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| WMO WIS Monitoring: JSON Message Specifications and Guidelines |
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| Version | Remarks | Author | Date |
| 0.1 | Initial Draft | BoM, CMA, DWD, JMA | 2014-12-16 |
| 0.2 | Allow "null" for events\_url, monitor\_url, rmdcn, remarks | Markus Heene, DWD | 2015-05-11 |
| 1.1 | Increase the version of the JSON messages from 1.0 to 1.1  Change the version of this documentation to be consistent with the version used in the actual JSON messages.  Defined the concepts of Omissible and Nullable.  Rename some elements in JSON messages to follow a consistent naming convention.  Structural changes and new elements for Monitor JSON message.  Rename Centres JSON message to Cache JSON message. It is also expanded to include more metrics.  Structural changes to Cache JSON (previously Centres JSON)  Repurpose the Centres JSON message to report response time from other WIS Centres and potentially high frequency exchange.  Rules to define and name WIS centres. | BoM | 2016-04-23 |

# Introduction

The purpose of this document is to provide specifications as well as guidelines on how to implement the specification for WMO WIS monitoring programme

**Four messages following JSON specification are proposed for exchange of WIS monitoring information**. These messages are detailed in subsequent sections of this document. The bare-bone architecture of the monitoring system is composed of two components. **The first component is for generating and publishing the messages.** The second component is for retrieving and consuming the messages. While specifications of the JSON messages are shared between the two components, the scope of this document covers only on operational guidelines of the first component.

# Definitions

* **Reporting GISC**

The GISC that generates and publishes the JSON messages

* **Aggregation Application**

An application, e.g. WMO Common Dashboard, which retrieves and consumes JSON messages from Reporting GISCs

* **Reporting Time**

The scheduled time to **start** generating and publishing the JSON messages. As monitoring program requires a certain amount of time to finish its tasks, the completion time could be seconds or even minutes after the reporting time.

* **Product**

A product is data and any derived records that form the contents of a GISC's 24-hour Cache. Exactly how products are stored, e.g. as files or database records, is implementation detail and out of scope of this document. They are simply called "product" in this document.

* **Unique Product**

A unique product is defined by its GTS Abbreviated Heading Line, i.e. TTAAiiCCCC. Multiple product instances (see below) bearing the same TTAAiiCCCC are considered as one unique product. For an example, the GTS bulletin SMDL01EDZW is issued four times a day at 00, 06, 12, and 18 (if no corrections exist). They are counted as a single unique product as they all have the same TTAAiiCCCC.

* **Product Instance**

A product instance is one instance of some unique product. It is defined with its issuing time and correction numbers in addition to TTAAiiCCCC. Using the above example again, the four SMDL01EDZW messages at different hours are counted as four instances. If there are additional corrections, they are counted as separate product instances as well.

* **Metadata**

A metadata is associated to a unique product. The relationship is one-to-one except for those data with missing metadata (see below). It is sometimes called metadata record in this document and has the same meaning as metadata.

* **Missing Metadata**

For data that has no metadata record in the WIS DAR catalogue, the handling of metadata for those data can take different forms at different GISC Centres. For centres using OpenWIS system, a missing metadata is currently a draft (stop-gap) metadata generated with placeholder information except for the GTS Abbreviated Heading Line. For other centres, it could be indeed missing, i.e. no record at all. Both of the forms are considered as a missing metadata. It is also sometimes called "with no associated metadata" in this document.

* **Received, Stored and 24-hour Cache**

A product instance is "**received**" when it reaches some kind of gateway (either physical or conceptual) of a GISC and ready to be processed. The end result of the processing has many possibilities with one of them being the product instance getting "**stored**" in the GISC's **24-hour Cache**.

When a product instance with no associated metadata (i.e. missing metadata) is "**received**" by a GISC, it may or may not be "**stored**" in the GISC's 24-hour Cache (depending on a GISC's implementation).

Therefore when a metric is related to product instances with no associated metadata, the term "**received**" is used. When a metric is related product instances existing in the Cache, the term "**stored**" is used and **the measurement shall exclude product instances without associated metadata (if they are stored in the 24-hour Cache)**.

# General Guidelines

## Overview

The JSON messages cover both dynamic metrics and static information. Three out of the four messages are expected to be generated and retrieved at regular time intervals (e.g. daily or every 10 minute), while Events JSON message is generated whenever necessary and retrieved at regular time intervals.

1. **Monitor JSON** message (**mandatory**)

This message covers static information and overview metrics of the GISC.

1. **Centres JSON** message (**mandatory**)

This message covers HTTP response time from service URLs of other WIS centres.

