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**Long-term preservation of digital heritage
beyond borders**

In line with what was discussed in Riga on March 15 I am sending to my esteemed colleagues in Latvia, Lithuania, and Poland a memorandum on Estonia's initiative for the cross-border preservation of digital cultural heritage.

I hope for your support on this matter in the European Commission expert group on the common European Data Space for Cultural Heritage (CEDCHE) and the ad hoc focus group for the long-term preservation of digital cultural heritage beyond national borders.

Yours sincerely,

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Estonia’s proposal for the long-term preservation of digital heritage beyond borders

Table of Contents

Introduction	1
Background and developments in Estonia	2
Estonia’s proposal for the pan-European preservation service	3
Initial cost calculations for the preservation service	5
Developments in the EU	5
Next steps	7
Annex. Estonia’s position on the copyright matters	8

Introduction

The preservation of cultural heritage is a critically important issue with a clear cross-border dimension. The war in Ukraine unfortunately vividly demonstrates how an aggressor state deliberately targets cultural heritage and historical memory. We can only protect our culture, language, and, more broadly, our country by taking strong preventive measures.

In addition to aggression, cultural heritage is threatened by climate change, natural and man-made disasters, and cyberattacks. Therefore, developing and implementing a joint solution at the EU level may be more reasonable, cost-effective, and sustainable.

Estonia places great importance on the EU’s sustained efforts to preserve and enhance the cultural heritage ecosystem. In this context, joint initiatives both at the EU level and international levels have made significant contributions to the advancement and resilience of the sector.

We highly welcome the fact that the European Preparedness Union Strategy has included culture and culture institutions to better anticipate and manage various crises and threats and to preserve the resilience of vital societal functions and the need to develop mutual resilience in the area of cultural heritage across the EU.

We see an urgent need to secure access to and continuity of services even when cultural heritage - both tangible and digital heritage - is at risk or has been destroyed in the home country by either natural disasters or man-made crisis. The ability to launch and operate priority digital heritage services from outside national borders should be guaranteed across the EU.

Background and developments in Estonia

To shape Estonia's positions, a digital preservation working group was convened in 2025 under the Digital Cultural Heritage Council of the Ministry of Culture. The group included experts from the Ministry of Culture, Ministry of Justice and Digital Affairs, and cultural heritage institutions. The working group explored potential solutions, described crisis scenarios, mapped the cultural heritage data sets and data requirements for long-term preservation of digital cultural heritage and identified the essential elements that need further analysis for a cross-border solution at EU level.

Working group's positions:

- We consider it important that the **European Commission develop together with the Member States a unified cross-border solution at the EU level** and within the EU financial framework for the preservation of digital heritage. Such solution would have to run on European service providers, which might further innovation and empower new European business models. The aim of such a solution is to **ensure the long-term preservation of the most valuable part of Europe's digital heritage and the related information systems.**
- The pan-European preservation service should **ensure the sustainable long-term preservation of unique digital heritage and related information systems, and the capability to launch and provide priority digital heritage-related services** outside national borders within the EU.
- **It is the responsibility of each Member State to assess which part of their digital cultural heritage needs to be preserved outside the national borders and which priority information systems and critical services, if necessary, must be launched and maintained from another location.**
- If something happens to our cultural heritage within our country, there is little that can be done afterward to save it. In the darkest scenario, some Member States might be forced to manage their heritage assets from exile, providing the documentation of war crimes, destruction and theft. Therefore, a solution for preserving digital heritage and its related information systems outside national borders must be developed and implemented as soon as possible. Only in this way can we ensure that our digital heritage is preserved and remains accessible, regardless of global crises or domestic situations.
- Several aspects need to be further analysed: the need for unified technical framework to ensure interoperability between long-term preservation systems, including common data exchange standards, metadata compatibility and distributed storage solutions to enable rapid data recovery in a crisis situation. Furthermore, a joint approach and agreement on clear data protection and liability principles are needed to safeguard the security and confidentiality of cultural heritage data shared across Member States.
- For the development of effective cross-border solutions, it is essential to agree on uniform business requirements, establish a methodology for assessing all priority components for preservation, also the volume and cost of the solutions offered and developing a possible co-financing model.
- **A pilot project needs to be carried out involving 5–7 Member States of different sizes and volumes of digital heritage to ensure that the model is tested in various cultural environments.** During the testing phase, EU-coordinated crisis simulations should be conducted to assess the system's reliability and potential improvements.

