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# Policies and Standards for Digitization of Qatar's Culture, Heritage, Media and Social Institutions

## Policy Instrument Proposal

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The Supreme Council of Information & Communication Technology 'ictQATAR'

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## Definitions

2-dimensional artifact	An artifact that carries relevant information on faces in not more than 2 physical dimensions e.g. paintings, maps, printed material etc.
2-dimensional digital conversion center	Institution converting 2-dimensional artifacts into digital format.
3-dimensional artifact or object	An object or artifact that carries relevant information on faces in all three physical dimensions e.g. statues, pots, weapons etc.
3-dimensional digital conversion center	Institution converting 3-dimensional objects or artifacts into digital format.
Artifact	A physical item made by man, in this context having cultural, heritage or social importance.
Audiovisual material	Materials, such as films, mechanical discs and magnetic tape recordings, which present information in audible and pictorial form.
Audiovisual digital conversion center	Institution converting analogue Audiovisual material into digital format.
Asset management	Generalized reference to any solution for manipulation of intellectual property in the form of digital files where the content contained in the files represents an asset of the entity to which it belongs. Content Management System (CMS) and Media Asset Management (MAM) are examples of asset management solutions.
Broadcasting institution	An institution involved in the creation, collection, editing and/or broadcasting of audio and/or video content.
Content management system (CMS)	A software application suite for the management of digital text, image, audio or video assets, such that those can be used to populate pages to be delivered via a website. This application may also perform other distribution or archiving functions.
Digital package identity	A digital package identity relates to sub-packets of information that can form a component to be added to a master identity.
Digital surrogate	A digital version of an object that represents the actual physical object. Used in the context of preservation, the digital surrogate becomes the primary access for information on the object thus reducing the interactions with the actual object and increasing its longevity. It can also be referred to as a digital media object.
DRM	Digital Rights Management.
Dublin core metadata initiative (DCMI)	The Dublin Core metadata terms are a set of vocabulary terms which can be used to describe resources for the purposes of discovery. The terms can be used to describe a full range of web resources: video, images, audio content, web pages etc. and physical resources such as books and objects like artworks.
Hierarchical storage management (HSM)	Includes a policy-based management process for file backup and archiving in a way that uses a software application suite and associated hardware platform containing storage devices economically and

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	<p>without the user needing to be aware of when files are being retrieved from backup storage media. Although hierarchical storage management (HSM) can be implemented as a standalone system, it is more frequently used in the distributed network architecture of an enterprise.</p>
Ingest	<p>The process of transferring content or information located on physical media such as mechanical disc, optical disc or magnetic tape to a digital editing or storage system. The whole process includes conversion of the information from its original format or standard into that used by the digital system, adding metadata, compressing (if required) the digital data stream to reduce the amount of data stored, creating low resolution proxy copies, ensuring and maintaining quality control of the digital package and finally, storing the data as a file on a hard disk prior to transfer into HSM.</p>
Institutions	<p>Any organization involved in creation, collection, preservation, exhibition, promotion and dissemination of culture, heritage, media and social content in the state of Qatar, such as libraries, museums, print media, broadcasting etc.</p>
Interconnectivity	<p>Telecommunications infrastructure designed to connect digital conversion centers and storage facilities for the purpose of transferring content in digital format from point to point.</p>
Local storage	<p>Temporary storage of digitized content at the digital conversion center level before content is sent to long-term storage facilities.</p>
Master identity	<p>This is a name used to identify a unique database object at the top of the logical hierarchy.</p>
MCH	<p>Media, Culture and Heritage.</p>
Media asset management (MAM)	<p>A software application suite for the management tasks, knowledge and decisions surrounding the ingestion, annotation, cataloguing, storage, retrieval and distribution of intellectual property expressed in the form of digital assets.</p>
Metadata	<p>Defined as 'data about data.' The term will be applied to any information that will be represented as digital data and as may be considered relevant for providing technical or descriptive, informative or other information about one or more aspects of an object/data, such as means of creation, purpose, time and date of creation, creator or author, location on a computer network where the data was created, standards used etc.</p>
Metadata dictionary	<p>Reference material that lists in alphabetical order the specific words associated with metadata terms and gives the meaning.</p>
Object	<p>A physical item of natural origins, in this context having cultural, heritage or social importance.</p>
OCR	<p>Optical character recognition is the mechanical or optical conversion of scanned images of handwritten, typewritten or printed text into machine-encoded text.</p>

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Qatar National Library	Refers to the new Qatar National Library which includes Qatar Foundation Library and the old Qatar National Library (previously with the Ministry of Culture, Arts and Heritage).
Storage area network (SAN)	A dedicated network optimized for the purposes of efficiently managing the distribution of data across multiple storage devices and that provides access to consolidated, block level data storage. SANs are primarily used to make storage devices, such as disk arrays, tape libraries, and optical jukeboxes, accessible to servers so that the devices appear like locally attached devices to the operating system.
Storage facility	Institution storing digital content in its premises. In this context, it refers to the new central storage (mainly serving museums, broadcast institutions and institutions without a current storage facility), or to the institutions that already store content in-house, or to both. Storage facility systems include HSM, MAM, CMS, DRM and business recovery systems.
UAP	Unified Access Platform is a web portal providing access to digitized content of Qatari MCH institutions.
Unique item identifier	A unique entry in the database for each and every object being digitized.

## 1 Legal Mandate

Article 3 of Decree Law No.36 of 2004 establishing ictQATAR provides that the objective of the Supreme Council is to regulate the two sectors of Communication and Information Technology and to create an advanced Information Community by preparing a suitable environment of infrastructure and a community capable of using communication and information technologies.

