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# Global Digital Format Registry (GDFR) An Interim Status Report

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## Global Digital Format Registry

- “The Global Digital Format Registry (GDFR) will provide sustainable services to collect, review, store, discover, and deliver significant representation information about digital formats.”
  - Centrally-organized collection and review
  - Distributed storage, discovery, and delivery via a peer-to-peer network

## Format and digital preservation

- Preservation is concerned with ensuring *access* to managed digital assets over time
- Thus, preservation activities are focused on
  - Viability
  - Fixity
  - Interpretability
  - Renderability
- The last two are primarily a function of *format*

## What is a format?

- “A serialized encoding of an abstract information model”
- Encompasses the nominal sense of “file format” as well as a range of conceptual entities from the micro to the macro level
  - IEEE 754 floating point number
  - File system

# Without format typing, all content is opaque

```
ffd8ffe000104a46494600010201
008300830000ffed0fb050686f74
6f73686f7020332e30003842494d
03e90a5072696e7420496e666f00
00000078000000000004800480000
000002f40240ffeeffee03060252
0347052803fc0002000000480048
0000000002d80228000100000064
000000010003030300000001270f
0001000100000000000000000000
0000600800190190000000000000
0000000000000000000000000000
00000000000000000000000003842
494d03ed0a5265736f6c7574696f
6e0000000010008313a3000200 ...
```

# Without format typing, all content is opaque

ffd8ffe000104a46494600010201	SOI
008300830000ffed0fb050686f74	APP0 JFIF 1.2
6f73686f7020332e30003842494d	APP13 IPTC
03e90a5072696e7420496e666f00	APP2 ICC
00000078000000000004800480000	DQT
000002f40240ffeeffee03060252	SOF0 183x512
0347052803fc0002000000480048	DRI
0000000002d80228000100000064	DHT
000000010003030300000001270f	SOS
0001000100000000000000000000	ECS0
0000600800190190000000000000	RST0
0000000000000000000000000000	ECS1
000000000000000000000000003842	RST1
494d03ed0a5265736f6c7574696f	ECS2
6e0000000010008313a3000200 ...	...

# Without format typing, all content is opaque

ffd8ffe000104a46494600010201	SOI
008300830000ffed0fb050686f74	APP0 JFIF 1.2
6f73686f7020332e30003842494d	APP13 IPTC
03e90a5072696e7420496e666f00	APP2 ICC
00000078000000000004800480000	DQT
000002f40240ffeeffee03060252	SOF0 183x512
0347052803fc0002000000480048	DRI
0000000002d80228000100000064	DHT
000000010003030300000001270f	SOS
0001000100000000000000000000	ECS0
0000600800190190000000000000	RST0
0000000000000000000000000000	ECS1
000000000000000000000000003842	RST1
494d03ed0a5265736f6c7574696f	ECS2
6e0000000010008313a3000200 ...	...



## GDFR project

- Two DLF-sponsored invitational workshops
  - University of Pennsylvania, January 2003
  - Washington, March 2003
- Provisional data and service models
- Two independent demonstration projects
  - FRED [John Ockerbloom, University of Pennsylvania]  
<http://tom.library.upenn.edu/fred/>
  - FOCUS [Joseph JaJa, University of Maryland]  
<http://www.umiacs.umd.edu/~joseph/focus-archiving06.pdf>



## The GDFR project

- Harvard University Library (HUL) funded for 2 years by the Mellon Foundation
- Staffing and technical work subcontracted by HUL to OCLC (July 2006)
- Project oversight
  - Steering Committee (SC) for policy oversight
  - Technical Working Group (TWG) for technical oversight
  - Active solicitation of the international stakeholder community for review and comment

## Technical Working Group (TWG)

- Bibliothèque nationale de France
- British Library
- California Digital Library
- Digital Curation Centre
- Library of Congress
- National Archives (UK)
- National Archives and Records Administration
- National Library of Australia
- National Library of New Zealand
- Stanford University
- University of Pennsylvania

# Project web site and wiki

<http://www.formatregistry.org>

<https://collaborate.oclc.org/wiki/gdfr/index.php>

The screenshot shows a Mozilla Firefox browser window displaying the GDFR Collaboration Homepage. The browser's address bar shows the URL [https://collaborate.oclc.org/wiki/gdfr/index.php/Main\\_Page](https://collaborate.oclc.org/wiki/gdfr/index.php/Main_Page). The page title is "Main Page - GDFR - Mozilla Firefox". The browser's menu bar includes File, Edit, View, Go, Bookmarks, Tools, and Help. The browser's toolbar shows navigation buttons (back, forward, home, search), a search bar, and a Go button. The page content includes a navigation menu on the left with links to Main Page, Community portal, Current events, Recent changes, Random page, Help, and Donations. The main content area features a search bar, a toolbox with links to What links here, Related changes, Upload file, Special pages, Printable version, and Permanent link, and a main heading "Main Page". The main content area includes a welcome message, a "Getting Help" section, a "Navigation" section, and two sub-sections: "Published" and "Draft". The footer of the page includes the text "This page was last modified 2006-09-13 08:57:57. This page has been accessed 324 times." and links to Privacy policy, About GDFR, and Disclaimers. The page is powered by MediaWiki.

