HERITWIN

ECCCH and ECHOES:

Current Maturity, Data Integration Readiness and Implications for the Five HERITWIN Pilots

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ECCCH and ECHOES: Current Maturity, Data Integration Readiness and Implications for the Five HERITWIN Pilots

Technical and strategic assessment | 4 November 2026



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Executive assessment

The European Collaborative Cloud for Cultural Heritage (ECCCH) has reached a sufficient level of technical and conceptual maturity for HERITWIN to begin preparing datasets, implementing semantic interoperability mechanisms and testing integration workflows. However, the available evidence does not yet establish that ECCCH offers a fully operational, generally accessible production environment for the ingestion, persistent management and collaborative processing of heterogeneous cultural heritage datasets.

An important distinction must be made between ECCCH and the *Common European Data Space for Cultural Heritage*. The latter is operational and already provides established mechanisms for publishing, discovering and reusing cultural heritage information, primarily through the Europeana ecosystem.

The two initiatives are complementary rather than interchangeable. Their respective functions and future technical convergence were explicitly recognised in a joint statement by the Europeana Initiative and ECHOES in March 2026.

For HERITWIN, this leads to three immediate conclusions:

1. **Data preparation and interoperability development should begin now**, across all five pilots, without waiting for the completion of ECCCH.
2. **Existing European data-sharing infrastructure should be used wherever appropriate**, particularly for discoverable heritage metadata, archival material, documentation and reusable digital objects.
3. **ECCCH integration should be pursued through controlled, evidence-based technical validation**, initially using representative pilot datasets and agreed interfaces, rather than assuming that the emerging infrastructure is already production-ready.

HERITWIN is particularly well positioned to contribute to this process. Its five pilots represent substantially different heritage environments, spanning historical reconstruction, infrastructure conservation, distributed heritage collections, environmental monitoring and archaeological interpretation. Together, they can test whether ECCCH interoperability concepts are transferable between institutions, data types and operational settings.

1. Distinguishing ECCCH, ECHOES and the Common European Data Space for Cultural Heritage

The terminology is important because the three initiatives fulfil different institutional and technological functions.

Initiative	Primary purpose	Assessment as of November 2026
ECCCH – European Collaborative Cloud for Cultural Heritage	European collaborative research and innovation infrastructure providing access to interconnected heritage data, tools, workflows and Heritage Digital Twins	Under development; architecture, data models and integration specifications are emerging

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Initiative	Primary purpose	Assessment as of November 2026
ECHOES – European Cloud for Heritage Open Science	Horizon Europe project developing the foundations, services, interoperability framework and governance mechanisms underpinning ECCCH	Active implementation project; technical outputs and initial software components are publicly available
Common European Data Space for Cultural Heritage	European ecosystem for the provision, discovery, exchange, accessibility and reuse of digital cultural heritage resources	Operational; established aggregation and publication pathways exist

The European Commission's vision for ECCCH extends beyond conventional data repositories. ECCCH is intended to provide a collaborative working environment in which cultural heritage professionals can combine datasets, generate new knowledge, create and analyse Heritage Digital Twins, and use advanced digital applications across institutional boundaries.

The Common European Data Space for Cultural Heritage has a different emphasis. It supports access to reusable digital cultural heritage content and associated metadata, and provides established mechanisms for sharing these resources.

In March 2026, Europeana and ECHOES committed to several measures directly relevant to HERITWIN, including alignment between the Europeana Data Model (EDM) and the Heritage Digital Twin Ontology (HDTO), interoperability between their infrastructures, coordinated intellectual property approaches, and integration workflows designed to avoid duplicate data submissions.

Consequently, publication of a heritage collection through Europeana should not be interpreted as equivalent to integrating its digital twin and associated analytical services into ECCCH.

Both processes may ultimately operate on shared or interconnected data, but they serve different purposes.

2. Current technical and operational maturity

2.1 Common European Data Space for Cultural Heritage: operational

The European data space already supports the publication and reuse of cultural heritage resources through Europeana and its network of aggregators.