Article 4 of Decree Law no. 2004 establishing ictQATAR acknowledges the Supreme Council of Information and Communication Technology, as the highest competent authority in the affairs of communications and information technology, has the authority and competence necessary for the discharge of such affairs and in particular the authority to regulate and to make policies for the two sectors of Communication and Information Technology in the state of Qatar.

Qatar's National ICT Plan 2015 commits the nation to Increased creation and production of Arabic digital content and content from the Arab region through local media, locally hosted websites, and the digitization of cultural artifacts will be a significant driver of an innovative domestic ICT market. It will also help to establish Qatar as a regional ICT hub, and differentiate it from other countries in the region.

## 2 Introduction

As the State of Qatar transitions to a knowledge-based economy, it seeks to ensure that the nation's path to modernity is rooted in its values and traditions. A key first challenge identified in both the Qatar National Vision 2030 and the Qatar National Development Strategy (2011-2016) is the preservation of Qatar's culture. The National Digitization Plan, outlined in Qatar's National ICT Plan 2015, thus leverages the very tools of modernity in the preservation of Qatar's culture, traditions and heritage. As part of the Digital Content Program, the plan aims to provide incentives for the development of a vibrant digital ecosystem through which future generations can tap into their past and create new expressions of Qatari culture on the global stage. ictQATAR is central to this endeavor because it is mandated with setting the rules that govern this digital frontier through its policies, laws and guidelines.

In the State of Qatar, digitization of material in the culture, heritage, and media arena (i.e. the conversion of material from analogue and physical shapes to digital images and objects in light of ensuring preservation and accessibility) is still in its early phases. The overall digitization levels in the culture, media and heritage sectors are low. Key challenges faced by Qatar to meet higher digitization levels include lack of policies and standards, limited human resource capabilities and technical infrastructure, and inadequate funding for digitization.

A key first step in addressing these challenges is the development of nationwide policies and standards for digitization. This will assist in the adoption of best practices that are key to the success of digitization projects in the media, culture and heritage (MCH) sectors. The MCH digitization policies and standards (henceforth, the Policies and Standards) detailed in this document, will:

- Ensure standardization and optimization of quality of digitized MCH content
- Limit risks of output inefficiencies from sub-optimal handling of such content
- Allow for different institutions to share data and put together joint programs

### 3 Objectives

Digitization of Qatar's culture, heritage, media and social material aims to achieve a series of objectives described below.

- Digitally preserve and document Qatar's culture, heritage and intellectual capital primarily for general interest and secondarily for academic research
- Promote Qatar's culture, heritage and intellectual capital
- Enable wide access to Qatar's culture, heritage and intellectual capital
- Encourage the creation of Arabic digital-born content
- Enable entrepreneurship among young Qatari citizens and Arabs in the digital arena

The primary objective of digitization is to create a digital version of Qatar's culture and heritage for general interest and academic research purposes. It offers an alternative method to capture and preserve historical material that would otherwise have been lost due to natural deterioration or outdated technology preventing the information from being accessed.

The secondary objective of digitization is to promote and enable access to the digital content about Qatar. At a national level, digitization will serve to increase the amount of publicly available information about Qatar's culture and heritage, foster economic development through digital content development, increase the amount of Arabic content on the internet and increase Qatar's recognition as a leader in Arabic-originated digital content.

At an institutional level, digitization will provide simple and robust avenues to preserve and disseminate digital content, provide better security to sensitive content within organizations by addressing or raising key questions related to their storage and access, spearhead the development of new skill sets within the institution and enable better external access to the institution's content collection.



## 4 Scope and Application

The goal of this policy is to provide culture, heritage, media and social institutions in the State of Qatar with a common set of standards that they can adopt when digitizing their material and publishing their digital content. Such digitization initiatives will, when well executed, increase the quality and quantity of content related to Qatar, especially Arabic content, while simultaneously providing a venue for the preservation of material that would otherwise have been lost due to a variety of factors including technology obsolescence, degradation, and neglect.

### 4.1 Material definition and capture methods

There are three major categories of relevant digital materials owned by concerned institutions in the State of Qatar. This document covers the Policies and Standards for the digitization of these three categories of material:

- **Audiovisual material:** Materials, such as video, films and audio recordings, which present information in audio and/or video format and which may have accompanying information in printed form.
  - Capture method: High quality playback and digital capture
  - Output format: Digital audio and video files with associated metadata
- **2-Dimensional objects and artifacts:** Artifact (such as manuscripts, paintings and photographs) and text material (such as letters and books) which present relevant information on not more than two faces.
  - Capture method: High resolution photography and scanning
  - Output format: Digital image and text files with associated metadata
- **3-Dimensional objects:** Materials and objects (such as statues pottery, weapons, scrolls and large books) which require to be viewed in three dimensions to gather all relevant information.
  - Capture method: High resolution video capture (videography) and photography; optional 3-dimensional laser scanning of selected material for academic purposes
  - Output format: Digital video and image files; optional laser data content files with associated metadata

### 4.2 Concerned stakeholders

There are seven types of institutions that own material to be digitized. These institutions are referred to as the media, culture and heritage (MCH) institutions and include:

- **Libraries such as (Qatar National Library):** Institutions owning rich collections of newly published and old heritage books as well as manuscripts, maps and a range of print collections (magazines, gazettes, etc.)
- **Ministries and cultural centers such as (Ministry of Culture, Heritage and Arts and Cultural Innovation Center):** Institutions owning a rich and unique collection of Qatari heritage, including artifacts, archeology, paintings as well as audiovisual historical records.
- **Museums such as (Museum of Islamic Arts, Modern Museum and Sheikh Faisal Museum):** Institutions with highly valuable heritage and modern art collections, including artifacts, archeology, manuscripts, paintings, sculptures, etc.

