D1.2 - Data Management Plan (DMP)

Deliverable Report n. 1.2: final version, issue date on 31/07/2025

Grant Agreement number:	101195149
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:	D1.2 - Data Management Plan (DMP)
Issue Date:	31/07/2025
Produced by:	INCEPTION
Main author:	Marco Medici, INCEPTION
Co-authors:	-
Version:	v1.0
Reviewed by:	Roberto Di Giulio, INCEPTION (Ethics Mentor) Matevz Staus, ARCTUR Fderica Maietti, UNIFE
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

- 16.07.2025: Draft version (v0.5) - *ready for review*
- 31.07.2025: Final version (v1.0) - *final version to be delivered*

Table of Content

Executive Summary **5**
1. Introduction **6**
2. Data summary **6**
3. FAIR Data Management **8**
4. Storage, Infrastructure and Security Measures **10**
5. Ethical and Legal Compliance (Privacy, GDPR, and IPR) **12**
6. Sustainability and Long-Term Preservation **16**
7. Roles and Responsibilities **17**
8. Conclusion **18**

Executive Summary

This Data Management Plan (DMP) outlines the strategy for managing all data generated and used within the 3D-4CH project (*Online Competence Centre in 3D for Cultural Heritage*), a Digital Europe Programme initiative. It covers the creation, curation, storage, sharing, and long-term preservation of the project's key outputs, including high-quality 3D cultural heritage models, training resources, survey data, and platform usage information.

The plan ensures that all data adhere to **FAIR principles** – making them *Findable, Accessible, Interoperable, and Reusable* – and fully complies with **GDPR** and Horizon Europe open data requirements. Particular emphasis is placed on:

- **3D Models and Metadata:** Produced and curated in open formats with rich descriptive and technical metadata to enable aggregation into the European Data Space for Cultural Heritage and ensure sustainable reuse by researchers, institutions, and the public.
- **Training Resources:** Educational materials (PDFs, presentations, videos) released under open licenses with structured metadata to support capacity building and integration into other training frameworks.
- **Survey Data:** Feedback collected from stakeholders via GDPR-compliant surveys, with optional personal identifiers, informed consent, and secure handling through partner and central repositories.
- **Platform User Data and Analytics:** User registration and course progress tracking managed under privacy-by-design principles, including explicit consent, opt-outs for non-essential analytics, and a user dashboard for exercising data rights (access, correction, deletion).

Robust **security measures** (role-based access control, encryption, regular backups) are implemented to safeguard all data categories. A clear **sustainability strategy** ensures long-term availability of datasets and knowledge base content through deposition in trusted repositories (e.g., Zenodo, Europeana) and a post-project hosting plan for the competence centre platform.

The DMP defines partner responsibilities, allocates resources for data stewardship, and provides a timeline for data milestones and updates. It will be maintained as a living document throughout the project to accommodate new data types and evolving best practices.

By implementing this plan, 3D-4CH ensures its outputs are ethically managed, openly shared, and preserved for future reuse, contributing to a sustainable digital ecosystem for cultural heritage.

1. Introduction

The 3D-4CH project (Online Competence Centre in 3D for Cultural Heritage) is a 36-month initiative (Feb 2025 – Jan 2028) co-funded by the EU Digital Europe Programme. Its objectives include providing online training, tools, and resources for 3D digitisation, deploying high-quality 3D cultural heritage models, and building an accessible platform for cultural heritage professionals. This Data Management Plan (DMP) is the first version (Deliverable due Month 6) and provides a comprehensive strategy for handling all data generated and used in the project up to this early stage. It consolidates the initial DMP content (covering datasets, tools, models, metadata, platform architecture, FAIR, GDPR, security, sustainability, etc.) and **integrates new provisions** identified since the project's start.

The DMP outlines the types of data and digital assets involved, how they will be collected, documented, stored, and shared, and the measures for privacy, security, and long-term preservation. It adheres to EU guidelines on research data management and Open Science. The plan is a living document and will be updated as needed throughout the project's lifecycle. All project partners are committed to implementing the practices described here to ensure data is **findable, accessible, interoperable, and reusable (FAIR)** while fully complying with ethical and legal requirements (notably GDPR for personal data).

2. Data summary

The 3D-4CH project will generate and manage multiple categories of data. These include: **(1)** 3D digital cultural heritage models and associated metadata; **(2)** Training materials and resources (e.g. PDF manuals, PowerPoint slides, videos) for capacity building; **(3)** User survey data gathered from stakeholders and trainees; **(4)** Platform user data and usage analytics; and **(5)** Software tools and platform configurations. Table 1 provides a summary of each data type, including its content, format, size, and purpose, which are then detailed in the subsections below.

- **3D Cultural Heritage Models:** High-quality 3D representations of cultural heritage artefacts (e.g. sculptures, architectural elements) produced or curated by the project. These may include 3D mesh files, point clouds, textures, and related documentation. Expected formats are standard 3D file types such as OBJ, STL, PLY, glTF, etc. Each 3D model will be accompanied by rich metadata (descriptive, technical, and provenance metadata) to document the object and the digitisation process. No personal data is contained in these models. The purpose of this dataset is to populate the competence centre's repository with exemplary 3D content and to support research and training in 3D digitisation. The volume is anticipated to grow as the project supports the creation and aggregation of 3D content (potentially several gigabytes of data, depending on model complexity and number). The project emphasises including comprehensive metadata and paradata (process documentation) for each model, following best practices for 3D in cultural heritage.

