Software Architecture Document

Master Repository of Computing History Artifacts Information
MARECHAI

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Version 1.1

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Revision History

Version	Description of Versions / Changes	Responsible Party	Date
1.0	Initial version	Natalia Portillo	2019/08/18
1.1	Renamed to Marechai and DiscImageChef renamed to Aaru	Natalia Portillo	2020/05/23

Approval Block

Version	Comments	Responsible Party	Date

Table of Contents

Master Repository of Computing History Artifacts Information - Software Architecture Document

1. Introduction

This document provides a high level overview and explains the architecture of the Marechai systems (that is, web and mobile applications, as well as metadata and database schemas).

The document defines goals of the architecture, the use cases supported by the system, architectural styles and components that have been selected. The document provides a rationale for the architecture and design decisions made from the conceptual idea to its implementation.

1.1. Purpose

The Software Architecture Document (SAD) provides a comprehensive architectural overview of the Master Repository of Computing History Artifacts Information (Marechai). It presents a number of different architectural views to depict the different aspects of the system.

1.2. Scope

The scope of this SAD is to explain the architecture of the Distributed Development Monitoring and Mining system.

This document describes the various aspects of the Marechai systems design that are considered to be architecturally significant. These elements and behaviors are fundamental for guiding the construction of the Marechai systems and for understanding this project as a whole.

1.3. Definitions, Acronyms, and Abbreviations

- **Artifact:** Refers to any element registered in the database. It can be physical, or digital only.
- **Component:** The physical element that compose a physical artifact.
- **Dump:** The digital representation of the contents of a software artifact. Can be generated from a physical artifact (e.g. an installation disc, or a game cartridge), or from a digital artifact (e.g. an installation package).
- **Inventory:** The cataloguing of physical artifacts belonging to an entity like a museum, society or collector.
- **Machine:** A turing-complete physical artifact, existing or at least prototyped, that allows the execution of software, user or manufacturer provided. It englobes typical concepts like computers, videogame consoles, arcade systems, smartphones, etc.
- **Screenshot:** An image representing the execution of a software artifact.

1.4. History

The Marechai project started in 2002 as a database of old computer specification, implemented in PHP. The second version of the database and front end was launched publicly the 24th of December of 2003 in http://museum.claunia.com, with moderate success. In 2004 the third version started development, but it halted due to the lack of resources.

Since then, the launch of the Wikipedia, and several computer museums, with their own websites, changed the fundamental needs for the archival and representation of information about the history of computing.

In 2017 the new version of the Marechai database was designed and started to be implemented in ASP.NET at a slow pace. This is the version described in this document.

1.5. Overview

In order to fully document all the aspects of the architecture, the Software Architecture

Document contains the following subsections.

Section 2: to be filled

2. Architectural Goals and Constraints

There are some key requirements and system constraints that have a significant bearing on the architecture. They are:

1. All the systems will be in an OSI certified open source license. However it's development will be kept private to the developers until it arrives a phase secure enough for other users to experiment with it without complaining about known issues, or missing features, that are already in the backlog.

2. The web application will be implemented using the C# language for the backend, and JavaScript for the frontend. It is to run under .NET Core in a Linux environment or Docker container.

3. The mobile applications will be implemented using the C# language under the Xamarin frameworks.

4. The web frontend should not use any bloated framework (like Angular or Vue) but can use libraries or frameworks like Bootstrap and jQuery.

5. All the systems should be user agnostic, so they can be used by any museum or private collector.

3. Description of systems

The purpose of this section is to describe the various systems that comprise the Marechai projects, as well as sister projects that help fullfil the same objectives.

3.1. Main systems

3.1.1. Web application

The web application system shall provide end users with a view and description of computing history artifacts, including but not limited to, computing companies facts and history, machines and components specifications and photos, software descriptions and screenshots, and important persons history.

It shall also provide internal users, like museum curators and technicians, with a private asset inventory, repair log and auditing system.

3.1.2. Mobile application

The mobile application system shall provide end users access to the public part of the web application, in an offline way, similar to other applications like MacTracker or Intel ARK.

3.1.3. Metadata sidecar

The metadata sidecar specification is the specification for a file that contains several metadata about a digital artifact, that can accompany copies of it, and contains information about the artifact, its contents, and how it was obtained.

It is currently hosted at https://www.github.com/claunia/CICMMetadata and supported for creation of media dumps by Aaru.

3.2. Sister projects

3.2.1. Aaru

Aaru is an opensource application designed as a complete management tool of media dumps. It can create dumps from physical media, analyze, convert and hash them, and in a few cases, list the files contained in such dumps.

It is, as of the writing of this document, the only known implementation of the Lisa filesystem, besides the Lisa operating system itself, and was used by the Computer History Museum to recover the historic source code of the Lisa operating system.

It is currently hosted at https://www.github.com/aaru-dps.

4. Web application

This section describes the components that make the web application system and their relationships.

4.1. User

A user is any person that access the application. It can be an anonymous user, that is, not logged in, limited to read-only access to the information in the database, or a user with role, whose access to certain parts of the database is determined by their role.

Also the parts of the database accessible by anonymous users shall be configurable by the system administrator.

Any anonymous user shall be able to register, getting an automatic role as defined by the system administrator, and any registered and logged in user shall have the option to remove its account.

All personal data of a registered user shall comply with the GDPR rules, that is, but not limited to, the data must be stored encrypted at rest, not shared with third parties unless explicitly allowed by the user, and removed completely and irrecoverabily at the user will.

User login is controlled by ASP.NET Identity.

4.2. Role

A role is a series of permissions of access and/or modification to certain parts of the system and its database applied to registered users.

Roles are controlled by ASP.NET Identity.

This list of roles is in no way complete. New roles can be added to this documentation as needed.

4.2.1. Uberadmin

The uberadmin is the maximum role. It corresponds to the system administrator and gives all permissions, both access and modification, to all parts of the system and its database.

4.2.2. Writer

The writer is the role that gives an user permission to write new data about an artifact in the database, for example, the history of a company. It can also modify existing data, and approve suggestions of modifications and additions that come from a basic user.

An uberadmin is the only role that can give the *Writer* role.

Modifications of data by the writer are stored in the database as deltas, but do not require approval to be applied to the main tables.

4.2.3. Proofreader

The proofreader is the role that gives an user permission to correct textual data about an artifact in the database. It is expected to be someone with demonstrated proficiency in the main language of the system (usually American English, *en-US*).

Uberadmin and writer are the only roles that can give the *Proofreader* role.

This role can only modify textual data, not relationships or specifications.

Modifications of textual data by the proofreader are stored in the database as deltas, but do not require approval to be applied to the main tables.

4.2.4. Translator

The translator is the role that gives an user permission to propose a translation of the textual data about an artifact on the database, or the elements of the system itself. It has assigned one or several languages, different from the main language of the database.

This role can create a new translation, on any of its assigned languages, from any of its assigned languages or from the main language of the database, of any textual data assigned to an artifact or of any text element from the system.

This role can also proofread textual data assigned to artifacts that is in any of its assigned languages.

Modifications created by a translator are hold on approval by a supertranslator role.

Any registered user can ask to become a translator by requesting to translate textual data assigned to an artifact to a language they choose, but not a text element from the system.

The translator role can only be assigned by a uberadmin, or by a supertranslator that has assigned any of the corresponding translator languages.

4.2.5. Supertranslator

The supertranslator is the role that gives an user permission to create a translation of the textual data about an artifact on the database, or the elements of the system itself. It has assigned one or several languages, different from the main language of the database.

This role can create a new translation, on any of its assigned languages, from any of its assigned languages or from the main language of the database, of any textual data assigned to an artifact or of any text element from the system.

This role can also proofread textual data assigned to artifacts that is in any of its assigned languages.

This role can also approve changes proposed by a translator, that are in any of its assigned languages.

Modifications created by a supertranslator are stored as deltas in the databases and applied to the main tables without approval.

Any translator can be promoted to supertranslator.

A registered user can be a supertranslator in a set of languages, but only a translator in any other set of non-overlapping languages.

A uberadmin can promote any translator to a translator of any language.

A supertranslator can promote any translator as a supertranslator of any language it has assigned.

4.2.6. Collaborator

The collaborator is the role that gives an user permission to propose adding or modifying an artifact in the database.

This role can create a new artifact of any type in the database (except for inventory and repairs), or modify the data from any existing artifact (except for inventory and repairs), as well as upload any photography or scan of any existing artifact.

Additions, modifications and uploads from a collaborator are hold on approval by a curator role.

Any registered user can ask to become a collaborator by requesting to add an artifact, modify the data about an existing artifact, or upload a photography or scan.

The collaborator role can be assigned by a uberadmin or by a curator.

4.2.7. Curator

The curator is the role that gives an user permission to propose adding or modifying an artifact in the database.

This role can create a new artifact of any type in the database (except for inventory and repairs), or modify the data from any existing artifact (except for inventory and repairs), as well as upload any photography or scan of any existing artifact.

Additions, modifications and uploads from a collaborator are stored as deltas in the database and applied to the main tables without approval.

The curator role can be assigned by a uberadmin or by a curator.

4.2.8. Physical curator

The physical curator has the same permissions as a *curator* but its permissions also apply to inventory artifacts.

The physical curator role can be assigned by a uberadmin or by a physical curator.

4.2.9. Technician

The technician is the role that can modify repairs of artifacts in the inventory.

This role can add photographies to a repair, part exchanges or request parts for replacement.

This role is indented to give the possibility of auditing of the whole repair process for physical inventory in a museum or collection.

The technician role can be assigned by a uberadmin or a supertechnician.

4.2.10. Supertechnician

The supertechnician is the role that can create, or close as completed, repairs of artifacts in the inventory.

This role must approve repairs and parts requests.

Also this role has the same permissions as the technician role.

The supertechnician role can only be assigned by a uberadmin.

4.3. User view

The user view is the public part of the system.

It is to be composed of several webpages, organized by artifact types, allowing users to explore the artifacts contained in the database.

Pages should be implemented using Razor, themable throught the usage of Bootstrap and customized CSS.

4.4. Admin view

The admin view is the private part of the system.

The different subsections of this view allow registered users with the appropriate role to modify the artifacts in the database.

The subsections of the view that are visible to a user depends on its roles.

5. Artifacts

The purpose of this section is to describe the various artifacts that are stored in the systems databases. They have a one to one relation to tables of a database or models of the applications. All text is written in American English (aka *en-US*) and latin script by default. The system administrator can choose other language as the primary text language.

When an Id field is not specified, or any other specified field is marked as a primary key, it is implicit that the artifact requires such a field for storage in the database.

Field types in *cursive* represent links to another artifact.

5.1. Book

This artifact represents books about computing.

