

eIDAS-Node eID Error and Event Logging v3.1.0

eID Internal

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Document history

Version	Date	Modification reason	Modified by
1.0	06/10/2017	Extracted from Installation Manual	DIGIT
2.0	11/04/2018	- Editorial improvements - Update to Error Codes and Error Messages	DIGIT
2.1	06/07/2018	Reuse of document policy updated and version changed to match the corresponding Release.	DIGIT
2.3	20/06/2019	Added information regarding the new implementation of message logging. Other updates to existing examples regarding Zulu time improvement.	DIGIT
2.4	06/12/2019	- Editorial improvements - Minor Updates	DIGIT
2.5	11/12/2020	eIDAS-Node 2.5 release	DIGIT
2.6	15/04/2022	eIDAS-Node 2.6 release	DIGIT
2.7	01/09/2023	eIDAS-Node 2.7 release	DIGIT
2.8	21/05/2024	eIDAS-Node 2.8 release	DIGIT
2.9	04/02/2025	eIDAS-Node 2.9 release	DIGIT
3.0.0	10/10/2025	eIDAS-Node 3.0.0 release	DIGIT
3.1.0	29/05/2026	eIDAS-Node 3.1.0 release	DIGIT

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List of abbreviations

The following abbreviations are used within this document.

Abbreviation	Meaning
eIDAS	electronic Identification and Signature. The Regulation (EU) N°910/2014 governs electronic identification and trust services for electronic transactions in the internal market to enable secure and seamless electronic interactions between businesses, citizens and public authorities.

Abbreviation	Meaning
IdP	Identity Provider. An institution that verifies the citizen's identity and issues an electronic ID.
MS	Member State
SAML	Security Assertion Markup Language
SP	Service Provider

List of definitions

The following definitions are used within this document.

Term	Meaning
Audit	A function which seeks to validate that controls are in place, adequate for their purposes, and which reports inadequacies to appropriate levels of management.
Audit log	An audit log is a chronological sequence of audit records, each of which contains evidence directly as a result of the execution of a business process or system function
eIDAS-Node	An eIDAS-Node is an application component that can assume two different roles depending on the origin of a received request. See eIDAS-Node Connector and eIDAS-Node Proxy Service.

1 Introduction

This document is intended for a technical audience consisting of developers, administrators and those requiring detailed technical information on how to configure, build and deploy the eIDAS-Node application.

This document provides information on the eID implementation of error and event logging as a building block for generating an audit trail of activity on the eIDAS Network. It describes the files that are generated, the file format, the components that are monitored and the events that are recorded. It also presents points that should be considered when planning, implementing and operating an auditing environment.

1.1 Purpose

The purpose of this document is to describe the strategy for logging errors and events in the eIDAS-Node.

1.2 Document Structure

This document is divided into the following sections:

- Chapter 1 – *Introduction*: this section.
- Chapter 2 – *What is an audit trail?* Introduces the concept of an audit trail and discusses the forensics and diagnosis of audit trail analysis.
- Chapter 3 – *Standards, frameworks and best practices* provides a brief introduction to industry standards and guidelines that should be considered when implementing a logging and auditing scheme.
- Chapter 4 – *Log generation* shows the format and describes the information attributes that are contained in a log record.
- Chapter 5 – *Logging configuration settings* discusses log management requirements and recommendations.
- Chapter 6 – *Log files* describes the locally stored log files and presents a matrix of which events are logged, in which log file and which response would be triggered.
- Chapter 7 – *eIDAS-Node* messages logging provides information about the information stored in the logs regarding incoming and outgoing messages.
- Chapter 8 – *Operational considerations* contains information that should be taken into account when implementing a logging process.
- Chapter 9 – *References* contains a list of reference material with links.
- Appendix A – *eIDAS-Node Error Codes and Error Messages* contains a list of error code and associated message properties.
- Appendix B – Full Logging examples

1.3 Other technical reference documentation

We recommend that you also familiarise yourself with the following eID technical reference documents which are available on **Digital Home > eID** :

- *eIDAS-Node Installation, Configuration and Integration Quick Start Guide* describes how to quickly install a Service Provider, eIDAS-Node Connector, eIDAS-Node Proxy Service and IdP from the distributions in the release package. The distributions provide

preconfigured eIDAS-Node modules for running on each of the supported application servers.

- *eIDAS-Node Installation and Configuration Guide* describes the steps involved when implementing a Basic Setup and goes on to provide detailed information required for customisation and deployment.
- *eIDAS-Node National IdP and SP Integration Guide* provides guidance by recommending one way in which eID can be integrated into your national eID infrastructure.
- *eIDAS-Node Demo Tools Installation and Configuration Guide* describes the installation and configuration settings for Demo Tools (SP and IdP) supplied with the package for basic testing.
- *eIDAS-Node and SAML* describes the W3C recommendations and how SAML XML encryption is implemented and integrated in eID. Encryption of the sensitive data carried in SAML 2.0 Requests and Assertions is discussed alongside the use of AEAD algorithms as essential building blocks.
- *eIDAS-Node Security Considerations* describes the security considerations that should be taken into account when implementing and operating your eIDAS-Node scheme.
- *eIDAS-Node Error Codes* contains tables showing the error codes that could be generated by components along with a description of the error, specific behaviour and, where relevant, possible operator actions to remedy the error.

Disclaimer: The users of the eIDAS-Node sample implementation remain fully responsible for its integration with back-end systems (Service Providers and Identity Providers), testing, deployment and operation. The support and maintenance of the sample implementation, as well as any other auxiliary services, are provided by the European Commission according to the terms defined in the European Union Public Licence (EUPL) at https://joinup.ec.europa.eu/sites/default/files/custom-page/attachment/eupl_v1.2_en.pdf

2 What is an audit trail?

A log is a record of the events occurring within an organisation's systems and networks. Logs are composed of log entries; each entry contains information related to a specific event that has occurred within a system or network.

An audit trail consists of a number of log records providing documentary evidence of the sequence of activities that have affected at any time a specific operation, procedure or event.

In a stand-alone system, all the security relevant activities in individual components can be isolated. This allows us to maintain a time-ordered list of all actions and events (e.g. audit trail) that happened in the system and enabling us to audit the system by simply following the information trail in a single place, obeying to a defined notation and in a specific timeline.

The number, volume and variety of different systems operating in an eIDAS-Network's distributed architecture has created the need for security log management and safeguards to help protect the confidentiality, integrity, and availability of service and the data therein. With this in mind, an audit trail must meet two very important requirements:

- The possibility of reconstructing an entire transaction by linking all related request/response identifiers throughout the complete path of the request processing, from Service Provider to eIDAS-Node to Identity Provider and back.
- The association between an incoming request and all subsequently-related outgoing request(s), as well as the corresponding replies

In order to meet these requirements the eIDAS-Node implementation is required to record and retain audit-logging information sufficient to answer the following questions:

- Who performed the logging (the main component or an external module/party)?
- What activity was performed? (e.g. Input, Process, Output)
- Who or what performed the activity, including where or on what system the activity was performed from whom (subject)?
- What the activity was performed on (object)?
- When was the activity performed?
- What tool(s) was used to perform the activity?
- What was the status (such as success/failure), outcome, or result of the activity?

2.1 Forensics and diagnostics

Analysis of the audit trail will help to identify use and abuse of the eIDAS Network, including the following conditions:

- Sequencing failure
- Excessive use
- Data changes
- Fraud and other criminal activities
- Suspicious, unacceptable or unexpected behaviour
- Modifications to configuration
- Application code file and/or memory changes input validation failures e.g. protocol violations, unacceptable encodings, invalid parameter names and values
- Output validation failures e.g. database record set mismatch, invalid data encoding
- Authentication successes and failures

- Authorisation (access control) failures
- Session management failures e.g. cookie session identification value modification
- Application errors and system events e.g. syntax and runtime errors, connectivity problems, performance issues, third party service error messages, file system errors, file upload virus detection, configuration changes
- Application and related systems start-ups and shut-downs, and logging initialisation (starting, stopping or pausing)
- Use of higher-risk functionality e.g. network connections, addition or deletion of users, changes to privileges, assigning users to tokens, adding or deleting tokens, use of systems administrative privileges, access by application administrators, all actions by users with administrative privileges, access to payment cardholder data, use of data encrypting keys, key changes, creation and deletion of system-level objects, data import and export including screen-based reports, submission of user-generated content - especially file uploads
- Legal and other opt-ins e.g. permissions for mobile phone capabilities, terms of use, terms & conditions, personal data usage consent, permission to receive marketing communications

3 Standards, frameworks and best practices

Standards and frameworks like COBIT (Control Objectives for Information and Related Technology) by the Technology IT Governance Institute and the Information Systems Audit and Control Association (ISACA) and ITIL (Information Technology Infrastructure Library) provide information on IT governance and auditing. However there is little regulatory guidance on the specific controls, the standard of due care means doing at least what one's peers are doing as well as following security best practices frameworks as proposed by COBIT, BITS, COSO and standards including ISO 17799 and NIST SP 800-53 and ISF Standard of Good Practice, ISO / ISO 27002.

Note: The eIDAS-Node logs may contain person identification data, hence these logs should be handled and protected appropriately in accordance with the European privacy regulations [Dir. 95/46/EC] and [Reg. 2016/679].

[Reg. 2016/679] REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.

[Dir. 95/46/EC] Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data.

4 Log generation

The following table shows the information attributes that are contained in a log record.