- **Training Materials and Resources:** A collection of educational content developed or curated by 3D-4CH to enhance the skills of cultural heritage professionals. This includes training manuals, presentations (e.g. PowerPoint files), lecture notes, tutorial documents (PDFs), infographics, and possibly recorded webinars or demonstration videos. These materials are considered structured datasets (with metadata such as title, authorship, language, version, etc.) and are crucial outputs of the project's capacity-building objective. Formats will primarily be PDF, PPTX, DOCX, MP4 (for videos), etc. The materials often integrate multi-language content from past and ongoing projects as well. While the content itself is not personal data, it will be produced under specific licenses to allow broad reuse. Managing these files as part of the DMP ensures they are archived, indexed, and made

FAIR (e.g. clearly licensed and easily accessible to the target audience for reuse).

- **Survey Data:** The project will conduct surveys and questionnaires among its stakeholders (such as cultural heritage professionals, trainees, and platform users) to gather feedback, needs assessment, or evaluation data. These surveys may collect information like respondents' names, professional roles or positions, institutional affiliation, and their responses to various questions. Notably, providing personally identifiable information (name, position) is **optional** for respondents – surveys can be completed anonymously or with partial identity if the participant prefers. Survey responses will be stored initially by the partner organisations administering the survey (e.g. each partner collecting data from their region or event will store the raw data locally) and later aggregated into a central dataset for analysis. Typical formats include CSV/Excel files or online survey tool exports. This data is primarily qualitative and quantitative feedback used to improve the platform content and services. **Personal data handling:** Each survey is accompanied by a standard privacy notice and consent form, ensuring participants are informed of the survey's purpose, what data is being collected, how it will be used, who will access it, and how long it will be retained. Participants must give explicit consent (e.g. via a checkbox at the start of the survey) before proceeding. The privacy notice template (provided to all partners) is GDPR-compliant, clarifying that any personal data collected (such as names or contact info, if given) is voluntary and will be used only for the stated research purposes, kept confidential, and not disclosed in identifiable form in any results. Survey data containing personal identifiers will be **pseudonymized or anonymised** for reporting: results will be presented in aggregate form or with personal details removed to protect identities. Partners will transfer survey datasets to the coordinator through secure means, and all personal data will be handled in compliance with GDPR (see Section "Ethics and Privacy" below for details on consent and rights).

- **Platform User and Usage Data:** The 3D-4CH online platform will maintain user accounts and track certain usage metrics to personalise the experience and improve the service. **User account data** includes information provided at registration, such as name, email, affiliation, and chosen preferences. This is necessary to manage login credentials and user profiles. **Usage tracking data** includes logs of user activities on the platform: for example, login dates/times, pages or resources viewed, actions taken, and course/module progress (for the e-learning components). Course progress data (e.g. which lessons completed or quiz scores) is linked to user identities to allow users to resume training and for the platform to award certifications or provide feedback. Usage analytics may also aggregate page views or feature usage statistics to help the project team understand engagement levels with various content. All such tracking is done transparently and with user consent: upon registration, users must accept the platform's Terms of Use and Privacy Policy, which explicitly describe what data is collected and why (including the logging of activities) and obtain the user's consent for this processing. In addition, non-essential analytics (those not strictly necessary for providing the core service) will be optional – users are offered the ability to opt out of analytics that are purely for project research or usage analysis. For example, a user could choose not to have their page navigation tracked for analytics purposes, while still allowing essential tracking like course progress (which is integral to the service). The platform will segregate personal identifiers from analytical data wherever feasible, and may use aggregated or anonymised analytics for reporting usage trends. Platform user data will be stored in a secure database within the platform's infrastructure (see **Storage and Security** section), and only authorised project team members (e.g. site administrators or data managers) will have access to detailed logs, with strict access controls in place.

- **Tools and Software Outputs:** While not "data" in the traditional sense, the project will develop or utilise software tools as key outputs – for instance, scripts for 3D data processing, the web platform code itself, or plugins for 3D visualisation and AI-based processing pipelines. The management of software intersects with data management in ensuring reproducibility and reuse of the tools

alongside the data. All custom software and code developed by 3D-4CH will be documented and stored in version-controlled repositories (e.g. on GitHub or the project's repository) with appropriate licenses (open-source licenses are preferred to align with open science). Documentation (README files, manuals) will be provided to describe the tools, their purpose, and usage. Additionally, any datasets used to train or evaluate such tools (for example, if an AI algorithm is trained on a dataset of 3D models or images) will be documented in this DMP and made available when possible. The **platform architecture** itself (server-side components, databases, front-end) is documented to explain how data flows and is stored, which is important for security and data governance (outlined in Section "Infrastructure and Storage"). By treating software outputs with similar care as data (in terms of preservation and sharing), the project ensures that not only the data but also the means to use and reproduce results are available (aligned with the FAIR principle that algorithms and workflows should be as open and reusable as the data.

