

WMO WIS2 Monitoring Events

World Meteorological Organization

Date: 2025-03-04

Version: 1.0.0-DRAFT-2025-03-04

Document location: TBD

Document status: DRAFT

Standing Committee on Information Management and Technology (SC-IMT)^[1]

Commission for Observation, Infrastructure and Information Systems (INFCOM)^[2]

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i. Abstract

WIS2 is comprised of a network of Global Services which provide highly available services for discovery, subscription, notification and download, based on the publication of data by WIS2 Nodes.

Successful operation of WIS2 Global Services will depend on running well-managed IT environments with a very high level of reliability so that all WIS Users and WIS2 Nodes will be able to access and provide the data they need for their duties. The WIS2 Guide defines service levels and performance indicators ^[3] for Global Services in order to monitor and maintain the health of the network.

This document defines the content, structure, and encoding for WIS2 monitoring events. This standard is an extension of the [WIS2 Topic Hierarchy](#) as well as the [CloudEvents specification](#).

WIS2 Monitoring Event topics shall extend the approach of the WIS2 Topic Hierarchy. WIS2 Monitoring Events messages shall be encoded using CloudEvents along with a domain specific model for WIS2.

ii. Keywords

The following are keywords to be used by search engines and document catalogues.

wmo, wis 2.0, weather, climate, water, metadata, pubsub, event, mqp, monitoring, cloudevents, JSON

iii. Security Considerations

TODO

No security considerations have been made for this standard.

Chapter 1. Scope

This document defines the content, structure, and encoding for WIS2 Monitoring Events. This standard is an extension of the [WIS2 Topic Hierarchy](#) as well as the [CloudEvents specification](#).

This specification defines the conformance requirements for WIS2 Monitoring Events (topic hierarchy and notification message). Annex A defines the abstract test suite.

[1] <https://community.wmo.int/governance/commission-membership/commission-observation-infrastructures-and-information-systems-infcom/commission-infrastructure-officers/infcom-management-group/standing-committee-information-management-and-technology-sc-int>

[2] <https://community.wmo.int/governance/commission-membership/infcom>

[3] https://wmo-im.github.io/wis2-guide/wis2-guide-DRAFT.html#_2_7_2_2_service_levels_performance_indicators_and_fair_usage_policies

Chapter 2. Conformance

Conformance with this standard shall be checked using the tests specified in Annex A (normative) of this document.

The WIS2 Topic Hierarchy defines the topic hierarchy used by WIS message brokers to manage message delivery to subscribers and / or recipients. This standard is an extension of the WIS2 Topic Hierarchy.

CloudEvents is a specification for describing event data in common formats to provide interoperability across services, platforms and systems. This standard is an extension of CloudEvents.

Global Service providers are required to comply with all conformance classes of this specification in support of providing highly available services for discovery, subscription, notification and download of data and metadata within WIS2.

WMO shall publish guidance material to assist data providers in constructing WIS2 Monitoring Event Topic and Event Messages.

This standard identifies numerous Requirements Classes which define the functional requirements.

The mandatory Requirements Classes for this specification are:

- "WIS2 Monitoring Event Topic"
- "WIS2 Monitoring Event Message Encoding: Core"
- "WIS2 Monitoring Event Message Encoding: System Alert"

Chapter 3. References

- IETF: RFC-8259 The JavaScript Object Notation (JSON) Data Interchange Format (2016) ^[1]
- IETF: RFC 3339: Date and Time on the Internet: Timestamps (2002) ^[2]
- W3C: Data on the Web Best Practices, W3C Recommendation (2017) ^[3]
- IANA: Link Relation Types (2020) ^[4]
- IETF: JSON Schema (2022) ^[5]
- CloudEvents: CloudEvents specification (2025) ^[6]
- WMO: WIS2 Topic Hierarchy (2022) ^[7]
- WMO: WIS2 Notification Message (2022) ^[8]

[1] <https://datatracker.ietf.org/doc/html/rfc8259>

[2] <https://datatracker.ietf.org/doc/html/rfc3339>

[3] <https://www.w3.org/TR/dwbp>

[4] <https://www.iana.org/assignments/link-relations/link-relations.xml>

[5] <https://json-schema.org>

[6] <https://github.com/cloudevents/spec/blob/main/cloudevents/spec.md>

[7] <https://github.com/wmo-im/wis2-topic-hierarchy>

[8] <https://github.com/wmo-im/wis2-notification-message>

Chapter 4. Terms and definitions

This document uses the terms defined in [OGC Policy Directive 49](#), which is based on the ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards. In particular, the word “shall” (not “must”) is the verb form used to indicate a requirement to be strictly followed to conform to this Standard and OGC documents do not use the equivalent phrases in the ISO/IEC Directives, Part 2.