Table 1: Log record attributes

Name	See Figure 1	Description
Date time	1	The date time of the logging event in Zulu Time, also known as Coordinated Universal Time (UTC) format.
Thread	2	Outputs the name of the server processing thread that generated the logging event.
Level	3	Outputs the level of the logging event. • ERROR: some type of failure has occurred, users are probably being affected (or will soon be) and the fix probably requires human intervention. • WARN: an unexpected technical or business event occurred, users may be affected, but probably no immediate human intervention is required. Support personnel will want to review these issues as soon as possible to understand what the impact is. Basically any issue that needs to be tracked but may not require immediate intervention. • INFO: things we want to see at high volume in case we need to forensically analyse an issue. Typical business exceptions can go here (e.g. login failed due to bad credentials). • DEBUG: used for entry/exit of most non-trivial methods and detailed information on the flow through the system. This will be written to logs only. • TRACE: this would be for extremely detailed and potentially high volume logs that you do not typically want enabled even during normal development.
ClassName	4	Outputs location information of the caller's (Java) class which generated the logging event.
sessionId	5	If available, the session Id.
IpAddress	6	If available, the Remote IP address.
Even	7	If available, the type of logging event.
Message	8	The content of the message
EventNumber	9	Sequential increasing number of the event
Hash	10	A hash generated of the line log content guaranteeing integrity

The following is an example of log content showing three log records.

1	2	3	4	5
2015-06-15T13:58:53.469Z	2015-06-15T13:58:57.825Z	INFO	eu.eidas.auth.engine.EIDASSAMLEngine SAML	9DD4C51374BE635296A7295CA32B7632
127.0.0.1	SAML_EXCHANGE	-Get instance: SP-Connector	#1#	[MaAG32KHbrOV+ABUawBv4iibuazJltc+Qmk2VDsl1NM=]
6	7	8	9	10

```

2015-06-15T13:58:57.825Z [http-bio-8080-exec-2] DEBUG
eu.eidas.auth.engine.EIDASSAMLEngine -9DD4C51374BE635296A7295CA32B7632 -
127.0.0.1 SAML_EXCHANGE -null #2#
[/d5F9UqFZy3OY37PA500TGpepPczdUzbJigiZxGla2E=]
2015-06-15T13:59:07.212Z [http-bio-8080-exec-2]
INFO eu.eidas.node.auth.connector.AUCONNECTORSAML -
9DD4C51374BE635296A7295CA32B7632 -127.0.0.1 SAML_EXCHANGE -Connector -
Processing SAML Request with ID _a43526c05fc8168879b5789ba0d62744 #3#
[AeRp3ofGkl3gcIEH4QypViREHPB9Kw+hFFpt1DdUKGc=]

```

Figure 1: Example of log content

Notes: The following shows the attribute delimiters and their meaning

is used as a field delimiter

[] delimits optional components

Important: Additional attributes may be added in future phases of this project.

Figure 2 below show examples of log records on an eIDAS-Node.

```

2015-06-15T13:58:53.469Z [http-bio-8080-exec-2]
INFO eu.eidas.auth.engine.EIDASSAMLEngine SAML_EXCHANGE -
9DD4C51374BE635296A7295CA32B7632 -127.0.0.1 -Get instance: SP-Connector #1#
[MaAG32KHbrOV+ABUawBv4iibuazJltc+Qmk2VDsl1NM=]
2015-06-15T13:59:07.212Z [http-bio-8080-exec-2]
INFO eu.eidas.node.auth.connector.AUCONNECTORSAML SAML_EXCHANGE -
9DD4C51374BE635296A7295CA32B7632 -127.0.0.1 -Connector - Processing SAML Request
with ID _a43526c05fc8168879b5789ba0d62744 #3#
[AeRp3ofGkl3gcIEH4QypViREHPB9Kw+hFFpt1DdUKGc=]
...
2015-06-15T13:59:07.393Z [http-bio-8080-exec-2]
INFO eu.eidas.auth.engine.EIDASSAMLEngine SAML_EXCHANGE -
9DD4C51374BE635296A7295CA32B7632 -127.0.0.1 -Get instance: Connector-Service #15#
[IJCReY/HA7Kcc9HyKuJww2qFRvjSxkQfmw/1sBGnxH8=]
2015-06-15T13:59:07.529Z [http-bio-8080-exec-2]
INFO eu.eidas.node.auth.connector.AUCONNECTORSAML SAML_EXCHANGE -
9DD4C51374BE635296A7295CA32B7632 -127.0.0.1 -Connector - Processing SAML Request
with ID _a43526c05fc8168879b5789ba0d62744 #16#
[zsSBlcAwF8Lg1lg7u2S//OtoklvnnLZnAPcWX6Quci8=]
...
2015-06-15T13:59:08.445Z [http-bio-8080-exec-2]
INFO eu.eidas.auth.engine.EIDASSAMLEngine SAML_EXCHANGE -
9DD4C51374BE635296A7295CA32B7632 -127.0.0.1 -Get instance: Service #29#
[/K59pCfDIhDHTBiQKc1n5VLKBtdOprWsEumndh8TIQ=]
2015-06-15T13:59:08.697Z [http-bio-8080-exec-2]
INFO eu.eidas.node.auth.service.AUSERVICESAML SAML_EXCHANGE -
9DD4C51374BE635296A7295CA32B7632 -127.0.0.1 -Service - Processing SAML Request

```

with ID [_d41ae1dc063c7e4a87f17e57fdb1329](#) #31#
[rkLbukPhl+5ia+wzzJyVY2DHHfz2JIXPvpT1CmHRZgw=]

Figure 2: Log records on IT-eIDAS-Node

In cases where the information to be logged is generated by an application other than an eIDAS-Node, sanitizing can be applied. The string, with information, will be escaped if it contains any of the following characters Carriage Return (ASCII 13, \r) and/or Line Feed (ASCII 10, \n) and CRLF. Furthermore, a suffix will be added to the original string to signal the modification of the original information.

5 Logging configuration settings

The deployer or host of the eIDAS-Node and related specific components should ensure that other jurisdiction or organisation specific, guidelines, and procedures with respect to logging and to incorporate and support these log management requirements and recommendations; also comply with functional and operational requirements. The following table provides examples of the types of logging configuration settings to be specified in policies, which are MS specific.

Table 2: Logging configuration settings

Category	Low Impact Systems	Moderate Impact Systems	High Impact Systems
How long to retain log data	1 to 2 weeks	1 to 3 months	3 to 12 months, in absence of specific legal requirements
How often to rotate logs	Optional (if performed, at least every week or every 25 MB)	Every 6 to 24 hours, or every 2 to 5 MB	Every 15 to 60 minutes, or every 0.5 to 1.0 MB
If the organisation requires the system to transfer log data to the log management infrastructure, how frequently that should be done	Every 3 to 24 hours	Every 15 to 60 minutes	At least every 5 minutes
How often log data needs to be analysed locally (through automated or manual means)	Every 1 to 7 days	Every 12 to 24 hours	At least 6 times a day
Whether log file integrity checking needs to be performed for rotated logs	Optional	Yes	Yes
Whether rotated logs need to be encrypted	Optional	Optional	Yes
Whether log data transfers to the log management infrastructure need to be encrypted or performed on a separate logging network	Optional	Yes is feasible	Yes

6 Log files

Each eIDAS Node is configured to generate ten different locally stored log files for tracing activities:

- **The Application System log:** (eIDASNodeConnectorSystem and eIDASNodeProxySystem) contains all the events occurring at the application level (e.g. server start/stop, change of configuration).
- **The Application Security log:** (eIDASNodeConnectorSecurity and eIDASNodeProxySecurity) contains all the security-related events.
- **The Message Exchange log:** (eIDASNodeConnectorSAMLExchange and eIDASNodeProxySAMLExchange) contains the details about exchanged messages.
- **The Debug Message Exchange log:** (eIDASNodeConnectorFullMsgExchange and eIDASNodeProxyFullMsgExchange) contains the full content of the messages that are exchanged by the Node.
- **The Application Detailed log:** (eIDASNodeConnectorDetail and eIDASNodeProxyDetail) contains the more detailed information at destination to the technical team for forensics, investigation and debugging purposes.

The locations of the audit files are by default configured to use a Java system properties variable called LOG_HOME.

A value can be assigned to this variable by using: `-DLOG_HOME="<myDirectoryName>"` at server start-up.

If modification of the environment variable is not possible, the value of this variable could also be assigned by adding the following line in the `logback.xml` file `<property name="LOG_HOME" value="<myDirectoryName>" />`

The following table shows a matrix of which events are logged, in which log file and which response would be triggered.

Table 3: Event log matrix

Event	Record in log file							Response type			
	Syst em	Detail ed	Secu rity	MessageE xchg	Cons ole	App l. serv er log	Thresh old level (see Table 1)	Immed iate	Routi ne	Foren sics - histori c	Comme nt
SAML request processing \\EVT-1\\		√		√	√		Info		√		Normal processing of the SAML messages
SAML Response processing \\EVT-2\\		√		√	√		Info		√		Normal processing of the SAML messages

		Record in log file						Response type			
OpenSA ML Error \\[EVT-3\\]		√		√	√	Error	√				Error occurs in the OpenSA ML product library
Configur ation change \\[EVT-4\\]	√				√				√	√	Configur ation change via manage ment console
Configur ation reload \\[EVT-5\\]	√				√				√	√	
Applicati on startup \\[EVT-6\\]	√					√			√	√	Start of applicati on filters
Applicati on shutdow n \\[EVT-4\\]	√					√			√	√	Start of applicati on filters
Console alerts \\[EVT-5\\]	√	√			√		√			√	
Exceptio ns Applicati on errors and system events e.g. syntax and runtime errors, connecti vity problems , performa		√			√		√				

	Record in log file							Response type			
nce issues, file system errors \\[EVT-6\\]											
Unauthorised access attempt to management console \\[EVT-7\\]	√	√		√			√				
Input validation failures \\[EVT-8\\]	√	√		√				√			Could hide an attack
Output validation failures \\[EVT-9\\]	√	√		√				√			Could hide an attack
Session management failures e.g. cookie session identification value modification \\[EVT-10\\]	√	√		√			√				Could hide an attack
Content security violation \\[EVT-11\\]	√	√		√			√				Could hide an attack

		Record in log file						Response type			
Sequencing failure (like SAML Response without being preceded by SAML Request) \[EVT-12\]		√	√		√			√			Could hide an attack
Excessive use (like SAML request limitation exceeded) \[EVT-13\]		√	√		√			√			Could hide an attack
Certificate not valid \[EVT-13\]		√	√		√			√			Could hide an attack
Signature not valid \[EVT-14\]		√	√		√			√			Could hide an attack

6.1 Event detailed error codes and associated actions

For full information on eIDAS-Node error codes and associated actions, refer to the *eIDAS-Node Error Codes* document.