## General development goals

- A generalized registry framework, specialized for the GDFR application
- Globally fault tolerant
- Platform independence
- Open source
- Re-use well-known products and protocols
- Human and machine interfaces
- Localization and accessibility
- Full information content expressible in XML form, and re-instantiatable from that expression

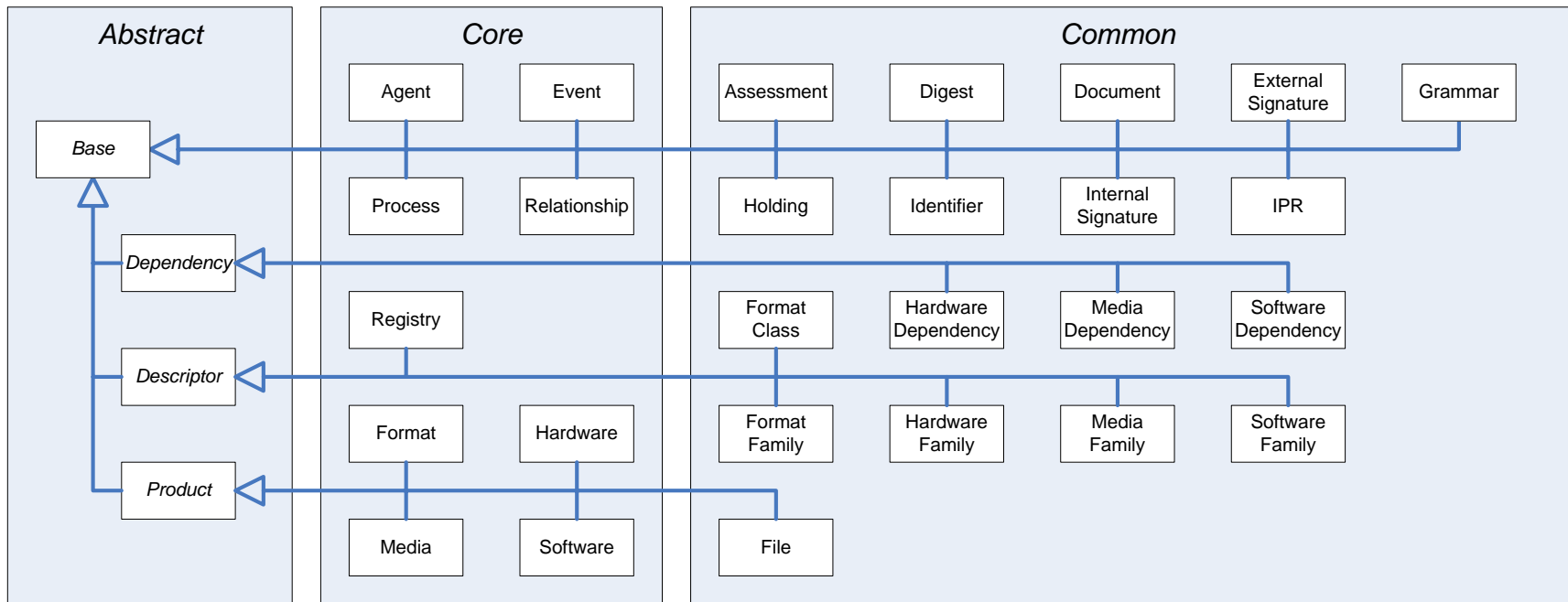
# Format model

- Formal abstraction
  - AIM Abstract information model
    - FCS Format coded set (semantic)
    - FEF Format encoding form (syntactic)
    - FES Format encoding scheme (serialization)
  - SBS Serialized byte stream
- A format is a triple,  $F = (FCS, FEF, FES)$
- Informed by the Unicode character encoding model [www.unicode.org/unicode/reports/tr17/](http://www.unicode.org/unicode/reports/tr17/)