Existing capabilities include metadata aggregation, multilingual discovery, rights information, content access and established publication workflows. Europeana also provides the *Share 3D Dashboard*, maintained by CARARE, through which institutions can submit metadata describing 3D models for aggregation and publication.

For HERITWIN, this means that suitable heritage metadata and digital resources can be prepared and submitted without waiting for ECCCH to reach operational maturity.

However, publication eligibility depends on the relevant aggregator's requirements, data quality, licensing arrangements and the availability of an appropriate institutional contribution pathway.

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2.2 ECCCH: integration foundations established

ECHOES has already published significant components of the technical framework required to establish ECCCH.

These include an integration strategy, integration roadmap, data strategy, interoperability guidelines, architectural descriptions and the Heritage Digital Twin Ontology.

This documentation provides a substantive foundation for implementing compatible data models and designing federation-oriented integration services.

The availability of these specifications should not, however, be confused with the availability of a complete production platform.

ECHOES explicitly describes a federated approach in which heritage data should, wherever possible, remain within repositories or infrastructures controlled by the organisations responsible for them. ECCCH is intended to provide an interconnected environment rather than require all participants to transfer their data into a single central repository.

This distinction has direct implications for HERITWIN's data architecture and sustainability strategy.

2.3 ECCCH: production integration remains insufficiently verified

The public documentation examined does not establish that all external cultural heritage institutions currently have unrestricted access to a complete, production-ready ECCCH environment.

In particular, the evidence does not yet demonstrate the general availability of:

- A complete external onboarding procedure covering registration, authentication, authorisation and organisational administration.
- Stable, versioned production APIs supporting the complete lifecycle of Heritage Digital Twins.
- Documented operational service levels, availability commitments and long-term data management arrangements.
- A fully validated mechanism for federated exchange, updating, access control and provenance tracking across independent repositories.

These are verification gaps, not assertions that the capabilities are absent. ECHOES has published software components and technical material, but the operational maturity of an integrated service must be demonstrated independently of the availability of specifications or source code.

Overall assessment: ECCCH is ready for structured technical experimentation and interoperability development, but HERITWIN should not yet treat it as an independently verified production dependency.

3. Technical specifications and tools already available to HERITWIN

Several ECHOES publications now provide a practical basis for HERITWIN development.

ECHOES output	Technical relevance to HERITWIN
D3.1 – Integration Strategy	Defines the overall strategy for integrating datasets, tools, services and reusable workflows

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ECHOES output	Technical relevance to HERITWIN
D3.2 – Integration Roadmap	Establishes practical procedures for preparing, aligning and integrating digital resources
D6.1 – Data Strategy for the Cultural Heritage Knowledge Base	Addresses data management, federated infrastructure and semantically interoperable Heritage Digital Twins
D6.2 – Interoperability Requirements and Guidelines	Defines technical, semantic, organisational and legal interoperability requirements
D6.3 – Architecture for Data and Cloud Components	Describes the target architecture for federated services, repositories and cloud components
D7.1 – The Digital Commons	Describes Heritage Digital Twins and their representation through HDTO and related CIDOC CRM specifications

These documents are published through the ECHOES Reports and Deliverables repository.

3.1 Heritage Digital Twin Ontology

One particularly significant development is the publication of the Heritage Digital Twin Ontology (HDTO).

ECHOES maintains a public repository containing versioned ontology specifications, RDF representations, documentation and selected use cases. The repository identifies **HDTO version 1.1** as its current version.

HDTO – official ontology repository

HERITWIN can therefore begin developing and validating mappings between its own semantic representations, CIDOC CRM and HDTO.

Such mappings should be version-controlled and tested against representative data from each pilot. They should not be treated as permanently fixed, since the ontology and the wider ECCCH architecture remain under development.