- Print Media such as (Al Sharq Newspaper, Al Watan Newspaper and Al Raya Newspaper): Information providers mainly including Newspapers, magazines and gazettes.
- News Agencies such as (Qatar News Agency): News gathering agencies with print media material as well as short audiovisual clips.
- Broadcasters such as (Qatar TV, Qatar Radio, Al Rayyan TV): TV and radio broadcasters, whose main collection is formed of audiovisual films and tapes.
- Social interest groups such as (Qatar Photographic Society): Groups of individuals who established a sense of unity on the basis of similar interests and meet to discuss and share ideas and / or amateur work. Relevant materials owned by social interest groups include poetry, literature, artifacts, sculptures, pottery, as well as short videos and audio-history.

Within the broader MCH institutions, three key functional responsibilities are identified: digital conversion centers, storage facilities and a unified access platform. Some of the larger national MCH institutions may provide these functions as services for all MCH institutions. The governance and role of these national entities will be detailed in a separate MCH National Digitization Plan. The Policies and Standards, however, pertain to all MCH institutions engaged across the digitization value chain.

### 4.3 Policy and Standards allocation to key stakeholders

#### 4.3.1 MCH Institutions

The Policies and Standards specifically directed to MCH institutions are detailed in Policy Provisions section, and are covered across the below sub-sections:

- Material Prioritization and Selection (Policy Provision section 5.2)
- Material Preparation (Policy Provision section 5.3)
- Content Rights (Policy Provision section 5.4)
- E-Archiving – Rules for digital content retention and preservations (Policy Provision section 5.7)
- Publishing (Policy Provision section 5.9)
- Policy provision sections applicable to all stakeholders: Security Definition (section 5.10), Human Resource Planning (section 5.13), and Entrepreneurship (section 5.14).

Moreover, MCH institutions with internal conversion capabilities shall also implement Policies and Standards specific to digital conversion centers, and MCH institutions with internal storage capabilities shall implement Policies and Standards specific to storage facilities.

#### 4.3.2 Digital Conversion Centers

Digital conversion centers will provide digital conversion and indexing services to national MCH institutions. The Policies and Standards specifically directed to digital conversion centers are detailed in Policy Provisions section, and are covered across the below sub-sections:

- Content Rights (Policy Provision section 5.4)
- Ingest Facility Planning (Policy Provision section 5.5)
- Technical Conversion (Policy Provision section 5.6)

- Human Resource Planning (Policy Provision section 5.13)
- In addition to Policy provision sections applicable to all stakeholders: Security Definition (section 5.10), Human Resource Planning (section 5.13), and Entrepreneurship (section 5.14).

#### **4.3.3 Storage Facilities**

Storage facilities will ensure long-term preservation and security of digitized content. The Policies and Standards specifically directed to storage facilities are detailed in Policy Provisions section, and are covered across the below sub-sections:

- E-Archiving (Policy Provision section 5.7)
- Content Management (Policy Provision section 5.8)
- Business Continuity and Disaster Recovery (Policy Provision section 5.11)
- Interconnectivity (Policy Provision section 5.12)
- Human Resource Planning (Policy Provision section 5.13)
- In addition to Policy provision sections applicable to all stakeholders: Security Definition (section 5.10), Human Resource Planning (section 5.13), and Entrepreneurship (section 5.14).

#### **4.3.4 Unified Access Platform**

The unified access platform will provide access to institutions' collections in Qatar, promote Qatari heritage and engage community in Qatari culture. It will provide online users seamless access to local and international culture and heritage collections.

The Policies and Standards specifically directed to UAP are detailed in Policy Provisions section, and are covered across the below sub-sections:

- Content Rights (Policy Provision section 5.4)
- Publishing (Policy Provision section 5.9)
- In addition to Policy provision sections applicable to all stakeholders: Security Definition (section 5.10), Human Resource Planning (section 5.13), and Entrepreneurship (section 5.14)

### **4.4 Role of ictQATAR**

ictQATAR will play a major role in developing and updating the Policies and Standards. It will:

- Publish the Policies and Standards for the digitization of MCH material.
- Ensure Policies and Standards are updated within a one year time interval for the first year and every two years afterwards
- Transfer knowledge of Policies and Standards to MCH institutions

## 5 Policy Provisions

### 5.1 Digitization

Digitization includes various operations required for the prioritization and selection, restoration if required, digital conversion, digital file format conversion, storage and retrieval, sharing, dissemination and protection of digital content versions of the physical material in the collection of the concerned institutions.

**5.1.1** MCH digitization stakeholders shall implement digitization over the three phases described below:

- a. Pre-digitization: In this phase, institutions shall categorize their collection, prioritize and select the most critical materials for digitization. The institutions shall also ensure that the materials are stabilized and prepared so that no further physical deterioration of the object happens during the digitization process. Institutions shall gather as much information related to the material being digitized, which will eventually form an integral part of the metadata associated with the digitized version of the physical material.
- b. Digitization: In this phase, digital conversion centers and Institutions shall execute the digital capture and conversion of the physical material. The digital capture methods shall include audio/video playback on legacy equipment, videography, photography and laser scanning, depending on the type of physical material. The digital conversion centers shall use the most appropriate capture method for each type of physical material, as elaborated within this policy document.
- c. Post-digitization: In this phase, storage facilities and Institutions shall ensure the safe storage, security, quality control and integrity of the digital content. The unified access platform and the institutions shall also publish the digitized content, subject to digital rights and permissions, on the internet to ensure highest possible visibility for the digitized content.

**5.1.2** The recommended workflows for each of the phases described above are elaborated in section 6.1, under *Guidelines and References*.

**5.1.3** All stakeholders involved in MCH digitization shall implement the Policies and Standards elaborated within this document, that correspond to their role, to ensure that all digitized content meets the minimum quality standards, interoperability is maintained and digitized content is easily accessible.