Purpose of Data Collection and Reuse: Collectively, these datasets underpin 3D-4CH's goal of building capacity and fostering innovation in the cultural heritage sector. By producing training materials and exemplary 3D content, the project not only aids its direct participants but also creates **open resources for the wider community**. Each data category is designed with future reuse in mind – from reusing training materials in other courses to sharing 3D models in pan-European heritage repositories. This approach aligns with EU open science and digital preservation objectives, ensuring the project's outputs continue to generate impact after the project's conclusion. In summary, the data collected and generated will be valuable for **further research, education, and digital heritage initiatives**, well beyond the 3D-4CH project itself.

Note: *At this stage (Month 6), exact data volumes and counts are being determined. For instance, the project anticipates on the order of hundreds of 3D models (potentially several gigabytes of data) and a knowledge base comprising hundreds of pages of content. These estimates will be refined as data collection progresses [to be updated by the user with precise figures].*

3. FAIR Data Management

All project data will be managed in accordance with the **FAIR principles** – making data **Findable, Accessible, Interoperable, and Reusable**. The DMP follows the guidelines of Horizon Europe and the Digital Europe Programme to ensure the data's long-term value and compliance with open data requirements. Key measures for each FAIR aspect are as follows:

- **Findable:** Each dataset will be described with rich metadata and indexed to enable discovery by othersopenaire.eu. We will use standard metadata schemas relevant to cultural heritage (for example, Dublin Core or Europeana Data Model for descriptive metadata, and domain-specific terms for 3D data) so that records are uniformly documented. Datasets published online will be assigned **persistent identifiers (PIDs)** such as DOIs, ensuring that they can be reliably found and cited over time. Keywords and cataloguing information (title, creator, date, location, etc.) will be included to enhance searchability. For internal tracking, we will maintain a catalogue of all datasets, and the **knowledge base** will include cross-references linking tools, training resources, and 3D models. In summary, anyone seeking the project's outputs should be able to easily **find** them via the competence centre portal or external repositories, thanks to consistent metadata and PIDs.

- **Accessible:** Data will be made accessible through trusted platforms under clear conditions. Public datasets (e.g. training materials, open 3D models) will be deposited in **open repositories** or the project's platform with download links, allowing anyone to retrieve them without barriersopenaire.eu. We embrace the principle "**as open as possible, as closed as necessary**"openaire.eu – meaning that by default data will be open-access, but if certain data cannot be openly shared (for legal or security

reasons), access will be restricted with proper justification. In such cases, we will still publish the metadata openly (so others know the data exists) and provide a means for legitimate users to request access. The project's web platform will ensure **continuous access** to resources during the project. Additionally, at least one established repository (for example, Zenodo or a domain-specific repository recommended for cultural heritage) will be used to host core datasets; these repositories offer stable URLs and ensure data remains accessible long-termopenaire.euopenaire.eu. All repository entries will include information on how to access the data, including any authentication or license requirements if applicable. By project end, we will double-check that all datasets are archived in such a way that they remain accessible beyond the project's lifetime (see Section 6).

- **Interoperable:** The project will use **open, standard data formats** and controlled vocabularies to maximise interoperabilityopenaire.euopenaire.eu. For 3D data, formats like PLY, OBJ, STL, and glTF are widely adopted and can be read by a variety of software, ensuring that other platforms or researchers can use our files without specialised or proprietary software. Textual and structured data (metadata, tool listings, etc.) will use formats like CSV, JSON, or XML with documented schemas, making them easy to parse and integrate with other systems. We will adhere to established **ontologies and vocabularies** for cultural heritage (e.g., Getty AAT for object types, geospatial standards for location data, etc.) so that our metadata can be cross-walked or aggregated with other datasets in the heritage sectoropenaire.eu. The knowledge base content will be structured in a semantically clear way (using HTML5 and possibly schema.org or JSON-LD annotations) to enable indexing and machine-readability. If any proprietary formats or software-specific data are used during the project, we will, whenever possible, export or convert those into open formats for preservation and sharing. This commitment to standards and openness will ensure the data can **interoperate** with other datasets, tools, and platforms – for example, allowing integration of our 3D models into the European Collaborative Cloud for Cultural Heritage or linking our metadata with Europeana records.

- **Reusable:** To maximise reusability, all datasets will be provided with clear usage licenses and thorough documentation. We intend to apply **open licenses** (preferably Creative Commons licenses) to our outputs, allowing others to copy, modify, or build upon them. Specifically, we anticipate using **CC BY 4.0** for most content (requiring attribution for reuse) and **CC0** (public domain waiver) for metadata or data intended to be completely unrestrictedopenaire.eu. These licenses are in line with Horizon Europe recommendations for open access data and metadataopenaire.eu. Alongside licensing, we will document the **provenance and quality** of the data: for each 3D model, for example, the documentation will note how it was created (scanner or photogrammetry settings), who created it, and any processing steps – information crucial for others to trust and reuse the model. Training datasets will come with instructions or readme files explaining their content and suggested usage. We will also ensure that any software or tools needed to use the data are mentioned (e.g., if a 3D model requires a particular viewer or if a CSV has a specific schema, those details will be provided). By providing machine-readable metadata, citing related publications, and using standard licenses, we remove obstacles to reuse. Anyone interested in our data – from a museum professional to a software developer – should be able to understand what the data is, under what conditions it can be reused, and have confidence that it's well-documented and legally cleared for reuse.