3.2 Emerging ECCCH applications

Three ECHOES applications are particularly relevant:

Application	Potential HERITWIN application	Qualification
CIT – Collection Ingestion Tool	Collection registration, metadata enrichment and semantic interoperability, especially UC1 and UC3	Published capabilities include planned functions; deployment readiness requires verification
VTL – Virtual Transcription Laboratory	Transcription and enrichment of historical archival records, particularly UC1	Suitable candidate for controlled trials, subject to available interfaces
OCRA – Online Conservation Restoration Annotator	Collaborative annotation of 3D heritage objects, particularly UC4 and UC5	Implemented functionality is publicly described, but external operational access remains to be confirmed

ECHOES describes OCRA as supporting spatially anchored semantic annotations, concurrent collaboration, federated authentication and integration with ECCCH knowledge infrastructure. This is

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more substantial than a conceptual application proposal, although OCRA remains under active development.

A working application does not establish that every associated ECCCH service is generally available or sufficiently stable for production deployment.

4. Pilot-specific assessment: HERITWIN UC1–UC5



The five HERITWIN pilots require different integration strategies because their objectives, source materials, operational constraints and intended users differ.

> The following assessments distinguish published project objectives from recommended implementation activities. Suggested datasets and workflows are not assertions that those resources have already been acquired, cleared for publication or technically validated.

UC1 – Sweden: Stockholm Exhibition of 1930

Primary objective: Historical reconstruction and semantic integration of fragmented, multilingual archival collections.

The pilot aims to connect historical documentation relating to the Stockholm Exhibition of 1930, using digital twins, AI-assisted metadata enrichment and federated institutional workflows.

Principal challenge: archival heterogeneity and the distinction between documented historical evidence and reconstructed interpretations.

Recommended data preparation

The initial integration dataset should comprise a selected group of related archival records, such as photographs, exhibition drawings, catalogues, object descriptions and supporting historical documentation, subject to confirmation of their availability and reuse rights.

Each record should receive a persistent identifier and clear source attribution. Where a historical building or object is reconstructed from incomplete evidence, its digital representation should explicitly identify which characteristics are documented, inferred or hypothetical.

ECCCH integration opportunity

UC1 is a suitable candidate for testing the relationship between EDM-based archival descriptions and HDTO-based digital twin representations. CIT and VTL could support collection enrichment and transcription where their relevant capabilities are available.

Europeana opportunity

Descriptive metadata and eligible digital archival objects can be made discoverable through established aggregation channels.

Recommended first validation: Demonstrate that a reconstructed historical object can be linked to multiple original archival sources, queried semantically, and accessed without losing provenance or introducing unsupported certainty.

This would establish a reusable method for reconstructing heritage assets from distributed historical collections.

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UC2 – Norway: Telemark Canal and Vrangfoss

Primary objective: Heritage preparedness, predictive conservation and risk-informed management of historic canal infrastructure.

The Norwegian pilot combines cultural heritage, water infrastructure, environmental exposure and operational management. Vrangfoss provides a suitable candidate for a bounded technical demonstration.

Principal challenge: connecting geospatial, structural, environmental and operational information without confusing model predictions with validated physical conditions.

Recommended data preparation

A representative dataset should connect georeferenced canal infrastructure, asset descriptions, authorised imagery and available historical or maintenance documentation.

Where agreements and existing acquisition activities permit, the dataset could be extended with LiDAR, photogrammetry, GIS/BIM models and environmental observations.

This is consistent with the published Norwegian pilot objectives, but the availability and quality of individual datasets still require verification.

ECCCH integration opportunity

The Norwegian pilot is particularly suitable for demonstrating an operational Heritage Digital Twin linked to conservation and preparedness decisions.

However, high-frequency sensor telemetry should not automatically be transferred into ECCCH. A more defensible model would preserve detailed observations in an authorised operational repository and expose appropriate metadata, time references, derived observations and relevant analysis results through interoperable services.

Europeana opportunity

Historic documentation, asset descriptions, photographs and selected 3D representations may be eligible for publication through Europeana. Live monitoring data and operational control functions should remain separate.

Recommended first validation: Use one selected canal asset, potentially at Vrangfoss, and demonstrate an evidence-controlled workflow connecting geometry, historical information, an environmental observation and an associated conservation or preparedness decision.

The key measure should be whether heritage managers can trace the decision back to the relevant data and understand the uncertainty involved.