This document also uses terms defined in the OGC Standard for Modular specifications ([OGC 08-131r3](#)), also known as the 'ModSpec'. The definitions of terms such as standard, specification, requirement, and conformance test are provided in the ModSpec.

The following additional terms and definitions also apply.

4.1. Abbreviated terms

Table 1. Symbols and abbreviated terms

Abbreviation	Term
API	Application Programming Interface
DCPC	Data Collection and Production Centres
GDC	Global Discovery Catalogue
GIS	Geographic Information System
GISC	Global Information System Centre
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
IANA	Internet Assigned Numbers Authority
IETF	Internet Engineering Task Force
ISO	International Organization for Standardization
JSON	JavaScript Object Notation
MQP	Message Queuing Protocol
MQTT	Message Queuing Telemetry Transport
NC	National Centre
NWP	Numerical Weather Prediction
OGC	Open Geospatial Consortium
PubSub	Publish / Subscribe
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
UUID	Universally Unique Identifier

Abbreviation	Term
W3C	World Wide Web Consortium
WCMP	WMO Core Metadata Profile
WIS	WMO Information System
WME	WIS2 Monitoring Events
WMEM	WIS2 Monitoring Event Message
WMET	WIS2 Monitoring Event Topic
WMO	World Meteorological Organization
WNM	WIS2 notification message

Chapter 5. Conventions

This section provides details and examples for any conventions used in the document. Examples of conventions are symbols, abbreviations, use of JSON Schema, or special notes regarding how to read the document.

5.1. Identifiers

The normative provisions in this Standard are denoted by the URI:

<http://wis.wmo.int/spec/wme/1>

All requirements and conformance tests that appear in this document are denoted by partial URIs which are relative to this base.

5.2. Examples

Monitoring event topics examples provided in this specification are encoded as **plain text strings**.

Monitoring event message examples provided in this specification are encoded as JSON.

Complete examples can be found at <https://schemas.wmo.int/wme/1.0/examples>

5.3. Codelists bundle

Given the WIS2 Monitoring Event Topic extends the WIS2 Topic Hierarchy, no additional codelists bundles are made available given the WTH codelists bundles satisfy the requirements of this specification.

5.4. Schemas

Monitoring event message schemas can be found at <https://schemas.wmo.int/wme/1.0>

5.5. Schema representation

JSON Schema ^[1] objects are used throughout this standard to define the structure of metadata records. These schema objects are also typically represented using YAML ^[2]. YAML is a superset of JSON, and in this standard is regarded as equivalent.

Event message instances are always defined as JSON.

5.5.1. Properties

A JSON **property** represents a key-value pair, where the key is the name of the property and the value is a standard JSON data type.

```
"myPropertyName": "test123"
```

[1] <https://json-schema.org>

[2] <https://en.wikipedia.org/wiki/YAML>

Chapter 6. Introduction

6.1. Motivation

WIS2 Global Services provide high availability capabilities in support of discovery, access and exchange of weather/climate/water/environmental data on WIS2.

Once connected to the WIS2 infrastructure, any Global Service will be monitored by the WIS2 Global Monitor. Monitoring of WIS2 Global Services will allow for detection of service anomalies, interruptions or quality assessments of metadata. These "events" can jeopardize normal WIS2 Operations.

A mechanism to notify on and describe such events is required in support of Global Service communication and corrective action. Using the WIS2 Topic Hierarchy and CloudEvents baselines for this specification provide broad interoperability and low barrier publication and event handling for the WIS2 ecosystem and beyond.

6.2. Scenarios

The following scenarios are useful in understanding the drivers and principles that were used in the development of this specification:

- *Global Service service down*: a Global Service may cease to operate for any given reason
- *Global Service malfunctioning*: a Global Service may fail to function normally (e.g.: Global Cache not providing messages, etc.)
- *WIS2 Node malfunctioning*:
 - a WIS2 Node may publish malformed or invalid WIS2 Notification Messages
 - a WIS2 Node may provide correct notifications but no data

These scenarios can be realized as planned/expected outages, or occur suddenly, in an unexpected manner.

Those events should be detected, and the Global Services or WIS2 Nodes should be informed to drive corrective action and successful operation of WIS2.

Chapter 7. The WIS2 Monitoring Event Topic

The WIS2 Monitoring Event Topic (WET) provides a mechanism for Global Services to provide reports and notifications to WIS2 Global Services, as well as data/metadata reports for WIS2 Nodes to subscribe to and receive notifications.

