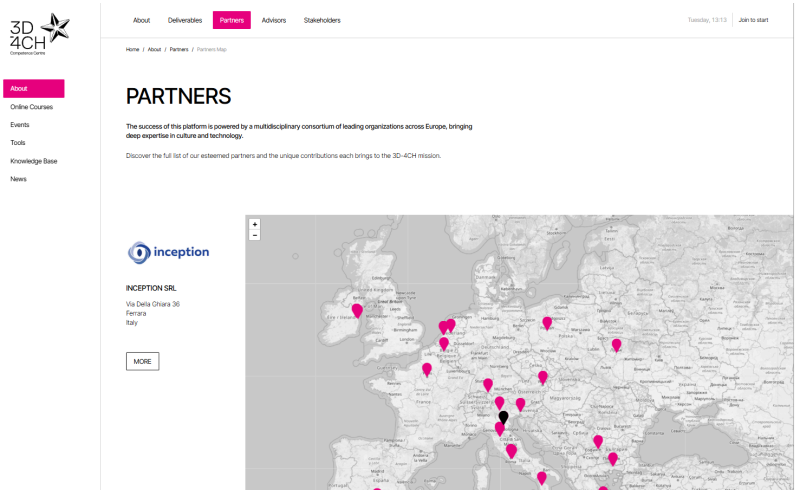

Figure 6 - screenshot of the Partners subsection

Advisors

The Advisors subsection introduces the project's Advisory Board, showcasing the experts who provide strategic guidance and quality assurance. It underlines the scientific and professional credibility supporting the platform's development.

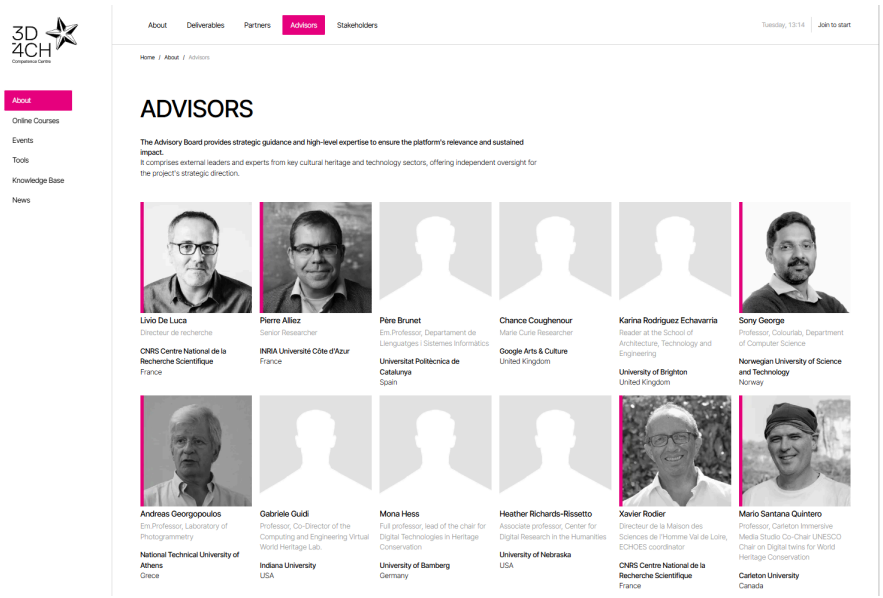

Figure 7 - screenshot of the Advisors subsection

Stakeholders

This subsection highlights the broader Stakeholder Panel engaged with the project, representing cultural heritage institutions and related actors. It demonstrates how user needs and feedback are incorporated into the platform's evolution.