UC3 – Spain: Camino de Santiago

Primary objective: Validation of the cultural heritage cloud through distributed organisations, collections and operational workflows.

The pilot involves five Camino de Santiago organisations and specifically addresses the requirements of smaller cultural heritage institutions.

Principal challenge: achieving practical interoperability across institutions with differing capabilities, data quality, languages and resource constraints.

Recommended data preparation

UC3 should establish a representative collection of records originating from more than one participating organisation.

Candidate materials include heritage asset descriptions, route-related records, historic documents, digital imagery and interpretation resources. The chosen sample should demonstrate genuine institutional heterogeneity rather than relying on a centrally normalised demonstration dataset.

ECCCH integration opportunity

UC3 is particularly relevant to the testing of the ECHOES Collection Ingestion Tool, institutional interoperability, metadata harmonisation and collaborative workflows.

It should also examine the feasibility of connecting the same heritage information to Europeana and, where relevant and technically justified, the European Open Science Cloud (EOSC).

Europeana opportunity

The Camino pilot may provide one of the most direct routes for demonstrating the complementary roles of the data space and ECCCH.

Records can be published through established channels while the same underlying information is used to test richer semantic and collaborative workflows.

Recommended first validation: Have at least two participating organisations submit heterogeneous heritage records through a documented ingestion and mapping process, then verify that users can discover and relate those records without manually reconstructing their original context.

The results should include the time, effort and specialist knowledge required to complete the workflow.

This is especially important because an integration method requiring extensive specialist intervention may be technically successful but unsuitable for the smaller institutions that UC3 is intended to serve.

UC4 – Northern Ireland: Knockmany Passage Tomb

Primary objective: Preventive conservation through environmental monitoring, edge-based analysis and digital twin integration.

The pilot addresses the conservation of fragile Neolithic heritage and the relationship between environmental changes, monument condition and risk-informed intervention.

Principal challenge: converting environmental observations into defensible conservation evidence while protecting a sensitive heritage asset.

Recommended data preparation

The pilot should begin with a clearly delimited digital representation of the monument and a documented conservation information model.

Subject to the agreed monitoring design, this could be linked to environmental observations, inspection records, relevant photographs and condition assessments.

Any use of existing or new sensors must distinguish measured conditions from inferred material degradation. Environmental variation alone is not sufficient evidence of deterioration.

ECCCH integration opportunity

UC4 can evaluate whether distributed monitoring and edge-processing results can be linked semantically to heritage assets and made available for collaborative conservation analysis.

OCRA may provide a useful environment for associating conservation annotations with spatially referenced features, subject to integration validation.

Europeana opportunity

Publicly approved documentation, digital representations and descriptive metadata may be shared, but detailed monitoring information and sensitive conservation data should remain subject to site-specific access controls.

Recommended first validation: Demonstrate that a documented environmental observation can be linked to a specific heritage component, reviewed by an authorised conservation specialist and recorded with its provenance, temporal context and uncertainty.

Predictive or automated conservation recommendations should not be considered validated until assessed against relevant observations and expert judgement.

This pilot provides a strong test of whether ECCCH can support conservation workflows rather than merely visualise sensor data.

UC5 – Greece: Aphytos, Halkidiki

Primary objective: Archaeological documentation, semantic enrichment and extended-reality interpretation.

The Aphytos pilot aims to connect archaeological information with digital twins and AR/VR environments, enabling professional analysis and public interpretation.

Principal challenge: preserving archaeological context, stratigraphic relationships and interpretative uncertainty across digital representations.

Recommended data preparation

The initial integration dataset should include a clearly bounded archaeological context, with associated spatial descriptions, authorised documentation and available interpretation records.

Where such information exists and can be shared, stratigraphic relationships, excavation documentation, photogrammetry and 3D models could provide the basis for a semantically enriched digital twin.

ECCCH integration opportunity

UC5 is particularly relevant to testing how archaeological evidence can be represented through HDTO and related CIDOC CRM models.

OCRA could be evaluated for collaborative annotation, especially where interpretations need to be linked to distinct areas of a model.