7.1. Requirements Class "WIS2 Monitoring Event Topic"

7.1.1. Overview

This Requirements Class provides requirements for the WIS2 Monitoring Event Topic.

Requirements Class	
http://www.wmo.int/spec/wme/1/req/monitoring-event-topic	
Target type	Topic classification
Dependency	WIS2 Topic Hierarchy
Pre-conditions	Topic levels 2-4 conform to the WIS2 Topic Hierarchy.

Successful operation of the WIS2 infrastructure and monitoring events of same should be information that is made available to all Global Services and WIS2 Nodes, and not designed for communication to external users or data consumers. Global Services need to be able to report information to Global Services and WIS2 Nodes to trigger corrective action.

The WET is composed of five levels: A fixed channel of **monitor**, WTH primary topic levels 2 (version) and 3 (system), as well as WTH primary topic level 4 (centre identifier) at two WET levels:

- *producer*: the centre identifier of the entity producing the event notification
- *target*: the centre identifier of the intended target of the event notification

The representation is encoded as a simple text string of values in each topic level separated by a slash (/).

Examples:

monitor/a/wis2/ca-eccc-msc-global-discovery-catalogue/de-dwd

monitor/a/wis2/fr-meteofrance-global-broker/cn-cma

The table below provides an overview of the primary topic levels.

Table 2. WETprimary topic levels

Level	Name	Description
1	channel	Location of where the data originates from (fixed value of monitor)

Level	Name	Description
2	version	Alphabetical version of the topic hierarchy
3	system	Fixed value of wis2 for WIS2
4	centre-id	Acronym proposed by Member and endorsed by WMO Secretariat, of the entity producing the event (source)
5	centre-id	Acronym proposed by Member and endorsed by WMO Secretariat, of the intended target of the event (subject)

7.1.2. Publishing

A simple ruleset is defined for publishing events to WET that enables the clear identification of the event producer and its intended target, to trigger corrective action.

Requirement 1	/req/monitoring-event-topic/publishing
A	Events SHALL NOT be published with a topic that is not defined in this specification.
B	Events SHALL be published to exactly level 5.
C	Event topic level 1 SHALL be named monitor .
D	Event topic level 2 SHALL be named a .
E	Event topic level 3 SHALL be named wis2 .
F	Event topic level 4 SHALL be a centre identifier (as per the WIS2 Topic Hierarchy) based on the entity producing the event.
G	Event topic level 5 SHALL be a centre identifier (as per the WIS2 Topic Hierarchy) based on the intended target of the event.

Chapter 8. WIS2 Monitoring Event Message Encoding

Event payloads published via the WIS2 Monitoring Event Topic (WET) are defined using the [CloudEvents](#) specification as a building block.

8.1. Requirements Class "WIS2 Monitoring Event Message Encoding: Core"

8.1.1. Overview

This Requirements Class provides baseline requirements for all WIS2 event and report types.

CloudEvents provides a standards-based encoding for all event data, and provides mechanisms for extensibility.

Requirements Class	
http://www.wmo.int/spec/wme/1/req/monitoring-event-message-encoding-core	
Target type	Event metadata
Dependency	CloudEvents
Pre-conditions	The event message conforms to the CloudEvents specification.

The table below provides an overview of the set of properties that are included in a WIS2 Monitoring Event Message (WEM).

Table 3. WEM core properties

Property	Requirement	Description
id	Required	A universally unique identifier (UUID) of the message (see Identifier)
specversion	Required	The CloudEvents specification version (see Version)
source	Required	The centre identifier producing the event (see Source)
type	Required	The event type related to the message (see Type)
subject	Required	The centre identifier of the intended target of the event (see Subject)

Property	Requirement	Description
<code>time</code>	Required	The date and time of when the notification was published, in RFC3339 format, UTC (see Time)
<code>datacontenttype</code>	Required	The media type of the data content encoding in the event message (<code>application/json</code>) (see Data content type)
<code>data</code>	Required	The event payload as JSON (see Data)

8.1.2. Message size

The WIS2 Monitoring Event Message Encoding allows for the transmission of event messages in a compact manner.

Requirement 2	<code>/req/monitoring-event-message-encoding-core/message_size</code>
A	A WEM message SHALL NOT exceed 64 000 bytes.

8.1.3. Identifier

A universally unique identifier of the event using the UUID standard ([RFC4122](#)). The identifier is generated by the originator of the event.

