



ASSESSMENT SUMMARY v1.0.0

Multipurpose Internet Mail Extensions (MIME)¹

IETF²

¹ The MIME specification homepage: <https://datatracker.ietf.org/doc/html/rfc2045>

² The development organisation homepage: <https://www.ietf.org/>

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1. INTRODUCTION

The present document is a summary of the assessment of **MIME** carried out by CAMSS using the CAMSS Assessment EIF scenario³. The purpose of this scenario is assessing the compliance of a standard or specification with the European Interoperability Framework (EIF)⁴.

2. ASSESSMENT SUMMARY

MIME is a set of standards and specifications that extend the capabilities of email and web applications to handle various types of content beyond plain text, such as images, audio, video, and binary files. MIME provides a way to specify the type and structure of data within messages or documents, ensuring that different email clients and web browsers can interpret and display the content correctly.

MIME was designed to extend the format of email to support non-ASCII characters, attachments other than text format, and message bodies which contain multiple parts. MIME describes the message content type and the type of encoding used with the help of headers. All manually composed and automated emails are transmitted through SMTP in MIME format.

The first formal specification for MIME, RFC 1341, was published in June 1992 by the Internet Engineering Task Force (IETF). Since then, MIME has undergone several updates and extensions to accommodate the evolving needs of internet communication, including the handling of multimedia content and diverse data types.

2.1. EIF Interoperability Principles

Interoperability principles are fundamental behavioural aspects that drive interoperability actions. They are relevant to the process of establishing interoperable European public services. They describe the context in which European public services are designed and implemented.

The specification fully supports the principles setting context for EU actions on interoperability:

- **Subsidiarity and proportionality**

MIME is included in 5 national catalogues of recommended specifications according to the CAMSS List of Standards⁵. They belong to Croatia, Cyprus, France, Germany, Malta, the Netherlands and Sweden. The National Interoperability Framework (NIF) of France and the Netherlands are fully aligned with at least 2 out of 3 sections of the European Interoperability Framework (EIF) according to the National

³ CAMSS Assessment EIF Scenario 6.0.0: <https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/camss-assessment-eif-scenario/release/600>

⁴ ISA² programme: https://ec.europa.eu/isa2/eif_en

⁵ CAMSS List of Standards: <https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/camss-list-standards>

Interoperability Framework Observatory (NIFO) factsheets⁶. ***The specification supports the principles setting context for EU actions on interoperability:***

- **Openness**

MIME (Multipurpose Internet Mail Extensions) serves various purposes, but it is not related to the publication of public data as open data. Developed in 1991 by the IETF, MIME has become a widely used format for transferring different types of files over the internet, primarily via email. Its extensive adoption by numerous mail software and services, including Gmail⁷, showcases its maturity and market acceptance. MIME's ability to support various file formats makes it highly reusable and suitable for developing a wide range of services and products, and it is often used in conjunction with protocols like SMTP⁸ for internet data exchange.

The development process has been developed by IETF to make it accessible to the different stakeholders and it also includes a public review. IETF has a formal review and approval so that all the relevant stakeholders can formally appeal or raise objections to the development and approval of specifications. Furthermore, like all the IETF standards, this specification is a free and open technical specification, built on IETF standards and licenses from the Open Web Foundation⁹.

In terms of availability, iCalendar is publicly available, as well as its complementary specifications. It is licensed on a royalty-free basis for its implementation or study.

- **Transparency**

MIME serves as a valuable tool for internet-based information sharing among administrations and stakeholders. It enables the exchange of data and information in specific formats, enhancing the visibility of administration data and services. MIME also encourages collaboration between public administrations and streamlines their decision-making processes. By facilitating the sharing of data in a structured format, it improves the comprehensibility of administrative rules and processes, ultimately aiding in more informed decision-making within public administration. While MIME itself is not directly involved in exposing interfaces, it indirectly contributes by promoting content negotiation and defining data exchange formats, which can support interface exposure initiatives.