Europeana opportunity

Selected archaeological records, imagery, descriptive metadata and approved 3D resources can potentially be made discoverable through established publication mechanisms.

Recommended first validation: Demonstrate that an archaeological interpretation used in an XR environment remains traceable to its underlying evidence, including documented uncertainty and alternative interpretations.

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An immersive reconstruction that cannot distinguish archaeological evidence from visual conjecture would represent a significant methodological weakness.

The integration test should therefore validate the semantic and evidential foundations before assessing the visual quality of the XR experience.

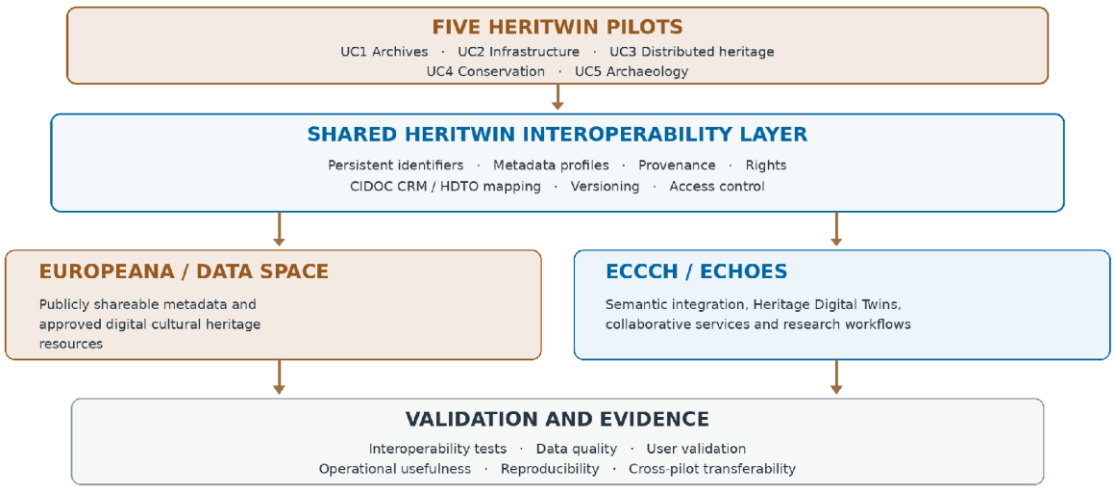
5. Cross-pilot integration strategy

The five pilots should not independently establish incompatible approaches to ECCCH integration.

A shared HERITWIN integration framework is required, but this does not mean that all pilots must use identical data processing tools, repository technologies or digital twin implementations.

The appropriate commonality lies in identifiers, semantic principles, interfaces, governance and verification procedures.

5.1 Proposed common architecture



Proposed HERITWIN integration architecture. The diagram describes the recommended separation of responsibilities, not an already implemented or validated production deployment. Data may remain in the source repositories throughout the process.

ECHOES explicitly envisages three technical integration levels: data/metadata integration, service-level integration and application-level integration. Sister projects can select an appropriate combination, including loosely coupled approaches that do not require transferring all operational functions to the Cloud.

For HERITWIN, I would adopt a staged approach rather than impose deep ECCCH integration on every pilot immediately.

5.2 Proposed priorities across the five pilots

Pilot	Initial integration emphasis	Most suitable first demonstration
UC1 Stockholm	EDM/HDTO mapping and archival provenance	Historical record to semantically linked reconstruction

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Pilot	Initial integration emphasis	Most suitable first demonstration
UC2 Telemark	Federated spatial and conservation data	Georeferenced heritage asset linked to documented environmental evidence
UC3 Camino	Multi-institutional ingestion and data-space interoperability	Records from different organisations discovered and related through shared semantics
UC4 Knockmany	Sensor evidence, conservation annotation and controlled access	Traceable monitoring-to-conservation workflow
UC5 Aphytos	Archaeological semantics and 3D annotation	Evidence-based archaeological interpretation linked to an XR representation

The table identifies proposed first demonstrations, not previously confirmed technical milestones.