1. **Cache JSON** message (**mandatory**)

This message covers metrics of Centres in the GISC's area of responsibility (AoR). These stats are mostly calculated by performing analysis against a GISC's.

1. Events JSON message (optional)

This message covers GISC’s events such as maintenance, service disruption, etc.. This is the only optional message and shall be generated whenever necessary.

Monitor JSON, Cache JSON and Centres JSON formats are designed for easy consumption and automation by computers. Reported values are required to be consistent to enable automatic aggregation across multiple centres. The Events JSON message is designed for easy manual manipulation.

## Omissible and Nullable fields

**All fields are required to present** in JSON messages (**Non-Omissible**) so that **the structure of a JSON message is invariant**. One exception is for fields that are descendants of an array type field (see details below). Some Non-Omissible fields can however take **null** to indicate a missing value. These are called **Nullable** fields and designed to help reporting GISCs to generate structural-complete JSON messages without reporting more metrics than what they already have.

An **array** type field itself is always **Non-Nullable**. However it is allowed to take an empty array as its value. This empty array effectively makes its entire descendant fields become **Omissible**.

## Metrics Types

A metric can be measured either for a required monitoring period (cumulative) or at a specific monitoring time (instantaneous). The value of a metric is then reported at a scheduled reporting time. To completely define a metric, it is necessary to specify the nature of the metric (instantaneous or cumulative), its Monitoring Period and Reporting Time. **Unless otherwise specified, for instantaneous metric, the Reporting Time is the same as the monitoring time. For cumulative metric, the Reporting Time is one second after the end of previous Monitoring Period (see details below).**

* Instantaneous metric examples
  + The total number of metadata is an instantaneous metric and reported daily at 00 UTC. Hence the measurement shall be performed at 00 UTC every day.
  + The service (e.g. OAI-PMH) status of a WIS centre is also an instantaneous metric and reported every 10 minutes. Hence the reporting time is 00:00, 00:10, 00:20, 00:30 ... 23:30, 23:40, 23:50 UTC.
* Cumulative metric examples
  + Number of deleted metadata is a cumulative metric measured for last 24 hours and reported daily at 00 UTC. Hence the reporting time is 00 UTC for the period 00:00:00 – 23:59:59 UTC of the **previous** day.
  + If a cumulative metric is to be reported every 10 minutes, one reporting time could be 00 UTC for 23:50:00 – 23:59:59 UTC of the **previous** day. The next reporting time will then be 00:10:00 UTC for 00:00:00 – 00:09:59 UTC of the **same** day.
  + Number of new and modified metadata is also a cumulative metric measured for a time period.

## Timestamps

A monitoring program requires certain amount of time to finish its tasks (e.g. obtaining the metrics, generating and publishing JSON messages), the exact time when the program finishes is therefore usually seconds or even minutes after the scheduled Reporting Time. However it is required to report the actual scheduled reporting time (NOT program completion time) in JSON messages. This difference is less important for longer monitoring period but becomes more important for shorter monitoring period (e.g. 10 minutes).

For an example, if the scheduled reporting time is 00:00:00 UTC, the monitoring program is set to run exactly at 00:00:00 UTC. It may take 30 seconds to finish the program execution. In the generated JSON messages, the timestamps shall be set to 00:00:00 UTC (**NOT** 00:00:30 UTC).

An Aggregation Application consuming the JSON messages is recommended to wait for a certain amount of time (e.g. one minute) to allow each reporting GISC to finish its reports before start collecting the JSON messages.

# The JSON Messages

The JSON messages are generated by the reporting GISC and made available via HTTP protocol. Three out of the four JSON messages (Monitor, Cache and Centres) are mandatory and one of them (Events) is optional. The messages have different scheduled reporting time/frequency depend on nature of the contents. An Aggregation Application pulls these messages via HTTP and consumes their contents. Since the creation of this JSON messages could take seconds or minutes, an Aggregation Application is recommended to wait for a certain amount of time (e.g. 1 minute) at the scheduled reporting time before pulling these messages.

## Monitor JSON message (monitor.json)

Monitor JSON message provides static information about a GISC (e.g. name, contacts) and reports some overall stats. It also serves as the entry point of all other JSON messages by listing corresponding URLs for other JSON messages (or **null** to indicate a missing Events JSON message). The Monitor JSON message is mandatory.

**The schedule reporting time for this message is every 24 hours at 00 UTC.**

### An Example of the Monitor JSON message

Here is an example of the Monitor JSON message. Non-Nullable elements are shown in bold font.