### 5.2 Material Prioritization and Selection

Given the limitations of time, resources and digital storage space, it is essential for institutions to prioritize and select the material for digitization.

- 5.2.1** Institutions shall assess the total volume of non-digital material in their collection. Depending on the total volume of material to be digitized, and the available resources for digitization, institutions shall prioritize and select the most critically important physical material for digitization.
- 5.2.2** Institutions shall assess the critical importance, for digitization, of audiovisual material based on the following parameters:
- Genre
  - Age and condition
  - Medium of storage
  - Legacy equipment required for playback
  - Historical and cultural significance
- 5.2.3** Institutions shall assess the critical importance, for digitization, of 2-dimensional and 3-dimensional physical material based on the following parameters:
- Historical and cultural significance
  - Physical condition
- 5.2.4** Institutions shall closely involve and utilize in-house knowledge resources (such as the curator, collection preservation department etc.) to assess the historical and cultural significance of the material, during the prioritization and selection phase, and ensure that the materials selected for digitization meet the criteria to fulfill the objectives of Qatar's National ICT Plan 2015.
- 5.2.5** Institutions shall assign the following digitization priority levels and implement the digitization for each priority level within the timeline stipulated below.
- Very high priority: Digitize in less than 2 years.
  - High priority: Digitize in 2 to 3 years.
  - Medium priority: Digitize in 3 to 5 years.
  - Low priority: Digitize in 5 to 10 years.
- 5.2.6** The recommended guidelines for prioritization, selection of material and assigning of priority levels, as described above, are elaborated in section 6.2, under *Guidelines and References*.

### **5.3 Material Preparation**

A thorough assessment of the condition of material prior to executing digitization is necessary to prevent damage to material or equipment, and danger to the handlers.

- 5.3.1 Broadcasting institutions** (having audiovisual material), shall critically assess the condition of their material selected for digitization and utilize specialist technicians or companies, where necessary, to prepare the material for digitization. Institutions may refer to details described below for more information on assessing the condition of audiovisual material.
- 5.3.1.1** The recommended list of steps and a framework to assess the condition of the media, and the most common types of damage and degradation that affect audiovisual storage media, are elaborated in section 6.3 and 6.4, under *Guidelines and References*.

**5.3.2 Non-broadcasting institutions** shall critically assess the condition of their material selected for digitization to ensure that the digitization process does not, in any way, accelerate or contribute to the degradation of the physical object or artifact.

5.3.2.1 The references for best practices on conservation and preparation of 3-dimensional and 2-dimensional objects and artifacts are available in section 6.7, under *Guidelines and References*.

## 5.4 Content Rights

Content rights management is a business and legal decision making process related to the usage of content. All MCH stakeholders shall be involved in content rights management and shall follow herein the Policies and Standards corresponding to their level of involvement.

Content rights management consists of three key aspects which are detailed below:

**5.4.1 Identification of copyright:** Identify the copyright owner of the content, intellectual property or physical object, along with their digital rights, and record the information within the content. The policies for identification of copyright are as follows.

5.4.1.1 Institutions shall formulate business rules for digital rights management focusing around the key questions listed below.

- a. What is the objective of digitization – digital preservation or publishing?
- b. Once available for publication, to whom will access rights be granted?
- c. For content that is to be published, who owns the publishing rights?
- d. For which medium do publishing rights exist?
- e. For which medium are publishing rights restricted?
- f. Over which period are publishing rights restricted?
- g. What territorial, regional, cultural, diplomatic, political, legal, financial or geographic restrictions regarding publication are in place?
- h. If the institution does not own the publishing rights for the content, is it possible to identify the owner and obtain his/her/their permission for publishing?
- i. Is the value of the content high enough to consider the establishment of rights as a key business requirement?
- j. Does publication present any residual risk that on balance is considered significant?
- k. Will the business decisions on the above questions change in the near future (3 year time frame) and how will it impact the digitization?

5.4.1.2 Institutions shall follow copyright laws, as specified by the Ministry of Justice in the State of Qatar as per Decree Law No. (30) of the year 2006.

5.4.1.3 Digital conversion centers shall embed the copyright ownership information in the metadata of the digitized content. The recommended metadata standard, Dublin Core, facilitates the embedding of copyright information.

5.4.1.4 Digital conversion centers shall implement digital rights identification (such as watermarking, digital tags, digital finger printing etc.) on digitized content to be published. Digital rights identification methods implemented shall not compromise the integrity of the information conveyed by the digital content, but only serve to ensure tracking and identification of the digital content once it is published.

5.4.1.5 Institutions and UAP host/owner shall ensure adherence to copyright provisions when publishing content online. The policies for three common copyright scenarios are described below.

- a. Content for which institution owns the copyright or has permissions for dissemination: Institutions shall facilitate the online sharing of copyright owned/permitted digital content to meet the objectives of the digitization program.
- b. Content for which institution does not own the copyright but is aware of the identity of the copyright owner: Institutions shall contact the copyright owner of the content or physical object as far as is reasonably possible and obtain the necessary permissions prior to publishing. If the owner does not give permission to publish his material, then institutions shall not publish the digital content.
- c. Content for which institution is unaware of or cannot reliably ascertain the copyright ownership: Institutions shall publish such works in good faith and solicit requests from viewers to identify and verify beyond reasonable doubt the copyright owner. Institutions shall also implement processes to streamline user responses and address genuine copyright claims.

5.4.1.6 The guidelines for content rights management and facilitation of content sharing are elaborated in section 6.10, under *Guidelines and References*.

**5.4.2 Implementation of copyright:** Implementation involves ensuring that the identified copyright is respected and due credits are extended to the copyright owners during the dissemination, publishing and usage of digitized content.