## Data model

- ISO 11179, *Information technology – Metadata registries (MDR)*
- LC Digital Formats Web  
[www.digitalpreservation.gov/formats/](http://www.digitalpreservation.gov/formats/)
- OASIS/ebXML Registry Information Model  
<http://www.ebxml.org/specs/ebRIM.pdf>
- PRONOM  
[www.nationalarchives.gov.uk/pronom/](http://www.nationalarchives.gov.uk/pronom/)
- Representation Information Registry/Repository  
[dev.dcc.ac.uk/twiki/bin/view/Main/DCCRegRepV04](http://dev.dcc.ac.uk/twiki/bin/view/Main/DCCRegRepV04)

# Data model



## Format entity

- Canonical (GDFR) and alias identifiers
- Version
- Description
- Classification
- Relationships
- Disclosure – open, proprietary, closed
- Documentation
- Orientation – text vs. binary
- Byte order



# Taxonomy

Ontological CLASSES, abstract *families*, concrete formats, and **relationships**

BYTESTREAM

IMAGE

STILL

RASTER

*GIF*

GIF87a

GIF89a

**is-new-version-of** GIF87a

*JPEG*

ISO 10918-1

JFIF

**is-extension-of** ISO 10918-1

*TIFF*

TIFF 4.0

TIFF 5.0

**is-new-version-of** TIFF 4.0

TIFF 6.0

**is-new-version-of** TIFF 5.0

TIFF/IT

**is-extension-of** TIFF 6.0

TIFF/IT/CT

**is-subtype-of** TIFF/IT

TIFF/IT/CT/P1

**is-subtype-of** TIFF/IT/CT

## Relationships

- Subtype                      ASCII    **is-subtype-of**    UTF-8
- Extension                    DNG    **is-extension-of**    TIFF 6.0
- Containment                WAVE    **can-contain**     $\mu$ -law
- Equivalence                DXF(ASCII) **is-equivalent-to** DXF(binary)
- Version                      TIFF 6.0 **is-version-of**    TIFF 5.0
- Affinity                      SPIFF    **is-similar-to**    JPEG

## Documentation

- Public domain specifications managed and replicated in the network
- For non-public domain, full bibliographic citation with actionable identifiers
- Mechanism for agents to register locally-held copy with terms of use

## Format entity

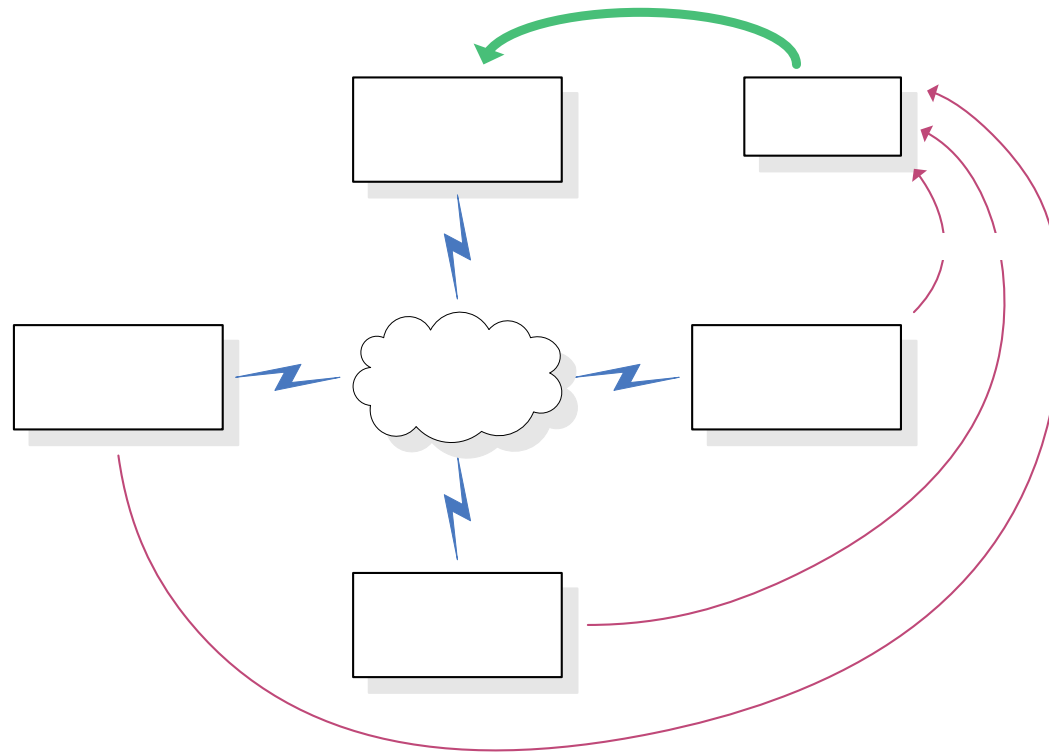
- Internal/external signatures – magic number/file extension
- Grammar – ABNF, BNF, BSDL, DFDL, EAST
- Assessment – LC SQF, OCLC INFORM, DSTC PANIC, VRC
- Release date
- Withdrawal date
- Software, hardware, media dependencies
- Developer
- Support
- Rights