Field name	Field type	Description
Title	String	Untranslated title in the default system writing script.
NativeTitle	String	Title as written in the book cover.
Published	Date	Date of publication.
Country	*ISO 3166-1 Numeric*	Country of publication.
Synopsis	FullText	Book synopsis, as printed on it.
Isbn	String(13)	International Standard Book Number.
Pages	Short	Number of pages.
Edition	Int	Edition.
Previous	*Book*	Link to previous edition, if applicable.
Next	*Book*	Link to next edition, if applicable.
Source	*Book*	If this book is a derivate (e.g. translation) of another, link to the original.

5.2. Companies by book

This artifact links books and document companies.

Field name	Field type	Description
Company	*Document company*	Link to the document company.
Book	*Book*	Link to the book.

Field name	Field type	Description
Role	*Document role*	Role the document company has in the book.

5.3. Companies by document

This artifact links documents and document companies.

Field name	Field type	Description
Company	*Document company*	Link to the document company.
Document	*Document*	Link to the document.
Role	*Document role*	Role the document company has in the document.

5.4. Companies by magazine

This artifact links magazines and document companies.

Field name	Field type	Description
Company	*Document company*	Link to the document company.
Magazine	*Magazine*	Link to the magazine.
Role	*Document role*	Role the document company has in the magazine.

5.5. Company

This artifact represents a business entity that created other artifacts belonging to computing history. It can be, but not limited to, a manufacturer, software developer, publisher, etc.

Field name	Field type	Description
Name	String	Company legal name, without company type identifier (no Inc., S.A., etc)
Founded	Date	Date when company was legally registered
Website	Url	URL of the latest known company official website.
Twitter	String(45)	Twitter user of the official company Twitter account.

Field name	Field type	Description
Facebook	String(45)	Facebook account number of the official company Facebook account.
Sold	Date	Date the company changed status.
SoldTo	*Company*	Link to the company that acquired this company when it changed status.
Address	String(80)	Last known physical address of the company headquarters.
City	String(80)	City of the last known physical address of the company headquarters.
Province	String(80)	Province or state of the last known physical address of the company headquarters.
Postal code	String(25)	Postal or ZIP code of the last known physical address of the company headquarters.
Country	*ISO 3166-1 Numeric*	Country code where the company is, or was, legally registered.
Status	*Company status*	Current status of the company.
DocumentCompany	*Document company*	Link to the DocumentCompany artifact that is equivalent to this company.

5.6. Company description

This artifact contains a textual description and history, corresponding to a company.

Field name	Field type	Description
Company	*Company*	Company this description belongs to.
Text	IndexedText	Markdown version of the description.
Html	IndexedText	Rendered and cleaned HTML version of the description.

5.7. Company logo

This artifact points to a vectorial representation of the company logo.

Field name	Field type	Description
Company	*Company*	Company this logo belongs to.
Year	Int[1000,3000]	Year the company started usign this logo.
Guid	Guid	GUID used to generate the server side file containing the logo.

5.8. Currency inflation

This artifact lists the known inflations for a currency, allowing to calculate current-day costs given a previously known cost.

Field name	Field type	Description
Currency	*ISO 4217*	Currency.
Year	Year	Indicates this inflation becomes effective that year, respective with the currency value the previous year.
Inflation	Float	The inflation occurred at the specified year.

5.9. Currency pegging

This artifact links pegged currencies, specially when a currency becomes historic and substituted for another, to allow to convert values between them.

Field name	Field type	Description
Source	*ISO 4217*	Source currency.
Destination	*ISO 4217*	Destination currency.
Ratio	Float	Ratio between source and destination currencies.
Start	Date	Date when the pegging became effective.
End	Date	Date when the pegging finished if applicable.

5.10. Document

This artifact represents documents about computing.

Field name	Field type	Description
Title	String	Untranslated title in the default system writing script.

Field name	Field type	Description
NativeTitle	String	Title as written in the document cover.
Published	Date	Date of publication.
Country	*ISO 3166-1 Numeric*	Country of publication.
Synopsis	FullText	Document synopsis.

5.11. Document company

This artifact represents a business entity that created, or published, document artifacts belonging to computing history. It is separate from the *Company* artifact because a document company can publish documents (e.g. books, magazines) while not being exclusively dedicated to computing artifacts.

Field name	Field type	Description
Name	String	Company legal name, without company type identifier (no Inc., S.A., etc).
Company	*Company*	Identifier of the company artifact that is the same legal entity as this document company.
Books	*Companies by book[]*	List of books this document company has published.
Documents	*Companies by document[]*	List of documents this document company has published.
Magazines	*Companies by magazine[]*	List of magazines this document company has published.

5.12. Document person

This artifact represents a person that has participated in the creation of a document artifact.

Field name	Field type	Description
Name	String	Name of this person.
Surname	String	Surname of this person.
Person	*People*	Link to the person artifact.
Alias	String	Alias of this person.

Field name	Field type	Description
DisplayName	String	Name to be displayed for this person.
Books	*People by book[]*	List of books by this document person.
Documents	*People by document[]*	List of documents by this document person.
Magazines	*People by magazine[]*	List of magazines by this document person.

5.13. Document role

This artifact lists all the roles a person or company can have in a document. It is copied from the EPUB specification list of roles, as standard used worldwide by publishers and libraries.

Field name	Field type	Description
Id	String(3)	Id of the role as set in the specification.
Name	String	Role name.
Enabled	Bool	Set if the role is usable, unset if it is historical.

5.14. Dump

This artifact represents the act of taking physical storage media and creating an image file of it. Several dumps can however represent the same media dumps, as this artifact is the act itself, not its results, and different dumps can achieve the same results.

Field name	Field type	Description
Dumper	String	Name or alias of the person that created the dump.
Dumper user	*User*	User in the system of the person that created the dump.
Dumping group	String	Dumping group the person that created the dump belongs to. Specially important for import of DAT files from dumping groups, like TOSEC, No-Intro, etc.
Date	DateTime	Date and time when the dump was done.
Upload date	DateTime	Date and time when the dump was uploaded to the system.
Dump hardware	*Dump hardware[]*	List of hardware used to create the dump.

Field name	Field type	Description
Media	*Media*	Link to the media that was dumped.
Media dump	*Media dump*	Link to the results of the dump.

5.15. Dump hardware

This artifact represents information about the hardware, and software, used to create a dump.

Field name	Field type	Description
Manufacturer	String	Manufacturer of the drive used to read the media, or of the media itself it non-removable.
Model	String	Model of the drive used to read the media, or of the media itself if non-removable.
Revision	String	Revision of the drive used to read the media, or of the media itself if non-removable.
Firmware	String	Firmware version of the drive used to read the media, or of the media itself if non-removable.
Serial	String	Serial number of the drive used to read the media, or of the media itself if non-removable.
Software name	String	Name of the software used to read the media.
Software version	String	Version of the software used to read the media.
Software OS	String	Normalized name and version of the operating system where the software that read the media was run.
Extents	*Extent[]*	List of extents. Blocks in the media not present in the extent where not read at all in the dump.

5.16. Extent

This artifact represents a read extent, that is, a start and end of a read block.

Field name	Field type	Description
Start	Long	First block number of the extent, inclusive.
End	Long	Last block number of the extent, inclusive.
Error	Bool	If set indicates the extent was tried to read but could not be read without errors.

5.17. File

This artifact identifies a computer file, in a unique way, allowing to create file lists from media, dumps, etc.

Field name	Field type	Description
Size	Long	Size in bytes of the file.
Md5	String(16)	MD5 hash of the file contents.
Sha1	String(20)	SHA1 hash of the file contents.
Sha256	String(32)	SHA2-256 hash of the file contents.
Sha3	String(64)	SHA3-512 hash of the file contents.
Spamsum	String	SpamSum fuzzy hash of the file contents.
Mime	String	MIME type of the file.
Magic	String	Identification string as made by libmagic.
AccoustId	String	Accoust ID of the audio contained in the file.
Infected	Bool	If set, the file is infected by, or is, malware.
Malware	String	Name of the malware contained in the file.
Hack	Bool	If set, the file has been hacked, cracked, or its functionality if facilitating the cracking of software. E.g. serial number, key generator, crack patch, etc...
HackGroup	String	Name of the hacking group.

5.18. File data stream

This artifacts represents the data stream contents of a file. That is, normal data, a fork, an extended attribute, or an alternate data stream.

Field name	Field type	Description
Name	String	Name of the data stream. *'NULL'* when it is the default data stream.
Size	Long	Size in bytes of the data stream.
Contents	*File*	Link to the artifact that uniquely identify the contents of this data stream.

5.19. Filesystem

This artifact represents a filesystem contained in a media.

Field name	Field type	Description
Type	String	Filesystem type.
CreationDate	DateTime	Date and time when the filesystem was created.
ModificationDate	DateTime	Date and time when the filesystem was last modified.
BackupDate	DateTime	Date and time when the filesystem was last backed up.
ClusterSize	Int	Size, in bytes, of each cluster or block in the filesystem.
Clusters	Long	Number of clusters or blocks in the filesystem.
FilesCount	Long	Number of files, if known, in the filesystem.
Bootable	Bool	If set, the filesystem is known to contain boot code.
VolumeSerial	String	Filesystem volume serial number.
VolumeName	String	Filesystem volume name.
FreeClusters	Long	Number of free culsters or blocks in the filesystem.
ExpirationDate	DateTime	Date and time when the filesystem expires.
EffectiveDate	DateTime	Date and time when the filesystem becomes effective.
SystemIdentifier	String	System identifier.
VolumeSetIdentifier	String	Volume set identifier.
PublisherIdentifier	String	Publisher identifier.
DataPreparerIdentifier	String	Data preparer identifier.
ApplicationIdentifier	String	Application identifier.
Files	*Media file[]*	Files contained in the filesystem.

5.20. Graphical Processing Unit

This artifact represents a chip, or chipset, whose functionality is the generation of text, bidimensional raster images, bidimensional vectorial images, tridimensional images or raytraced images, to be shown by a machine.

Field name	Field type	Description
Name	String	Commercial name of the graphical processing unit.
Company	*Company*	Identifier of the company artifact that manufactured the graphical processing unit.
Model	String	Model number, SKU or equivalent of this graphical processing unit, if applicable.
Introduced	DateTime	Date of public introduction (sale), minimum value for prototypes and NULL for unknown.
Package	String	If graphical processing unit is a single chip, chip package type.
Process	String	If graphical processing unit is a single chip, chip manufacturing process.
ProcessNm	Float	If graphical processing unit is a single chip, size in nanometers of the manufacturing process.
DieSize	Float	If graphical processing unit is a single chip, size in square milimeters of the die surface area.
Transistors	Long	If graphical processing unit is a single chip, number of transistors, if applicable, that comprise it.
Resolutions	*Resolution[]*	List of resolutions the graphical processing unit can generate.