- Developing a unified cross-border preservation solution for all EU Member States may be more **cost-effective and sustainable** than if each Member State were to develop its own solution. Most importantly, it is the **only** way we can securely preserve European heritage in a unified way. With a unified solution, Member States and individual memory institutions would not need to maintain their own separate infrastructure, thus reducing duplication. A shared system allows for **better resource use and cost-sharing**. A unified solution also **mitigates security risks**, as common standards and principles are agreed upon and implemented, and the preservation service is distributed.
- Developing and implementing a unified solution can stimulate innovation and technological development. This is especially important in conditions where so far, extensive use has been made of cloud services based on US technology for information and data backup, but we believe that the EU solution must be based on EU technologies.

Estonia's proposal for the pan-European preservation service

Estonia proposes a two-tier model as an example for the pan-European preservation service:

1. **High-quality preservation copies** of digital heritage are **stored in a different location outside national borders**, either physically or in a cloud service. To mitigate risks, we believe it is reasonable to store European digital heritage in cloud services and in multiple locations. Using cloud services is safer and more cost-effective than organizing the logistics of digital heritage across Europe on physical data carriers on a regular basis. Digital heritage can be transferred to the cloud from national digital archives in seconds. But at the same time, we are open to different and/or combined solutions. The preservation copies are not used unless absolutely necessary, but if needed, access copies can be generated from them. Preservation copies can also be used to assess physical damage to cultural heritage objects or to restore the physical object.

The main goal of tier 1 is the preservation of digital heritage for centuries.

2. **Priority information systems, along with access copies** of digital heritage, are **stored in a different location outside national borders** in a cloud service and **can be launched and operated** to ensure the continuity of critical services.

The main goal of tier 2 is to ensure the capability to provide priority and time-critical services outside national borders.

What is a preservation copy? A preservation copy is a high-quality file created from the original cultural heritage object, equipped with the necessary metadata and descriptive information about the object. It is a lossless copy made to preserve information in case the original is lost or damaged.

What is an access copy? An access copy is a smaller-sized copy created from the preservation copy (or from the original in the case of born-digital objects), intended to ensure the widest possible accessibility of the information.

We believe that the **two tiers of the preservation service should be implemented in parallel**. If only the first tier is implemented, high-quality preservation copies of digital heritage are preserved without the information systems, and in case services based on digital heritage are needed, the systems must be rebuilt.

If only the second tier is implemented, the capability to launch information systems and provide time-critical services from another location is ensured. However, these systems usually do not store high-quality preservation copies, only lower-quality access copies. For example, if there is a need to restore a heritage object or assess its damage, this cannot be done using only an access copy.

The war in Ukraine has highlighted the urgent need for countries to plan ahead for the preservation of their cultural heritage. The need to launch and provide priority digital heritage-related services from another location were assessed based on three scenarios:

Scenario 1: Full-scale war in Estonia and/or occupation of the country, destruction of cultural heritage, and loss of preservation copies and information systems stored in Estonia.

Scenario 2: War in Estonia, cultural heritage at risk, cultural institutions partially operational, but preservation copies and information systems stored in Estonia are lost.

Scenario 3: A local disaster (e.g., natural disaster, fire, flood, cyberattack) affects one or more cultural institutions. Preservation copies and information systems stored in Estonia are destroyed or altered (e.g., via AI-driven cyberattacks).

Based on these scenarios, the following use cases were identified as **time-critical for launching certain information systems** from another location:

- Preventing the illegal trade of cultural values, proving ownership of found cultural values;
- Assessing and documenting damages to physically damaged cultural heritage;
- Producing media content for the Public Broadcasting.

According to Estonian experts, not all of Estonia's digital heritage should be preserved outside the country. Only the priority, unique digital heritage found in the collections of memory institutions and universities and described and published in sectoral portals/information systems, should be included. Estonia has 26 portals/information systems that fit these criteria.

According to Estonian experts, making substantive selections is too labour-intensive, separating collections or heritage objects is not practical, and making substantive choices would not significantly reduce the resources needed to launch services. The obligation for the long-term preservation of cultural heritage described and published in the aforementioned information systems arises mostly from sector-specific special laws (e.g. the Legal Deposit Act, the Museums Act, the Heritage Conservation Act, the Estonian Public Broadcasting Act, the National Library of Estonia Act). Also, cultural monuments, rare printed works, and museum objects held in museum collections are inherently unique, and if the original is destroyed, the digital copy together with its metadata is the only thing that remains of the object. Therefore, the approach to preserving digital heritage beyond borders was organised on a system-by-system basis.

Estonia has four digital heritage information systems for which launching them from another location is time critical. In the context of a prolonged war or disaster, launching other information systems from another location should also be considered—for example, for processing archive queries or public access to digital collections—but these use cases are not time-critical.