In summary, the project's data management approach is designed to make all outputs **FAIR**. This not only meets the obligations of the European Commission's open science policy but also amplifies the impact of 3D-4CH: data that are findable, accessible, interoperable, and reusable will support future research, education, and innovation in cultural heritage far beyond the project's own activities.

4. Storage, Infrastructure and Security Measures

Platform Architecture & Storage Locations: The 3D-4CH online platform serves as the central hub for most data storage and management. It is built with a multilayer architecture comprising a front-end web interface, a back-end application server, and a database for content and user data. All components are hosted on secure servers within the European Union (leveraging a cloud provider or data centre that complies with EU data protection standards). The **3D models** and large media files are stored in a dedicated storage repository (which could be a cloud storage bucket or a file server attached to the platform). This repository is configured to handle large file sizes and bandwidth for downloads/viewing. The **metadata** for these models resides in a relational database and/or an indexing engine that powers search functionality. **Training materials** are stored similarly – either in the database (if small) or as files on the server, with references in the database. **Survey data** initially will reside on partner systems (e.g. a partner may use an online survey tool or local database); once collected, these datasets will be securely transferred to the central project storage – likely on the project's internal SharePoint or a secure Nextcloud repository accessible to the consortium. If centralised analysis is needed, the survey data might be imported into a database or analysis software by the coordinator. **User and usage data** are stored in the platform's primary database (e.g. a PostgreSQL or MySQL database) and log files. The platform architecture separates the application logic from the database, and strict access controls are implemented (only the necessary services can query the database, and administrative access is limited to key technical staff).

Backup and Recovery: Regular backups are in place for all critical data. The platform's databases and file storage are backed up on a scheduled basis (daily incremental backups and weekly full backups, for instance). Backups are encrypted and stored in a secure off-site location (or a different zone of the cloud) to ensure that in case of any server failure or data corruption, data can be restored. We also maintain checksums for large files like 3D models to detect any corruption over time. The consortium's internal data (like collected survey files or working documents) is stored on secure cloud collaboration spaces (with version control and backup, e.g. SharePoint or similar, provided by the coordinator). A disaster recovery plan is outlined: if the main platform goes down, a secondary instance can be brought up using the backups to minimise downtime. Given the relatively small user base in early stages, this is manageable, but as the platform usage grows, we'll scale our backup frequency and possibly implement real-time replication for high availability.

Security Measures: Security of data is paramount, especially for personal data (user accounts, survey responses) and any sensitive project information. We employ a multi-faceted security strategy:

- **Access Control:** Different data categories have role-based access restrictions. Public datasets (3D models, open training content) are accessible to all users, but editing or uploading new content is restricted to authorised project members or contributors. User personal data and surveys are accessible only to project members who require it (e.g. the data analyst or the DPO). Within the platform, admin accounts are needed to view user lists or logs – and such accounts are given only to a minimum number of staff. Each partner handling survey data locally is responsible for restricting access to that data on their side as well (e.g. only the partner's survey administrator sees raw responses). We maintain logs of who accesses what data in the platform to have an audit trail.

- **Authentication and Encryption:** The platform uses secure authentication (passwords are stored as salted hashes, and possibly two-factor authentication for admin users). All web traffic runs over HTTPS with TLS encryption, so data transmitted (user logins, downloads of files, API calls) is encrypted in transit. For data at rest, servers are encrypted or at least the database and backup files are encrypted to prevent unauthorised access even if hardware is compromised. Survey data files transferred between partners and the coordinator will be encrypted (e.g. using encrypted archives or secure file transfer methods). Emails or external drives will be avoided for PII transfer; instead, we use secure cloud links with limited access.

- **GDPR Compliance and Pseudonymization:** Where possible, personal data is pseudonymized. For instance, in analytics, instead of using raw identifiers, we might use internal IDs or aggregate data. Survey datasets, when aggregated centrally, will replace names with codes. If analysis does not require identity, we'll strip that out. Key-coded files linking codes to identities (if needed) are stored separately with extra protection. We ensure that data minimisation principles are applied – only data actually needed for the project's purposes is collected and retained.

- **Vulnerabilities and Updates:** The IT team (with partners responsible for the platform infrastructure) will keep all software up to date (OS patches, framework updates) to minimise security vulnerabilities. Regular security audits or tests (even basic penetration testing on the web platform) will be conducted as the platform goes live to identify and fix any weaknesses. We will also adhere to the consortium's security policies (if any partner, like a university, has a cybersecurity policy, those guidelines will be followed).

- **Data Processing Agreements:** Since multiple partners handle data, we have internal agreements aligning with GDPR's requirements for data controllers and processors. For example, if the platform is operated by Partner X on behalf of the consortium, and user data from EU citizens is stored, a Data Processing Agreement between the coordinator (controller) and Partner X (processor) will be in place. Similarly, when survey data is shared from one partner to the coordinator, we treat the coordinator as a processor for analysis; all partners have agreed via the consortium agreement to uphold confidentiality and data protection for any personal data exchanged.

- **Third-Party Services:** If any third-party tools are used (for instance, using an external analytics service or cloud storage), we will ensure they comply with EU data protection (using EU-based servers, GDPR-compliant terms). At this time, the project prefers open-source, locally hosted solutions to keep control over data (for example, using Matomo for analytics instead of Google Analytics, to allow an opt-out and keep data on our servers).