Example:

```
"id": "6e1c7f9f-dd6c-48d9-bbc4-aef0625f1fb8"
```

Requirement 3	<code>/req/monitoring-event-message-encoding-core/id</code>
A	The <code>id</code> property SHALL be a Universally Unique Identifier (UUID).

8.1.4. Version

The CloudEvents specification version of the event message encoding.

Example:

```
"specversion": "1.0"
```

Requirement 4	<code>/req/monitoring-event-message-encoding-core/version</code>
A	The <code>specversion</code> property SHALL be fixed to "1.0".

8.1.5. Source

The centre identifier of the event producer (as defined in the [\[wis2-topic-hierarchy\]](#)).

Example:

```
"source": "ca-eccc-msc-global-discovery-catalogue"
```

Requirement 5	/req/monitoring-event-message-encoding-core/source
A	The source property SHALL be a valid WIS2 centre identifier.

8.1.6. Type

The type of event related to the event message encoding, using a reverse DNS notation.

Example:

```
"type": "int.wmo.wis.wme.event.wcmp2"
```

Requirement 6	/req/monitoring-event-message-encoding-core/type
A	The type property SHALL be encoded using a reverse DNS notation.
B	The type property SHALL be one of the following values: <ul style="list-style-type: none">• int.wmo.wis.wme.event.wcmp2.ets• int.wmo.wis.wme.event.wcmp2.kpi• int.wmo.wis.wme.event.wnm• int.wmo.wis.wme.event.system.alert

8.1.7. Subject

The centre identifier of the intended target of the event (as defined in the [\[wis2-topic-hierarchy\]](#)).

Example:

```
"subject": "de-dwd"
```

Requirement 7	/req/monitoring-event-message-encoding-core/subject
A	The subject property SHALL be a valid WIS2 centre identifier.

8.1.8. Time

The **time** property identifies the date/time when the notification was first posted or published by the

originator. The date/time is encoded in RFC3339 format with the Coordinated Universal Time (UTC) timezone (Z).

Example:

```
"time": "2024-10-17T03:42:23Z"
```

Requirement 8	/req/monitoring-event-message-encoding-core/time
A	A WEM SHALL provide a time property.
B	The time property SHALL be in RFC3339 format.
C	The time property SHALL be in UTC timezone.

8.1.9. Data content type

The **datacontenttype** property identifies the media type associated with the event message payload. **application/json** (JSON) is the required media type for all data specific encodings.

Example:

```
"datacontenttype": "application/json"
```

Requirement 9	/req/monitoring-event-message-encoding-core/datacontenttype
A	The datacontenttype property SHALL be fixed to application/json .

8.1.10. Data

The **data** property provides the event payload in JSON.

Example:

```
"data": {
  "id": "ab7cd199-ffa3-4909-80be-c78e99791435",
  "report_type": "ets",
  "summary": {
    "PASSED": 12,
    "FAILED": 0,
    "SKIPPED": 0
  },
  "generated_by": "pywcmp 0.10.1 (https://github.com/wmo-im/pywcmp)",
  "tests": [
    {
      "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/conformance",
      "code": "PASSED",
      "message": "Passes given schema is compliant/valid"
    }
  ]
}
```

```
    },  
    ...  
  }  
}
```

Requirement 10	/req/monitoring-event-message-encoding-core/data
A	The data property SHALL be a JSON encoded payload of a given event.
B	The data property SHALL NOT be an escaped representation of JSON.

Chapter 9. WIS2 Monitoring Event Message Encoding: System Alert Report

WNM Validation reports provide the results of validating WIS2 Notification Messages a GB or validation service, in alignment with the requirements of WNM.

9.1. Requirements Class "WIS2 Monitoring Event Message Encoding: System Alert Report"

9.1.1. Overview

This Requirements Class provides the requirements for System Alert reports.

Requirements Class	
http://www.wmo.int/spec/wme/1/req/monitoring-event-message-encoding-system-alert	
Target type	Event metadata
Dependency	WIS2 Monitoring Event Message Encoding: Core
Pre-conditions	The event message conforms to "WIS2 Monitoring Event Message Encoding: Core" Requirements Class.

9.1.2. Validation

The System Alert report schema is based on the Requirements Class WIS2 Monitoring Event Message Encoding: Core schema and the associated information model, and applies to the **data** property of an event report.

Requirement 11	/req/monitoring-event-message-encoding-system-alert/validation
A	Each System Alert report SHALL validate without error against the System Alert report schema.

9.1.3. Type

The type of event related to the event message encoding, using a reverse DNS notation.