Initial cost calculations for the preservation service

As of Q1 2025, a total of 14.7 petabytes (PB) of preservation copies would need to be stored outside Estonia's borders, with an indicative annual cost of €352,800 the first year, €376,800 the second year etc.

The annual growth of Estonia's preservation copies is 1.2 PB.

Based on the market research the annual cost of preserving 1 PB of preservation copies is €24,000 euros.

In addition, 11.4 PB of information systems and access copies would need to be preserved, with an indicative annual cost of €2,850,000, increasing by approximately €125,000 per year.

The annual growth of Estonia's access copies is 0,5 PB.

Based on the market research the annual cost of preserving 1 PB of access copies is €250,000.

Estonia has four priority information systems whose launching and operating from another location (e.g., in a wartime scenario) is time critical. The indicative annual cost for launching and operating these four systems from another location is €120,000.

The cost of preserving information systems varies depending on the specific service level requirements of each system.

Additional costs (e.g., monitoring and logging, information security, other services) **must also be mapped separately** during the development of the solution.

The cost of the preservation service will increase annually in proportion to the growth of digital heritage.

If Estonia were to develop its own solution, the minimum cost in the first year would be €3,202,800. In subsequent years, the cost would increase with the volume of digital heritage. If the four priority systems need to be launched from another location, an additional €120,000 per year would be required.

Estonia's example	PB	PB annual growth	Cost of 1 PB (€)	Cost for I year (€)	Cost for II year (€)
Preservation copies	14,7	1,2	24 000	352 800	376 800
Acces copies with IS	11,4	0,5	250 000	2 850 000	2 975 000
TOTAL COST				3 202 800	3 351 800
Launching 4 IS				120 000	120 000
TOTAL COST + launching				3 322 800	3 471 800

Developments in the EU

In a letter to the European Commission dated 28 January 2025, the Estonian Minister of Culture, Ms Heidi Purga, highlighted the urgent need to ensure the sustainable long-term preservation of unique digital heritage and related information systems.

In a letter to Ms. Henna Virkkunen dated 7 July 2025, Ms Heidi Purga **called on the European Commission, in collaboration with the Member States, to explore the possibilities of developing a common cross-border preservation solution for digital heritage at the EU level** through a dedicated EU working group to ensure the long-term preservation of the most valuable part of Europe's digital cultural heritage and the associated information systems.

By Decision C(2021) 4647 of 29/06/2021, the Commission has set up a group of experts *on the common European Data Space for Cultural Heritage* ('CEDCHE'), to provide advice and expertise to the Commission, to monitor the implementation of the revised Recommendation on a European common Data Space and to steer the future development of the Data space and further links with other Data spaces under the Digital Europe Programme.

The main tasks of the CEDCHE are to assist the Commission in relation to the implementation of existing Union legislation, programmes and policies; coordinate with Member States, exchange of views; to contribute to the evolution of the data space and sustainability of Europeana; to support the Commission in defining the general objectives and priorities for actions for the data space under the Digital Europe Programme, in particular by acting as a governance body to support policy related decisions; provide expertise to the Commission when preparing implementing measures, i.e. before the Commission submits these draft measures to a comitology committee.

Estonia presented the proposal on the long-term preservation of digital cultural heritage beyond borders to the European Commission, as well as at the discussion at the Culture Council on digital heritage preservation of 13 May 2025, and at the 8th meeting of the CEDCHE on 21 May 2025. An ad hoc CEDCHE meeting was set up on the 17 July 2025, during which an agreement arose about the **establishment of a dedicated focus group** with representatives from interested Member States within the framework of CEDCHE to explore possible ways forward and next steps regarding the proposal from Estonia.

We highly welcome the fact that DG CONNECT has taken the initiative and established an ad hoc focus group. The focus group is tasked with

- discussing the type of digital heritage assets to be prioritised and criteria for selecting these assets;
- discussing critical information systems to be prioritised and the circumstances under which these systems could be launched;
- identifying, exploring and assessing essential elements of and barriers to such solutions taking into account specific (national) priorities, needs of the participating Member States and the specificities of the cultural heritage sector, building on the work carried out by Estonia;
- identifying existing solutions, initiatives and multi-country collaborations that could be useful;
- exploring possible collaboration between interested and willing Member States;
- assessing the potential feasibility of working together for a pilot solution.

The ad hoc focus group met 1 December 2025. At the same time DG CONNECT launched a survey to map the practices, positions, plans, interests and concerns of the Member States. The survey ended 31 January 2026, and 15 Member States responded.