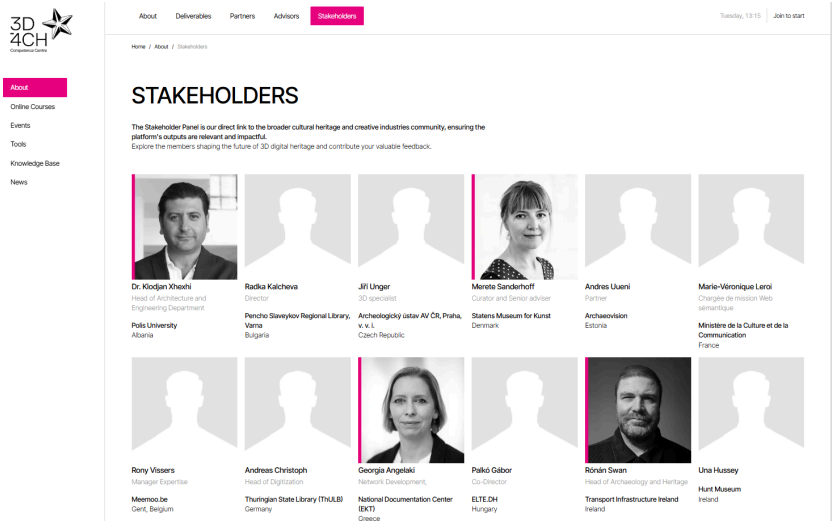

Figure 8 - screenshot of the Stakeholders subsection

Online Courses

The Online Courses section aggregates training opportunities related to 3D digitisation, data management, visualisation, and reuse of cultural heritage content. It includes existing courses as well as information on upcoming training activities, supporting skills development and capacity building across different target groups.

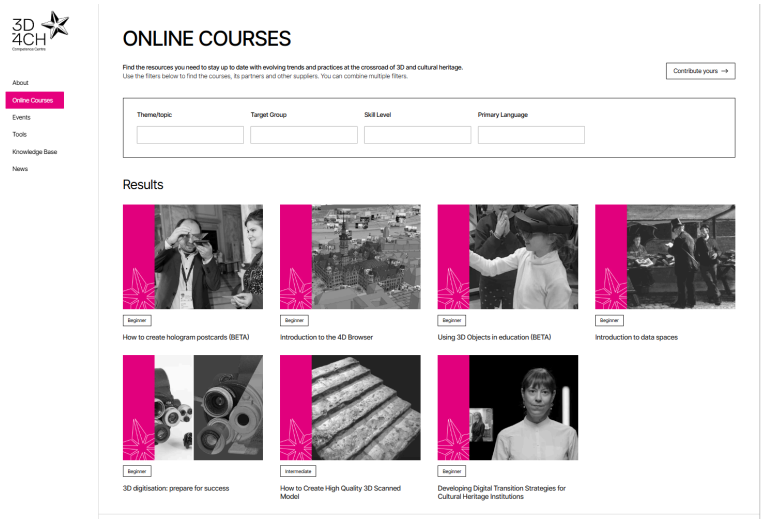

Figure 9 - screenshot of the Online courses section

Events

The Events module provides information about relevant project-related and external events, such as webinars, workshops, conferences, and training sessions. It acts as a dynamic calendar supporting community engagement and knowledge exchange within the digital cultural heritage ecosystem.

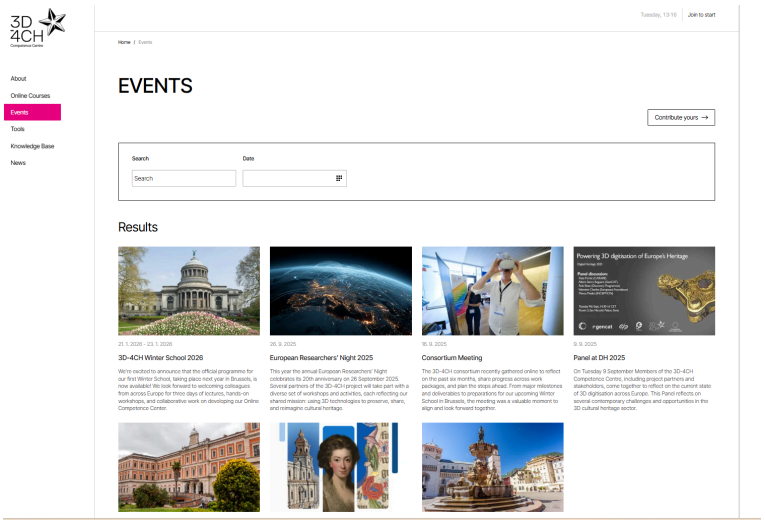

Figure 10 - screenshot of the Events section

Tools

The Tools section presents digital tools and platforms relevant to 3D cultural heritage workflows. Each tool is described with key metadata, including purpose, process category, thematic relevance, and licensing, allowing users to quickly assess its applicability for their needs.