{

"**wmo\_wis\_monitoring**": "1.1",

"**centre**": "GISC Tokyo [JP]",

"**timestamp**": "2014-11-10T00:00:00Z",

**"gisc\_properties": {**

**"portal\_url": "http://www.wis-jma.go.jp/cms/",**

"monitor\_url": "http://www.wis-jma.go.jp/monitor",

**"oaipmh\_url": "http://www.wis-jma.go.jp/meta/oaiprovider.jsp",**

**"sru\_url": "http://www.wis-jma.go.jp/meta/sru.jsp",**

"events\_url": "http://www.wis-jma.go.jp/json/events.json",

**"cache\_url": "http://www.wis-jma.go.jp/json/cache.json",**

**"centres\_url": "http://www.wis-jma.go.jp/json/centres.json",**

**"backup\_giscs": [**

"GISC Beijing [CN]",

"GISC Melbourne [AU]",

"GISC Offenbach [DE]"

**],**

**"contact\_info": {**

"voice": "+869348987397",

"email": "email@operation.jp"

**},**

**"rmdcn": {**

"main": "http://rmdcn.ecmwf.int/p/techinfo/\_cricket/png/CPE-JAPM1-IPVPN-145033/",

"sub": "http://rmdcn.ecmwf.int/p/techinfo/\_cricket/png/CPE-JAPM1-IPVPN-145033/",

"DR\_main": "http://rmdcn.ecmwf.int/p/techinfo/\_cricket/png/CPE-JAPM1-IPVPN-145033/"

**}**

**},**

**"metrics": {**

**"metadata\_catalogue": {**

"number\_of\_metadata": 150000,

"number\_of\_changes\_insert\_modify": 200,

"number\_of\_changes\_delete": 100

**},**

**"cache\_24h": {**

"number\_of\_product\_instances": 310000,

"size\_of\_cache": 1300000000,

"number\_of\_product\_instances\_missing\_metadata": 3100,

"size\_of\_product\_instances\_missing\_metadata": 1300000,

"number\_of\_unique\_products\_missing\_metadata": 1000,

"number\_of\_unique\_products\_missing\_metadata\_AoR": 1

**},**

"**services**": {

"**oaipmh**": {

**"status": true**

},

"**portal**": {

**"status": true**

},

"**distribution\_system**": {

**"status": false**

},

"**sru**": {

**"status": false**

}

**}**

**},**

"remarks": "Any additional text message"