Integrity and Quality Control: We implement measures to ensure data integrity – checksums as mentioned for files, and validation checks for metadata entries. When ingesting 3D models, we run quality assurance (ensuring files open and are not corrupted, and metadata fields are complete). For training materials, a peer review by the content team checks that metadata is accurate and that files are the final versions. Survey data collected will be reviewed for completeness (e.g. checking if any entries need clarification) and stored as read-only master files to prevent inadvertent edits.

Data Retention and Deletion: Security also involves proper deletion when needed. Personal data (user accounts, survey responses) will not be kept longer than necessary. The DMP foresees that at the end of the project (or a defined period after), user accounts and personal usage logs may be purged or anonymised if they are no longer required. The platform likely will continue beyond the project, but inactive user data might be deleted after a certain period per the privacy policy. We have procedures for secure deletion – e.g. using database deletion commands and wiping backups when their retention period is over – to fulfil the GDPR "right to be forgotten" when invoked (discussed more in the next section).

In summary, the storage and infrastructure setup ensures that project data is safely housed in a robust platform with regular backups, and that strong **security controls** protect against data loss, unauthorised access, or breaches. We will continually monitor and improve these measures, treating data security as an ongoing responsibility.

5. Ethical and Legal Compliance (Privacy, GDPR, and IPR)

All activities in 3D-4CH involving data are conducted in compliance with ethical standards and legal requirements, particularly the EU's General Data Protection Regulation (GDPR) for personal data and relevant intellectual property rights (IPR) laws for cultural content.

Personal Data and GDPR: The project processes personal data in two main contexts: survey responses and platform user accounts (including usage logs). In both cases, GDPR principles (lawfulness, transparency, purpose limitation, data minimisation, accuracy, storage limitation, integrity/confidentiality, and accountability) are strictly followed. Below, we detail how we address these:

- **Lawful Basis & Consent:** For **surveys**, the lawful basis for processing is typically consent: participants are provided with a clear privacy notice and must consent before providing data. The privacy notice (using a standard template across all surveys) informs them about the purpose of the survey, what personal data (if any) is collected, who will access it, and that participation is voluntary. It also informs them of their rights (to withdraw, etc.). This ensures **transparency** and aligns with GDPR's requirement that individuals "always have access and the right to modify or delete the personal information collected about them" in such research. For the **platform user data**, the lawful basis is consent (obtained at registration) and also necessity for service: users agree to the Terms of Service that outline that their data will be used to provide the platform functionality (account, progress tracking). For analytics beyond core service, consent is sought separately (e.g. an opt-in or at least an opt-out mechanism is provided for non-essential tracking as described earlier). In all cases, consent obtained is **explicit, informed, and documented** (e.g. log of consent timestamp and what was agreed to is kept).

- **Minimisation:** We only collect data that we truly need. Surveys avoid asking for sensitive personal data (no questions on health, political views, etc., which are irrelevant to our aims), and even standard personal identifiers are optional. For instance, a typical survey might say "Name (optional)" and "Position (optional)" if we only need that to contextualise responses. Platform registration asks for only basic contact info required to create an account (name, email); demographic data is not collected unless justified for improving the service (and even then, optional). Usage tracking is limited to what can help improve the platform or provide the service – we are not collecting, for example, detailed user-generated content beyond what the training system needs.

- **Rights of Data Subjects:** We have established procedures and features to uphold all data subject rights under GDPR. Notably, the platform includes a **User Account Dashboard** that empowers users with self-service for their GDPR rights. This dashboard allows a logged-in user to: view the personal information we hold about them (profile details, and potentially a log of their activities – fulfilling the **right of access**), correct or update their information (**right to rectification**) by editing their profile, and delete their account if they wish (**right to erasure**). When a user triggers account deletion, the system will remove or anonymize their personal data from active databases (with possibly a retention of a hashed record in backups for a limited period, which is common, but we will ensure that any retained backup data is not restored unless absolutely needed, and even then, deletion requests are reapplied). For surveys, since respondents might not have accounts, if they provided contact info and want to exercise rights, the privacy notice gives them a contact (e.g. the project's Data Protection Officer or survey responsible partner) to reach out. We will then locate their response (if identifiable) and provide, correct, or remove it as requested, within the GDPR timeframe (usually one month). By making these rights easy to exercise (especially via the user dashboard), we operationalise the GDPR principle that respondents "have access and the right to modify or delete personal data" collected about them. This user-centric design is a strong point of compliance and is clearly communicated to users.

- **Data Protection Officer (DPO) and Governance:** The consortium has designated a data protection lead (if not a formal DPO, an equivalent role) to oversee GDPR compliance. This person advises on data collection forms (e.g. approves the survey consent form text), verifies that the platform's privacy policy is comprehensive, and handles any data subject requests or potential incidents. All partners have been briefed on GDPR basics, and those handling personal data have internal protocols (most are institutions with their own DPOs as well). We have also considered whether a Data Protection Impact Assessment (DPIA) is needed. Given the nature of data (mostly low-risk personal data, no special categories, and relatively low volume), a full DPIA might not be mandatory, but we have essentially done a lightweight assessment through this DMP process and will revisit if any data processing expands in risk (e.g. if we were to track sensitive info or do automated profiling, which we currently do not).