7 eIDAS-Node messages logging

The incoming and outgoing Light Requests/Light Responses and eIDAS Requests and Responses to the eIDAS Node are logged in 8 points as depicted in the below Figure 3.

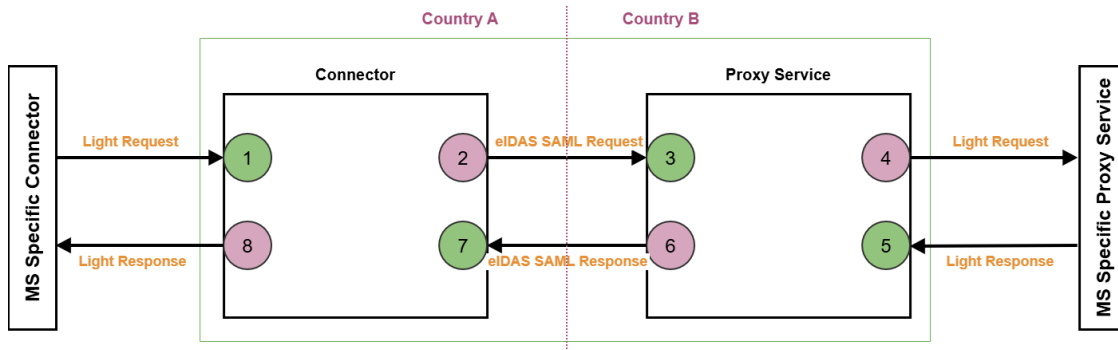


Figure 3: Message Logging diagram

7.1 Enabling of the logging

To enable the logging, the following entries may be set in the `eidas.xml` configuration file.

Key	Description
<code>saml.audit</code>	Activated the logging of information regarding incoming outgoing LightRequest/LightResponse, eIDAS Request and Response. If true logs information about the mentioned incoming requests and responses and does not log if false. Default value: true (This logging is activated by default).
<code>full.message.logging</code>	Activate the logging of the full content of the incoming or outgoing message (LightRequest, LightResponse, eIDAS Request and eIDAS Response). If true, logging will be executed, if false or not present the logging will not be executed. This functionality should only be used for debugging purposes.

7.2 Selection of the logging file

The locations of the audit files are by default configured to use a Java system properties variable called `LOG_HOME`.

A value can be assigned to this variable by using: `-DLOG_HOME="<myDirectoryName>"` at server start-up.

If modification of the environment variable is not possible, the value of this variable could also be assigned by adding the following line in the `logback.xml` file
`<property name="LOG_HOME" value = "<myDirectoryName>" />`

7.3 Description of the logging entries

Note: The eIDAS-Node logs may contain person identification data; hence, these logs should be handled and protected appropriately in accordance with the European privacy regulations [Dir. 95/46/EC] and [Reg. 2016/679].

[Reg. 2016/679] REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.

At each of these points, information regarding the message is logged with different entries. The following table describes the logging entries:

Entry	Description	Remarks
Timestamp	Current time.	UTC (Zulu)
OpType	Operation type can be receives or sends.	
NodeId	The Id of the node from which this message was received (in case of OpType receives) or to which it will be sent (in case of OpType sends).	For eIDAS Requests and eIDAS Responses to the EntityId.
Origin	The origin of the incoming message. (e.g., HTTP referer header.)	N/A for OpType sends
Destination	The destination of the message	
flowId	The Id of the eIDAS flow. Used to relate messages from the same eIDAS authentication process.	The same eIDAS authentication flow will have 2 different flowIds one for Connector and another for Proxy-Service.
msgId	Id of the message	
msgHash	Hash of the message	Uses SHA512.
bltHash	Hash of the Binary Light Token	Uses SHA512. Only logged for Light Requests and Light Responses.
inResponseTo	Id of request to which the response is related.	Only logged for Responses.
statusCode	Status code of the response.	Only logged for Responses.

The correlation of requests and responses can be done using the entries: *msgId*, *flowId*, and *inResponseTo*.

One example of the values logged for all the 8 points is as follows. Note that the line hashes were not included for more readability as you would find in *eIDASNodeConnectorDetail* and *eIDASNodeProxyDetail* or in *eIDASNodeConnectorSAMLExchange* and *eIDASNodeProxySAMLExchange* files.

Point 1

Timestamp	2019-06-17T13:36:30.269Z,
OpType	eIDAS Connector receives the request from Specific Connector,
NodeId	specificConnector,

Origin	http://localhost:8080/SpecificConnector/ServiceProvider ,
Destination	http://localhost:8080/EidasNodeConnector/SpecificConnectorRequest ,
flowId	_teeF25P50axuRHOk5uP1K_678N9D5oP1j_khKNqjuV59yOeHFqmocWSJolZACjD,
msgId	87cc1ae7-10df-4237-acf2-ac4957c4f899,
msgHash	ENshi09fT2f6Z5hwUj8DCF9SQmdkOJ7wiZVS9yJNskV+Obrs2kMoe3S1GokcaffUOC VOhOlw4dsT8a94pLTMMw==,
bltHash	6MA9YGjgD22SYyoLqJJDxD4y1xiTM0rA8Azv9RYLCpyL6LaSqwOZx9mAvIPZCfTx MVn/7vCycFjjExTPn8GqgQ==

Point 2

Timestamp	2019-06-17T13:36:30.840Z,
OpType	eIDAS Connector sends request to eIDAS Proxy Service,
NodeId	http://localhost:8081/EidasNodeProxy/ServiceMetadata ,
Origin	N/A,
Destination	http://localhost:8081/EidasNodeProxy/ColleagueRequest ,
flowId	_teeF25P50axuRHOk5uP1K_678N9D5oP1j_khKNqjuV59yOeHFqmocWSJolZACjD,
msgId	_0at.n7PwAPBqTvJd0pV1X-DV.NxNtwHWlpSiAYi2hpqiPWxfwEJLvTgwzGEHJ9N,
msgHash	0oFuUvWD9FNGhIvtp2LrOEPQLoRnYNhhDksaDmqObipFoTVet6cytx1658Mjb4ub9 mwam4ctK7L2JvvcniPnQ==

Point 3

Timestamp	2019-06-17T13:36:31.490Z,
OpType	eIDAS Proxy Service receives the request from eIDAS Connector,
NodeId	http://localhost:8080/EidasNodeConnector/ConnectorMetadata ,
Origin	http://localhost:8080/EidasNodeConnector/SpecificConnectorRequest ,
Destination	http://localhost:8081/EidasNodeProxy/ColleagueRequest ,
flowId	_dKlqa0LWWcAzxNR67B4vh5r0.Cv-28vRyOH.B3VV5sTLt3Pn.ViOVmoJaxqQOfF,
msgId	_0at.n7PwAPBqTvJd0pV1X-DV.NxNtwHWlpSiAYi2hpqiPWxfwEJLvTgwzGEHJ9N,
msgHash	0oFuUvWD9FNGhIvtp2LrOEPQLoRnYNhhDksaDmqObipFoTVet6cytx1658Mjb4ub9 mwam4ctK7L2JvvcniPnQ==

Point 4

Timestamp	2019-06-17T13:36:31.635Z,
OpType	eIDAS Proxy Service sends the request to Specific Proxy Service,

Nodeld	specificProxyService,
Origin	N/A,
Destination	http://localhost:8081/SpecificProxyService/ProxyServiceRequest ,
flowId	_dKlqa0LWWcAzxNR67B4vh5r0.Cv-28vRyOH.B3VV5sTLt3Pn.ViOVmoJaxqQOfF,
msgId	_GfAaa-Kz2X.gdywQuGMwd133hYM3TdgC6nrZ1r6qCr2elzRxFagueLd8VYTnGWR,
msgHash	utu1Z4sHax2W/0mZd4jx44TGpdKuJj7HKv7VIJ/PHL7fx5joUFUI7u0+mcEdE9BDPRk672VILxhAgOgwMTwpGg==,
bltHash	uU8WCpZQejNKFxjiSHoRQnZPe19VcB1YsR7D5MiSNZIEZCy1/6rmanPs7rx8zZ2/O4lzl8ub74vSi34m9FZXEW==

Point 5

Timestamp	2019-06-17T13:37:18.970Z,
OpType	eIDAS Proxy Service receives the response from Specific Proxy Service,
Nodeld	specificProxyService,
Origin	http://localhost:8081/SpecificProxyService/AfterCitizenConsentResponse ,
Destination	http://localhost:8081/EidasNodeProxy/SpecificProxyServiceResponse,
flowId	_dKlqa0LWWcAzxNR67B4vh5r0.Cv-28vRyOH.B3VV5sTLt3Pn.ViOVmoJaxqQOfF,
msgId	3e1b6aee-fa0b-44a3-add0-09d81826cd66,
msgHash	04ICIOQQSWaeZ/5kUxDFYJw7qVZgOKuvrnfWYebwgbkqhXkNBUG4XajPDd1zc4S7NTERGEOvJdZ8e2TmM9GDKQ==,
bltHash	LCb+tPt+fSIGgc9l3KRbiRljLkaXnlRiNFj1WyBLSH6g4Cb2N8LETdtdKuOk9yLhUcGRk/wxRKMAPJyzA+23MA==,
inResponseTo	_GfAaa-Kz2X.gdywQuGMwd133hYM3TdgC6nrZ1r6qCr2elzRxFagueLd8VYTnGWR,
statusCode	urn:oasis:names:tc:SAML:2.0:status:Success