My preferred sequencing would be to establish a common metadata and HDTO mapping exercise first, then develop parallel pilot-specific integration tests.

UC3 is particularly useful for testing the data ingestion process, while UC2 provides a useful reference for geospatial and operational digital twin integration. UC1 and UC5 can test richer historical and archaeological semantic relationships, and UC4 can test access-controlled conservation evidence.

This distribution would provide meaningful architectural coverage without forcing all five pilots into one technical implementation.

6. Requirements before production-level integration

Before HERITWIN declares an ECCCH integration operational, several conditions should be satisfied.

Requirement	Evidence needed	Principal risk if unresolved
Data ownership and rights	Written authorisation, data licences, publication conditions and responsibility assignments	Unauthorised disclosure or reuse
Semantic interoperability	Validated mappings between source models, CIDOC CRM, HDTO and, where applicable, EDM	Loss or distortion of cultural heritage meaning
Persistent identification	Stable identifiers for heritage assets, digital resources and relationships	Broken references and duplicate records
Technical interoperability	Documented API contracts, authentication, versioning and exchange tests	Dependency on changing infrastructure
Provenance and uncertainty	Traceable source information, documentation of transformations and interpretative status	Unsupported historical or scientific claims
Operational sustainability	Named data custodians, maintenance procedures and repository commitments	Digital twins becoming obsolete after the project

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Requirement	Evidence needed	Principal risk if unresolved
Validation	Reproducible test results and acceptance by authorised pilot users	Demonstrations being mistaken for operational capabilities

These requirements should be applied proportionately. A publicly available historical photograph and a conservation monitoring dataset do not necessarily require the same access restrictions or operational controls.

6.1 Data rights require particular attention

Europeana's licensing framework establishes that metadata received through its Data Exchange Agreement is published under Creative Commons Zero (CC0). Rights information for associated digital objects is handled separately.

For HERITWIN, this distinction is significant. Metadata relating to sensitive archaeological records, protected heritage locations, commercially licensed surveys or operational infrastructure should not be submitted without assessing the implications of open publication.

For the Norwegian and Northern Irish pilots, the publication of detailed operational or monitoring information should also be considered against conservation responsibilities and relevant security requirements.

7. Recommended implementation programme for HERITWIN

HERITWIN commenced in September 2026 and is scheduled to conclude in February 2029. Its initial project phase is intended to establish pilot plans, technical baselines, data responsibilities and access conditions.

I would translate this into four controlled implementation stages.

Stage 1 – Establish the integration baseline

Recommended during M1–M6

Create one common data and integration register covering all five pilots. Record data custodians, asset classes, metadata formats, rights, technical interfaces and intended uses.

Select a small, representative dataset from each pilot. Establish the first shared semantic mappings against an explicitly versioned HDTO specification.

Acceptance criterion: Five documented datasets, each with identifiable ownership, defined provenance and an initial semantic mapping suitable for testing.

Stage 2 – Validate existing publication mechanisms

Test the publication of approved metadata and eligible digital objects through established Europeana aggregation procedures.

Establish whether relevant records are discoverable, whether metadata remains accurate and whether the source institution retains an appropriate mechanism for correcting or updating its information.

Acceptance criterion: At least one documented publication and retrieval exercise, with a record of validation results, errors and corrections. Publication should proceed only after rights clearance.

Stage 3 – Execute controlled ECCCH integration tests

Engage with the ECHOES Integration Task Force to establish an agreed integration profile, identify available test environments and obtain the necessary technical documentation.

Validate metadata exchange, semantic queries, resource identification, access control and selected application workflows.

Acceptance criterion: At least one reproducible end-to-end ECCCH integration test, supported by technical logs, documented interfaces and independently reviewable evidence.

Stage 4 – Extend and validate across all five pilots

Apply common interoperability requirements across the pilots while retaining their different application requirements and operating environments.

Measure semantic correctness, data retrieval success, reproducibility, user effort, integration maintenance requirements and demonstrated operational value.

Acceptance criterion: Five pilot validation reports using a common evidence structure, with explicit documentation of successful integrations, limitations, unresolved dependencies and transferable methods.