Example:

```
"type": "int.wmo.wis.wme.event.system.alert"
```

Requirement 12	/req/monitoring-event-message-encoding-system-alert/type
A	The type property of a System Alert report SHALL be equal to int.wmo.wis.wme.event.system.alert

9.1.4. Data schema

The **dataschema** property identifies the JSON Schema that is adhered to by event message payload. This is the value of a given JSON Schema's **\$id** property.

Example:

```
"dataschema": "https://schemas.wmo.int/wme/1.0.0/schemas/wis2-event-message-encoding-system-alert.json"
```

Requirement 13	/req/monitoring-event-message-encoding-system-alert/dataschema
A	The dataschema property SHALL be a URL to the System Alert JSON Schema.

9.1.5. Data

The **data** property provides the event payload in JSON.

Example:

```
"data": {
  "id": "ab7cd199-ffa3-4909-80be-c78e99791435",
  "report_type": "ets",
  "summary": {
    "PASSED": 12,
    "FAILED": 0,
    "SKIPPED": 0
  },
  "generated_by": "pywcmp 0.10.1 (https://github.com/wmo-im/pywcmp)",
  "tests": [
    {
      "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/conformance",
      "code": "PASSED",
      "message": "Passes given schema is compliant/valid"
    },
    ...
  ]
}
```

Requirement 14	/req/monitoring-event-message-encoding-system-alert/data
A	The data property SHALL be a JSON encoded payload of a given event.

Annex A: Conformance Class Abstract Test Suite (Normative)

A.1. Conformance Class: WIS2 Monitoring Event Topic

label

<http://wis.wmo.int/spec/wme/1/req/monitoring-event-topic>

subject

Requirements Class "WIS2 Monitoring Event Topic"

classification

Target Type:Topic Classification

A.1.1. Publishing

label

/conf/monitoring-event-topic/publishing

subject

/req/monitoring-event-topic/publishing

test-purpose

Validate that a given topic meets the conventions of WET.

Split the topic by the / character, into tokens.

Check that there are exactly 5 tokens.

Check that the first token is a value of **monitor**.

Check that the second token is a value of **a**.

Check that the third token is a value of **wis2**.

Check that the fourth token is a valid centre identifier.

Check that the fifth token is also a valid centre identifier.

A.2. Conformance Class: WIS2 Monitoring Event Message Encoding: Core

label

<http://wis.wmo.int/spec/wme/1/req/monitoring-event-message-encoding-core>

subject

Requirements Class "WIS2 Monitoring Event Message Encoding: Core"

classification

Target Type:Event Metadata

A.2.1. Message size

label

/conf/event-message-encoding-core/message_size

subject

/req/event-message-encoding-core/message_size

test-purpose

Validate that a WEM has a valid message size.

Check that the size of the complete WEM does not exceed 64000 bytes.

A.2.2. Identifier

label

/conf/event-message-encoding-core/id

subject

/req/event-message-encoding-core/id

test-purpose

Validate that a WEM has a valid identifier.

Check for the existence of an **id** property in the WEM.

Check that the **id** property is a valid UUID.

A.2.3. Version

label

/conf/event-message-encoding-core/version

subject

/req/event-message-encoding-core/version

test-purpose

Validate that a WEM has a valid version.

Check for the existence of a **specversion** property in the WEM.

Check that the **specversion** property is set to **1.0**.

A.2.4. Source

label

/conf/event-message-encoding-core/source

subject

/req/event-message-encoding-core/source

test-purpose

Validate that a WEM has a valid source.

Check for the existence of a **source** property in the WEM.

Check that the **source** property is a valid WIS2 centre identifier.

A.2.5. Type

label

/conf/event-message-encoding-core/type

subject

/req/event-message-encoding-core/type

test-purpose

Validate that a WEM has a valid type.

Check for the existence of a **type** property in the WEM.

Check that the **type** property begins with **int.wmo.wis.wme.event**.

A.2.6. Subject

label

/conf/event-message-encoding-core/subject

subject

/req/event-message-encoding-core/subject

test-purpose

Validate that a WEM has a valid subject.

Check for the existence of a **subject** property in the WEM.

Check that the **subject** property is a valid WIS2 centre identifier.

A.2.7. Time

label

/conf/event-message-encoding-core/time

subject

/req/event-message-encoding-core/time

test-purpose

Validate that a WEM has a valid identifier.

Check for the existence of an **time** property.

Check that the **time** property is in RFC3339 format.

Check that the **time** property is in the UTC timezone.

A.2.8. Data content type

label

/conf/event-message-encoding-core/datacontenttype

subject

/req/event-message-encoding-core/datacontenttype

test-purpose

Validate that a WEM has a valid data content type.