## Service model

- Maintenance
  - Add, review, update, and store representation information
- Patron
  - Manual and automated discovery and delivery of representation information
- Administrative
  - Local management
- Synchronization
  - Global management

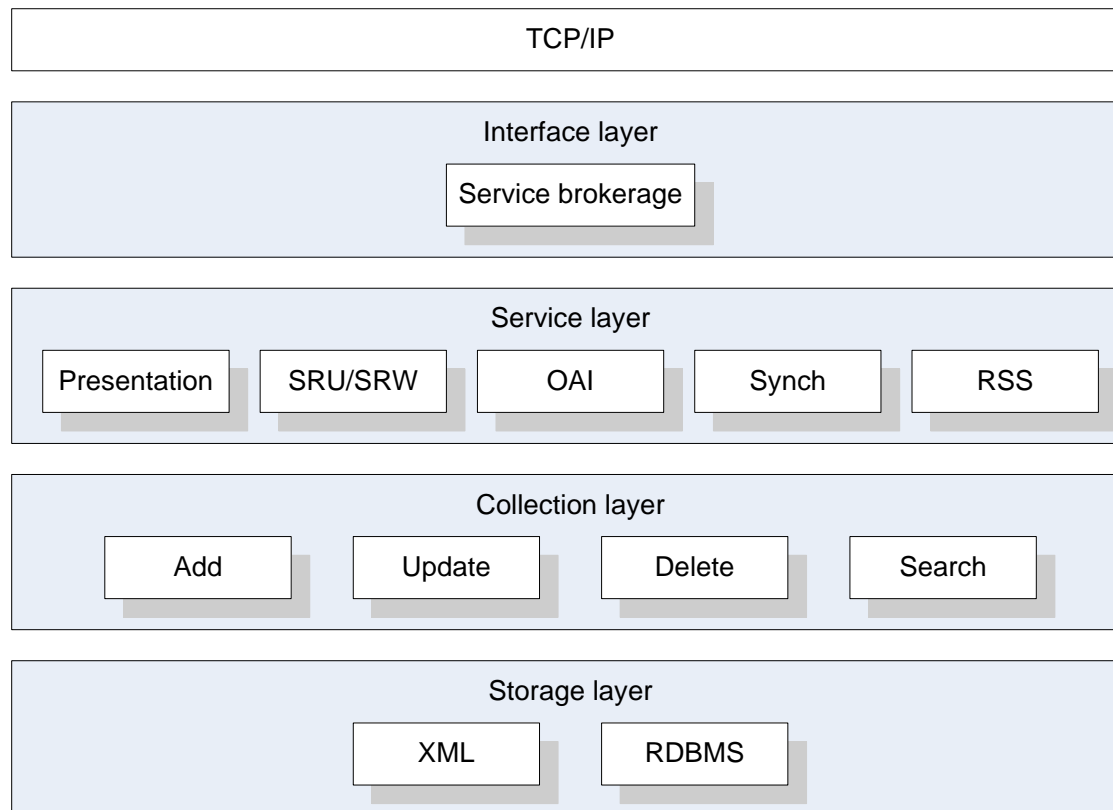
## GDFR network

- Peer-to-peer network communicating over a common protocol



# GDFR node

- Based on the IWSA framework



## Technical review

- RFC 2026, *Internet Standards Process*  
[www.ietf.org/rfc/rfc2026.txt](http://www.ietf.org/rfc/rfc2026.txt)
  - “Iterations of review by the ... community and revision based upon experience”
- Draft distribution and public discussion
- Approval by “area” editors
- Release to the network for distribution



## Governance and succession

At the end of the two year Mellon-funded project, GDFR will be turned over to a long-term policy and maintenance agency

- Harvard will undertake to continue maintenance for up to two years
- Library of Congress has agreed to be a care-taker agency until a permanent body is identified
- NARA GDFR governance investigation

## Summary

- The GDFR is an enabling technology that will support digital repository operations and preservation activities
  - Enables the typing of digital objects at an appropriate level of granularity
  - Enables the future recovery of the syntax and semantics associated with typed digital objects
  - A means to pool and redistribute the expertise of the digital preservation community

## For more information

Presentation and Birds-of-a-Feather (BOF) session  
*DLF Fall Forum*, Boston, 8-10 November 2006

<http://www.formatregistry.org/>

<https://collaborate.oclc.org/wiki/gdfr/index.php>

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