Point 6

Timestamp	2019-06-17T13:37:21.168Z,
OpType	eIDAS Proxy Service sends the response to eIDAS Connector,
Nodeld	http://localhost:8080/EidasNodeConnector/ConnectorMetadata,
Origin	N/A,
Destination	http://localhost:8080/EidasNodeConnector/ColleagueResponse,
flowId	_dKlqa0LWWcAzxNR67B4vh5r0.Cv-28vRyOH.B3VV5sTLt3Pn.ViOVmoJaxqQOfF,

msgId	_e1hSsKlpJ.Ow-wCEzbgnbGc2lhd1PTKXwYgtz8ld9.UCpWImUBt.jAFtWRAAckd,
msgHash	9drKEZ8ixvQ8ycKCMVI6t5xwE8Qil7sZuQYrHqFXLZJuDAHIFYwCM6dQiEWxUE8yHzHrYNWxf1v4/7vr+dXjHQ==,
inResponseTo	_0at.n7PwAPBqTvJd0pV1X-DV.NxNtwHWlpSiAYi2hpqiPWxfwEJLvTgwzGEHJ9N,
statusCode	urn:oasis:names:tc:SAML:2.0:status:Success

Point 7

Timestamp	2019-06-17T13:37:21.896Z,
OpType	eIDAS Connector receives the response from eIDAS Proxy Service,
NodeId	http://localhost:8081/EidasNodeProxy/ServiceMetadata,
Origin	http://localhost:8081/EidasNodeProxy/SpecificProxyServiceResponse,
Destination	http://localhost:8080/EidasNodeConnector/ColleagueResponse,
flowId	_teeF25P50axuRHOk5uP1K_678N9D5oP1j_khKNqjuV59yOeHFqmocWSJolZACjD,
msgId	_e1hSsKlpJ.Ow-wCEzbgnbGc2lhd1PTKXwYgtz8ld9.UCpWImUBt.jAFtWRAAckd,
msgHash	9drKEZ8ixvQ8ycKCMVI6t5xwE8Qil7sZuQYrHqFXLZJuDAHIFYwCM6dQiEWxUE8yHzHrYNWxf1v4/7vr+dXjHQ==,
inResponseTo	_0at.n7PwAPBqTvJd0pV1X-DV.NxNtwHWlpSiAYi2hpqiPWxfwEJLvTgwzGEHJ9N,
statusCode	urn:oasis:names:tc:SAML:2.0:status:Success

Point 8

Timestamp	2019-06-17T13:37:23.241Z,
OpType	eIDAS Connector sends the response to the Specific Connector,
NodeId	specificConnector,
Origin	N/A,
Destination	http://localhost:8080/SpecificConnector/ConnectorResponse ,
flowId	_teeF25P50axuRHOk5uP1K_678N9D5oP1j_khKNqjuV59yOeHFqmocWSJolZACjD,
msgId	_Ji1R-U_ikNrfdl7PrWm6hITG6NcKz3ltC6l-IOE.qs9rU6HA7VnKGr058.4KbBO,
msgHash	FEM2e5zTV77egP5wQRcREeOwoAmLwjx26hGtC+alhkuThcSot+O5KPceYKuvNhjEsOI8QfUOHp5kkmkSo/sFG0w==,
bltHash	pRdaV0JKhp+gPofrwBHWbpX8PE3lWidr/pVOTd0UD0oXtmNJBvM56FdJhF5HoP+C0ok94gUDQYXLf1B6uT8mgA==,

inResponseTo	87cc1ae7-10df-4237-acf2-ac4957c4f899,
statusCode	urn:oasis:names:tc:SAML:2.0:status:Success

For more details on the logging points and an example of an end-to-end logging trail eIDAS Connector (country A) ↔ eIDAS ProxyService (country B) for the messages, please refer to *Message logging improvements in eIDAS-Node v2.3* <https://ec.europa.eu/digital-building-blocks/wikis/x/hCUIBQ>.

The URLs with ec.europa.eu domain in this document are only accessible to the experts registered with the eIDAS eID Implementation community.

7.4 Usage Statistics Logging

Usage statistics logging logs the **performance and integrity** of an authentication flow in the eIDAS-Node, tracked by the flowID in previous log points.

As you can see, the flowID tracks a single authentication across either the connector or proxyService.

Connector usage logging based on 4 message log points (CSV)	Cross Border Location	Requested LoA	Point 1 (ms)	Point 2 (Request (ms))	Point 7 (ms)	Point 8 (Response (ms))	Outcome
_rREmRQzX23.ju95rdiLTCs2TRxCy4mgIZBuujYt1mLtZ_3rMiAAVd.U7fV1h8RI,CA,http://eid.as.europa.eu/LoA/low,2026-01-20T10:55:49.953Z,22,2026-01-20T10:55:54.835Z,48,success	CA	low	Time1	22ms	Time2	48ms	success

Proxy service usage logging based on 4 message log points (CSV)	Cross Border Location	Requested LoA	Point 3 (ms)	Point 4 (Request (ms))	Point 5 (ms)	Point 6 (Response (ms))	Outcome
_51uGUOdbphxBeu4woqlmdfleLl3alMGYirYDrIrQWNYZ18m-bazcltxdDrO4K,https://ca/EidasNode/ConnectorMetadata,http://eid.as.europa.eu/LoA/low,2026-01-23T13:30:07.827Z,55,2026-01-23T13:30:12.171Z,32,success	https://ca/EidasNode/ConnectorMetadata	low	Time1	55ms	Time2	32ms	success

NOTE: Usage Statistic does **NOT** log statistics about **users**, there is are no conclusion that can be made about the authentication success rate of citizens.

A non-success flow from the perspective of a user will be an error page, network issue or broken component **where the user is not returned to the SP** to try again.

In most cases it will be up to the bilateral operators to resolve an issue.

7.4.1 Outcome

Only once a flow is considered complete, or uncompletable, a final outcome can be written down.

Possible outcomes are as follows:

- **Success:** The authentication has passed through all 4 log points
- **Request error:** After the authentication request entered the connector or proxy, for any reason it was not processed and did not pass through. The outcome is determined after the configured cache timeout used for flow tracking has elapsed. 1 log point.
- **Lost user:** There was no response logged for an authentication request within the allowed time frame, based on the configured cache timeout used for flow tracking. 2 log points.
- **Response error:** After the authentication response entered the connector or proxy, for any reason it was not processed and did not pass through. The outcome is determined after the configured cache timeout used for flow tracking has elapsed. 3 log points.

Notes on errors & lost users:

- The system measures the traffic and operational integrity of the eIDAS connector and proxy in the eIDAS network.
- The system is **not** meant to log personal information.
- The system is **not** meant to measure the success rate at which citizens manage to authenticate.
- Since the errors are based on input and output, the system does not rely on node code handling errors to identify problems.
- Authentication failures that perform a full flow and return the user nicely back to the SP are seen as successes.
- Infrastructure and authentication failures that stop the user on the IdP side are seen as lost users. (no way for us to know)
- Users that fail to complete the authentication flow through inaction or other connection problems are logged as lost users.

Settings for this module are currently mapped inside the eIDAS Node application see:

Node Installation and Configuration Guide: Additional Configuration — Usage statistics

7.5 Downloadable Demo Summary

For the purpose of sharing the usage statistics data we have included a download json button to the Status-board demo.

This information is grouped by interconnection and can be required for month, week, day, hour and minute intervals.

```
[
  {
    "crossBorderLocations": [
      {
        "crossBorderLocation": "CA",
        "lost": 2,
        "requestError": 3,
        "responseError": 0,
        "success": 14
      },
      {
        "crossBorderLocation": "CB",
        "lost": 0,
        "requestError": 2,
        "responseError": 0,
        "success": 0
      }
    ],
    "interval": "2026-04"
  }
]
```

Code block 1 Connector connecting to CA & offline CB

```
[
  {
    "crossBorderLocations": [
      {
        "crossBorderLocation":
"https://ca/EidasNode/ConnectorMetadata",
        "lost": 2,
        "requestError": 0,
        "responseError": 0,
        "success": 16
      }
    ],
    "interval": "2026-04"
  }
]
```

**Code block 2 Proxy with one connection to Connector
<https://ca/EidasNode/ConnectorMetadata>**

7.6 Giving a NodeId alias to the National IdP and SP applications

To allow logging the NodeId for Light Requests and Light Responses, the following parameters were added:

to *server/connector/specificCommunicationDefinition.xml*:

Key	Description	Point	Logging class
lightToken.connector.request.node.id	Id that identifies the sender of the Light Request to	1	ConnectorIncomingLightRequestLogger

Key	Description	Point	Logging class
	the Connector		
lightToken.connector.response.node.id	Id that identifies the receiver of the Light Response to the Connector	8	ConnectorOutgoingLightResponseLogger

and to *server/proxy/specificCommunicationDefinition.xml*

Key	Description	Point	Logging class
lightToken.proxy.service.request.node.id	Id that identifies the receiver of the Light Request to the Proxy Service	4	ProxyServiceOutgoingLightRequestLogger
lightToken.proxy.service.response.node.id	Id that identifies the sender of the Light Response to the Proxy Service	5	ProxyServiceIncomingLightResponseLogger

7.7 Description of the full message logging

This functionality should only be used for debugging purposes.

The full message logging is printing the full content of the request or response incoming into or outgoing from the Node in a specific logging file (cfr. Section 6 Log files).