5.21. Instruction set

This artifact lists the known instruction sets that can be implemented by a processor.

Field name	Field type	Description
Name	String	Name of the instruction set.

5.22. Instruction set extension

This artifact lists the known instruction set extensions that can be implemented by a processor.

Field name	Field type	Description
Name	String	Name of the instruction set extension.

5.23. ISO 3166-1 Numeric

This artifact contains the list of numeric unique identifiers for countries, existing or historic, as defined by the ISO 3166 standard.

Field name	Field type	Description
Id	Short	ISO 3166-1 Numeric country code
Name	String(64)	Country name

5.24. ISO 4217

This artifact lists all currencies, existing and historic, as defined in the ISO 4217 standard.

Field name	Field type	Description
Code	String(3)	Alphanumeric unique identifier for the currency.
Numeric	Int(3)	Numerical unique identifier for the currency.
Minor unit	Int(1)	Number of decimal points to represent minor units.
Name	String	Name of the currency.
Withdrawn	Date	Date the currency become historic.

5.25. ISO 639

This artifact contains the list of unique identifiers for languages, existing or historic, as defined by the ISO 639 standard.

Field name	Field type	Description
Id	Char(3)	ISO 639-3 language code
Part2B	Char(3)	ISO 639-2 Bibliographic language code
Part2T	Char(3)	ISO 639-2 Terminological language code
Part1	Char(2)	ISO 639-1 language code
Scope	Char(1)	Language code scope

Type	Char(1)	Language type
ReferenceName	String(150)	Language reference name
Comment	String(150)	Comment on any of the other columns

5.26. License

This artifact contains the list of software licenses, document licenses, and other copyright authorization licenses.

Field name	Field type	Description
Name	String	License name
SPDX	String	SPDX license identifier
FsfApproved	Bool	Set if license is approved as open-source by the Free Software Foundation
OsiApproved	Bool	Set if license is approved as open-source by the Open Source Initiative
Link	Url	Link to the entity responsible of the license creation
Text	Text(131072)	Full license text

5.27. Logical partition

This artifact represents a logical partition inside a media.

Field name	Field type	Description
Sequence	Int	Partition number.
Name	String	Partition name, if the partition scheme includes it.
Type	String	Partition type.
FirstSector	Long	First sector of the partition.
LastSector	Long	Last sector of the partition.
Size	Long	Size in bytes of the partition.
Description	String	Partition description, if the partition scheme includes it.
Scheme	String	Name of the partition scheme.

Field name	Field type	Description
Filesystems	*Filesystem[]*	List of known filesystems residing in this partition.

5.28. Machine

This artifact represents a turing complete physical machine, typically a computer, videogame console, arcade board, etc.

Field name	Field type	Description
Name	String	Name of the machine.
Company	*Company*	Identifier of the company artifact that manufactured the machine.
MachineType	*Machine type*	Type of machine.
Introduced	DateTime	Date of public introduction (sale), minimum value for prototypes and NULL for unknown.
Family	*Machine family*	Identifier of the machine family this machine belongs to.
Model	String	Model number, SKU or equivalent of this machine, if applicable.
Gpus	*Graphical Processing Unit[]*	List of graphical processing units that came installed from factory with this machine.
Memory	*Memory[]*	List of memory that came installed from factory with this machine.
Processors	*Processor by machine[]*	List of processors that came installed from factory with this machine.
Sound	*Sound synthetizer[]*	List of sound synthetizers that came installed from factory with this machine.
Storage	*Storage by machine[]*	List of storage units that came installed from factory with this machine.
Photos	*Machine photo[]*	List of photographies belonging to this machine that have been uploaded to the system.
Screens	*Screen[]*	List of screens this machine has physically, and inseparably, installed

Field name	Field type	Description
		from factory with this machine.
Documents	*Document[]*	List of documents where this machine is a main topic.
Books	*Book[]*	List of books where this machine is a main topic.
Magazines	*Magazine issue[]*	List of magazines issues where this machine is a main topic.

5.29. Machine family

This artifact represents an aggrupation of machines that are technically the same, side for some configuration, or regional, differences. As an example, the Sega Genesis / Mega Drive family of videogame consoles, or the Apple Powerbook 1400 family of laptop computers.

Field name	Field type	Description
Name	String	Name of the machine family.
Company	*Company*	Identifier of the company artifact that manufactured the machine family members.
Documents	*Document[]*	List of documents where this machine family is a main topic.
Books	*Book[]*	List of books where this machine family is a main topic.
Magazines	*Magazine issue[]*	List of magazines issues where this machine family is a main topic.

5.30. Machine photo

This artifact represents the photographies about a machine that are stored in the system.

Field name	Field type	Description
Author	String	Name of the author of the photo.
CameraManufacturer	String	Manufacturer of the camera.
CameraModel	String	Model of the camera.
ColorSpace	ColorSpace	Colorspace of the photo.

Field name	Field type	Description
Comments	String	User comments for the photo.
Contrast	Contrast	Contrast from EXIF.
CreationDate	DateTime	Date and time the photo was taken.
DigitalZoomRatio	Double	Digital zoom ratio.
ExifVersion	String	EXIF version.
Exposure	String	Exposure time.
ExposureMethod	ExposureMode	Exposure mode from EXIF.
ExposureProgram	ExposureProgram	Exposure program from EXIF.
Flash	FlashMode	Flash mode from EXIF.
Focal	Double	Focal number (F-number).
FocalLength	Double	Focal length in mm.
FocalLengthEquivalent	Ushort	Focal length equivalent for 35mm.
HorizontalResolution	Double	Horizontal resolution.
IsoRating	Ushort	ISO rating.
Lens	String	Lens name.
LightSource	LightSource	Light source from EXIF.
MeteringMode	MeteringMode	Metering mode from EXIF.
ResolutionUnit	ResolutionUnit	Unit for horizontal and vertical resolutions.
Orientation	Orientation	Orientation.
Saturation	Saturation	Saturation from EXIF.
SceneCaptureType	SceneCaptureType	Scene capture type from EXIF.
SensingMethod	SensingMethod	Sensing method from EXIF.
Sharpness	Sharpness	Sharpness from EXIF.
SoftwareUsed	String	Software used in the process of this photo.
SubjectDistanceRange	SubjectDistanceRange	Subject distance range from EXIF.

Field name	Field type	Description
UploadDate	DateTime	Date and time when this photo was uploaded to the system.
VerticalResolution	Double	Vertical resolution.
WhiteBalance	WhiteBalance	White balance from EXIF.
User	User	User that uploaded this photo.
License	License	License that covers the rights for this photo.
Source	Url	URL were this photo was taken from, if not original.
Machine	*Machine*	Machine this photo belongs to.

5.31. Magazine

This artifact represents magazines about computing.

Field name	Field type	Description
Title	String	Untranslated title in the default system writing script.
NativeTitle	String	Title as written in the magazine cover.
Country	*ISO 3166-1 Numeric*	Country of publication.
Synopsis	FullText	Magazine synopsis.
Issn	String(8)	International Standard Serial Number.
FirstPublication	Date	Date when the first issue of the magazine was published.
Issues	*Magazine issue[]*	List of published issues of this magazine.

5.32. Magazine issue

This artifact represents issues from magazines about computing.

Field name	Field type	Description
Magazine	*Magazine*	Link to the magazine information
Caption	String	Untranslated caption in the default system writing script.

Field name	Field type	Description
NativeCaption	String	Original caption in the original writing script.
Published	DateTime	Date and time when this issue was published.
ProductCode	String(18)	EAN or UPC of this magazine issue.
Pages	Short	Number of pages in this magazine.
CoverMedia	*Media[]*	Media included with this magazine issue.

5.33. Mastering texts by media

This artifact represents text written in the physical media itself by the mastering or manufacturer facility.

Field name	Field type	Description
Type	*Mastering text type*	Mastering text type.
Text	String	Mastering text.
Side	Short	Side if applicable.
Layer	Short	Layer if applicable.

5.34. Media

This artifact represents media (disks, tapes, cartridges), that compose a software variant.

Field name	Field type	Description
Title	String	Title as shown in media.
Sequence	Short	Sequence number of media.
LastSequence	Short	Last sequence number in media set.
Type	*Media type*	Type of media.
WriteOffset	Int	In Compact Disc and derivates, the number of bytes of write offset.
Sides	Short	For optical discs, number of written/stamped sides.
Layers	Short	For optical discs, number of layers per side.

Field name	Field type	Description
Sessions	Short	For optical discs, the number of recorded/stamped sessions.
Tracks	Short	For optical discs, the number of recorded/stamped tracks.
Sectors	Long	Total number of sectors in media.
Size	Long	Total number of bytes in media.
CopyProtection	String	Copy protection present in media if applicable.
PartNumber	String	Part number or SKU number.
SerialNumber	String	Serial number from manufacturer when different from part number. This is not the software registration serial number.
Barcode	String	Barcode, if present.
CatalogueNumber	String	Publisher catalogue number.
TableOfContents	*Table of contents[]*	For optical discs, the disc TOC.
Dumps	*Media dump[]*	Known dumps for this media.
Partitions	*Logical partition[]*	Logical partitions on this media.
Manufacturer	String	Media manufacturer.
Model	String	Media model.
Revision	String	Media revision.
Firmware	String	Media firmware version.
Physical block size	String	Physical block size of media when constant.
Logical block size	String	Logical block size of media whe n constant.
Variable block sizes	*Variable block size[]*	List of block sizes per extent.
Storage interface	*Storage interface*	If the media is non-removable from the drive (hard disk, flash drive, PCMCIA card, etc), which interface it uses to connect.

5.35. Media dump

Represents a known dump of a software media.

Field name	Field type	Description
Format	String	Normalized name of the media dump file format.
Image	*Media dump image*	Link to media dump image.
Tracks	*Media dump track image[]*	Link to media dump track image(s).
Files	*Media dump file image[]*	Link to media dump file image(s).
Subchannel	*Media dump subchannel image*	Link to media dump subchannel image.
Dump status flags	*Dump status flags*	Flags giving information about the dump status.

5.36. Media dump file image

Represents the file that contains the data from the dump of a software media, restricted to the data of a single tape file.

Field name	Field type	Description
File sequence	Long	File number.
Partition sequence	Short	Partition number this file resides in.
Filesystems	*Filesystem[]*	List of known filesystems residing in this file.
Size	Long	Size in bytes of the file.
Md5	String(16)	MD5 hash of the file contents.
Sha1	String(20)	SHA1 hash of the file contents.
Sha256	String(32)	SHA2-256 hash of the file contents.
Sha3	String(64)	SHA3-512 hash of the file contents.
Spamsum	String	SpamSum fuzzy hash of the file contents.