Check for the existence of a **datacontenttype** property in the WEM.

Check that the **datacontenttype** property is set to **application/json**.

A.2.9. Data

label

/conf/event-message-encoding-core/data

subject

/req/event-message-encoding-core/data

test-purpose

Validate that a WEM has a valid data payload.

Check for the existence of a **data** property in the WEM.

Parse the **data** property as a JSON object.

A.3. Conformance Class: WIS2 Monitoring Event Message Encoding: System Alert

label

<http://wis.wmo.int/spec/wme/1/req/monitoring-event-message-encoding-system-alert>

subject

Requirements Class "WIS2 Monitoring Event Message Encoding: System Alert"

classification

Target Type:Event Metadata

A.3.1. Validation

label

/conf/event-message-encoding-system-alert/validation

subject

/req/event-message-encoding-system-alert/validation

test-purpose

Validate that a System Alert report is valid to the authoritative System Alert report schema.

Run JSON Schema validation on the System Alert report against the System Alert report authoritative schema.

A.3.2. Type

label

/conf/event-message-encoding-system-alert/type

subject

/req/event-message-encoding-system-alert/type

test-purpose

Validate that a System Alert report has a valid type.

Check for the existence of a **type** property in the WEM.

Check that the **type** property is equal to **int.wmo.wis.wme.event.system.alert**.

A.3.3. Data schema

label

/conf/event-message-encoding-system-alert/dataschema

subject

/req/event-message-encoding-system-alert/dataschema

test-purpose

Validate that a System Alert report has a valid data schema.

Check for the existence of a **dataschema** property in the WEM.

Issue a HTTP GET request on the value of the **dataschema** property.

Parse the HTTP response.

Ensure the response is a valid JSON Schema.

A.3.4. Data

label

/conf/event-message-encoding-system-alert/data

subject

/req/event-message-encoding-system-alert/data

test-purpose

Validate that a System Alert report has a valid data payload.

Check for the existence of a **data** property in the WEM.

Parse the **data** property as a JSON object.

Validate the parsed JSON object against the JSON Schema defined in the **dataschema** property.

Annex B: Schemas (Normative)

NOTE

Schema documents will only be published on schemas.wmo.int once the standard has been approved.

B.1. WIS2 Monitoring Event Message Encoding Schema

```
$schema: https://json-schema.org/draft/2020-12/schema
$id: https://schemas.wmo.int/wme/1/eventMessageEncodingJSON.yaml
title: WIS2 Event Message Encoding
description: WIS2 Event Message Encoding

allOf:
  - $ref:
    'https://raw.githubusercontent.com/cloudevents/spec/refs/heads/v1.0.2/cloudevents/formats/json-format.md'
  - properties:
      type:
        type: string
        enum:
          - int.wmo.wis.wme.event.wcmp2.ets
          - int.wmo.wis.wme.event.wcmp2.kpi
          - int.wmo.wis.wme.event.wnm.schema
          - int.wmo.wis.wme.event.system.alert

  - required:
      - datacontenttype
      - dataschema
      - subject
      - time
      - data
```

Annex C: Examples (Informative)

C.1. WIS2 Monitoring Topic

Example: Notification from Environment and Climate Change Canada, Meteorological Service of Canada, Global Discovery Catalogue Service, concerning a WCMP2 record from Météo-France (Toulouse)

```
monitor/a/wis2/ca-ecccc-msc-global-discovery-catalogue/fr-meteofrance
```

Example: Notification from Météo-France (Toulouse), Global Broker Service, concerning a WNM from Servicio Meteorológico Nacional (Argentina)

```
monitor/a/wis2/fr-meteofrance-global-broker/ar-smn
```