}

### Fields of the Monitor JSON message

The following table describes each field in the Monitor JSON message. Note that all Nullable elements are marked with "Yes" in the "Nullable" column. Additionally, **Non-Nullable and Non-Omissible** fields are shown in bold font. Object and Array type fields are indicated by light grey and aqua shadings, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Field** | **Description** | **Type** | **Nullable** | **Example** | **Remarks** |
| **1** | **wmo\_wis\_monitoring** | **The version of the Spec that the JSON message conforms.** | **string** | **No** | **"1.1"** | **As WIS monitoring progresses, data for new metrics can be added to the JSON message and the version number is updated accordingly. This enables backward compatibility.** |
| **2** | **centre** | **The name of Centre that issues the JSON message** | **string** | **No** | **"GISC Tokyo [JP]"** |  |
| **3** | **timestamp** | **The UTC timestamp of the required reporting time** | **string (RFC 3339)** | **No** | **"2014-11-10T00:00:00Z"** |  |
| **4** | remarks | Any additional message that the issuing Centre wants to share. | string, null | Yes | "Any additional text message" | This message is displayed literally on monitor website's GISC page. |
| **5** | **gisc\_properties** | **Static information about a GISC** | **object** | **No** |  | **Includes following fields 6 – 20** |
| **6** | **portal\_url** | **URL of the GISC's portal website (catalogue)** | **string** | **No** | **"http://www.wis-jma.go.jp/cms/"** | **Renamed from "catalogue\_url" (v0.2)** |
| 7 | monitor\_url | URL of the GISC's own monitoring website | string | Yes | "http://www.wis-jma.go.jp/monitor" |  |
| **8** | **oaipmh\_url** | **URL of the GISC's OAI-PMH provider** | **string** | **No** | **"http://www.wis-jma.go.jp/meta/oaiprovider.jsp"** | **Renamed from "oai\_url" (v0.2)** |
| **9** | **sru\_url** | **URL of the GISC's SRU provider** | **string** | **No** | **"http://www.wis-jma.go.jp/meta/sruprovider.jsp"** |  |
| 10 | events\_url | URL of EVENTS JSON message including the GISC's events such as maintenance | string | Yes | "http://www.wis-jma.go.jp/json/events.json" | A JSON message consumer can choose to display this information on a calendar page. |
| **11** | **cache\_url** | **URL of the Cache JSON message including metrics from Cache Analysis for centres in the GISC's AoR** | **string** | **No** | **"http://www.wis-jma.go.jp/json/cache.json"** |  |
| **12** | **centres\_url** | **URL of the Centres JSON message including the HTTP response time from service URLs of other WIS centres** | **string** | **No** | **"http://www.wis-jma.go.jp/json/centres.json"** | **The centres can possibly be any type of centre in the WIS network.** |
| **13** | **backup\_giscs** | **Array of backup GISCs of the reporting GISC** | **array** | **No** | **"backup\_giscs": [**  **"GISC Beijing [CN]",**  **"GISC Melbourne [AU]",**  **"GISC Offenbach [DE]"**  **]** | **Each element is the name of a centre (string). See Error! Reference source not found. for discussions about centre naming rules.** |
| **14** | **rmdcn** | **URLs of the GISC's RMDCN statistics published on the ECMWF website** | **object** | **No** |  | **Includes fields 15 – 17**  **Expanded from "rmdcn" (v0.2) and relocated from "metric" to "gisc\_properties"** |
| 15 | main | RMDCN stats for the main connection | string | Yes | "http://rmdcn.ecmwf.int/p/techinfo/\_cricket/pgn/CPE-JAPM1-IPVPN-145033/" |  |
| 16 | sub | RMDCN stats for the sub connections | string | Yes | "http://rmdcn.ecmwf.int/p/techinfo/\_cricket/pgn/CPE-JAPM1-IPVPN-145033/" |  |
| 17 | DR\_main | RMDCN stats for connection of the Disaster Recovery site | string | Yes | "http://rmdcn.ecmwf.int/p/techinfo/\_cricket/pgn/CPE-JAPM1-IPVPN-145033/" |  |
| **18** | **contact\_info** | **Contact information** | **object** | **No** |  | **Includes fields 19 and 20** |
| 19 | voice | Phone number | string | Yes | "+869348987397" |  |
| 20 | email | Email address | string | Yes | "email@operation.jp" |  |
| **21** | **metrics** | **Monitoring metrics** | **object** | **No** |  | **Includes fields 22 – 36** |
| **22** | **services** | **The status of various services of the reporting GISC** | **object** | **No** |  | **including fields 23 – 26** |
| **23** | **oaipmh** | **The status of the GISC's OAI-PMH provider** | **boolean** | **No** | **true** | **instantaneous value**  **Renamed from "oai\_pmh" (v0.2)** |
| **24** | **portal** | **The status of the GISC's portal website** | **boolean** | **No** | **true** | **instantaneous value**  **Renamed from "catalogue" (v0.2)** |
| **25** | **distribution\_system** | **The status of the GISC's distribution system** | **boolean** | **No** | **true** | **instantaneous value** |
| **26** | **sru** | **The status of the GISC's SRU provider** | **boolean** | **No** | **true** | **instantaneous value** |
| **27** | **metadata\_catalogue** | **Stats about the GISC's metadata catalogue** | **object** | **No** |  | **Including following fields 28 – 30** |
| 28 | number\_of\_metadata | Snapshot number of active metadata records in reporting GISC's metadata catalogue at reporting time.  It is the number of records in WIS-CATALOGUE set if exists. Otherwise it is the total number of records in all GISC's authoritative sets (i.e. WIS-GISC-CITY\_NAME) plus GISC-UNASSOCIATED set.  Deleted records are not counted.  The missing metadata (the draft metadata in case of OpenWIS sysgem) shall not be counted. | number | Yes | 150000 | instantaneous value  Renamed from "number\_of\_records\_at00UTC" (v0.2) |
| 29 | number\_of\_changes\_insert\_modify | Number of metadata records which have been inserted and/or modified during the monitoring period. Count only once even a metadata is inserted and/or modified more than once in the last monitoring period. | number | Yes | 200 | cumulative value |
| 30 | number\_of\_changes\_delete | Number of metadata records which have been deleted during the last monitoring period. | number | Yes | 100 | cumulative value |
| **31** | **cache\_24** | **The stats of the 24 hour Cache** | **object** | **No** |  | **including following fields 32 – 37** |
| 32 | number\_of\_product\_instances | Number of product instances that were **stored** in the GISC cache during the last monitoring period (**excluding any product instances without associated metadata**).  For an example, assuming the monitoring period is 24 hours and reporting time is 00 UTC, an unique product of SMDL01EDZW is issued four times at 00:00, 06:00, 12:00 and 18:00 (assuming no corrections); in this case they are counted as 4. | number | Yes | 310000 | cumulative value  Renamed from "number\_of\_products\_all". |
| 33 | number\_of\_product\_instances\_missing\_metadata | Number of product instances that were **received** during the last monitoring period and did not have an associated metadata i.e. missing metadata.  These product instances may or may not be stored in the GISC cache.  For an example, assuming the monitoring period is 24 hours and reporting time is 00 UTC, a product which does not have an associated metadata is issued at 00:00, 06:00, 12:00 and 18:00 (assuming no corrections); in this case they are counted as 4. | number | Yes | 3100 | cumulative value  Renamed from "number\_of\_products\_without\_metadata"  This metric plus "number\_of\_product\_instances" yields the number of product instances that shall be stored in the Cache when each every incoming product instance has an associated metadata (the ideal situation). |
| 34 | size\_of\_cache | Size of product instances in bytes that were **stored** in the GISC cache during the last monitoring period (**excluding any product instance without associated metadata**). | number | Yes | 1300000000 | cumulative value  Renamed from "bytes\_of\_cache\_all" |
| 35 | size\_of\_product\_instances\_missing\_metadata | Size of product instances in bytes that were **received** during the last monitoring and did not have associated metadata records (excluding draft metadata for OpenWIS GISCs) | number | Yes | 1300000 | cumulative value  Renamed from "bytes\_of\_cache\_without\_metadata"  This metric plus "size\_of\_cache" yields the size of cache in the ideal situation when every incoming product instance has an associated metadata. |
| 36 | number\_of\_unique\_products\_missing\_metadata | Number of unique products which were **received** during the last monitoring period with no associated metadata.  Count all unique products received from centres in both the reporting GISC’s own AoR and other areas.  Count only once even if multiple product instances were received during the last monitoring period. For an example, assuming the monitoring period is 24 hours and reporting time is 00 UTC, a product which does not have an associated metadata is issued at 00:00, 06:00, 12:00 and 18:00 (assuming no corrections); in this case they are counted as 1 (cf. "number\_of\_product\_instances\_missing\_metadata" is counted as 4). | number | Yes | 1000 | cumulative value  Renamed from "number\_of\_unique\_products\_without\_metadata\_all" |
| 37 | number\_of\_unique\_products\_missing\_metadata\_AoR | Number of unique products which were **received** during the last monitoring period with no associated metadata.  Count only for unique products received from centres in the reporting GISC’s own AoR.  Count only once even if multiple product instances were received during the monitoring period. For an example, assuming the monitoring period is 24 hours and reporting time is 00 UTC, a product which does not have an associated metadata is issued at 00:00, 06:00, 12:00 and 18:00 (assuming no corrections); in this case they are counted as 1 (cf. "number\_of\_product\_instances\_missing\_metadata" is counted as 4). | number | Yes | 1 | cumulative value  Renamed from "number\_of\_unique\_products\_without\_metadata\_AMDCN" |