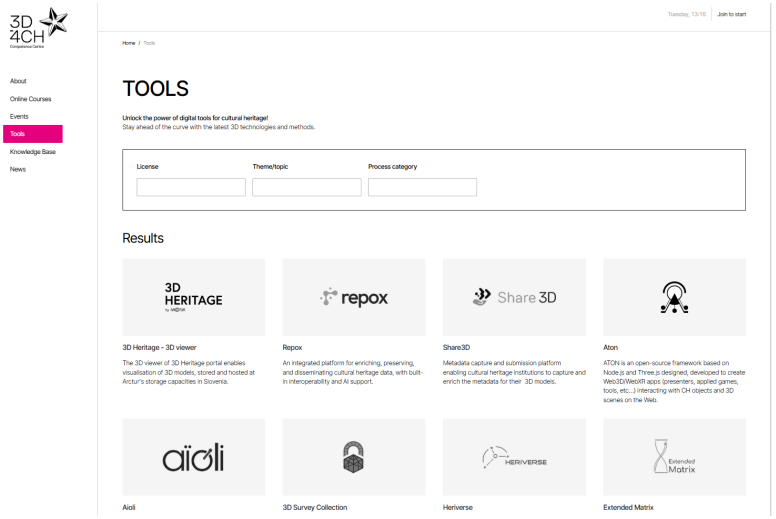

Figure 11 - screenshot of the Tools section

Knowledge Base

The Knowledge Base is a curated repository of guidelines, best practices, learning materials, case studies, and reference resources. It supports users in understanding and applying 3D technologies across the full digitisation lifecycle, from planning and capture to reuse and dissemination.

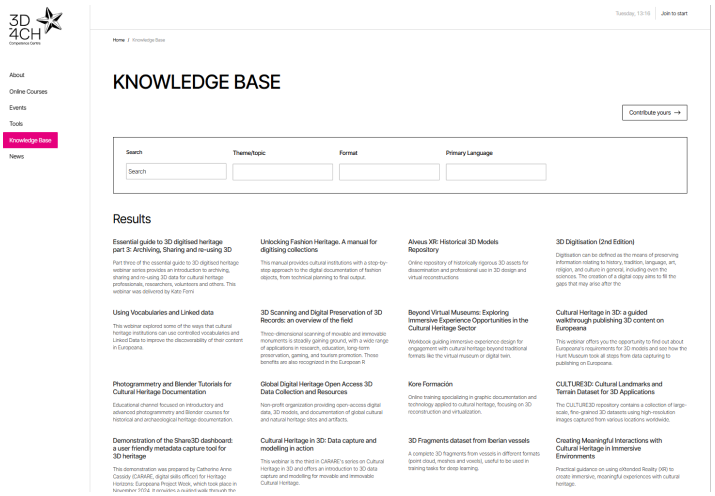

Figure 12 - screenshot of the Knowledge base section

News

The News section communicates project updates, milestones, announcements, and relevant developments from the wider digital cultural heritage field. It helps keep users informed about ongoing activities and emerging opportunities related to 3D-4CH.