5.37. Media dump image

Represents the file that contains the data from the dump of a software media, or in the case of some specific formats, the descriptor for the tracks in such dump.

Field name	Field type	Description
Size	Long	Size in bytes of the file.
Md5	String(16)	MD5 hash of the file contents.
Sha1	String(20)	SHA1 hash of the file contents.
Sha256	String(32)	SHA2-256 hash of the file contents.
Sha3	String(64)	SHA3-512 hash of the file contents.
Spamsum	String	SpamSum fuzzy hash of the file contents.
AccoustId	String	Accoust ID of the audio contained in the file.
HackGroup	String	Name of the hacking group.

5.38. Media dump track image

Represents the file that contains the data from the dump of a software media, restricted to the data of a single Compact Disc track.

Field name	Field type	Description
Track sequence	Short	Track number.
Format	String	Normalized name of the format. BINARY if Intel byte ordering for audio tracks, YRANIB if Motorola byte ordering.
Size	Long	Size in bytes of the file.
Md5	String(16)	MD5 hash of the file contents.
Sha1	String(20)	SHA1 hash of the file contents.
Sha256	String(32)	SHA2-256 hash of the file contents.
Sha3	String(64)	SHA3-512 hash of the file contents.
Spamsum	String	SpamSum fuzzy hash of the file contents.
AccoustId	String	Accoust ID of the audio contained in the file.

Field name	Field type	Description
Subchannel	*Media dump subchannel image*	Link to dump subchannel image for this track only.

5.39. Media dump subchannel image

Represents the file that contains the data from the dump of a software media, restricted to the subchannel data from a Compact Disc, being it the full disc or a single track.

Field name	Field type	Description
Track sequence	Short	Track number.
Subchannel	*Subchannel flags*	Indicates if P, Q, P to W, R to W, etc.
Size	Long	Size in bytes of the file.
Md5	String(16)	MD5 hash of the file contents.
Sha1	String(20)	SHA1 hash of the file contents.
Sha256	String(32)	SHA2-256 hash of the file contents.
Sha3	String(64)	SHA3-512 hash of the file contents.
Spamsum	String	SpamSum fuzzy hash of the file contents.

5.40. Media file

This artifact represents a file as contained in a filesystem.

Field name	Field type	Description
Path	String	Path where the file resides. By default uses '/' as path separator excepts in the cases that's a legal character for filenames in the filesystem.
Name	String	Filename, without path.
PathSeparator	String(1)	If present, indicates which is the path separator character present in path. Should only be present when the path separator is not '/'.
IsDirectory	Bool	If set, indicates this file is a directory. It must not contain a *'NULL'* data stream.
CreationDate	DateTime	Date and time when the file was created.

Field name	Field type	Description
AccessDate	DateTime	Date and time when the file was last opened.
StatusChangeDate	DateTime	Date and time when the file metadata was last changed.
BackupDate	DateTime	Date and time when the file was backed up.
LastWriteDate	DateTime	Date and time when the file was last written or appended.
Attributes	*File attributes*	File attributes.
PosixMode	Short	POSIX permissions mode. ACLs go in data streams.
DeviceNumber	Int	Device number.
GroupId	Long	Identifier of the owner group.
UserId	Long	Identifier of the owner user.
Inode	Long	Unique identifier of the file in the filesystem it resides.
Links	Long	Number of different paths that point to the same file.
DataStreams	*File data stream[]*	Contents of the file, its extended attributes, forks, and alternate data streams.

5.41. Media tag

This artifact represents binary data that is part of a media outside of the normal user area data part. E.g. PFI, DMI, etc.

Field name	Field type	Description
Type	*Media tag type*	Media tag type.
Tag	*File*	Information about the contents of the media tag.

5.42. Memory

This artifact represents primary storage, a.k.a. memory, present in a machine.

Field name	Field type	Description
Type	*Memory type*	Type of memory.
Usage	*Memory usage*	What is the use of the memory in the machine.
Size	Long	Size, in bytes, of the memory.
Speed	Double	Speed, in Hz, of the memory.

5.43. Owned machine

This artifact represents a machine as owned by the system owner (museum, preservation society, etc) or registered users.

Field name	Field type	Description
AcquisitionDate	DateTime	Date the machine was acquired.
LostDate	DateTime	Date when the machine was sold, traded, or otherwise lost.
Status	*Status type*	Status of the machine.
LastStatusDate	DateTime	Last status check date and time.
Trade	Bool	If set, the machine is available for trading with other users.
Boxed	Bool	If set, the user has the original boxing materials.
Manuals	Bool	If set, the user has the original manuals.
SerialNumber	String	Serial number of the machine.
SerialNumberVisible	Bool	If set, the serial number of the machine is visible to other users.
Machine	*Machine*	Link to machine specifications.
User	*User*	Link to owner user artifact.
Gpus	*Graphical Processing Unit[]*	List of graphical processing units that are installed in this machine.

Field name	Field type	Description
Memory	*Memory[]*	List of memory that are installed in this machine.
Processors	*Processor by owned machine[]*	List of processors that are installed in this machine.
Sound	*Sound synthetizer[]*	List of sound synthetizers that are installed in this machine.
Storage	*Storage by owned machine[]*	List of storage units that are installed in this machine.
Photos	*Owned machine photo[]*	List of photographies belonging to this machine that have been uploaded to the system.

5.44. Owned machine photo

This artifact represents the photographies about an owned machine that are stored in the system.

Field name	Field type	Description
Author	String	Name of the author of the photo.
CameraManufacturer	String	Manufacturer of the camera.
CameraModel	String	Model of the camera.
ColorSpace	ColorSpace	Colorspace of the photo.
Comments	String	User comments for the photo.
Contrast	Contrast	Contrast from EXIF.
CreationDate	DateTime	Date and time the photo was taken.
DigitalZoomRatio	Double	Digital zoom ratio.
ExifVersion	String	EXIF version.
Exposure	String	Exposure time.
ExposureMethod	ExposureMode	Exposure mode from EXIF.
ExposureProgram	ExposureProgram	Exposure program from EXIF.
Flash	FlashMode	Flash mode from EXIF.

Field name	Field type	Description
Focal	Double	Focal number (F-number).
FocalLength	Double	Focal length in mm.
FocalLengthEquivalent	Ushort	Focal length equivalent for 35mm.
HorizontalResolution	Double	Horizontal resolution.
IsoRating	Ushort	ISO rating.
Lens	String	Lens name.
LightSource	LightSource	Light source from EXIF.
MeteringMode	MeteringMode	Metering mode from EXIF.
ResolutionUnit	ResolutionUnit	Unit for horizontal and vertical resolutions.
Orientation	Orientation	Orientation.
Saturation	Saturation	Saturation from EXIF.
SceneCaptureType	SceneCaptureType	Scene capture type from EXIF.
SensingMethod	SensingMethod	Sensing method from EXIF.
Sharpness	Sharpness	Sharpness from EXIF.
SoftwareUsed	String	Software used in the process of this photo.
SubjectDistanceRange	SubjectDistanceRange	Subject distance range from EXIF.
UploadDate	DateTime	Date and time when this photo was uploaded to the system.
VerticalResolution	Double	Vertical resolution.
WhiteBalance	WhiteBalance	White balance from EXIF.
User	User	User that uploaded this photo.
License	License	License that covers the rights for this photo.
OwnedMachine	*Owned machine*	Owned machine this photo belongs to.

5.45. People by book

This artifact links books and document people.

Field name	Field type	Description
Person	*Document person*	Link to the document person.
Book	*Book*	Link to the book.
Role	*Document role*	Role the document person has in the book.

5.46. People by document

This artifact links documents and document people.

Field name	Field type	Description
Person	*Document person*	Link to the document person.
Document	*Document*	Link to the document.
Role	*Document role*	Role the document person has in the document.

5.47. People by magazine

This artifact links magazines and document people.

Field name	Field type	Description
Person	*Document person*	Link to the document person.
Magazine	*Magazine*	Link to the magazine.
Role	*Document role*	Role the document person has in the magazine.

5.48. People

This artifact stores information about people that has been important in the computing history.

Field name	Field type	Description
Name	String	Person name.
Surname	String	Person surname.
ContryOfBirth	*ISO 3166-1 Numeric*	Person country of birth (use historic, if applicable).

Field name	Field type	Description
BirthDate	Date	Date of birth.
DeathDate	Date	Date of death if applicable.
Webpage	Url	Official webpage.
Twitter	String	Official Twitter handle.
Facebook	String	Official Facebook handle.
Photo	Guid	GUID that uniquely identifies the photo of this person that is stored in the system.
DocumentPerson	*Document person*	Link to document person artifact.
Alias	String	Alias name for the person.
DisplayName	String	Name to be displayed for the person.

5.49. Processor

This artifact represents the chip, or chipset, that processes the data, inputs and outputs, or basically, runs the turing machine.

Field name	Field type	Description
Name	String	Commercial name of the processor.
Company	*Company*	Identifier of the company artifact that manufactured the processor.
Model	String	Model number, SKU or equivalent of this processor, if applicable.
Introduced	DateTime	Date of public introduction (sale), minimum value for prototypes and NULL for unknown.
Speed	Double	Nominal sustained speed of the processor. This field can change in the link with a *machine*.
Package	String	If processor is a single chip, chip package type.

Field name	Field type	Description
Gprs	Int	Number of general purpose registers, that is, registers used for storage and calculations with integer numbers.
GprSize	Int	Size, in bits, of the general purpose registers.
Fprs	Int	Number of floating point registers, that is, registers used for storage and calculations with floating point numbers.
FprSize	Int	Size, in bits, of the floating point registers. If this value is positive, but the number of FPRs is 0, means floating point numbers of the specified bits are stored in the general purporse registers.
Cores	Int	Number of simultaneous executing complete cores.
ThreadsPerCore	Int	Number of simultaneous threads each core can execute.
Process	String	If processor is a single chip, chip manufacturing process.
ProcessNm	Float	If processor is a single chip, size in nanometers of the manufacturing process.
DieSize	Float	If processor is a single chip, size in square milimeters of the die surface area.
Transistors	Long	If processor is a single chip, number of transistors, if applicable, that comprise it.
DataBus	Int	Size in bits of the external data bus.
AddrBus	Int	Size in bits of the external address bus.
SimdRegisters	Int	Number of registers designated

Field name	Field type	Description
		for SIMD calculations.
SimdSize	Int	Size of registers designated for SIMD calculations. If this has a positive value, but the number of registers is zero, it means SIMD calculations are executed in the FPRs (or the GPRs if they are zero).
L1Instruction	Float	Size in kibibytes of the L1 instruction cache.
L1Data	Float	Size in kibibytes of the L1 data cache.
L2	Float	Size in kibibytes of the L2 cache.
L3	Float	Size in kibibytes of the L3 cache.
InstructionSet	*Instruction set*	Instruction set implemented by this processor.
InstructionSetExtensions	*Instruction set extension[]*	List of extensions of the instruction set implemented by this processor.