- **Privacy by Design and Default:** The platform is developed with privacy by design principles. For example, user profiles are private by default (users can choose what information to share with others, if the platform even has any social features – currently it's primarily an e-learning repository, not a social network). Default settings favour privacy (analytics off unless enabled, etc.). Personal data fields in our databases are flagged so we always remember their sensitivity. When sharing data within the consortium, we use anonymised datasets unless identifying information is necessary.

- **Standard Safeguards:** We use a **standard GDPR-compliant Privacy Notice** for each context: one for surveys and one for the platform. These notices cover all required information (identity of controller, what data, purpose, legal basis, retention period, how to exercise rights, etc.). All respondents and users are thus **informed** (right to be informed). The platform's privacy policy is easily accessible on the website (linked in the footer and at registration).

- **Data Transfers:** Most data is stored and processed within the EU. One partner in the consortium is from Ukraine; if any personal data is to be transferred to or from that partner, we will ensure compliance with applicable transfer safeguards. Since Ukraine is not in the EU/EEA, we'd rely on mechanisms like standard contractual clauses if needed. However, likely the platform and central storage remain in EU, and Ukrainian participants will use it like any user (consenting to the terms), so personal data stays on EU servers, and the Ukrainian partner just accesses it as an authorised user (which is acceptable under GDPR with proper access control). In analysis reports, only aggregated or anonymised data will be used, so no personal data leaves the secure environments.

Moreover, in order to guarantee Ethical compliance within 3D-4CH, an Ethics mentor has been appointed.

The Ethics Mentor is Roberto Di Giulio, Architect, Phd in "Technology of Architecture" at the University "La Sapienza" in Rome, Full Professor at the University of Ferrara, Department of Architecture, where he teaches Construction Design. Member of the Administrative Committee and Research Council of the University of Ferrara from 2002 to 2005. Head of the Department of Architecture at the University of Ferrara from 2006 to 2012. Dean of the new Department of Architecture at the University of Ferrara from 2012 to 2018. Vice Rector delegate to buildings and properties at the University of Ferrara from 2015 to 2021. Coordinator of the PhD in Architectural Technology until 2013 and then of the International PhD 'Architecture and Urban Planning' until 2024. He has been involved as Principal Investigator or Coordinator of the Italian research unit and member of the Technical Committee in 18 research projects funded by the European Commission, several COST Actions and numerous national research projects. Among these: Coordinator of the research project 'INCEPTION - Inclusive Cultural Heritage in Europe through 3D semantic model' (2015-2019), funded by the European Commission in the Horizon 2020 programme; Scientific Coordinator of the research project '4CH - Competence Centre for the Conservation of Cultural Heritage', funded by the European Commission in the Horizon 2020 programme (2021-2023); Promoter and Coordinator of the COST

Action TU0701 ‘Improving the Quality of Suburban Building Stocks’ (2008-2012); National coordinator of the Research Project of National Interest PRIN 2008 ‘Redevelopment, regeneration and valorisation of high-intensity social housing settlements built in urban suburbs in the second half of the 20th century.

The Mentor is highly qualified in ensuring alignment with ethical best practices. He is responsible for ongoing monitoring, compliance assessments, and addressing emerging ethical challenges. Regular audits and feedback mechanisms will be implemented to identify potential concerns and address them proactively.

The Mentor will actively participate in the project’s ethical oversight by joining key project meetings (e.g., periodic consortium meetings or dedicated ethics monitoring) and reviewing deliverables relevant to ethics issues. He will provide guidance on any emerging ethical concerns and ensure that project activities remain in line with the overall ethics framework. The Ethics Mentor’s advice will be sought particularly for tasks involving human participants, AI developments, or data sharing. All Consortium partners are encouraged to consult with the Ethics Mentor whenever there is uncertainty regarding ethical best practices. This formal involvement of the Ethics Mentor throughout the project duration will help to promptly identify and resolve ethics issues, and a summary of how ethics were managed will be included in the final project report.

Moreover, the Ethics Mentor will maintain a regular dialogue with the project Advisory Board on ethical issues. The Advisory Board, composed of scholars, experts and leaders in 3D technologies as well as representatives of European CHIs, plays a crucial role in ensuring the scientific integrity of the 3D-4CH Competence Centre. It acts as a sounding board and supports the project management team in making informed decisions about approaches and methodologies, ensuring alignment with evolving trends and the needs of the cultural heritage sector. The Advisory Board will provide guidance on critical decisions that contribute to 3D-4CH meeting its project objectives and long-term mission, including fostering a collaborative, transparent, diverse and gender-balanced culture that strengthens relationships with stakeholders and builds mutual understanding and trust.

The Advisory Board Chairperson is Livio De Luca, highly qualified in ensuring that new technologies, data sources, and partnerships align with ethical best practices, being aware of technological advancements and evolving societal expectations, making the project ethical approach adaptable, and ensuring that cultural heritage data and activities accomplished under 3D-4CH are accurate, accessible, and responsibly managed.