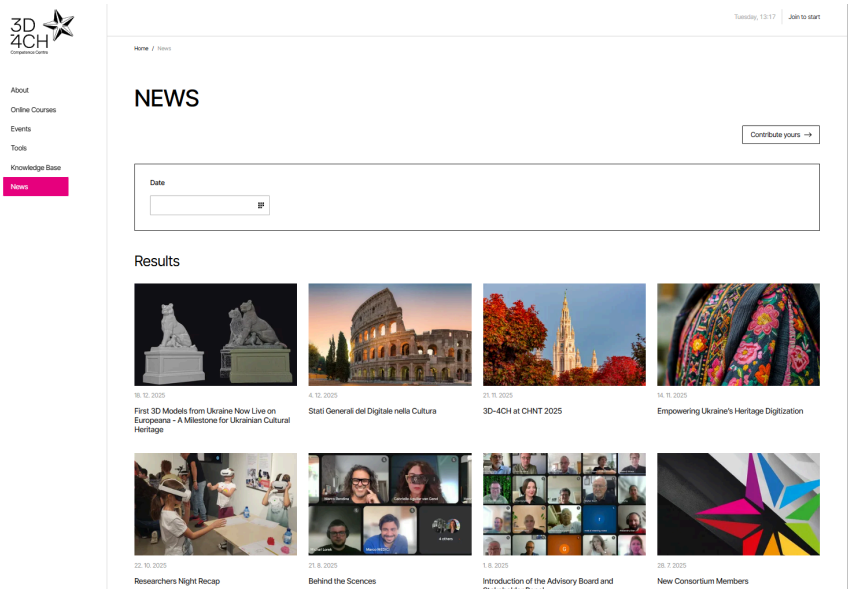

Figure 13 - screenshot of the News section

Footer

The Footer provides persistent access to essential information such as legal notices, contact details, social media links, and project acknowledgements. It ensures transparency, compliance, and consistent navigation across all platform pages.

Figure 14 - screenshot of the Footer

Log-in section / personal dashboard

The Log-in section provides access to restricted platform functionalities intended for registered users. It serves as the entry point for the dashboard, which offers a user-specific view of the platform, designed to support personalised interactions such as content management, contributions, and access to user-related features. In the first release, it establishes the structural basis for future expansion of user roles and personalised services.

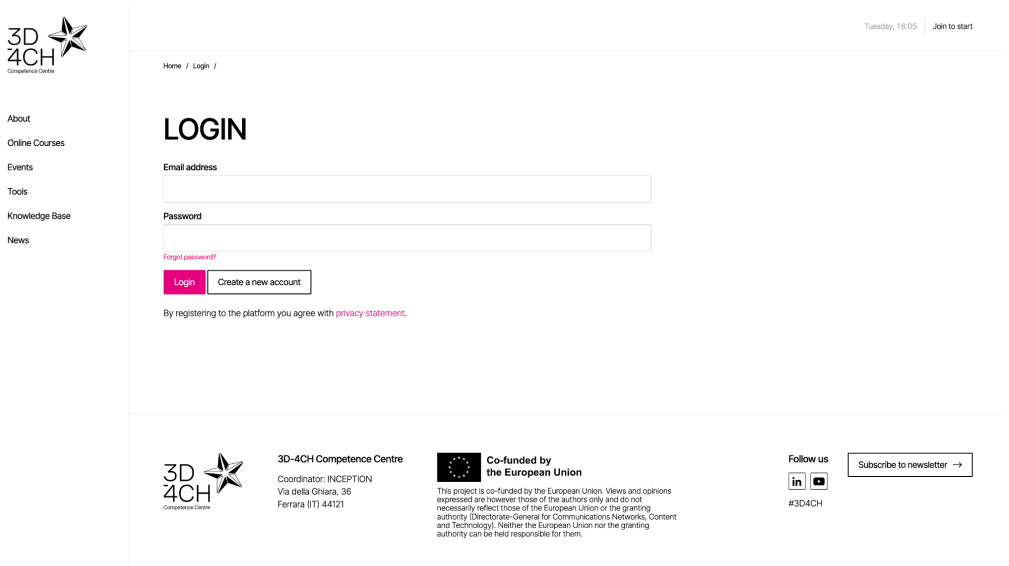

Figure 15 - screenshot of the Log in section (Join to start)