5.50. Processor by machine

This artifact links a processor artifact and a machine artifact.

Field name	Field type	Description
Processor	*Processor*	Link to processor.
Machine	*Machine*	Link to machine.
Speed	Float	Speed, in MHz, the linked processor runs at in the linked machine.

5.51. Processor by owned machine

This artifact links a processor artifact and an owned machine artifact.

Field name	Field type	Description
Processor	*Processor*	Link to processor.
OwnedMachine	*Owned machine*	Link to owned machine.
Speed	Float	Speed, in MHz, the linked processor runs at in the linked owned machine.

5.52. Resolution

This artifact represents a graphical resolution characteristics, to be generated by a graphical processing unit.

Field name	Field type	Description
Width	Int	Width of the resolution.
Height	Int	Height of the resolution.
Colors	Long	Number of simultaneous colors in the resolution.
Palette	Long	Number of colors available non simultaneously in the resolution.
Chars	Bool	If set, width and height indicate text characters. If not, they indicate pixels.
Grayscale	Bool	If set, colors and palette refer to number of shades of gray.

5.53. Screen

This artifact represents a physical screen.

Field name	Field type	Description
Width	Double	Width of the visible area of the screen in mm.
Height	Double	Height of the visible area of the screen in mm.
Diagonal	Double	Diagonal of the visible area of the screen in inches.
NativeResolution	*Resolution*	Native resolution of the screen.
EffectiveColors	Long	Maximum number of effective colors the screen can show.
Type	String	Screen physical type.
Resolutions	*Resolution[]*	List of resolutions supported by the screen.

5.54. Software family

This artifact identifies software, and englobes all different platforms, regional and language, or other variations of the software, that are finally published, distributed, or otherwise prototyped.

Field name	Field type	Description
Name	String	Name of the software family.
Introduction	Date	Date the software was first distributed in any way, or special values for never published prototypes.
Companies	*CompaniesBySoftware[]*	Companies that participated in the creation and/or distribution of the software.
People	*PeopleBySoftware[]*	People that participated in the creation and/or distribution of the software.
Versions	*Software version[]*	Versions of this software.
Parent	*Software family[]*	Software family this software family is a direct derivate, or continuation from.

5.55. Software variant

This artifact represents a specific distributed variant of a software version. A variant can be a different language, an upgrade only variant, a port to another platform, etc.

Field name	Field type	Description
Name	String	Name of the software variant.
Version	String	Software version number, if different from the parent *SoftwareVersion.*
Introduction	Date	Date this variant of the software was first distributed in any way, or special values for never published prototypes.
Companies	*CompaniesBySoftware[]*	Companies that participated in the creation and/or distribution of this variant of

Field name	Field type	Description
		the software.
People	*PeopleBySoftware[]*	People that participated in the creation and/or distribution of this variant of the software.
Parent	*Software variant*	Software variant this variant is a direct derivate from.
Architectures	*Instruction set[]*	Instruction set architectures this software variant runs on.
Languages	*ISO 3166-1 Numeric[]*	Languages this variant runs on.
RequiredProcessors	*Processor[]*	List of minimum required processor to run this variant.
RequiredGpus	*Graphical Processing Unit[]*	List of minimum required graphical processing units to run this variant.
RequiredSoundSynths	*Sound synthetizer[]*	List of sound synthetizers supported by this variant.
RequiredMemory	Long	Minimum required available primary memory for running this variant, in bytes.
RequiredStorage	Long	Minimum required available secondary storage, not including the installation media, for running this variant, in bytes.
RequiredOperatingSystem	*Software version[]*	Minimum required operating system versions this software variant requires to run.
RequiredSoftware	*Software version[]*	Software versiosn that this variant requires to install, or run. This field shall not be an operating system except when this variant is another operating system and the old

Field name	Field type	Description
		one will be upgraded to this version/variant.
MachineFamilies	*Machine family[]*	List of machines families this software variant runs on.
Machines	*Machine[]*	List of machines this family is restricted to run on. E.g. operating system versions that are locked to install on specific machines only.
InstallerFiles	*Standalone installer[]*	Files that make the installer, when distribution is purely digital (but not a disk image), or network install.
Media	*Media[]*	Media that makes the software variant, or when distribution is a digital disk image.
PartNumber	String	Part number or SKU number.
SerialNumber	String	Serial number from manufacturer when different from part number. This is not the software registration serial number.
ProductCode	String	Product code, as present in barcode, if applicable.
CatalogueNumber	String	Publisher catalogue number.
DistributionMode	*Distribution mode*	How is the software variant distributed.

5.56. Software version

This artifact identifies a specific software version.

Field name	Field type	Description
Name	String	Name of the software version.

Field name	Field type	Description
Codename	String	Software codename.
Version	String	Software version number.
Introduction	Date	Date this version of the software was first distributed in any way, or special values for never published prototypes.
License	*License*	License of this version of the software.
Companies	*CompaniesBySoftware[]*	Companies that participated in the creation and/or distribution of this version of the software.
People	*PeopleBySoftware[]*	People that participated in the creation and/or distribution of this version of the software.
Previous	*Software version*	Next known version of this software.
Next	*Software version*	Previous known version of this software.
Variants	*Software variant[]*	Variants of this software version.

5.57. Sound synthetizer

This artifact represents a chip, or chipset, whose functionality is the generation of sounds from a machine.

Field name	Field type	Description
Name	String	Commercial name of the processor.
Company	*Company*	Identifier of the company artifact that manufactured the sound synthetizer.
ModelCode	String	Model number, SKU or equivalent of this sound synthetizer, if applicable.
Introduced	DateTime	Date of public introduction (sale), minimum value for prototypes and NULL for unknown.
Voices	Int	Number of PCM voices the sound synthetizer can generate simultaneously.
Frequency	Double	Sample rate in Hz.
Depth	Int	Sample resolution in bits.

Field name	Field type	Description
SquareWave	Int	Number of square wave generators in the sound synthetizer.
WhiteNoise	Int	Number of white noise generators in the sound synthetizer.
Type	*SoundSynthType*	Type of sound synthetizer.

5.58. Standalone installer

This artifact represents the file, or set of files, used to install software, when it does not come as a media.

Field name	Field type	Description
Path	String	Relative path, where the file is.
Name	String	Filename, without path.
PathSeparator	String(1)	If present, indicates which is the path separator character present in path. Should only be present when the path separator is not '/'.
IsDirectory	Bool	If set, indicates this file is a directory. It must not contain a *'NULL'* data stream.
DataStreams	*File data stream[]*	Contents of the file, its extended attributes, forks, and alternate data streams.

5.59. Storage by machine

This artifact represents a secondary storage, usually a disk drive, installed on a machine.

Field name	Field type	Description
Type	*Storage type*	Storage type.
Interface	*Storage interface*	Interface the storage uses to connect to the machine.
Capacity	Long	Capacity, in bytes, of the storage.

5.60. Storage by owned machine

This artifact represents a secondary storage, usually a disk drive, installed on a owned

machine.

Field name	Field type	Description
Type	*Storage type*	Storage type.
Interface	*Storage interface*	Interface the storage uses to connect to the machine.
Capacity	Long	Capacity, in bytes, of the storage.

5.61. Software variant by media by magazine

This artifact represents the software that is included in magazine media, as it was usually the case.

Field name	Field type	Description
Path	String	Relative path, where the software resides inside the magazine media. NULL if the whole media belongs to the software.
Software	*Software variant*	Link to the software variant.
Media	*Media*	Link to the media included as cover in the magazine issue.
Magazine	*Magazine issue*	Link to the magazine issue.

5.62. Table of contents

This artifact represents the table of contents of an optical disc.

Field name	Field type	Description
TrackNumber	Int	Track number.
SessionNumber	Int	Session number.
FirstSector	Long	First sector of the track, inclusive of any pregap.
LastSector	Long	Last sector of the track, inclusive of any postgap.
TrackType	*TrackType*	Track type.

5.63. Variable block size

This artifact represents an extent of media that has a constant block size, but can be different from another extent in the same media.

Field name	Field type	Description
Start	Long	First sector, inclusive, of this extent.
End	Long	Last sector, inclusive, of this extent.
Size	Long	Size in bytes of the blocks contained in this extent.

6. Enumerations

The purpose of this section is to describe the various enumerations that help to classify the artifacts

6.1. Status type

This enumeration lists the status an owned machine can have.

Value	Description
Unknown	The status of the owned machine is unknown.
TestedGood	The last time the owned machine was tested it was working correctly.
NotTested	The owned machine has never been tested.
TestedBad	The last time the owned machine was tested it presented several problems.

6.2. Company status

This enumeration lists the status of a company.

Value	Description
Unknown	The status of the company is unknown or not set.
Active	The company exists and is active.
Sold	The company was sold, totally or partially.
Merged	The company merged with another to form a third company.
Bankrupt	The company legally filled for bankruptcy.
Defunct	The company ceased operations for reasons different to bankruptcy.
Renamed	The company was renamed, possibly with a change of intentions.

6.3. Machine type

This enumeration lists the types of machines.

Value	Description
Unknown	Unknown machine type.

Value	Description
Computer	Computer.
Console	Videogame console.
Arcade	Arcade board. Can be a single game board, or a multiple game board.
Pda	Personal digital assistant. Also modern tablets fall in this category.
Smartphone	Personal digital assistant with integrated phone capabilities.

6.4. Memory type

This enumeration lists the types of primary storage.

Value	Description
Unknown	The type of the memory is unknown or not set.
DRAM	Dynamic RAM
FPM	Fast page mode DRAM
EDO	Extended Data Out DRAM
VRAM	Dual-ported video DRAM
SDRAM	Synchronous DRAM
DDR	DDR SDRAM
DDR2	DDR SDRAM v2
DDR3	DDR SDRAM v3
DDR4	DDR SDRAM v4
DDR5	DDR SDRAM v5
RDRAM	Rambus DRAM
SGRAM	Synchronous Graphics RAM
PSRAM	Pseudostatic RAM
SRAM	Static RAM
ROM	Read-only memory

Value	Description
PROM	Programmable ROM
EPROM	Erasable and programmable ROM
EEPROM	Electronically-erasable and programmable ROM
NAND	NAND flash
NOR	NOR flash
ReRAM	Resistive RAM
CBRAM	Conductive-bridging RAM
DWM	Domain-wall memory
NanoRAM	Nano-RAM
Millipede	Millipede memory
FJG	Floating Junction Gate RAM
PunchedPaper	Punched paper
DrumMemory	Drum memory
MagneticCore	Magnetic-core
PlatedWire	Plated wire memory
CoreRope	Core rope memory
ThinFilm	Thin-film memory
Twistor	Twistor memory
Bubble	Bubble memory

6.5. Memory usage

This enumeration lists the kind of uses for primary storage.