Intellectual Property and Copyright: The project deals with cultural heritage content and newly created materials, so respecting IPR is critical:

- **Cultural Heritage 3D Content:** We ensure that we have right to digitise and share any 3D models we produce. For models generated by partners (e.g. scanning an artefact), the owning institution of the artefact is a partner or has given permission. We clarify the copyright status for each object and its 3D representation. As noted in Europeana’s guidance, a 3D model can have a different copyright status from the object depending on the creativity involved. The DMP approach is to assume the public domain for models of public domain works (no new creativity), but if any model might be creative, the project (or the content provider) will hold copyright. In all cases, we choose a license or rights statement that accurately reflects this and encourages reuse (preferably an open license). We also have partners sign agreements or licenses for any content they contribute to ensure the consortium can lawfully use and publish it. Europeana’s Data Exchange Agreement (which our partner Europeana Foundation has in place) might cover some content integration, ensuring that metadata is CC0 and that content has a clear rights statement.

- **Training Materials IPR:** The materials created by the project’s team are owned by the authors or their institutions but will be released under open content licenses (as mentioned, likely CC BY). We will

include attribution to the project and EU funding (as required by the grant). If we incorporate existing materials from elsewhere, we will do so only if the license allows or after obtaining permission. For example, if a partner reuses slides from a previous project, we'll confirm that those slides were open or get consent for reuse in 3D-4CH. All materials will have a clear statement like "© 2025 3D-4CH Consortium (CC BY 4.0)" or similar on them.

- **Software and Tools IPR:** Any software developed is intended to be open source (unless there's a specific reason not to). The IPR will typically remain with the developing partner, but per consortium agreement, they grant rights to the consortium for use. We plan to publish software code on a public repository under an OSI-approved license (MIT, Apache 2.0, or GPL, to be decided based on context). This ensures the tools can be reused and built upon by others freely.

Ethical Considerations: The project does not involve sensitive human subjects research beyond the professional surveys and training feedback, which are of minimal risk. Nonetheless, we treat participants ethically: participation in surveys or platform activities is voluntary, and we avoid any form of harm. We also consider cultural sensitivities in 3D content – e.g. if any 3D models represent culturally sensitive items or sacred objects, we will follow the guidance of content-providing institutions on access (some content might be restricted or have special handling). Although our aim is open access, we respect source community wishes as per good practices in cultural heritage. If any data could indirectly reveal personal info (say, a survey comment mentioning a name), we will redact those in any public outputs.

In summary, our approach to ethics and GDPR is proactive and robust: **informed consent, user empowerment, data protection by design, and respect for IPR** form the backbone of compliance in 3D-4CH. This ensures the project not only meets legal requirements but also builds trust with its users and contributors by handling their data with care and transparency.

6. Sustainability and Long-Term Preservation

The data and outputs of 3D-4CH are intended to remain available and useful well beyond the project's funded period. Sustainability is addressed both in terms of maintaining access to data and preserving it in stable formats/locations for the long term:

- **Project Platform Maintenance:** The online Competence Centre platform is envisioned as a lasting resource for the cultural heritage community. The consortium (notably the coordinator and key partners) is committed to keeping the platform operational after the project ends (Jan 2028) for a certain number of years, potentially by transitioning it to a host institution or integrating it with Europeana's infrastructure. A sustainability plan will be developed in the later stages to secure funding or ownership for the platform's continuation. In case full maintenance is not possible, we plan contingencies such as freezing the platform as a static archive or transferring the content to another widely available platform (for example, Europeana or a successor EU initiative). All critical data (3D models, training resources, metadata) will be backed up externally at project's end to ensure nothing is lost during any transition.

- **Repository Deposition:** To guarantee longevity and citability, we will deposit significant datasets into trusted repositories towards the end of the project. For **3D models and their metadata**, we will explore deposition in places like the Europeana Data Space for Cultural Heritage or Zenodo (Zenodo can host large files and assign DOIs). Each deposited item or collection will include all necessary files and documentation. Repositories like Zenodo ensure data will be preserved for the long term (Zenodo is backed by CERN and an EU open data policy, promising retention). For **training**

materials, Zenodo (or an institutional repository of a partner university) can also be used to host a collection of training manuals/slides, again with persistent identifiers and metadata. If the files are too large or numerous (e.g. video content), we might use multiple repositories (videos could be on an educational YouTube or media server for streaming, but with copies or descriptions in the repository). The choice of repository will consider the nature of data: Europeana is ideal for cultural heritage objects (3D and metadata) as it provides high visibility and archiving, while Zenodo or similar is good for more generic datasets or educational content. We will also follow any instructions from the Digital Europe Programme on data preservation if provided (some EU projects have mandated data portals).

- **Metadata Preservation:** We ensure metadata remains even if files are gone. Metadata records require very little storage, so they can live indefinitely in multiple forms (on Europeana, in a repository, in project reports). As one of the FAIR principles: “metadata are accessible even when data is no longer available”. We will comply with that by keeping metadata in open catalogues.

- **Formats and Obsolescence:** Using open standard formats (as discussed) is part of our sustainability strategy. This reduces the risk that future software cannot open our files. For example, glTF for 3D models is an open standard likely to be supported for a long time; PDF/A (archival PDF) for documents ensures readability in the future; CSV for data tables like survey results is timeless. If any specialised format is used, we will also save an export in a more common format. We will monitor as the project goes if any conversion is needed for longevity (e.g. if a 3D format falls out of favour, provide an additional format copy).