5.4.2.1 MCH digitization stakeholders are strongly encouraged to integrate their digitization software platforms and network architecture with content rights management technology or prepare for its future integration.

**5.4.3 Enforcement of copyright:** Enforcement involves a unified effort, usually at a national level, to identify and prosecute copyright infringement. MCH digitization stakeholders shall adopt copyright identification and implementation policies as preparatory steps, eventually facilitating the establishment of the necessary infrastructure for enforcement.

## 5.5 Ingest Facility Planning

5.5.1 Digital conversion centers shall ensure the availability of the following services:

- a. Facility, capability and processes for efficient, safe and reliable collection, short term storage and return of original content and metadata objects from departments within and outside the organization.
- b. Arrangements for safe and secure temporary storage of prepared audiovisual content prior to and after digitization. The recommended storage specifications for audiovisual media are elaborated in section 6.8, under *Guidelines and References*.
- c. Infrastructure and capabilities for storage and asset management. The storage facility details are explained in section 5.7.

- 5.5.2 Digital conversion centers shall ensure that the ingest facility fulfills international and locally accepted standards for safe working conditions for digitization operators including standards for fire, temperature, humidity, sound, electrical safety, equipment specific safety guidelines and other ambient or environmental conditions.
- 5.5.3 Digital conversion centers shall be responsible for maintenance of performance standards, Key Performance Indicators, managing third party preservation or transfer contracts, technical support and training.
- 5.5.4 The recommended list of equipment required in an ingest facility for broadcasting and non-broadcasting institutions, are elaborated in section 6.5, under *Guidelines and References*.

## 5.6 Technical Conversion

- 5.6.1 **Metadata:** Digital conversion centers shall follow the policies described below to capture metadata for the content, object or artifact being digitized.
  - 5.6.1.1 Ensure that all the types of metadata related to the object are compiled and captured during digitization.
  - 5.6.1.2 Adopt and develop their metadata model around standard metadata terms defined by Dublin Core Metadata Initiative (DCMI).
  - 5.6.1.3 Ensure file naming best practices are introduced in order to maintain interoperability. The recommended guidelines for file naming conventions are discussed in section 6.14, under *Guidelines and References*.
  - 5.6.1.4 The recommended metadata standards are elaborated in section 6.9, under *Guidelines and References*.
- 5.6.2 **Audiovisual capture methods:** Audiovisual digital conversion centers shall implement the policies elaborated below to capture audiovisual content in digital formats.
  - 5.6.2.1 All legacy content (i.e. content stored in legacy storage media such as tape, film, disc etc.), selected for digitization, shall be handled carefully and played back on appropriate, well maintained and fit for purpose legacy equipment and ingested into appropriate digital formats.
  - 5.6.2.2 All digital-born content, shall be converted to appropriate file formats and attached with appropriate metadata. The recommendations for audiovisual file formats are listed in section 6.16, under *Guidelines and References*.
  - 5.6.2.3 All legacy metadata in whatever format shall be scanned, photographed or otherwise processed as appropriate into digital files that become a digital package identity component of the master object identity.
- 5.6.3 **2-dimensional artifacts capture methods:** 2-dimensional digital conversion centers shall implement the policies and best practices described below for capture of 2-dimensional artifacts in digital format.
  - 5.6.3.1 Capture high resolution photograph images of all information carrying faces of all 2-dimensional artifacts selected for digitization.



- 5.6.3.2 Capture high resolution scanned images for all 2-dimensional artifacts, where high resolution photography is not relevant, such as books/photographs/negatives in good physical condition. The digital conversion centers shall refer to subject matter experts and specialists to judiciously decide on photography or scanning as the optimal digital capture method for the selected 2-dimensional artifact.
- 5.6.3.3 When high resolution scanning is chosen as the optimal digital capture method, digital conversion centers may also take a photograph of the 2-dimensional artifact to serve as “descriptive metadata”. For more information on “descriptive metadata”, refer to section 6.9, under *Guidelines and References*.
- 5.6.3.4 To facilitate future interoperability benefits to all institutions considering digitization, the digital conversion centers shall follow certain quality control policies. For more information on quality control of digitized material, refer to section 6.12, under *Guidelines and References*.
- 5.6.4 3-dimensional objects and artifacts capture methods:** 3-dimensional digital conversion centers shall implement the policies and best practices elaborated below to capture 3-dimensional objects and artifacts in digital format.
- 5.6.4.1 Capture high resolution, 360°, videos of all 3-dimensional objects and artifacts selected for digitization. Create audio narrations detailing the significance, characteristics, historical context and other important information related to the object or artifact. Attach the narration to the video to create a single file to form the digital version of the object or artifact.
- 5.6.4.2 Capture a high resolution photograph of all 3-dimensional objects and artifacts selected for digitization which will serve as a visual identifier of the object or artifact.
- 5.6.4.3 Capture laser scan data files of selected 3-dimensional objects and artifacts. The digital conversion centers shall judiciously select the 3-dimensional objects and artifacts for laser scanning depending on the need for digital preservation and replication of the object or artifact.
- 5.6.5 eAccessibility Compliance:** Digital conversion centers shall ensure that digital content prepared for dissemination shall comply with Qatar’s eAccessibility Policy (reference: SP110). The key aspects of enabling dissemination content to be eAccessible include addition of assistive technology such as video captioning, audio descriptions of key visual elements etc. The reference for Qatar’s eAccessibility Policy is available in section 6.20, under *Guidelines and References*.
- 5.6.6 Digital conversion centers shall deploy a local storage to ensure that newly digitized content can be stored temporarily prior to transfer to long-term storage. Digitized content shall be transferred to long-term storage within a month period.