Value	Description
Unknown	The use of the memory is unknown or not set.
Bootloader	Contains a boot loader (usually read-only) whose only function is to load the next memory (firmware or cartridge).
Firmware	Contains hardware initialization code, some (or many) low level

Value	Description
	calls and code to load software from secondary storage.
Work	Memory used by software running in the machine.
Video	Memory used by the graphics processing units.
Sound	Memory used by the sound synthetizers.
Wavetable	Memory used to store wave tables.
StorageBuffer	Memory used as a buffer from secondary storage.
Save	Memory used to save arbitrary data and possibly also configuration.
Configuration	Memory used to save only configuration.
Unified	Memory accessible directly to any of the processors in the machine, including graphical processing units and sound synthetizers.

6.6. Storage type

This enumeration lists the types of secondary storage.

Value	Description
Empty	The interface is empty.
Unknown	The type of storage is unknown or not set.
MagnetoOptical	Unknown type of magneto-optical drive.
HardDisk	Generic hard disk drive.
Microdrive	IBM/Hitachi Microdrive
ZonedHardDisk	Generic zoned hard disk drive.
FlashDrive	Generic flash drive.
CompactDisc	Compact Disc.
DDCD	Double-Density Compact Disc.
PD650	PD650
DVD	DVD
DVDRAM	DVD-RAM

Value	Description
HDDVD	HD DVD
Bluray	Blu-ray
EVD	Enhanced Versatile Disc
FVD	Forward Versatile Disc
HVD	Holographic Versatile Disc
CBHD	China Blue High Definition
HDVMD	High Definition Versatile Multilayer Disc
VCDHD	Versatile Compact Disc High Density
SVOD	Stacked Volumetric Optical Disc
FDDVD	Five Dimensional disc
LD	LaserDisc
LDROM	LaserDisc with digital data (Pioneer variation)
LDROM2	LaserDisc for LD-ROM^2 PAC
LVROM	LaserVision with digital data (Philips variation)
MegaLD	LaserDisc for Mega LD PAC
MD	MiniDisc
MDData	MiniDisc Data
MDData2	MiniDisc Data 2
HiMD	HiMD
UDO	UDO
UDO2	UDO 2
PlayStationMemoryCard	PlayStation memory card
PlayStationMemoryCard2	PlayStation 2 memory card
PS1CD	PlayStation Compact Disc
PS2CD	PlayStation 2 Compact Disc
PS2DVD	PlayStation 2 DVD

Value	Description
PS3DVD	PlayStation 3 DVD
PS3BD	PlayStation 3 Blu-ray
PS4BD	PlayStation 4 Blu-ray
UMD	PlayStation Portable Universal Media Disc
XGD	Xbox Game Disc
XGD2	Xbox 360 Game Disc
XGD3	Xbox 360 Game Disc (later variant)
XGD4	Xbox One Game Disc
MEGACD	Sega MegaCD (Sega CD) Compact Disc
SATURNCD	Sega Saturn Compact Disc
GDROM	Sega/Yamaha GD-ROM
SegaCard	Sega game card
HuCard	Hudson Soft game card
SuperCDROM2	Super CD-ROM^2
JaguarCD	Jaguar Compact Disc
ThreeDO	3DO Compact Disc
PCFX	NEC PC-FX Compact Disc
NeoGeoCD	SNK Neo-Geo Compact Disc
Floppy	8” floppy
Minifloppy	5¼” floppy
Microfloppy	3½” floppy
AppleFileWare	Apple FileWare floppy
Bernoulli	Iomega Bernoulli
Bernoulli2	Iomega Bernoulli (2nd generation)
Ditto	Iomega Ditto
DittoMax	Iomega Ditto MAX

Value	Description
Jaz	Iomega JAZ
Jaz2	Iomega JAZ (2nd generation)
PocketZip	Iomega Clik! (aka PocketZip)
REV120	Iomega REV (120Gb variant)
REV70	Iomega REV (70Gb variant)
REV35	Iomega REV (35Gb variant)
ZIP100	Iomega ZIP (100Mb variant)
ZIP250	Iomega ZIP (250Mb variant)
ZIP750	Iomega ZIP (750Mb variant)
CompactCassette	Philips Compact Cassette
Data8	Data8 cassette
MiniDV	MiniDV cassette
CFast	CFast memory card
CompactFlash	CompactFlash memory card
CompactFlashType2	CompactFlash memory card (type 2)
EZ135	Syquest EZ135
EZ230	Syquest EZ230
Quest	Syquest Quest
SparQ	Syquest SparQ
SQ100	Syquest SQ100
SQ200	Syquest SQ200
SQ300	Syquest SQ300
SQ310	Syquest SQ310
SQ327	Syquest SQ327
SQ400	Syquest SQ400
SQ800	Syquest SQ800

Value	Description
SQ1500	Syquest SQ1500
SQ2000	Syquest SQ2000
SyJet	Syquest SyJet
FamicomGamePak	Nintendo Famicom Game Pak
GameBoyAdvanceGamePak	Nintendo Game Boy Advance Game Pak
GameBoyGamePak	Nintendo Game Boy Game Pak
GOD	Nintendo Gamecube Optical Disc
N64DD	Nintendo 64 Disk Drive
N64GamePak	Nintendo 64 Game Pak
NESGamePak	Nintendo Entertainment System Game Pak
Nintendo3DSGameCard	Nintendo 3DS Game Card
NintendoDiskCard	Nintendo Famicom Disk Card
NintendoDSGameCard	Nintendo DS Game Card
NintendoDSiGameCard	Nintendo DSi Game Card
SNESGamePak	Super Nintendo Entertainment System Game Pak and Super Famicom Game Pak
SNESGamePakUS	Super Nintendo Entertainment System Game Pak (USA variant)
WOD	Nintendo Wii Optical Disc
WUOD	Nintendo Wii U Optical Disc
SwitchGameCard	Nintendo Switch Game Card
MemoryStick	Memory Stick
MemoryStickDuo	Memory Stick Duo
MemoryStickMicro	Memory Stick Micro
MemoryStickPro	Memory Stick Pro
MemoryStickProDuo	Memory Stick Pro Duo
microSD	microSD memory card

Value	Description
miniSD	miniSD memory card
SecureDigital	SecureDigital memory card
MMC	MultiMediaCard memory card
MMCmicro	MMCmicro memory card
RSMMC	RS-MMC memory card
MMCplus	MMCplus memory card
MMCmobile	MMCmobile memory card
eMMC	eMMC memory card
MO120	Generic 120mm magneto-optical
MO90	Generic 90mm magneto-optical
MO300	Generic 300mm magneto-optical
MO356	Generic 356mm magneto-optical
CompactFloppy	3” floppy
DemiDiskette	4” floppy
Floptical	3½” floppy with optical technology by Insite
HiFD	3½” floppy with optical technology by Sony
QuickDisk	2.8” floppy
UHD144	3½” floppy with optical technology by Caleb
VideoFloppy	2” floppy with analogue video
Wafer	Rotronics Wafadrive
ZXMicrodrive	Sinclair ZX Microdrive
BeeCard	BeeCard
Borsu	Borsu
DataStore	DataStore
MiniCard	MiniCard
Orb	Castlewood Orb

Value	Description
Orb5	Castlewood Orb (2nd generation)
SmartMedia	SmartMedia memory card
xD	xD memory card
XQD	XQD memory card
DataPlay	DataPlay
LS120	3½” floppy with optical technology by Imation
LS240	3½” floppy with optical technology by Imation (2nd generation)
FD32MB	3½” standard floppy formatted with optical technology by Imation
RDX	RDX interchangable disk interface
PunchedCard	Punched paper

6.7. Storage interface

This enumeration lists the interfaces a machine can provide for connection of secondary storage.

Value	Description
Unknown	The interface for storage is unknown or not set.
ACSI	Atari Computer System Interface.
ATA	AT attachment.
XTA	XT attachment.
ESDI	Enhanced Small Disk Interface.
SCSI	Small Computer System Interface.
USB	Universal Serial Bus.
FireWire	FireWire.
SASI	Shugart Associates System Interface.
ST506	Seagate ST-506 interface.
IPI	Intelligent Peripheral Interface.

Value	Description
SMD	Storage Module Device.
SATA	Serial ATA.
SSA	Serial Storage Architecture.
DSSI	Digital Storage Systems Interconnect.
HIPPI	High Performance Parallel Interface.
SAS	Serial Attached SCSI.
FC	Fibre Channel.
PCIe	PCI Express.
M2	M.2
SataExpress	SATA Express.

6.8. ColorSpace

This enumeration lists the photo color spaces defined by EXIF.

Value	Description
1	sRGB
2	Adobe RGB
4093	Wide Gamut RGB
65534	ICC Profile
65535	Uncalibrated

6.9. Contrast

This enumeration lists the photo contrasts defined by EXIF.

Value	Description
0	Normal
1	Low
2	High

6.10. ExposureMode

This enumeration lists the photo exposure modes defined by EXIF.

Value	Description
0	Auto
1	Manual
2	Auto bracket

6.11. ExposureProgram

This enumeration lists the photo exposure programs defined by EXIF.

Value	Description
0	Not defined
1	Manual
2	Program AE
3	Aperture-priority AE
4	Shutter speed priority AE
5	Creative (slow speed)
6	Action (high speed)
7	Portrait
8	Landscape
9	Bulb

6.12. FlashMode

This enumeration lists the photo flash modes defined by EXIF.

Value	Description
0	No flash.
1	Fired.
5	Fired, return not detected.
7	Fired, return detected.

Value	Description
8	On, did not fire.
9	On, fired.
13	On, return not detected.
15	On, return detected.
16	Off, did not fire.
20	Off, did not fire, return not detected.
24	Auto, did not fire.
25	Auto, fired.
29	Auto, fired, return not detected.
31	Auto, fired, return detected.
32	No flash function.
48	Off, no flash function.
65	Fired, red-eye reduction.
69	Fired, red-eye reduction, return not detected.
71	Fired, red-eye reduction, return detected.
73	On, red-eye reduction.
77	On, red-eye reduction, return not detected.
79	On, red-eye reduction, return detected.
80	Off, red-eye reduction.
88	Auto, did not fire, red-eye reduction.
89	Auto, fired, red-eye reduction.
93	Auto, fired, red-eye reduction, return not detected.
95	Auto, fired, red-eye reduction, return detected.