C.2. WIS2 Monitoring Event Message Encoding: WCMP2 ETS Report

Example: WCMP2 compliance report event notification from Environment and Climate Change Canada, Meteorological Service of Canada, Global Discovery Catalogue Service, concerning a WCMP2 record from Deutscher Wetterdienst (Germany)

```
{
  "specversion": "1.0",
  "type": "int.wmo.wis.wme.event.wcmp2.ets",
  "source": "ca-ecccc-msc-global-discovery-catalogue",
  "subject": "de-dwd",
  "id": "6e1c7f9f-dd6c-48d9-bbc4-aef0625f1fb8",
  "time": "2024-10-17T05:13:22Z",
  "datacontenttype": "application/json",
  "dataschema": "https://schemas.wmo.int/wme/1.0.0/schemas/wcmp2-ets-bundled.json",
  "data": {
    "id": "f84f34d6-cfb0-4cff-98ec-32f88d0fd7b8",
    "report_type": "ets",
    "summary": {
      "PASSED": 12,
      "FAILED": 0,
      "SKIPPED": 0
    },
    "generated_by": "pywcmp 0.10.1 (https://github.com/wmo-im/pywcmp)",
    "tests": [
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/conformance",
        "code": "PASSED",
        "message": "Passes given schema is compliant/valid"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/contacts",
```

```

        "code": "PASSED"
      },
      {
        "id":
"http://wis.wmo.int/spec/wcmp/2/conf/core/record_created_datetime",
        "code": "PASSED"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/data_policy",
        "code": "PASSED"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/description",
        "code": "PASSED",
        "message": "Passes given schema is compliant/valid"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/extent_geospatial",
        "code": "PASSED"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/extent_temporal",
        "code": "PASSED",
        "message": "Passes given schema is compliant/valid"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/identifier",
        "code": "PASSED"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/links",
        "code": "PASSED"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/themes",
        "code": "PASSED"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/title",
        "code": "PASSED",
        "message": "Passes given schema is compliant/valid"
      },
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/conf/core/type",
        "code": "PASSED"
      }
    ],
    "datetime": "2024-10-02T13:55:00Z",
    "metadata_id": "urn:wmo:md:de-dwd:icon-eps.ALL"
  }

```



```
}
```

C.3. WIS2 Monitoring Event Message Encoding: WCMP2 KPI Report

Example: WCMP2 KPI event notification from Environment and Climate Change Canada, Meteorological Service of Canada, Global Discovery Catalogue Service, concerning a WCMP2 record from Deutscher Wetterdienst (Germany)

```
{
  "specversion": "1.0",
  "type": "int.wmo.wis.wme.event.wcmp2.kpi",
  "source": "ca-eccc-msc-global-discovery-catalogue",
  "subject": "de-dwd",
  "id": "6e1c7f9f-dd6c-48d9-bbc4-aef0625f1fb8",
  "time": "2025-02-01T18:19:37Z",
  "datacontenttype": "application/json",
  "dataschema": "https://schemas.wmo.int/wme/1.0.0/schemas/wcmp2-ets-bundled.json",
  "data": {
    "id": "38631309-36b7-4c71-a7cd-aaca48f81a49",
    "report_type": "kpi",
    "metadata_id": "urn:wmo:md:de-dwd:icon-eps.ALL",
    "datetime": "2025-02-01T18:17:24Z",
    "generated_by": "pywcmp 0.10.1 (https://github.com/wmo-im/pywcmp)",
    "tests": [
      {
        "id": "http://wis.wmo.int/spec/wcmp/2/kpi/core/contacts",
        "title": "Contacts",
        "total": 3,
        "score": 3,
        "comments": [],
        "percentage": 100.0
      },
      {
        "id":
"http://wis.wmo.int/spec/wcmp/2/kpi/core/good_quality_description",
        "title": ": Good quality description",
        "total": 4,
        "score": 3,
        "comments": [
          "Description contains spelling errors ['eps', 'deg', '180h',
'lat', '6h', 'utc', 'lon']"
        ],
        "percentage": 75.0
      },
      {
        "id":
"http://wis.wmo.int/spec/wcmp/2/kpi/core/graphic_overview_for_metadata_records",
        "title": "Graphic overview for metadata records",
```

```

        "total": 0,
        "score": 0,
        "comments": [],
        "percentage": null
    },
    {
        "id": "http://wis.wmo.int/spec/wcmp/2/kpi/core/links_health",
        "title": "Links health",
        "total": 22,
        "score": 22,
        "comments": [],
        "percentage": 100.0
    },
    {
        "id":
"http://wis.wmo.int/spec/wcmp/2/kpi/core/persistent_identifiers",
        "title": "Persistent identifiers",
        "total": 3,
        "score": 1,
        "comments": [
            "No DOI/ARK/HDL schema found"
        ],
        "percentage": 33.333
    },
    {
        "id": "http://wis.wmo.int/spec/wcmp/2/kpi/core/time_intervals",
        "title": "Time intervals",
        "total": 6,
        "score": 5,
        "comments": [
            "No temporal resolution found"
        ],
        "percentage": 83.333
    },
    {
        "id": "http://wis.wmo.int/spec/wcmp/2/kpi/core/good_quality_title",
        "title": "Global Ensemble Prediction Model",
        "total": 8,
        "score": 7,
        "comments": [
            "Title is not sentence case"
        ],
        "percentage": 87.5
    }
],
"summary": {
    "total": 46,
    "score": 41,
    "comments": {
        "id": "http://wis.wmo.int/spec/wcmp/2/kpi/core/good_quality_title",
        "title": "Global Ensemble Prediction Model",