## 5.7 E-Archiving

- 5.7.1 Data center:** Storage facilities shall have a data center to house the storage, server and other technology infrastructure necessary for retaining and managing the digitized data content. The storage facilities shall draw on the best practices and standards described below to establish a data center of required capacity.

5.7.1.1 The data center shall conform to key standards and best practices given below:

- a. TIA-942 physical layer data center infrastructure design standards published by Telecommunication Industry Association.
- b. Environmental (temperature, humidity and moisture levels, noise etc.) standards and recommendations in *2011 Thermal Guidelines for Data Processing Environments*, whitepaper by American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
- c. Power requirements as discussed in *Calculating Total Power Requirements for Data Centers*, whitepaper by Richard Sawyer and published by APC (American Power Conversion)/Schneider Electric.
- d. Reliability and tier standards as specified by the Uptime Institute.

**5.7.2 Storage of audiovisual digital content:** Digitized audiovisual content, are extremely large data files which require customized systems. The recommendations for storage of such files are described below.

5.7.2.1 Storage for Audiovisual content shall utilize a hierarchical storage management (HSM) system. The hierarchical storage management system (HSM) shall reside in the data center environment described in section 5.7.1.1 and shall contain the following components

- a. Offline LTO data tape archive with externalization storage space for LTO data tapes
- b. Large, near line disc storage normally operated at no more than 85% maximum capacity
- c. On line disc storage normally operated at no more than 75% maximum capacity
- d. High reliability, high capacity and throughput I/O (input/output) connection
- e. Middleware interface to Media Asset Management systems

5.7.2.2 Storage facilities shall initiate internal process to define institutional content retention time objectives for digitized data in the hierarchical storage management (HSM) system. The recommended content retention policy is described below.

- a. Up to 72 hours of the high priority, most frequently demanded content in the online disc storage
- b. Up to 150 hours of the next highest priority content in the near line disc storage
- c. All other digitized content in the offline data tape archive
- d. Externalization of LTO tapes on a regular basis to be implemented when HSM capacity is normally greater than 95% utilized and even then only as part of a well prepared and constantly rehearsed disaster recovery plan.

5.7.2.3 **Storage of Audiovisual content shall also define user driven rules for transfer of data between various levels of storage in hierarchical storage management (HSM) system.**

**5.7.3 Storage of 3-dimensional content and 2-dimensional object digital files:** Digitized content of 3-dimensional artifacts are video, image and metadata files. Storage facilities shall utilize a combination of disc and tape based storage, attached to a storage area network (SAN) for data storage and access. The solution shall take into account the current availability of storage space at the institution, amount of prioritized objects for digitization and expected timeline of digitization to account for storage expansion needs.

**5.7.4 Retrieval:** Storage facilities shall ensure that the storage application interface and middleware is configured for compatibility with media asset management (MAM) systems or content management systems (CMS), as necessary. For more detailed information on content management, refer to section 5.8.

**5.7.5 Access rights:** Storage facilities shall define a process to identify and implement internal access rights, for each digitized content item, embedded in the content metadata.

5.7.5.1 Storage facilities shall acquire and configure the media asset management (MAM) system to capture access rights defined in the metadata to implement access rights and restrictions to data in disc storage.

5.7.5.2 Storage facilities shall acquire or develop storage interface applications and content management systems (CMS) to implement content access rights and restrictions to data in disc storage.

5.7.5.3 Storage facilities shall implement, in conjunction with the vendor and system integrator teams, strict organizational processes for transfer/backup of content, cataloguing of the backup media, limiting the access to the master records/images/information and maintaining records of individual's access to the master records/images/information.

5.7.5.4 Storage facilities shall implement access rights for published content through the web content management system (CMS), drawing on the access rights defined in the content metadata.

**5.7.6 Digital content retention:** Institutions shall decide the duration of digital file retention during the *Content Prioritization and Selection* phase. The duration of retention of the digital file shall be embedded as a metadata parameter attached to the file (at the digital conversion centers). The retention policy will be implemented by the storage facility through the DRM system . For each item of audiovisual content, 2-dimensional or 3-dimensional object/artifact selected for digitization, the retention policy shall explicitly state one of three retention options for the digital files.

- a. Retain digital files for as long as possible, for digital preservation purposes.
- b. Retain digital files for a specific period, after which the files are to be destroyed (e.g. digital files with publishing copyright permissions for a limited time period or digital files for objects on loan from partner institutions).
- c. Review the decision to retain digital files after a specific time period when, depending on demand for the digital files, the decision to retain or destroy the digital files shall be made.

For option 'c.' (i.e. review digital files after a specific time period), one of the key drivers of assessment shall be the demand and popularity of digital material. The demand shall be assessed by analyzing the user viewership/access of the digital files on the institution's website and any related online platforms for which user analytics are available. The time period after which to review the retention decision of the file shall be judiciously decided by the institution.

Institutions, especially state agencies, shall also ensure that the content retention policies adhere to the Government Information Assurance Policy issued by the state of Qatar.

**5.7.7 Digital content preservation:** Considering the fast pace of changing technology, it is essential to ensure long term preservation of the digital content and protection against loss due to changing technical standards/formats and access methods. Storage facilities shall mandate periodic reviews (minimum of once every 3 years) to assess the changes in digital technology, the impact on the standards and formats adopted for digitization, and implications on future digitization and digital content accessibility.

**5.7.8 Business continuity and disaster recovery:** Storage facilities shall incorporate their business continuity and disaster preparedness strategies during the e-archiving planning and implementation phases. For a more detailed description of business continuity and disaster recovery, refer to section 5.11.