- **Reusability**

MIME is a business domain agnostic specification that can be reused in a cross-domain way. It can be used for the exchange of files addressing any domain.

⁶ NIFO factsheets: <https://joinup.ec.europa.eu/collection/national-interoperability-framework-observatory-nifo/nifo-factsheets>

⁷ Gmail using MIME: <https://developers.google.com/gmail/api/guides/sending?hl=es-419>

⁸ SMTP specification: <https://datatracker.ietf.org/doc/html/rfc5321>

⁹ Intellectual Property Rights in IETF: <https://datatracker.ietf.org/doc/html/rfc8179>

- **Technological neutrality and data portability**

MIME extends the email format to accommodate both ASCII and non-ASCII character text and supports attachments of audio, video, images, and applications. This standardized format provides rules for encoding and exchanging multimedia and non-ASCII data across various platforms, operating systems, and email clients, ensuring compatibility and flexibility. MIME allows for partial implementations, enabling developers to tailor applications to their specific needs. It also supports customization through the creation of custom content types, headers, and encoding methods. Furthermore, MIME facilitates extension by allowing the creation of new specifications and profiles to adapt to evolving requirements and technologies, ultimately serving the purpose of seamless document exchange between systems and applications.

The specification partially supports the principles related to generic user needs and expectations:

- **User-centricity**

The purpose of MIME is not related to the implementation of the once-only principle. Therefore, this criterion does not apply to this specification.

- **Inclusion and accessibility**

While MIME itself is not a comprehensive solution for e-accessibility, it can be part of a broader strategy to create digital content and services that are inclusive and accessible to a wide range of users, including those with disabilities.

- **Privacy**

MIME (Multipurpose Internet Mail Extensions) focuses on data formatting and exchange but can be enhanced for data protection. Secure Multipurpose Mail Extension (S/MIME¹⁰) extends MIME to bolster email communication security, safeguarding personal data. S/MIME uses cryptography for data confidentiality, ensuring sensitive information remains confidential during transmission and storage. Additionally, MIME-based protocols like RFC 4130 (AS2)¹¹ are recognized for securely transporting structured business data over the internet, aligning with data protection requirements, as acknowledged by the Commission Implementing Decision (EU) 2017/1358¹².

- **Security**

MIME focuses on data formatting and exchange, but its security extension, S/MIME, enhances data security through encryption, digital signatures, authentication, and data integrity checks. Secure data processing, including encryption and access control, is typically implemented at the

¹⁰ S/MIME specification: <https://www.rfc-editor.org/rfc/rfc5751.html>

¹¹ MIME-Based Secure Peer-to-Peer Business Data Interchange Using HTTP, Applicability Statement 2, RFC 4130 (AS2): <https://www.rfc-editor.org/rfc/rfc4130.html>

¹² ICT Specifications for e-procurement: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32017D1358>

application level and is not part of the core MIME standard. MIME contributes to authentication processes by specifying content types and headers for digitally signed or authenticated messages but does not create or verify digital signatures. While MIME's security extension ensures data integrity during transmission, it does not directly address data accuracy, which is typically managed at the application or system level through validation and quality assurance practices. Access control mechanisms can be implemented independently at the email server, application, or network level and are not inherent to MIME itself.

- **Multilingualism**

MIME is designed to handle various types of content, including text, and it provides mechanisms for specifying character sets and language information to support multilingual communication.

The specification supports the foundation principles for cooperation among public administrations:

- **Administrative Simplification**

MIME serves as a valuable framework for structuring and encoding digital content, offering significant benefits for simplifying the delivery of public services. By enabling efficient, secure, and standardized communication and document exchange between government agencies and the public, MIME helps alleviate administrative burdens associated with document exchange. Moreover, MIME's ability to facilitate digital document exchange eliminates the need for traditional non-digital documents, further reducing administrative burdens.

- **Preservation of information**

The purpose of MIME is not related to long term preservation of electronic records. Therefore, this criterion is considered not applicable to this specification.