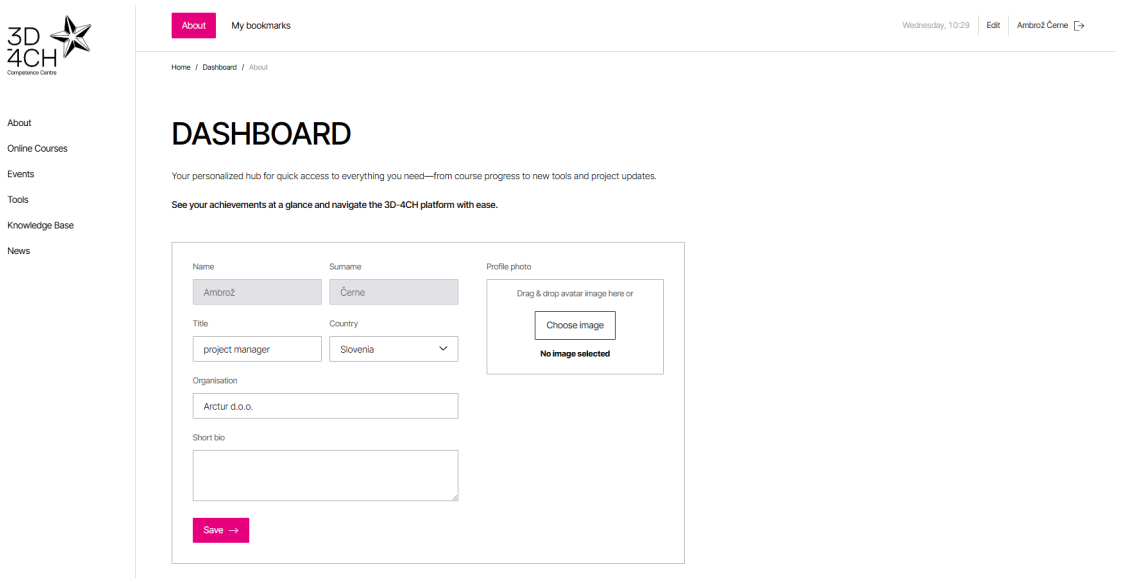

Figure 16 - screenshot of the personal Dashboard

5. Next steps

Following the delivery of this first version, the 3D-4CH consortium will enter a phase of intensive content enrichment and technical scaling. The following key milestones are planned:

5.1 Content Enrichment and Community Engagement

- **Expansion of the Knowledge Base:** Systematic integration of guidelines and case studies produced in the second half of the project, specifically focusing on the results of ongoing R&D projects.
- **Training Hub Rollout:** Launching the full catalogue of Massive Open Online Courses (MOOCs) developed in WP2, covering topics from advanced photogrammetry to legal frameworks for 3D assets.
- **Crowdsourced Contributions:** Opening a submission portal for the community to suggest tools and guidelines, which will be peer-reviewed by the Competence Centre experts.

5.2 Certification and Sustainability

- **Micro-credential Framework:** Implementing the Open Badge system to recognise the completion of training modules, facilitating professional recognition for CH professionals.
- **Sustainability Planning:** Developing the long-term governance and financial model for the platform to ensure it remains a permanent fixture in the European digital heritage landscape after the project's conclusion.
- **Stakeholder Feedback Loops:** Establishing a permanent user advisory group to conduct biannual reviews of the platform's utility and user experience.

6. Conclusion

The successful deployment of the first release of the **3D-4CH Online Competence Centre, accessible at https://www.3d4ch-competencecentre.eu,** marks an important milestone for the 3D-4CH project and represents a concrete step toward supporting the digital transformation of the cultural heritage sector. This demonstrator shows that a centralised, cloud-native platform can effectively connect high-level R&D advances, such as AI-driven reconstruction and XR storytelling, with the practical, day-to-day needs of cultural heritage professionals.

By integrating a **Training Hub**, a **Knowledge Base**, and a dedicated **Tools** library, the platform provides a unified ecosystem that addresses the fragmented nature of 3D digitisation efforts across the continent. Its adherence to European technical standards and its deep integration with the **Common European Data Space for Cultural Heritage** ensure that the assets and knowledge generated through the platform are interoperable, accessible, and preserved for the long term.

Furthermore, the project's commitment to emergency support - exemplified by the **Ukrainian CH Aggregation Pipeline** - demonstrates the platform's potential as a critical infrastructure for heritage protection in times of crisis. As the platform evolves toward its final version, the focus will remain on expanding content, refining the user experience, and establishing a sustainable governance model that secures its role as a permanent pillar of the European digital landscape.

In conclusion, the 3D-4CH platform is more than a technical tool; it is a collaborative environment that fosters innovation, builds capacity, and ensures that the richness of European cultural heritage is captured and celebrated in the third dimension. This first version establishes a stable and scalable foundation upon which the future of digital heritage will be built, solidifying Europe's global leadership in the field.