## 5.8 Content Management

**5.8.1 Management of audiovisual digital content:** Storage facilities shall implement a media asset management (MAM) system to access and manage the content in the hierarchical storage management (HSM) storage. The media asset management system (MAM) shall seamlessly interlink the content's data aspects mentioned below.

- a. Main high resolution video
- b. Low resolution viewing video
- c. Multiple audio tracks
- d. Multiple sub-title file languages
- e. Technical metadata
- f. Descriptive metadata
- g. Ancillary metadata
- h. Access rights information
- i. Parental guidance information
- j. EPG synopsis data
- k. Credits information
- l. Other information as may be deemed appropriate as Additional Metadata

The media asset management (MAM) shall also have the capability to seamlessly integrate with a content management functional component which may be either an integral module of the media asset management (MAM) application or an interface to a third party application in order to allow for the publishing of audiovisual content on the internet and on the institution's dissemination platforms such as their intranet.

**5.8.2 Management of 3-dimensional and 2-dimensional object digital files:** Storage facilities shall have content management systems (CMS) to access data in storage and for internet dissemination. Such content management systems (CMS) with internet dissemination functionality shall allow manipulation of the following content aspects:

- a. HTML text
- b. HTML control code
- c. JPEG images
- d. Text and Graphics
- e. Web compatible video files
- f. Web compatible audio files
- g. Downloadable documents
- h. Banner advertisements
- i. Hyperlinks

## 5.9 Publishing

- 5.9.1** Institutions are strongly encouraged to publish digitized content, in line with fulfilling Qatar's national digitization objectives defined in Qatar's National ICT Plan 2015.
- 5.9.2** Institutions are strongly encouraged to integrate digital content as a key aspect of their strategy.
- 5.9.3** Institutions are encouraged to develop their own website for publication of digitized material.
- 5.9.4** Institutions and UAP host/owner shall ensure that their websites fulfill World Wide Web Consortium (W3C) recommendations for website development and dissemination to ensure the best possible browsing experience for the user.
- 5.9.5** Institutions and UAP host/owner shall ensure that their websites comply with Qatar's eAccessibility Policy (ref: SP110) and the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI). The second edition of the W3C Web Content Accessibility Guidelines (WCAG) 2.0 Level AA will be the referenced standard for web accessibility in Qatar until a new international standard is developed superseding this version. See Guidelines (section 16) for more details on Qatar's eAccessibility Policy.
- 5.9.6** Institutions shall be provided with the choice to feature their digitized content collection on the UAP . For the further benefit of the institution, the content on the unified access platform will be linked back to the institution's website thereby increasing the institution's viewership and visibility.
- 5.9.7** Institutions shall actively engage in the content rights management of digitized content, identify copyright owners and embed the copyright information of each digitized content, object or artifact in the metadata. For a more detailed description of content rights management, refer to section 5.4.
- 5.9.8** Institutions shall publish only those digitized material for which they can prove ownership of the copyright or have obtained dissemination rights that facilitate publishing.

- 5.9.9** Institutions and UAP host/owner shall measure the analytics on web platforms used for content dissemination to create user retention and viewership growth strategies. This must be done in adherence to the privacy laws of the State of Qatar.
- 5.9.10** Institutions and UAP host/owner are strongly encouraged to utilize user engagement tools and user feedback solicitation to drive the digitization agenda.
- 5.9.11** Institutions and UAP host/owner are strongly encouraged to follow the guidelines of the Government Information Assurance Policy for securing content.

## **5.10 Security Definitions**

- 5.10.1** MCH digitization stakeholders shall create the security rules and define security parameters that govern the internal and external access to the digitized content. The security definitions will include the institution's department level and employee seniority level access permissions for the content. They will also cover the digitized content's digital copyright status, ownership details and publishing permission, which define the content's access permissions for users outside the institution.
- 5.10.2** MCH digitization stakeholders shall ensure that the content security governance, processes and controls are in line with the policies and procedures defined by the State of Qatar in the Government Information Assurance Policy.
- 5.10.3** MCH digitization stakeholders shall ensure that the defined security rules and security parameters are accurately implemented at the storage facilities and institution's physical and logical access controls.

## **5.11 Business Continuity and Disaster Recovery**

- 5.11.1** Storage facilities and institutions shall assess the impact of a critical business disruptive event and adopt either a business continuity or disaster recovery plan. The difference between business continuity and disaster recovery is described below.
- Business Continuity (BC) describes the processes and procedures an organization puts in place to ensure that essential functions can continue during and after a disaster.
  - Disaster Recovery (DR) refers to the process, policies and procedures that are related to preparing for recovery or continuation of technology infrastructure which are vital to an organization after a natural or human-induced disaster.
- 5.11.2** Storage facilities should apply Business Continuity (BC) and Disaster Recovery (DR) planning over the three stages described below.
- 5.11.2.1 In stage 1**, the storage facilities and institutions shall increase awareness about disaster preparedness by
- Adopting a top down, strategic (not tactical) approach to disaster preparedness.
  - Setting BC/DR recovery time or time-point objectives for all critical systems and processes.
  - Establishing critical backup requirements including people, processes, systems and technology.

- d. Identifying executive management reporting processes that are critical to the storage and the institution. Identifying critical functional human resource roles.
- e. Identifying critical information (printed and electronic)
- f. Identifying critical systems (technologies, processes, communications and workflows)
- g. Identifying critical services (power, water, security etc.)
- h. Identifying third party critical dependencies

5.11.2.2 **In stage 2**, the storage facilities and institutions shall increase confidence in disaster preparedness by

- a. Creating a BC/DR team comprising senior staff members.
- b. Identifying training requirements and creating a formal training plan.
- c. Identifying communications requirements and creating a communications plan
- d. Beginning with paper exercises of high level, loss of critical elements.
- e. Formulating a draft BC/DR plan.
- f. Rehearsing and refining the draft plan.
- g. Engaging with all third parties where a dependency has been identified

5.11.2.3 **In stage 3**, the storage facilities and institutions shall increase the readiness for disaster management by

- a. Establishing critical requirements in the event of a third party dependency suffering a BC/DR event.
- b. Establishing crisis communications processes in the event of a BC/DR plan invocation.
- c. Establishing crisis "blue light service" contacts including police, fire, ambulance etc.
- d. Update, implement and publish the BC/DR plan, and implement associated HR communications plan.
- e. Rehearse, refine and update plan every year for continued improvement.