The survey results were introduced at the second focus group meeting on 26 March 2026. All the Member States, that provided information in the survey, agree, that they **would be interested in exploring and/or participating in a collaboration between Member States for exploring cross-border solutions for long-term preservation in Europe**. The Member States highlighted several very important aspects that require more detailed analysis, such as copyright limitations and licences. It was also emphasised that the issue of long-term preservation of digital cultural heritage is unavoidable and that discussions must continue. Several Member States offered the assistance of their experts and expressed interest in contributing actively.

Since the EU Multiannual Financial Framework (MFF) 2028-2034 discussions are ongoing it is the right time to **strengthen the cooperation and develop similar positions** with likeminded Member States. European Commission is expecting Member States to be proactive and vocal about this matter. Estonia places great importance on safeguarding its cultural heritage. Therefore, the Ministry of Culture of Estonia has included the digitisation of cultural heritage and the long-term preservation of digital heritage in the National Plan of the MFF.

Next steps

To swiftly move forward together on such an important topic, we believe that the focus group established by DG CONNECT should be actively used as the platform, and the following topics should be discussed:

- What are the biggest fears and questions Member States (MS) need answered?
- What is the MVP (Minimum Viable Product) solution MS need, and anything less would be pointless to strive for? What are the essential elements of the MVP solution? Through these discussions we can understand what the common ground for MS is. Do we need preservation of digital heritage objects + metadata in physical data centres or in a cloud service? Do we need preservation of information systems + user copies + metadata and the ability to launch and operate information systems to offer priority services? Is it both in parallel? Is it something else? We can't implement every MS's ideal solution, but we can work towards the solution that has the biggest common interest and could benefit MS the most.
- Legal, copyright and licensing issues and questions – Do these hinder the development of a cross-border service? What can be the solutions?
- Mapping existing solutions, initiatives and multi-country collaborations that could be a part of or serve as an example for the EU solution. DG CONNECT's survey helped identify some initiatives already, but there are more good practices.
- What type of digital heritage assets and/or information systems should be prioritised? What could be the criteria for selection? Decisions and selection of assets should be the responsibility of each MS. But we could discuss the broad criteria or suggestions.
- Scenarios and use cases for assessing the need to launch and provide priority digital heritage services from another location (if this is a solution MS agree on).
- Mapping the heritage assets to be preserved beyond national borders (objects/collections + volumes) + average yearly growth.

- Technology, scalability and flexibility, performance, integration and interoperability, standards, business requirements, SLA (Service Level Agreement) for the preservation solution, security and confidentiality.
- Calculating the price of preservation + launching information systems (or whatever other solution MS agree on). Cost-effectiveness and economic feasibility. Cost model and financing. Sustainability model.
- Potential risks and mitigation measures.
- Potential plan for a pilot project.

Annex. Estonia's position on the copyright matters

The DSM Directive (*Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market*) article 6 introduced an obligation for Member States to establish in their national law an exception in order to allow cultural heritage institutions to make copies of any works or other subject matter that are permanently in their collections, in any format or medium, **for purposes of preservation of such works** or other subject matter and **to the extent necessary for such preservation**.

In Estonia, this is provided in the Copyright Act, which states that a cultural heritage institution may reproduce a work belonging to its collection without the author's consent and without paying remuneration, in order to ensure the preservation of the work and to the extent necessary for that purpose, in any form or on any medium, **including in digital form**.

Point 28 of the DSM Directive says: Cultural heritage institutions do not necessarily have the technical means or expertise to undertake the acts required to preserve their collections themselves, particularly in the digital environment, and might, therefore, have recourse to the assistance of other cultural institutions and other third parties for that purpose. Under the exception for preservation purposes provided for by this Directive, **cultural heritage institutions should be allowed to rely on third parties acting on their behalf and under their responsibility, including those that are based in other Member States, for the making of copies**.

Therefore, across the EU, where the exception has been harmonized, it is in principle possible to use a third party operating in another EU Member State for the preservation of digital heritage. The conditions of the exception must be observed and, **this of course does not mean widespread public access to digital heritage from another location**, but **only storage** on another server for preservation purposes. Files should not be used from the other location in any way other than for preservation.

If digital cultural heritage **information systems**, along with access copies, are **accessed from another location only within their home country and under the same conditions as currently applied**— or even for example, solely **for time-critical activities** and perhaps even only by those cultural heritage institution employees who require access—then this is also consistent with the intent of the DSM Directive. The principle remains the same; the only difference is that the files and information systems are stored in another EU Member State.