6.13. LightSource

This enumeration lists the photo light sources defined by EXIF.

Value	Description
0	Unknown.
1	Daylight.
2	Fluorescent.
3	Tungsten (incandescent).
4	Flash.
9	Fine weather.
10	Cloudy.
11	Shade.
12	Daylight fluorescent.
13	Day white fluorescent.
14	Cool white fluorescent.
15	White fluorescent.
16	Warm white fluorescent.
17	Standard light A.
18	Standard light B.
19	Standard light C.
20	D55.
21	D65.
22	D75.
23	D50.
24	ISO Studio Tungsten.
255	Other.

6.14. MeteringMode

This enumeration lists the photo metering modes defined by EXIF.

Value	Description
0	Unknown.
1	Average.
2	Center-weighted average.
3	Spot.
4	Multi-spot.
5	Multi-segment.
6	Partial.
255	Other.

6.15. Orientation

This enumeration lists the photo orientations defined by EXIF.

Value	Description
1	Horizontal.
2	Mirror horizontal.
3	Rotate 180°.
4	Mirror vertical.
5	Mirror horizontal and rotate 270° clock-wise.
6	Rotate 90° clock-wise.
7	Mirror horizontal and rotate 90° clock-wise.
8	Rotate 270° clock-wise.

6.16. ResolutionUnit

This enumeration lists the photo resolution units defined by EXIF.

Value	Description
1	None.
2	Inches.
3	Centimeters.

6.17. Saturation

This enumeration lists the photo saturations defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

6.18. SceneCaptureType

This enumeration lists the photo scene capture types defined by EXIF.

Value	Description
0	Standard.
1	Landscape.
2	Portrait.
3	Night.

6.19. SensingMethod

This enumeration lists the photo sensing methods defined by EXIF.

Value	Description
1	Not defined.
2	One-chip color area.
3	Two-chip color area.
4	Three-chip color area.
5	Color sequential area.
7	Trilinear.
8	Color sequential linear.

6.20. SubjectDistanceRange

This enumeration lists the photo subject distance ranges defined by EXIF.

Value	Description
0	Unknown.
1	Macro.
2	Close.
3	Distant.

6.21. WhiteBalance

This enumeration lists the photo white balances defined by EXIF.

Value	Description
0	Auto.
1	Manual.

6.22. Sharpness

This enumeration lists the photo sharpness defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

6.23. Mastering text type

This enumeration lists the types of mastering text.

Value	Description
LotNo	Lot number, usuallly printed or engraved in floppies.
MastSID	Mastering SID code.
MouldSID	Mould SID code.
MastCode	Mastering code, written by laser.
Barcode	Barcode (not BCA) of optical discs, usually Code 39.
Toolstamp	Toolstamp code, engraved.

6.24. Media type

This enumeration lists the type of media. It is maintained in sync with Aaru media type enumeration.

Value	Description
0	Unknown.
1	Unknown magneto-optical
2	Generic hard disk.
3	Microdrive type hard disk.
4	Zone hard disk.
5	USB flash drive.
6	Unknown streamed block tape.
10	Unknown or non-standard Compact Disc
11	Compact Disc Digital Audio (Red Book)
12	CD+G (Red Book)
13	CD+EG (Red Book)
14	CD-i (Green Book)
15	CD-ROM (Yellow Book)
16	CD-ROM XA (Yellow Book)
17	CD+ (Blue Book)
18	CD-MO (Orange Book)
19	CD-Recordable (Orange Book)
20	CD-ReWritable (Orange Book)
21	Mount-Rainier CD-RW
22	Video CD (White Book)
23	Super Video CD (White Book)
24	Photo CD (Beige Book)
25	Super Audio CD (Scarlet Book)
26	Double-Density CD-ROM (Purple Book)

Value	Description
27	DD CD-R (Purple Book)
28	DD CD-RW (Purple Book)
29	DTS audio CD (non-standard)
30	CD-MIDI (Red Book)
31	CD-Video (ISO/IEC 61104)
32	PD650 (ECMA-240, ISO 15485)
33	PD650 WORM (ECMA-240, ISO 15485)
34	CD-i Ready
35	FM-Towns disc
40	DVD-ROM (applies to DVD Video and DVD Audio)
41	DVD-R
42	DVD-RW
43	DVD+R
44	DVD+RW
45	DVD+RW DL
46	DVD-R DL
47	DVD+R DL
48	DVD-RAM
49	DVD-RW DL
50	DVD-Download
51	HD DVD-ROM (applies also to HD DVD Video)
52	HD DVD-RAM
53	HD DVD-R
54	HD DVD-RW
55	HD DVD-R DL
56	HD DVD-RW DL

Value	Description
60	BD-ROM (applies also to Blu-ray video)
61	BD-R
62	BD-RE
63	BD-R XL
64	BD-RE XL
70	Enhanced Versatile Disc
71	Forward Versatile Disc
72	Holographic Versatile Disc
73	China Blue High Definition
74	High Definition Versatile Multilayer Disc
75	Versatile Compact Disc High Density
76	Stacked Volumetric Optical Disc
77	Five Dimensional disc
80	LaserDisc or LaserVision
81	Pioneer LD-ROM
82	Pioneer LD-ROM^2
83	Philips LV-ROM
84	Pioneer MegaLD
90	Sony Hi-MD
91	Sony MiniDisc
92	Sony MiniDisc for Data
93	Sony MiniDisc for Data 2
100	UDO (ECMA-350, ISO 17345)
101	UDO2 (ECMA-380, ISO 11976)
102	UDO2 WORM (ECMA-380, ISO 11976)
110	PlayStation Memory Card

Value	Description
111	PlayStation 2 Memory Card
112	PlayStation Game CD
113	PlayStation 2 Game CD
114	PlayStation 2 Game DVD
115	PlayStation 3 Game DVD
116	PlayStation 3 Game Blu-ray
117	PlayStation 4 Game Blu-ray
118	PlayStation Portable Universal Media Disc (ECMA-365)
119	PlayStation Vita Game Card
130	Microsoft X-box Game Disc
131	Microsoft X-box 360 Game Disc
132	Microsoft X-box 360 Game Disc 2
133	Microsoft X-box One Game Disc
150	Sega CD / Sega MegaCD disc
151	Sega Saturn disc
152	Sega/Yamaha Gigabyte Disc (GD-ROM)
153	Sega/Yamaha Recordable Gigabyte Disc (GD-R)
154	Sega Card
155	MilCD
170	PC-Engine / TurboGrafx cartridge
171	Super CDROM^2
172	Atari Jaguar CD disc
173	3DO disc
174	NEC PC-FX disc
175	Neo-Geo CD disc
176	Commodore CDTV disc

Value	Description
177	Amiga CD32 disc
178	Nuon disc
179	Bandai Playdia disc
180	Apple][5.25” disk, 13 sectors
181	Apple][5.25” disk, 13 sectors, two sides
182	Apple][5.25” disk, 16 sectors
183	Apple][5.25” disk, 16 sectors, two sides
184	Apple 3.5” disk, double density, single side
185	Apple 3.5” disk, double density, double side
186	Apple FileWare 5.25” disk
190	IBM PC 5.25” disk, 8 sectors, single side
191	IBM PC 5.25” disk, 9 sectors, single side
192	IBM PC 5.25” disk, 8 sectors, double side
193	IBM PC 5.25” disk, 9 sectors, double side
194	IBM PC 5.25” disk, high density
195	IBM PC 3.5” disk, double density, 8 sectors, single side
196	IBM PC 3.5” disk, double density, 9 sectors, single side
197	IBM PC 3.5” disk, double density, 8 sectors, double side
198	IBM PC 3.5” disk, double density, 9 sectors, double side
199	IBM PC 3.5” disk, high density
200	IBM PC 3.5” disk, extra density
201	Microsoft DMF 3.5” disk
202	Microsoft DMF 3.5” disk, 82 tracks
203	IBM XDF 5.25” disk
204	IBM XDF 3.5” disk, high density
210	IBM 23FD 8” disk

Value	Description
211	IBM 33FD 8” disk, 128 bytes per sector
212	IBM 33FD 8” disk, 256 bytes per sector
213	IBM 33FD 8” disk, 512 bytes per sector
214	IBM 43FD 8” disk, 128 bytes per sector
215	IBM 43FD 8” disk, 256 bytes per sector
216	IBM 53FD 8” disk, 256 bytes per sector
217	IBM 53FD 8” disk, 512 bytes per sector
218	IBM 53FD 8” disk, 1024 bytes per sector
220	DEC RX01 8” disk
221	DEC RX02 8” disk
222	DEC RX03 8” disk
223	DEC RX50 5.25” disk
230	Acorn 5.25” disk, single density, 40 tracks
231	Acorn 5.25” disk, single density, 80 tracks
232	Acorn 5.25” disk, double density, 40 tracks
233	Acorn 5.25” disk, double density, 80 tracks
234	Acorn 5.25” disk, double density, double sided, 80 tracks
235	Acorn 3.5” disk, double density
236	Acorn 3.5” disk, high density
240	Atari 5.25” disk, single density, single side
241	Atari 5.25” disk, extended density, single side
242	Atari 5.25” disk, double density, single side
243	Atari 3.5” disk, 10 sectors, single side
244	Atari 3.5” disk, 10 sectors
245	Atari 3.5” disk, 11 sectors, single side
246	Atari 3.5” disk, 11 sectors

Value	Description
250	Commodore 1581 3.5” floppy
251	Amiga 3.5” floppy
252	Amiga 3.5” floppy, high density
253	Commodore 1540 5.25” floppy
254	Commodore 1540 5.25” floppy, 40 tracks
255	Commodore 1571 5.25” floppy
260	NEC 8” floppy, single density
261	NEC 8” floppy, double density
262	NEC 5.25” floppy, single density, single side
263	NEC 5.25” floppy, single density, double side
264	NEC 5.25” floppy, high density
265	NEC 3.5” floppy, high density, 77 tracks
266	NEC 3.5” floppy, high density, 80 tracks
267	NEC 3.5” floppy, triple density
268	Sharp 5.25” floppy, high density
269	Sharp 3.5” floppy, high density
270	ECMA-99 5.25” floppy, 8 sectors
271	ECMA-99 5.25” floppy, 15 sectors
272	ECMA-99 5.25” floppy, 26 sectors
273	ECMA-54 8” floppy
274	ECMA-59 8” floppy
275	ECMA-66 5.25” floppy
276	ECMA-69 8” floppy, 8 sectors
277	ECMA-69 8” floppy, 15 sectors
278	ECMA-69 8” floppy, 26 sectors
279	ECMA-70 5,25” floppy