- **Documentation for Future Use:** The DMP and additional documentation will be made available alongside the data (possibly as README files in repositories or as annexes in deliverables), so that future users or custodians of the data know how it was created and how to interpret it. This documentation includes the metadata schemas, any controlled vocabulary references, and any specific usage notes (like if a 3D model has to be cited a certain way or has cultural restrictions).

- **Post-project Support:** While the project is ongoing, user support is provided by partners (e.g. helpdesk for the platform). Post-project, if the platform continues, we will assign an institution to handle support and inquiries (tentatively, the coordinator or Europeana might take this role). This is important for community trust in using the platform’s resources beyond the funded life.

- **Retention Periods:** For data that we do not plan to make public (like personal data), we have retention limits. As mentioned, personal data will be deleted when no longer necessary. However, in terms of preserving research value, aggregated analysis results (with no personal identifiers) could be kept indefinitely and perhaps published (e.g. “60% of surveyed professionals preferred X…” can be in a report). The raw identifiable data will be deleted according to GDPR best practices (for instance, survey data with personal info might be deleted a year after analysis is completed, unless a respondent asked for it to be kept longer, which is rare). We will document the deletion in our internal records.

- **Succession of Responsibilities:** The DMP will name the person or role responsible for each dataset’s preservation. For example, Partner A might take ownership of preserving the training materials collection, while Partner B ensures the 3D model repository is handed over to Europeana properly. The final project review will check that these tasks are assigned and underway.

By proactively planning for sustainability, 3D-4CH intends that its valuable outputs – 3D models of heritage, best-practice training content, and the knowledge gained – continue to benefit stakeholders for many years.

This aligns with recommendations to “plan for open and broad access” and “plan for long-term preservation of the data acquired” from the outset. We consider this a critical success factor for the project’s legacy.

7. Roles and Responsibilities

Effective data management requires clear roles. The 3D-4CH consortium has defined responsibilities as follows:

- **Project Coordinator (INCEPTION, Italy):** Overall responsible for implementing the DMP. Ensures all partners follow the guidelines for data handling and contributes to updates of the DMP. The coordinator also manages the central storage (e.g. the platform and internal repositories) and oversees backups and security audits.

- **Data Management Lead (UNIFE, Italy):** They maintain this DMP document, provide training to partners on data management practices, and coordinate repository deposits. They also liaise with Europeana and other external platforms for data integration.

- **Data Protection Officer (INCEPTION, Italy):** The Data Protection Officer (DPO) advises on all personal data processing, reviews privacy notices, and is the contact for any data subject queries or complaints. They ensure GDPR compliance across partners.

- **Technical Platform Team:** Partners responsible for developing and hosting the platform take charge of implementing security measures, user management features (including the GDPR rights dashboard), and maintaining the infrastructure. They fix any technical issues that could risk data (like bugs affecting data integrity).

- **Content Providers:** Partners contributing 3D content or training materials are responsible for ensuring the content is appropriately vetted for IPR and that metadata is provided. They will follow the metadata templates and upload procedures defined, as well as use the standard consent forms for any data collection they conduct (e.g. if a partner runs a local workshop and surveys attendees, that partner ensures the approved privacy notice is used and data is sent to the coordinator securely).

- **All Partners:** Every partner has agreed in the Consortium Agreement to abide by data management and ethics requirements. They must promptly report any issues (e.g. a data breach or a mistake in data handling) to the coordinator and DPO. They also contribute to populating data inventories and reviewing DMP revisions.

Note: *Responsibility extends after the project – certain partners will be custodians of different parts of the legacy (as described in Sustainability). The roles will be re-confirmed at the project end for that phase.*

8. Conclusion

This integrated Data Management Plan for 3D-4CH (M6 deliverable) provides a comprehensive roadmap for handling the project’s data and digital outputs. We have combined the initial DMP’s coverage of training datasets, tools, 3D models, metadata standards, platform architecture, FAIR principles, GDPR compliance, security, and sustainability with new provisions regarding survey data management, training resource licensing, usage analytics, and user privacy features. The plan is structured to ensure a logical flow from

data description to practical management measures, aligning with both the project's objectives and EU best practices in open research data.

By implementing this DMP, 3D-4CH will ensure that:

- **Data is well-organised and documented**, facilitating internal use and external sharing.
- **Valuable content (3D models and training resources) is open, FAIR, and reusable**, amplifying the project's impact in the cultural heritage domain.
- **Personal data is handled responsibly and ethically**, with full respect for individuals' rights and privacy.
- **Robust infrastructure and security** protect the integrity and confidentiality of data throughout the project.
- **Long-term access and preservation** are planned from the start, so the project's outcomes remain accessible beyond its lifespan.

This DMP will be revisited and updated as needed (for example, if new data types emerge or if adjustments are required based on user feedback or platform changes). The consortium is dedicated to continuous improvement in data management, ensuring compliance with evolving standards and the highest quality of data stewardship. By following this plan, 3D-4CH not only meets its obligations to the funding body but also sets a benchmark for data management in 3D cultural heritage projects, ultimately contributing to a more sustainable and open digital cultural heritage ecosystem.