The content of the log is the XML content of the request or response preceded by a line containing the timestamp and the logger class.

An example of the content logged by the *ConnectorOutgoingEidasRequestLogger* is available in Appendix B. Full Logging examples.

8 Error ID

In the event an error message is logged, a randomly generated Error ID will be added to both the logged error and the page shown to the user. This allows the operator to quickly locate the error event in the log files.

An example of a logged error message with Error ID can be found below:

```
2022-05-30T13:05:16.584Z [http-nio-8080-exec-3] ERROR
eu.eidas.node.auth.connector.AUCONNECTOR -
ED8424D1312622BF97B7ECFDB3EB54C3 -0:0:0:0:0:0:1 -Error ID:a7606cca-48a4-
4b37-83c5-921e869db8d8, Error code and error message: 203021 - incomplete
attribute set, Additional information: incomplete mandatory set #352#
[EsobrrmGeew0hOAB2EF6vdiG0mzKRSf9a8XKg78QuTA=]
```

Timestamp	2022-05-30T13:05:16.584Z
Thread	[http-nio-8080-exec-3]
Level	ERROR
ClassName	eu.eidas.node.auth.connector.AUCONNECTOR
sessionId	-ED8424D1312622BF97B7ECFDB3EB54C3
IpAddress	-0:0:0:0:0:0:1
Error ID	-Error ID:a7606cca-48a4-4b37-83c5-921e869db8d8
Error code and message	Error code and error message: 203021 - incomplete attribute set
Additional information	Additional information: incomplete mandatory set
EventNumber	#352#
Hash	[EsobrrmGeew0hOAB2EF6vdiG0mzKRSf9a8XKg78QuTA=]

9 Operational considerations

- Audit facilities should be designed with their specific use(s) in mind, not simply adapted from existing system logs.
- Member States should create and maintain an audit log management structure, including policy, procedures, rules and tools.
- Audit log files should be periodically saved and moved to another storage space. The periodicity may be influenced by the classification of the data but should be defined either according to a fixed size (e.g. every time the log reaches 1Mb) and/or according to a fixed period of time (e.g. per day, per week).
- Attacks on systems should be prevented by the use of technical preventive controls. These controls should be preferred above procedural preventive controls if possible. Both measures should be used in conjunction with an examination of the audit data.
- Member States should consider the use of a Security Event management system due to the large volume of security events.
- Member States should not solely rely on unauthorised events or breaches of policy, but should additionally consider proactive monitoring.
- Member States should consider the use of Security Information and Event Management (SIEM) technology to help with the automation and collection of auditable events.
- Audit records should contain a time stamp. Ensure that each system's clock is synchronised to a common time source so that its timestamp will match those generated by other systems.
- The privacy of personal data must be protected.
- Measures should be implemented in order so that deleting or modifying logs of own activities should be detected and alerted immediately.
- Administrators should not be able to erase or deactivate logs of activities.
- Audit events should be protected from modification by using digital signatures to sign audit records.
- Audit events should be archived to 'write-once' media to protect the archive from modification or deletion.
- Where audit records are subject to cryptographic authentication the input data to the authentication computation should include an accurate timestamp.
- Archived audit log files should be protected by appropriate logical and physical security mechanisms.
- The capture of customer-sensitive data in audit logs should be avoided. If necessary sensitive data should be anonymised, tokenized or encrypted to avoid data breaches.
- Where audit data are encrypted, the appropriate decryption software and keys must be available and properly maintained, under appropriate access control, for the whole of the lifetime of the encrypted data. Proper maintenance should include periodic testing and adequate backup to cater for loss of stored encryption keys.
- Audit records should be created in a simple standard format.
- Where audit data are compressed, the appropriate decompression software must be available and properly maintained for the whole of the lifetime of the compressed data. Proper maintenance should include periodic testing.
- The audit trails must be stored in a long-term support and a tamper-evident format, such that illicit addition, modification or deletion of any audit trail can be detected.

9.1 Retention period

- MS should ensure that audit retention is part of the organisation's overall retention policy.
- Where the execution of sensitive security-related actions cannot be made subject to dual control, then that execution should be monitored in a timely fashion.
- MS should determine which data is classified as audit data and should protect and preserve this data appropriately.
- Personal notes should be kept by incident investigators throughout the whole course of an investigation and those notes should themselves be protected and preserved in the same manner as audit data.
- Audit records used during an investigation must be preserved at least until the end of the investigation and for any subsequent prosecution irrespective of their normal retention period.
- Follow the organisation's incident response policy to investigate an audit log incident.
- System configuration information should be modified, if necessary, to prevent an event from overwhelming the system.

10 References

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<http://www.europeanpaymentscouncil.eu/index.cfm/knowledge-bank/epc-documents/the-use-of-audit-trails-in-security-systems-guidelines-for-european-banks/><http://www.europeanpaymentscouncil.eu/index.cfm/knowledge-bank/epc-documents/the-use-of-audit-trails-in-security-systems-guidelines-for-european-banks/>
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+
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class="external-link"
rel="nofollow">http://www.enisa.europa.eu/doc/pdf/deliverables/enisa_privacy_features_eID.pdf
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- [11] AUDIT Trails - NIST publication <http://csrc.nist.gov/publications/nistbul/itl97-03.txt>
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- [13] Common Criteria: Common Criteria for Information Technology Security Evaluation, Version 3.1, revision 4, September.2012 Part 2: Security Functional Components,
<http://www.commoncriteriaportal.org/files/ccfiles/CCPART2V3.1R4.pdf><http://www.commoncriteriaportal.org/files/ccfiles/CCPART2V3.1R4.pdf>

11 Appendix A: eIDAS-Node Error Codes and Error Messages

The following table provides a list of eIDAS-Node errors and related error messages.

Table 4: Error Codes and Error Messages

Key	Description
sProviderAction.invalidCountry.code	Invalid Country selected by the Citizen error message on the ServiceProvider interface.
sProviderAction.invalidCountry.message	Invalid SP Domain error message on the ServiceProvider interface.
sProviderAction.invalidSaml.code	Invalid SP Saml request error code on the ServiceProvider interface.
sProviderAction.invalidSaml.message	Invalid SP Saml request error message on the ServiceProvider interface.
sProviderAction.invalidSPPProviderName.code	Invalid SP Provider Name error code on the ServiceProvider interface.
sProviderAction.invalidSPPProviderName.message	Invalid SP Provider Name error message on the ServiceProvider interface.
sProviderAction.invalidRelayState.code	Invalid SP Relay State parameter error code on the ServiceProvider interface.
sProviderAction.invalidRelayState.message	Invalid SP Relay State parameter error message on the ServiceProvider interface.
sProviderAction.invalidAttr.code	Invalid SP personal attribute list error code on the ServiceProvider interface.
sProviderAction.invalidAttr.message	Invalid SP personal attribute list error message on the ServiceProvider interface.
sProviderAction.errorCreatingSAML.code	Generating SAML Token error code on the ServiceProvider interface.
sProviderAction.errorCreatingSAML.message	Generating SAML Token error message on the ServiceProvider interface.
internalError.code	Generic error code.
internalError.message	Generic error message.
attrList.code	Invalid attribute list error code on Specific code.
attrList.message	Invalid attribute list error message on Specific code.
invalid.sessionId.code	Invalid session id error code.
invalid.sessionId.message	Invalid session id error code.
invalid.session.code	Invalid session error code.
invalid.session.message	Invalid session error code.

Key	Description
callback.code	Invalid eIDAS-Node Proxy Service callback URL error code on CitizenConsent interface.
callback.message	Invalid eIDAS-Node Proxy Service callback URL error message on CitizenConsent interface.
idp.url.code	Invalid IdP redirect URL error code.
idp.url.message	Invalid IdP redirect URL error message.
IdPSAMLResponse.code	Invalid IdP's SAML Response error code.
IdPSAMLResponse.message	Invalid IdP's SAML Response error message.
serviceSAMLResponse.code	Invalid Proxy Service's SAML Response error code.
serviceSAMLResponse.message	Invalid Proxy Service's SAML Response error message.
authenticationFailed.code	Authentication Failed error code on IdPResponse Interface.
authenticationFailed.message	Authentication Failed error message on IdPResponse Interface.
username.code	Authentication Failed error code on specific code.
username.message	Authentication Failed error message on specific code.
invalidAttributeList.code	Invalid Attribute List error code on Specific Code or IdP Response.
invalidAttributeList.message	Invalid Attribute List error message on Specific Code or IdP Response.
invalidAttributeValue.code	Invalid Attribute Value error code on Specific Code.
invalidAttributeValue.message	Invalid Attribute Value error message on Specific Code.
attVerification.mandatory.code	No consent given error code on the CitizenConsent interface.
attVerification.mandatory.message	No consent given to mandatory error message on the CitizenConsent interface.
hash.error.code	Hash generation error code.
hash.error.message	Hash generation error message.
qaaLevel.code	Invalid QAALevel error code on Specific Code or IdP Response.
qaaLevel.message	Invalid QAALevel error message on Specific Code or IdP Response.