```

```

        "total": 8,
        "score": 7,
        "comments": [
            "Title is not sentence case"
        ],
        "percentage": 87.5
    },
    "percentage": 89.13,
    "grade": "A"
}
}
}

```

Example: WNM compliance report event notification from a WIS2 development Global Broker, concerning a WIS2 Notification message from a WIS2 Node in testing

```

{
  "specversion": "1.0",
  "type": "int.wmo.wis.wme.event.wnm.schema",
  "source": "io-wis2dev-global-broker",
  "subject": "io-wis2dev-12-test",
  "id": "08361ecb-e7ff-4965-9abe-465b63433ca5",
  "time": "2024-12-11T12:54:40.605Z",
  "datacontenttype": "application/json",
  "dataschema": "https://schemas.wmo.int/wme/1.0.0/schemas/wnm-exception.json",
  "data": {
    "topic": "cache/a/wis2/de-dwd-gts-to-wis2/data/recommended/U/A/N/T/99/kddl",
    "wnm": {
      "id": "885f789e-b724-11ef-bede-e43d1a214826",
      "conformsTo": [
        "http://wis.wmo.int/spec/wnm/1/conf/core"
      ],
      "type": "Feature",
      "geometry": null,
      "properties": {
        "data_id": "wis2/de-dwd-gts-to-
wis2/data/recommended/U/A/N/T/99/kddl/UANT99KDDL101828",
        "metadata_id": "",
        "gts": {
          "ttaaii": "UANT99",
          "cccc": "kddl"
        },
        "pubtime": "2024-12-10T18:28:20.643304Z",
        "integrity": {
          "method": "sha512",
          "value":
"o0JGIwEbv4XGDPHxc7vf1dcX8BJb6tYl+xogVxENgYZ8ddVxnLxwPfhCqkmnuGqRP4jYpr5FZ3z0RHH9IcmLa
g=="
        }
      },
    },
  },
}

```

```

    "links": [
      {
        "href":
"https://wis2.dwd.de/recommended/gts/kddl/A_UANT99KDDL101828_C_EDZW_20241210182815_254
86915",
        "rel": "canonical",
        "type": "application/octet-stream",
        "security": {
          "default": {
            "type": "http",
            "scheme": "basic",
            "description": "Please contact DWD Team for WIS2 Global
Cache via wis@dwd.de for accessing this secured resource."
          }
        },
        "length": 122
      },
      {
        "href": "https://gisc.dwd.de/angular-
frontend/xmlProductDetails;pid=urn:x-wmo:md:int.wmo.wis::UANT99KDDL",
        "rel": "about",
        "type": "text/html"
      }
    ]
  },
  "exception": {
    "code": "invalid-schema",
    "description": "WIS2 Notification Message not compliant with the defined
schema",
    "errors": [
      {
        "keyword": "required",
        "dataPath": ".properties",
        "schemaPath": "#/properties/properties/oneOf/0/allOf/0/required",
        "params": {
          "missingProperty": "start_datetime"
        },
        "message": "should have required property 'start_datetime'"
      },
      {
        "keyword": "required",
        "dataPath": ".properties",
        "schemaPath": "#/properties/properties/oneOf/0/allOf/0/required",
        "params": {
          "missingProperty": "end_datetime"
        },
        "message": "should have required property 'end_datetime'"
      },
      {
        "keyword": "required",
        "dataPath": ".properties",

```

```

        "schemaPath": "#/properties/properties/oneOf/1/allOf/0/required",
        "params": {
            "missingProperty": "datetime"
        },
        "message": "should have required property 'datetime'"
    },
    {
        "keyword": "oneOf",
        "dataPath": ".properties",
        "schemaPath": "#/properties/properties/oneOf",
        "params": {},
        "message": "should match exactly one schema in oneOf"
    }
]
}
}
}
}

```

Annex D: Bibliography

- W3C/OGC: Spatial Data on the Web Best Practices, W3C Working Group Note 28 September 2017, <https://www.w3.org/TR/sdw-bp>
- W3C: Data on the Web Best Practices, W3C Recommendation 31 January 2017, <https://www.w3.org/TR/dwbp>
- IANA: Link Relation Types, <https://www.iana.org/assignments/link-relations/link-relations.xml>

Annex E: Revision History

Date	Release	Editor	Primary clauses modified	Description
2024-10-05	Template	Tom Kralidis	all	initial revision