The ECHOES Integration Task Force is an important mechanism here. ECHOES states that funded sister projects can engage with the task force to communicate technical requirements and define integration roadmaps. HERITWIN should use this channel rather than designing integrations solely from publicly available documentation.

The third ECHOES cascading-grants call is also scheduled for January 2027 and will focus on contributions of datasets and applications. It may provide an additional opportunity for organisations in the wider heritage community, although HERITWIN's participation or eligibility should not be assumed.

8. Immediate recommendations and outstanding decisions

The most important next action is to obtain a clear operational statement from ECHOES identifying which parts of ECCCH are available to HERITWIN now, which are available only in testing, and which remain under development.

I recommend that the project request confirmation of the following matters through the ECHOES Integration Task Force:

1. Which ECCCH services and applications can HERITWIN access during 2026–2027, under what conditions, and through which technical environments?
2. Which HDTO version and interoperability profiles should HERITWIN implement, and what validation mechanisms are available?
3. What are the recommended procedures for linking source repositories, Europeana records and Heritage Digital Twins without duplicating data unnecessarily?

4. What authentication, authorisation, provenance and persistent-identifier services are available for integration testing?
5. Which integration results will ECHOES recognise as evidence of successful interoperability, and how should sister projects submit technical feedback?

These questions should produce a jointly agreed integration baseline, not merely general assurances that the infrastructures are compatible.

9. Conclusions

HERITWIN should begin working with actual cultural heritage information immediately, while retaining institutional control over source data and avoiding premature dependence on ECCCH's evolving production services.

The maturity assessment can be summarised as follows:

Activity	Recommended decision
Prepare, document and semantically structure pilot datasets	**Proceed now**
Map HERITWIN metadata to published HDTO specifications	**Proceed now, with version control**
Publish eligible metadata and digital heritage objects through Europeana	**Proceed through established aggregation and rights-clearance procedures**
Test emerging ECCCH applications, including CIT, VTL and OCRA	**Proceed where technical access and test conditions are confirmed**
Integrate HERITWIN digital twin services with ECCCH	**Proceed through controlled, documented integration tests**
Adopt ECCCH as the primary production repository and operational platform	**Defer until service maturity and operational responsibilities are verified**

The five HERITWIN pilots collectively offer an opportunity to assess ECCCH interoperability under contrasting conditions.

UC1 can demonstrate the reconstruction and semantic connection of historical evidence. UC2 can test the relationship between geospatial information, monitoring and heritage management decisions. UC3 can examine whether integration workflows are practical for smaller organisations. UC4 can validate controlled access to conservation evidence and environmental observations. UC5 can test the relationship between archaeological knowledge, digital twins and immersive interpretation.

Taken together, these represent more than five separate demonstrations. They provide the basis for a **cross-pilot interoperability and validation framework** capable of documenting which ECCCH capabilities are genuinely transferable, which require adaptation and which remain dependent on future infrastructure development.

This is where HERITWIN could make a particularly valuable contribution to the wider Cultural Heritage Cloud initiative.

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The critical success factor should not be the quantity of information uploaded or the visual sophistication of the resulting digital twins. It should be the degree to which information remains discoverable, semantically meaningful, traceable, reusable and operationally useful across independent cultural heritage organisations.

Principal references

The assessment is based principally on the following public resources:

- ECHOES – Official Reports and Deliverables
- ECHOES – Integration, Interoperability and Technical FAQ
- HDTO – Ontology specifications and versioning
- Europeana–ECHOES Joint Statement, March 2026
- Europeana – Share 3D Dashboard
- HERITWIN – ECHOES Sister Project
- HERITWIN – Project objectives and five pilot descriptions
- ECHOES – How to Be Part of the Cultural Heritage Cloud?

Assessment boundary: The documented objectives and technical specifications have been distinguished from proposed implementation choices. Actual dataset availability, data-sharing permissions, deployment readiness and successful ECCCH interoperability remain subject to confirmation through the HERITWIN pilots and ECHOES technical coordination.