- **Assessment of effectiveness and efficiency**

There are many documents that provide an overview of the usage and functionalities of MIME. Such is the case of a scholar paper which describes the effectiveness and efficiency of the mechanisms provided by MIME for Internet multimedia mail¹³.

2.2. EIF Interoperability Layers

The interoperability model which is applicable to all digital public services includes:

- Four layers of interoperability: legal, organisational, semantic and technical;
- A cross-cutting component of the four layers, 'integrated public service governance';
- A background layer, 'interoperability governance'.

¹³ MIME: a portable and robust multimedia format for Internet mail:
<https://link.springer.com/article/10.1007/BF01210505>

The Specification supports the implementation of digital public services complying with the EIF interoperability model:

- **Interoperability governance**

MIME is mapped in the EIRA Library of Interoperability Specifications (ELIS¹⁴), specifically covering the "Data exchange" aspect in the EIRA technical view. The specification defines conformance criteria¹⁵ for implementing MIME to enable interworking with non-US-ASCII content. Additionally, free online validators¹⁶ are available to check MIME message compliance with IETF standards. Notably, MIME is recommended in the ICT National Catalogues of eight EU Member States, including Croatia, France, Germany, Greece, Malta, the Netherlands, Spain, and Sweden. Its use extends to specifying media types supported by Europeana collections, a cultural preservation initiative. MIME's distribution and adoption also span European collaborative platforms like Joinup¹⁷.

- **Legal Interoperability**

Although MIME has been pointed out by the European Commission as one of the 27 technical specifications widely used for internet purposes eligible for refereneing in public procurement, it has been developed and maintained by the IETF, which implies it is not a European standard.

- **Organisational interoperability**

The purpose of MIME is not related to business process modelling, nor to organisational interoperability agreements. Therefore, this criterions are not applicable to the specification.

- **Semantic Interoperability**

MIME can be found in the European collaborative platform Joinup. where it is the object of discussions about its implementation and the creation of ad-hoc solutions.

¹⁴ EIRA Library of Interoperability Specifications (ELIS):

<https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/elis/release/v501>

¹⁵ MIME Part Five: Conformance Criteria and Examples: <https://datatracker.ietf.org/doc/html/rfc2049>

¹⁶ MIME online validator: <https://www.mimevalidator.net/>

¹⁷ MIME in Joinup: <https://joinup.ec.europa.eu/collection/ict-standards-procurement/solution/rfc-2045-multipurpose-internet-mailextensions-mime>

3. ASSESSMENT RESULTS

This section presents an overview of the results of the CAMSS assessments for **MIME**. The CAMSS “Strength” indicator measures the reliability of the assessment by calculating the number of answered (applicable) criteria. On the other hand, the number of favourable answers and the number of unfavourable ones are used to calculate the “Automated Score” per category and an “Overall Score”.

Category	Automated Score	Assessment Strength	Compliance Level
Principle setting the context for EU actions on interoperability	100/100 (100%)	100%	Seamless
Core interoperability principles	1560/1700 (92%)	94%	Seamless
Principles related to generic user needs and expectations	780/1200 (65%)	92%	Sustainable
Foundation principles for cooperation among public administrations	500/500 (100%)	80%	Seamless
Interoperability layers*	840/1000 (84%)	80%	Seamless
Overall Score	3280/4000 (82%) ¹⁸	89%	

**The technical interoperability layer is covered by the criteria corresponding to the core interoperability principle "Openness".*

With a 89% of assessment strength, this assessment can be considered representative of the specification compliance with the EIF principles and recommendations.

The Overall Automated Score of 82% (3280/4000) demonstrates that the specification supports the European Interoperability Framework in the domains where it applies.

¹⁸ See the “results interpretation” section of the CAMSS Assessment EIF Scenario Quick User Guide:

<https://joinup.ec.europa.eu/collection/common-assessment-method-standards-and-specifications-camss/solution/camss-assessment-eif-scenario/results-visualisation-and-interpretation>