Key	Description
colleagueRequest.invalidSAML.code	Invalid SAML Token error code on the ColleagueRequest interface.
colleagueRequest.invalidSAML.message	Invalid SAML Token error message on the ColleagueRequest interface.
colleagueRequest.invalidCountry.code	Invalid Citizen Country error code on the ColleagueRequest interface.
colleagueRequest.invalidCountry.message	Invalid Citizen Country error code on the ColleagueRequest interface.
colleagueRequest.errorCreatingSAML.code	Generating SAML Response error code on the ColleagueRequest interface.
colleagueRequest.errorCreatingSAML.message	Generating SAML Response error code on the ColleagueRequest interface.
colleagueRequest.attrNull.code	Invalid personal attribute list error code on the ColleagueRequest interface.
colleagueRequest.attrNull.message	Invalid personal attribute list error message on the ColleagueRequest interface.
colleagueRequest.invalidDestUrl.code	Invalid Citizen Consent URL error code on the ColleagueRequest interface.
colleagueRequest.invalidDestUrl.message	Invalid Citizen Consent URL error code on the ColleagueRequest interface.
serviceRedirectUrl.code	Invalid Proxy Service Redirect configuration URL error code on the ServiceProvider interface.
serviceRedirectUrl.message	Invalid Proxy Service Redirect configuration URL error message on the ServiceProvider interface
colleagueResponse.invalidSAML.code	Invalid SAML Token error code on the ColleagueResponse interface.
colleagueResponse.invalidSAML.message	Invalid SAML Token error message on the ColleagueResponse interface.
auRequestIdError.code	The SAML Response Id is either null or not valid error code.
auRequestIdError.message	The SAML Response Id is either null or not valid error message.
audienceRestrictionError.code	SAML Conditions are not compliant error code.
audienceRestrictionError.message	SAML Conditions are not compliant error message.

12 Appendix B: Full Logging Examples

This section is dedicated to examples of the full logging of requests and responses.

- Full logging of an Outgoing Eidas Request from the Connector

Full logging output of the ConnectorOutgoingEidasRequestLogger.

```

2020-01-03T14:05:27.848Z [default task-1] INFO
eu.eidas.logging.full.ConnectorOutgoingEidasRequestLogger
FULL_MESSAGE_EXCHANGE -127.0.0.1: #1#
[hxDHUI9A3ccwpKrOJ4LlPYG3LO2v1IHLCAgJyM5tRK0=]
<saml2p:AuthnRequest xmlns:ds="http://www.w3.org/2000/09/xmldsig#"
xmlns:eidas="http://eidas.europa.eu/saml-extensions"
xmlns:saml2="urn:oasis:names:tc:SAML:2.0:assertion"
xmlns:saml2p="urn:oasis:names:tc:SAML:2.0:protocol"
Consent="urn:oasis:names:tc:SAML:2.0:consent:unspecified"
Destination="http://cef-eid-build-1:8085/EidasNodeProxy/ColleagueRequest"
ForceAuthn="true"
ID="_cjDLF_aHlQfI9yA10MXMKpzPEHXDGTauZPaOWvP9Vz25jMWEj_LEDqa44RPTDh8"
IsPassive="false" IssueInstant="2020-01-03T14:05:27.155Z"
ProviderName="DEMO-SP-CC" Version="2.0"><saml2:Issuer
Format="urn:oasis:names:tc:SAML:2.0:nameid-format:entity">http://cef-eid-
build-
1:8085/EidasNodeConnector/ConnectorMetadata</saml2:Issuer><ds:Signature><d
s:SignedInfo><ds:CanonicalizationMethod
Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#"><ds:SignatureMethod
Algorithm="http://www.w3.org/2001/04/xmldsig-more#ecdsa-
sha256"><ds:Reference
URI="#_cjDLF_aHlQfI9yA10MXMKpzPEHXDGTauZPaOWvP9Vz25jMWEj_LEDqa44RPTDh8"><d
s:Transforms><ds:Transform
Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-
signature"><ds:Transform Algorithm="http://www.w3.org/2001/10/xml-exc-
c14n#"></ds:Transforms><ds:DigestMethod
Algorithm="http://www.w3.org/2001/04/xmllenc#sha256"><ds:DigestValue>3N2C3
RjQWjGUWEY2TPxT4q+Q/Wb65bwUEnlTp7dtrz8=</ds:DigestValue></ds:Reference></d
s:SignedInfo><ds:SignatureValue>KULYicZRPqBKOFN6qlUqVc67WwyekQuJ07abNY/HlZ
ZU70q8QFFZVqlhFGPUe8eoMA64zFm/XEvSF+H/++A+9Q==</ds:SignatureValue><ds:KeyI
nfo><ds:X509Data><ds:X509Certificate>MIICTjCCAfSgAwIBAgIULqql9qk8a7BYHcg4h
QH60G9385QwCgYIKoZizj0EAwIwFDELMakGA1UEBhMCQkUxEDAOBgNVBAGMB0JlbGdpdW0xETA
PBgNVBACMCEJydXNzZWxzMRswGQYDVQQKDBJFdXJvcGVhbiBDb21pc3Npb24xDjAMBgNVBAsMB
URJR0lUMRswGQYDVQQDDDBJsb2NhbC1rYS1kZW1vLWNlcnQwHhcNMjM0MTI1MzI0W0hcnmJQ
xMDA1MTI1MzI0W0JBMQswCQYDVQQGEWJCRTEQMA4GA1UECAwHQMVsZ211bTERMA8GA1UEBwwIQ
nJlc3NlbHMxGzAZBgNVBAoMEkVlcm9wZWVfUENvbnVlc21vb21vbmAwGA1UECwwFRF1HSVQxGzA
ZBgNVBAMMEmxvY2FzLWthLWRLbW8tY2VydDBaMBQGBYqGSM49AgEGCSskAwMCCAEBBwNCAAR6G
PfWZsxJ+r9KgVSDCAJkeu+Mq7YV8APo4/ydKRBIRAHwdIR7/WvP6G7E9XBkmkeS1RSUMyisx/p
YrP+5jphrolMwUTAdBgNVHQ4EFgQUpdHaept65uZTZ3LCIHsuw5RnvpIwHwYDVR0jBBgwFoAUp
dHaept65uZTZ3LCIHsuw5RnvpIwDwYDVR0TAQH/BAUwAwEB/zAKBggqhkjOPQQDAQNIADBFAiA
SunseDrp7znsk6U8ot5JnzUjh6LjZf43oglr0hJNGWgIhAJut1Fg9FNXAWUKWh7RiLi4ZWgMxH
NqsTcwFiVNMqgmp</ds:X509Certificate></ds:X509Data></ds:KeyInfo></ds:Signat
ure><saml2p:Extensions><eidas:RequestedAttributes><eidas:RequestedAttribut
e FriendlyName="D-2012-17-EUIdentifier"
Name="http://eidas.europa.eu/attributes/legalperson/D-2012-17-
EUIdentifier" NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute FriendlyName="EORI"
Name="http://eidas.europa.eu/attributes/legalperson/EORI"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute FriendlyName="LEI"
Name="http://eidas.europa.eu/attributes/legalperson/LEI"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute FriendlyName="LegalName"
Name="http://eidas.europa.eu/attributes/legalperson/LegalName"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="true"/><eidas:RequestedAttribute FriendlyName="LegalAddress"
Name="http://eidas.europa.eu/attributes/legalperson/LegalPersonAddress"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute
FriendlyName="LegalPersonIdentifier"
Name="http://eidas.europa.eu/attributes/legalperson/LegalPersonIdentifier"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="true"/><eidas:RequestedAttribute FriendlyName="SEED"
Name="http://eidas.europa.eu/attributes/legalperson/SEED"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute FriendlyName="SIC"

```

```

Name="http://eid.europa.eu/attributes/legalperson/SIC"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute FriendlyName="TaxReference"
Name="http://eid.europa.eu/attributes/legalperson/TaxReference"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute
FriendlyName="VATRegistration"
Name="http://eid.europa.eu/attributes/legalperson/VATRegistrationNumber"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute FriendlyName="BirthName"
Name="http://eid.europa.eu/attributes/naturalperson/BirthName"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute
FriendlyName="CurrentAddress"
Name="http://eid.europa.eu/attributes/naturalperson/CurrentAddress"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute FriendlyName="FamilyName"
Name="http://eid.europa.eu/attributes/naturalperson/CurrentFamilyName"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="true"/><eidas:RequestedAttribute FriendlyName="FirstName"
Name="http://eid.europa.eu/attributes/naturalperson/CurrentGivenName"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="true"/><eidas:RequestedAttribute FriendlyName="DateOfBirth"
Name="http://eid.europa.eu/attributes/naturalperson/DateOfBirth"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="true"/><eidas:RequestedAttribute FriendlyName="Gender"
Name="http://eid.europa.eu/attributes/naturalperson/Gender"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute
FriendlyName="PersonIdentifier"
Name="http://eid.europa.eu/attributes/naturalperson/PersonIdentifier"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="true"/><eidas:RequestedAttribute FriendlyName="PlaceOfBirth"
Name="http://eid.europa.eu/attributes/naturalperson/PlaceOfBirth"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute
FriendlyName="LegalAdditionalAttribute"
Name="http://eid.europa.eu/attributes/legalperson/LegalAdditionalAttribute"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/><eidas:RequestedAttribute
FriendlyName="AdditionalAttribute"
Name="http://eid.europa.eu/attributes/naturalperson/AdditionalAttribute"
NameFormat="urn:oasis:names:tc:SAML:2.0:attrname-format:uri"
isRequired="false"/></eidas:RequestedAttributes></saml2p:Extensions><saml2
p:NameIDPolicy AllowCreate="true"
Format="urn:oasis:names:tc:SAML:1.1:nameid-
format:unspecified"/><saml2p:RequestedAuthnContext
Comparison="minimum"><saml2:AuthnContextClassRef>http://eid.europa.eu/Lo
A/low</saml2:AuthnContextClassRef></saml2p:RequestedAuthnContext></saml2p:
AuthnRequest> #2# [HKA8HgNhTMylytox5txoC19ThvfqIvX6ZX9L39A0S9c=]