Value	Description
280	ECMA-78 5,25” floppy
281	ECMA-78 5,25” floppy, 9 sectors
290	FDFORMAT 5.25” floppy, double density, 82 tracks, 10 sectors
291	FDFORMAT 5.25” floppy, high density, 82 tracks, 17 sectors
292	FDFORMAT 3.5” floppy, double density, 82 tracks, 10 sectors
293	FDFORMAT 3.5” floppy, high density, 82 tracks, 21 sectors
309	Apricot 3.5” floppy
310	OnStream ADR2120
311	OnStream ADR260
312	OnStream ADR30
313	OnStream ADR50
320	AIT
321	AIT Turbo
322	AIT 2
323	AIT 2 Turbo
324	AIT 3
325	AIT 3 Ex
326	AIT 3 Turbo
327	AIT 4
328	AIT 5
329	AIT E Turbo
330	Super AIT
331	Super AIT 2
340	Iomega Bernoulli
341	Iomega Bernoulli 2
342	Iomega Ditto

Value	Description
343	Iomega Ditto MAX
344	Iomega JAZ
345	Iomega JAZ 2Gb
346	Iomega Clik! / PocketZip
347	Iomega REV 120Gb
348	Iomega REV 70Gb
349	Iomega REV 35Gb
350	Iomega ZIP
351	Iomega ZIP 250Mb
352	Iomega ZIP 750Mb
360	Philips Compact Cassette
361	Data8
362	MiniDV
363	D/CAS-25: Digital data on Compact Cassette form factor, special magnetic media, 9-track
364	D/CAS-85: Digital data on Compact Cassette form factor, special magnetic media, 17-track
365	D/CAS-103: Digital data on Compact Cassette form factor, special magnetic media, 21-track
370	CFast
371	CompactFlash
372	CompactFlash Type 2
380	Digital Audio Tape
381	DAT160
382	DAT320
383	DAT72
384	DDS

Value	Description
385	DDS-2
386	DDS-3
387	DDS-4
390	DEC CompacTape
391	DEC CompacTape II
392	DECtape II
393	DLTtape III
394	DLTtape IIIxt
395	DLTtape IV
396	DLTtape S4
397	Super DLT
398	Super DLT 2
399	VStape I
400	Exatape (15m)
401	Exatape (22m)
402	Exatape AME (22m)
403	Exatape (28m)
404	Exatape (40m)
405	Exatape (45m)
406	Exatape (54m)
407	Exatape (75m)
408	Exatape (76m)
409	Exatape (80m)
410	Exatape (106m)
411	Exatape XL (160m)
412	Exatape (112m)

Value	Description
413	Exatape (125m)
414	Exatape (150m)
415	Exatape (170m)
416	Exatape (225m)
420	ExpressCard (34mm)
421	ExpressCard (54mm)
422	PC-Card Type I
423	PC-Card Type II
424	PC-Card Type III
425	PC-Card Type IV
430	SyQuest EZ135
431	SyQuest EZ230
432	SyQuest Quest
433	SyQuest SparQ
434	SyQuest SQ100
435	SyQuest SQ200
436	SyQuest SQ300
437	SyQuest SQ310
438	SyQuest SQ327
439	SyQuest SQ400
440	SyQuest SQ800
441	SyQuest SQ1500
442	SyQuest SQ2000
443	SyQuest SyJet
450	Nintendo Famicom Game Pak
451	Nintendo Game Boy Advance Game Pak

Value	Description
452	Nintendo Game Boy Game Pak
453	Nintendo Gamecube Optical Disc
454	Nintendo 64 Dynamic Disk
455	Nintendo 64 Game Pak
456	Nintendo Entertainment System Game Pak
457	Nintendo 3DS Game Card
458	Nintendo Disk Card
459	Nintendo DS Game Card
460	Nintendo DSi Game Card
461	Super Nintendo Entertainment System Game Pak
462	Super Nintendo Entertainment System Game Pak (USA)
463	Nintendo Wii Optical Disc
464	Nintendo Wii U Optical Disc
465	Nintendo Switch Game Card
470	IBM3470
471	IBM3480
472	IBM3490
473	IBM3490E
474	IBM3592
480	LTO
481	LTO-2
482	LTO-3
483	LTO-3 WORM
484	LTO-4
485	LTO-4 WORM
486	LTO-5

Value	Description
487	LTO-5 WORM
488	LTO-6
489	LTO-6 WORM
490	LTO-7
491	LTO-7 WORM
510	MemoryStick
511	MemoryStick Duo
512	MemoryStick Micro (M2)
513	MemoryStick Pro
514	MemoryStick Pro Duo
520	microSD
521	miniSD
522	Secure Digital
530	MultiMediaCard
531	MMCmicro
532	RS-MMC
533	MMCplus
534	MMCmobile
540	MLR
541	MLR SL
542	MLR-3
543	SLR
544	SLR-2
545	SLR-3
546	SLR-32
547	SLR-32 SL

Value	Description
548	SLR-4
549	SLR-5
550	SLR-5 SL
551	SLR-6
552	SLRtape7
553	SLRtape7 SL
554	SLRtape24
555	SLRtape24 SL
556	SLRtape40
557	SLRtape50
558	SLRtape60
559	SLRtape75
560	SLRtape100
561	SLRtape140
570	QIC-11
571	QIC-120
572	QIC-1350
573	QIC-150
574	QIC-24
575	QIC-3010
576	QIC-3020
577	QIC-3080
578	QIC-3095
579	QIC-320
580	QIC-40
581	QIC-525

Value	Description
582	QIC-80
590	STK4480
591	STK4490
592	STK9490
593	T9840A
594	T9840B
595	T9840C
596	T9840D
597	T9940A
598	T9940B
599	T10000A
600	T10000B
601	T10000C
602	T10000D
610	Travan
611	Travan Ex
612	Travan 3
613	Travan 3 Ex
614	Travan 4
615	Travan 5
616	Travan 7
620	VXA
621	VXA-2
622	VXA-3
630	5.25” magneto-optical, ECMA-153, ISO 11560, 1024 bytes per sector
631	5.25” magneto-optical, ECMA-153, ISO 11560, 512 bytes per sector

Value	Description
632	3.5” magneto-optical, ECMA-154, ISO 10090, 512 bytes per sector
633	5.25” magneto-optical, ECMA-183, ISO 13481, 512 bytes per sector
634	5.25” magneto-optical, ECMA-183, ISO 13481, 1024 bytes per sector
635	5.25” magneto-optical, ECMA-184, ISO 13549, 512 bytes per sector
636	5.25” magneto-optical, ECMA-184, ISO 13549, 1024 bytes per sector
637	300mm magneto-optical, ECMA-189, ISO 13614
638	300mm magneto-optical, ECMA-190, ISO 13403
639	5.25” magneto-optical, ECMA-195, ISO 13842, 1024 bytes per sector
640	5.25” magneto-optical, ECMA-195, ISO 13842, 512 bytes per sector
641	3.5” magneto-optical, ECMA-201, ISO 13963
642	3.5” magneto-optical, ECMA-201, ISO 13963, embossed
643	3.5” magneto-optical, ECMA-223, 1024 bytes per sector
644	3.5” magneto-optical, ECMA-223, 512 bytes per sector
645	5.25” magneto-optical, ECMA-238, ISO 15486
646	3.5” magneto-optical, ECMA-239, ISO 15498
647	356mm magneto-optical, ECMA-260, ISO 15898
648	356mm magneto-optical, ECMA-260, ISO 15898, double size
649	5.25” magneto-optical, ECMA-280, ISO 18093
650	300mm magneto-optical, ECMA-317, ISO 20162
651	5.25” magneto-optical, ECMA-322, ISO 22092, 4096 bytes per sector
652	5.25” magneto-optical, ECMA-322, ISO 22092, 2048 bytes per sector
653	3.5” magneto-optical, Cherry Book, GigaMO, ECMA-351, ISO 17346
654	3.5” magneto-optical, Cherry Book 2, GigaMO 2, ECMA-353, ISO 22533
660	3” CompactFloppy
661	IBM 4” DemiDiskette floppy
662	Insite 3.5” Floptical, ECMA-207, ISO 14169

Value	Description
663	Sony 3.5” HiFD floppy
664	Mitsumi 3” Quick Disk
665	Caleb 3.5” UHD144 floppy
666	Canon VideoFloppy
667	Wafer
668	ZX Microdrive
670	BeeCard
671	Borsu
672	DataStore
673	DIR
674	DST
675	DTF
676	DTF 2
677	Flextra 3020
678	Flextra 3225
679	HiTC
680	HiTC 2
681	LT-1
682	MiniCard
683	Orb
684	Orb 2
685	SmartMedia
686	xD memory card
687	XQD
688	DataPlay
690	Apple Profile

Value	Description
691	Apple Widget
692	Apple HD20 (not SCSI)
693	Priam Data Tower
694	Apple Pippin disc
700	DEC RA60
701	DEC RA80
702	DEC RA81
703	DEC RC25
704	DEC RD31
705	DEC RD32
706	DEC RD51
707	DEC RD52
708	DEC RD53
709	DEC RD54
710	DEC RK06
711	DEC RK06 (18 bits per word)
712	DEC RK07
713	DEC RK07 (18 bits per word)
714	DEC RM02
715	DEC RM03
716	DEC RM05
717	DEC RP02
718	DEC RP02 (18 bits per word)
719	DEC RP03
720	DEC RP03 (18 bits per word)
721	DEC RP04

Value	Description
722	DEC RP04 (18 bits per word)
723	DEC RP05
724	DEC RP05 (18 bits per word)
725	DEC RP06
726	DEC RP06 (18 bits per word)
730	Imation LS-120 3.5” floppy
731	Imation LS-240 3.5” floppy
732	Sony 3.5” floppy formatted in Imation LS-240 drive
733	RDX
734	RDX 320Gb
740	Hasbro/Tiger VideoNow
741	Hasbro/Tiger VideoNow Color
742	Hasbro/Tiger VideoNow XP

6.25. Dump status flags

This enumeration lists the photo sharpness defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

6.26. Subchannel flags

This enumeration lists the photo sharpness defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

6.27. File attributes

This enumeration lists the photo sharpness defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

6.28. Media tag type

This enumeration lists the photo sharpness defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

6.29. Distribution mode

This enumeration lists the photo sharpness defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

6.30. SoundSynthType

This enumeration lists the photo sharpness defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

6.31. TrackType

This enumeration lists the photo sharpness defined by EXIF.

Value	Description
0	Normal.
1	Low.
2	High.

7. Examples

The purpose of this section is to give real life examples of the artifacts described in the previous sections.