5.11.3 Storage facilities and institutions shall ensure the integrity of all digital files using suitable CRC programs.

5.11.4 Storage facilities and institutions shall co-ordinate with ictQATAR's Cyber Security Division / (Q-CERT) for training, knowledge transfer and assistance/consultation with implementation of institutional disaster recovery and business continuity plans, and building resilience into the critical infrastructure at the institution.

5.11.5 Storage facilities and institutions shall report all high impact incidents to ictQATAR's Cyber Security Division within 1 hour of identification, so as to coordinate remedial action. High impact incidents require a response that is above and beyond that given to normal incidents. Typically, these incidents require cross-company coordination, management escalation, the mobilization of additional resources, and increased communications.

## 5.12 Interconnectivity

5.12.1 Digital conversion centers and storage facilities must ensure that appropriate and fit for purpose, point to point network interconnectivity between the various conversion centers and the storage facilities is provided.

5.12.2 The network connection must be independent of file format and adopt industry standard transmission protocols.

- 5.12.3** The exact capacity of each network link must be carefully designed based on business driven throughput requirements and average content file size. In addition, each network link must not only be capable of delivering the required content throughput under 'business-as-usual' conditions but be provided with a capacity increase of 50% to cater for times of particularly high workload.
- 5.12.4** Monitoring network usage and ensuring capacities remain optimized over time will be performed by the storage facilities

### **5.13 Human Resource Planning**

- 5.13.1** Audiovisual digital conversion centers shall create a digitization team with the functions and hierarchy as described below, to facilitate the successful execution of digitization.

- Head of digitization operations
  - Digitization operations
    - Operation shift supervision
    - Ingest operations
    - Legacy VTR and film scanner operations
    - Metadata entry operations
  - Technology support
    - Legacy VTR support
    - Broadcast network and infrastructure support
  - Traffic co-ordination
  - Prioritization and Scheduling

- 5.13.2** 3-dimensional and 2-dimensional digital conversion centers shall create / complete their existing digitization team (if any) with the functions and hierarchy as described below, to facilitate the successful execution of digitization.

- Head of digitization operations
  - Workflow co-ordination
  - Logistics/traffic co-ordination
  - Quality management
  - Prioritization and scheduling
  - Scanning and photography execution
  - Classification, ingest and metadata entry

- 5.13.3** Digital conversion centers shall ensure that size of the digitizing team is proportional to the rate of digitization throughput required to digitize the content within requisite time frame.

- 5.13.4** Central storage facilities shall create / complete their existing digitization team (if any) with the functions and hierarchy as described below, to facilitate the successful storage of digitized content.

- Head of operations
- Head of technology
- Storage operations
  - Operation shift supervisor
  - Storage management
  - MAM system supervisor



- Hardware and software platform support
- Special application support
- Interconnectivity management

**5.13.5** All MCH digitization stakeholders shall adopt the following training framework to build internal team skill sets for digitization. Different types of trainings will be applied to storage facilities, digital conversion centers and institutions depending on their needs.

5.13.5.1 All MCH digitization stakeholders shall create a training program outline by executing the steps described below

- Identify the staff across all levels, departments, roles and functions that the digitization project may affect.
- Conduct a training needs analysis
- Identify appropriate training suppliers
- Design appropriate training program and refresher course schedule

5.13.5.2 All MCH digitization stakeholders shall identify the “ Trainers ” within their organizations. They will form the core, ongoing, training team who will train and transfer the necessary skill sets to all the staff identified in the training program outline. The training role is required to be added to the trainers’ job description to ensure permanency of the function.

5.13.5.3 All MCH digitization stakeholders shall include creation of the training program, as per the outline, as a key deliverable of the vendor RFP. This program must include training across all aspects of the digitization project including workflow, technology, digitization implementation, design philosophy, process, support and development.

5.13.5.4 All MCH digitization stakeholders shall implement an internal human resources plan to ensure acceptance and effective adoption of the training.

5.13.5.5 All MCH digitization stakeholders shall co-operate with the vendor to establish, manage, deliver and ensure the quality of a detailed workflow, technical, operational, and process training program. The vendor shall kick start the project by training the selected core training team at the All MCH digitization stakeholders and shall offer continued support required during the initial phase of the project.

5.13.5.6 All MCH digitization stakeholders shall ensure that the training program is not only for the implementation phase but also for continued training as required during years 1 – 3 of the digitization project.

## 5.14 Entrepreneurship

- 5.14.1 All MCH digitization stakeholders shall employ Qatari Human resources across key digitization roles, where Qataris' unique, and deep-rooted, understanding of local heritage and culture is of major value. See guidelines for more details on roles to be considered.
- 5.14.2 All MCH digitization stakeholders shall promote Qatari entrepreneurs by adopting their solutions to support digitization and dissemination of Arabic content.
- 5.14.3 All MCH digitization stakeholders shall promote Qatari entrepreneurship, throughout digitization projects. In that perspective, Qatari talents and services shall be employed across various steps of the digitization process.
- 5.14.4 The details on the roles, innovations, functions and services to be considered in promoting Qatari entrepreneurship is elaborated in section 6.21, under *Guidelines and References*.