```

- Full logging of an Outgoing LightResponse from the Connector

Full logging output of the ConnectorOutgoingEidasLightResponseLogger.

```

2020-02-06T10:17:17.943Z [http-nio-8080-exec-
1] INFO eu.eidas.logging.full.ConnectorOutgoingLightResponseLogger FULL_M
ESSAGE_EXCHANGE -
172.17.0.1: #11# [4LWthojFVqXLpv8tcMM2whTMOdMeuj7DPqb5+6D/rGg=]
<?xml version="1.0" encoding="UTF-
8" standalone="yes"?><lightResponse>    <id>_RX8QrnJIcr7vln4Z.PvTeKL6owCLs
akmS-tt2KaFtW3ItuNAkKvItj6q3-_QVZc</id>    <relayState>8e201975-c953-4bc1-
bdf8-
37677cf0039a</relayState>    <issuer>http://localhost:8080/EidasNodeConnec
tor/ConnectorMetadata</issuer>    <subject>0123456</subject>    <subjectNa
meIdFormat>urn:oasis:names:tc:SAML:1.1:nameid-
format:unspecified</subjectNameIdFormat>    <status>    <failure>>false
</failure>    <statusCode>urn:oasis:names:tc:SAML:2.0:status:Success</
statusCode>    <statusMessage>urn:oasis:names:tc:SAML:2.0:status:Succe
ss</statusMessage>    </status>    <inResponseToId>fd8e8c53-592a-48ea-
999c-
4cd4230aa10b</inResponseToId>    <levelOfAssurance>http://eidas.europa.eu/
LoA/low</levelOfAssurance>    <attributes>    <attribute>    <
definition>http://eidas.europa.eu/attributes/legalperson/LegalName</defini
tion>    <value>Current Legal Name</value>    </attribute>
    <attribute>    <definition>http://eidas.europa.eu/attributes/l
egalperson/LegalPersonIdentifier</definition>    <value>CA/CB/1254
57487Company</value>    </attribute>    <attribute>    <de
finition>http://eidas.europa.eu/attributes/naturalperson/CurrentFamilyName
</definition>    <value>Garcia</value>    </attribute>
    <attribute>    <definition>http://eidas.europa.eu/attributes/natur
alperson/CurrentGivenName</definition>    <value>javier</value>
    </attribute>    <attribute>    <definition>http://eidas.e
uropa.eu/attributes/naturalperson/DateOfBirth</definition>    <val
ue>1965-01-
01</value>    </attribute>    <attribute>    <definition>h
ttp://eidas.europa.eu/attributes/naturalperson/PersonIdentifier</definitio
n>    <value>CA/CB/12345</value>    </attribute>    </attribut
es></lightResponse> #12# [MkB9q0hjCn0SBRDQCczjz1ju3sT3tZ5y4zsqfzZa0Yo=]

```

13 Appendix C: Usage Statistics Use Cases

To illustrate the different use cases we will be using the original eIDAS Logging Diagram. The grayed out logging points and communication arrows resemble unwalked paths.

13.1 Full success flow

Both Connector and Proxy service are capable of logging and measuring a flow passing through all four points on each side.

Connector usage logging based on all 4 message log points (CSV)

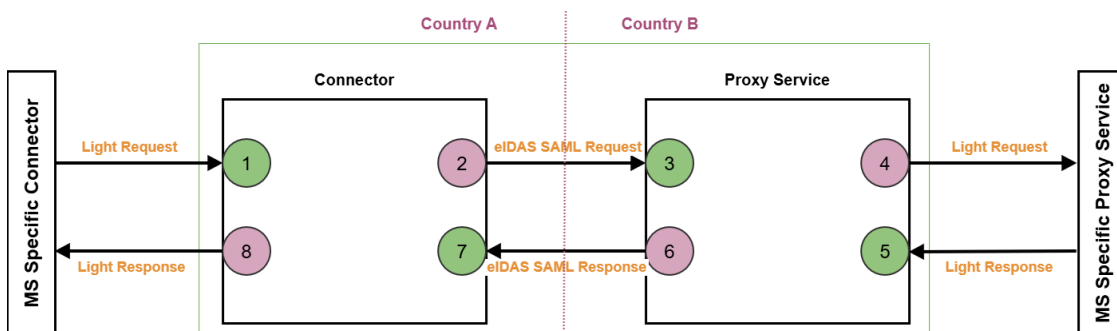
[_rREmRQzX23.ju95rdiLTCs2TRxCy4mglZBuujYt1mLtZ_3rMiAAVd.U7fV1h8RI,](#)
[CB,http://eidas.europa.eu/LoA/low,2026-01-20T10:55:49.953Z,22,2026-01-](#)
[20T10:55:54.835Z,48,success](#)

flowId	Cross Border Location	Requested LoA	Point 1	Point 2	Point 7	Point 8	Outcome
hash	CB	low	Time1	22ms	Time2	48ms	success

Proxy Service usage logging based on all 4 message log points (CSV)

[_51uGUOdbphxBeu4woqlmdfleLl3alMGYirYDrlrQWNYZ18m-bazcltxdDrO4K,](#)
[https://ca/EidasNode/ConnectorMetadata,http://eidas.europa.eu/LoA/low,2026-03-](#)
[17T23:40:20.360Z,51,2026-03-17T23:40:24.396Z,33,success](#)

flowId	Cross Border Location	Requested LoA	Point 3	Point 4	Point 5	Point 6	Outcome
hash	https://ca/EidasNode/ConnectorMetadata	low	Time 1	51ms	Time 2	33ms	success



13.2 Connector Request Error

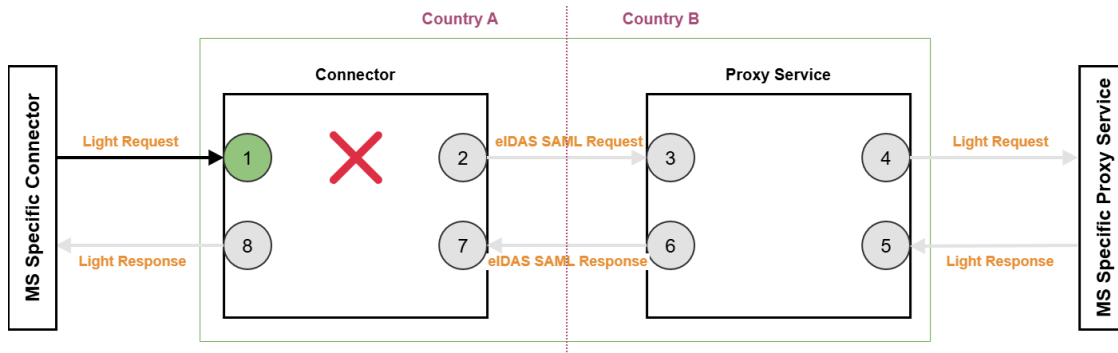
The Connector was not able to construct a Cross border SAML Request. This will be logged in usage statistics as a "request error". Common causes are:

- Connector was not able to retrieve proxy metadata
- Connector does not trust the proxy metadata
- Configuration towards the proxy has not been set up properly

- Light request can not be fulfilled based on proxy metadata checks

Connector usage logging based on 1/4 message log points (CSV)

<u>_rREmRQ</u> ,CB,http://eidas.europa.eu/LoA/low,2026-01-20T10:55:49.953Z,,,request error							
flowId	Cross Border Location	Requested LoA	Point 1	Point 2	Point 7	Point 8	Outcome
_rREmRQ	CB	low	Time1	-	-	-	request error



13.3 Connector Lost, Proxy Unreachable

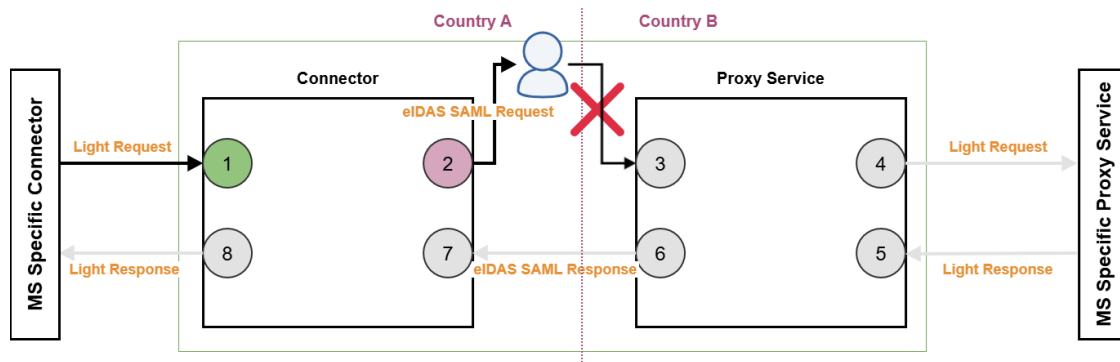
In the other use cases the diagram has been overly simplified, SAML is a 3 point system where the **SP(connector)** passes a message via the **Principal (user/citizen)** to be delivered to the **IdP (Proxy Service)**.

In this use case the Citizen cannot reach the proxy service from its location to deliver the SAML. The proxy service has no knowledge of an authentication attempt.

- The Proxy Service has is not open to connections from certain regions, IP ranges or using a narrow whitelist
- While it's likely the user is in the SP country, the user can be in a 3rd country that blocks the proxy
- The connection of the user has dropped

Connector usage logging based on 2/4 message log points (CSV)

<u>_rREmRQ</u> ,CB,http://eidas.europa.eu/LoA/low,2026-01-20T10:55:49.953Z,22,,,lost							
flowId	Cross Border Location	Requested LoA	Point 1	Point 2	Point 7	Point 8	Outcome
_rREmRQ	CB	low	Time1	22ms	-	-	lost



13.4 Connector Lost, Proxy Error

In this use case the proxy receives the SAML Request but is unable to process it. In this scenario it is also unlikely the connector will ever have knowledge of what has happened in Country B.

- Proxy service failed to retrieve connector metadata
- Configuration towards the connector has not been configured properly
- Proxy does not trust SAML Request due to malicious or expired signature data
- The SAML Request can not be fulfilled based on the proxy configuration or metadata

Connector usage logging based on 2/4 message log points (CSV)

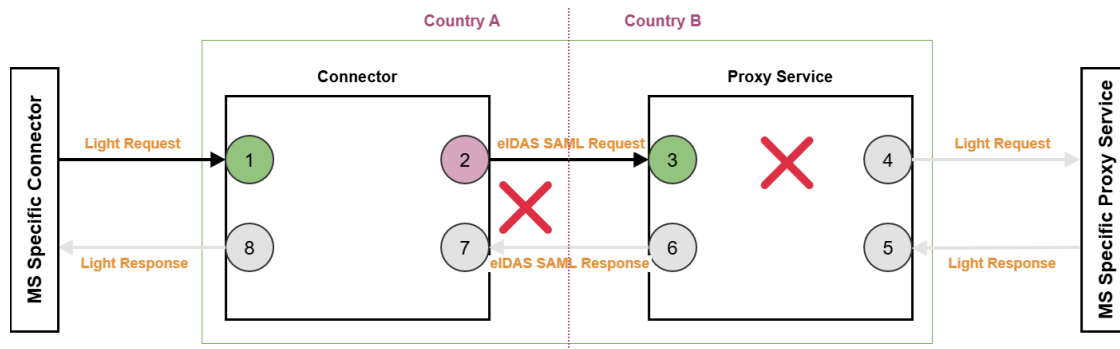
[_rREmRQ,CB,http://eidas.europa.eu/LoA/low,2026-01-20T10:55:49.953Z,22,,,lost](#)

flowId	Cross Border Location	Requested LoA	Point 1	Point 2	Point 7	Point 8	Outcome
_rREmRQ	CB	low	Time1	22ms	-	-	lost

Proxy Service usage logging based on 1/4 message log points (CSV)

[_51uGUO,https://ca/EidasNode/ConnectorMetadata,http://eidas.europa.eu/LoA/low,2026-03-17T23:40:20.360Z,,,,request error](#)

flowId	Cross Border Location	Requested LoA	Point 3	Point 4	Point 5	Point 6	Outcome
_51uGUO	https://ca/EidasNode/ConnectorMetadata	low	Time 1	-	-	-	request error



13.5 Connector Lost Proxy Lost

In this scenario the authentication request has made it all the way cross border to the citizen's memberstate. For unknown reasons the flow is not continued. **This the minimal use case to prove bidirectional trust in eIDAS.**

- The user lost connection
- The user fails to perform the manual IdP login steps within a reasonable timeframe
- Something is wrong with the IdP connection side

Connector usage logging based on 2/4 message log points (CSV)

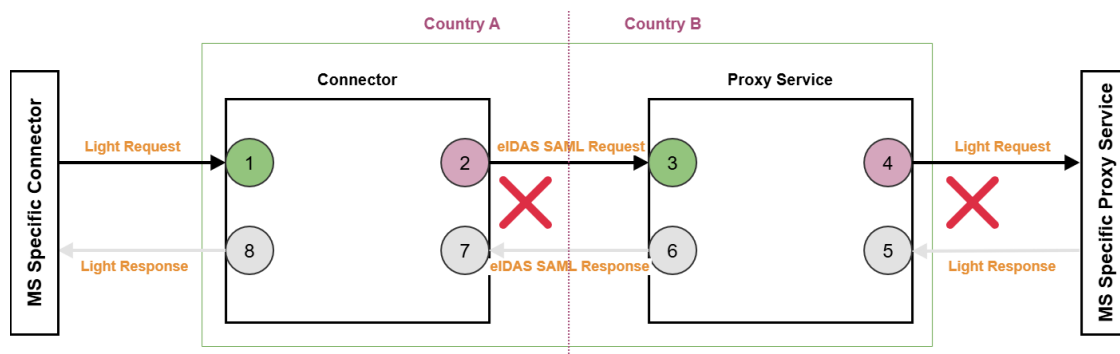
_rREmRQ,CB,http://eid.as.europa.eu/LoA/low,2026-01-20T10:55:49.953Z,22,,,lost

flowId	Cross Border Location	Requested LoA	Point 1	Point 2	Point 7	Point 8	Outcome
_rREmRQ	CB	low	Time1	22ms	-	-	lost

Proxy Service usage logging based on 2/4 message log points (CSV)

_51uGUO,https://ca/EidasNode/ConnectorMetadata,http://eid.as.europa.eu/LoA/low,2026-03-17T23:40:20.360Z,51,,,lost

flowId	Cross Border Location	Requested LoA	Point 3	Point 4	Point 5	Point 6	Outcome
_51uGUO	https://ca/EidasNode/ConnectorMetadata	low	Time 1	51ms	-	-	lost



13.6 Connector Lost Proxy Response Error

The IdP

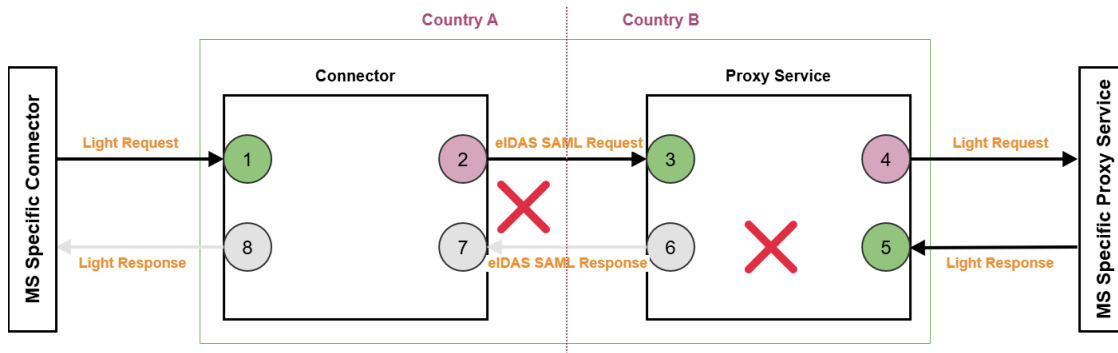
- Encryption cannot be fulfilled
- The response contains attributes that were not requested

Connector usage logging based on 2/4 message log points (CSV)

<u>_rREmRQ</u> ,CB, <u>http://eidas.europa.eu/LoA/low</u> ,2026-01-20T10:55:49.953Z,22,, <u>lost</u>							
flowId	Cross Border Location	Requested LoA	Point 1	Point 2	Point 7	Point 8	Outcome
_rREmRQ	CB	low	Time1	22ms	-	-	lost

Proxy Service usage logging based on 3/4 message log points (CSV)

<u>_51uGUO</u> , <u>https://ca/EidasNode/ConnectorMetadata</u> , <u>http://eidas.europa.eu/LoA/low</u> ,2026-03-17T23:40:20.360Z,51,2026-03-17T23:40:24.396Z,, <u>response error</u>							
flowId	Cross Border Location	Requested LoA	Point 3	Point 4	Point 5	Point 6	Outcome
_51uGUO	https://ca/EidasNode/ConnectorMetadata	low	Time 1	51ms	Time 2	-	response error



13.7 Connector Response Error Proxy Success

Description

- Decryption fails
- Attribute validation fails

Connector usage logging based on 3/4 message log points (CSV)

<u>_rREmRQ</u> ,CB, <u>http://eidas.europa.eu/LoA/low</u> ,2026-01-20T10:55:49.953Z,22,2026-01-20T10:55:54.835Z,, <u>response error</u>							
---	--	--	--	--	--	--	--

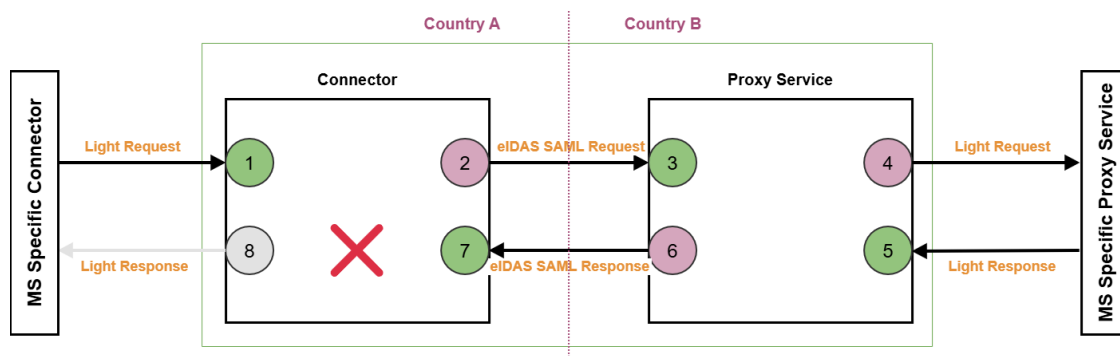
Connector usage logging based on 3/4 message log points (CSV)

flowId	Cross Border Location	Requested LoA	Point 1	Point 2	Point 7	Point 8	Outcome
_rREmRQ	CB	low	Time1	22ms	Time2	-	response error

Proxy Service usage logging based on 4/4 message log points (CSV)

[51uGUO](#),<https://ca/EidasNode/ConnectorMetadata>,<http://eidas.europa.eu/LoA/low>,2026-03-17T23:40:20.360Z,51,2026-03-17T23:40:24.396Z,33,success

flowId	Cross Border Location	Requested LoA	Point 3	Point 4	Point 5	Point 6	Outcome
_51uGUO	https://ca/EidasNode/ConnectorMetadata	low	Time 1	51ms	Time 2	33ms	success



13.8 Comparing notes

While one country does not have visibility on what is happening in another country's systems. Just by comparing notes on the count of events, one should be able to deduce what kind of problems the specific connection is dealing with from the use cases above.