### Schema of the Monitor JSON message

The schema of Monitor JSON message is created using version 3 of the draft from json-schema.org (http://json-schema.org/)

{

"type":"object",

"$schema": "http://json-schema.org/draft-03/schema",

"id": "http://wis.wmo.int/monitoring/monitor",

"required":true,

"properties":{

"centre": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/centre",

"required":true

},

"gisc\_properties": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties",

"required":true,

"properties":{

"backup\_giscs": {

"type":"array",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/backup\_giscs",

"required":true,

"items":

{

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/backup\_giscs/0",

"required":true

}

},

"contact\_info": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/contact\_info",

"required":true,

"properties":{

"email": {

"type":["string", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/contact\_info/email",

"required":true

},

"voice": {

"type":["string", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/contact\_info/voice",

"required":true

}

}

},

"rmdcn": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/rmdcn",

"required":true,

"properties":{

"main": {

"type":["string", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/rmdcn/main",

"required":true

},

"sub": {

"type":["string", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/rmdcn/sub",

"required":true

},

"DR\_main": {

"type":["string", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/rmdcn/DR\_sub",

"required":true

}

}

},

"portal\_url": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/portal\_url",

"required":true

},

"oaipmh\_url": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/oaipmh\_url",

"required":true

},

"sru\_url": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/sru\_url",

"required":true

},

"monitor\_url": {

"type":["string", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/monitor\_url",

"required":true

},

"cache\_url": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/cache\_url",

"required":true

},

"centres\_url": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/centres\_url",

"required":true

},

"events\_url": {

"type":["string", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/gisc\_properties/events\_url",

"required":true

}

}

},

"metrics": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/metrics",

"required":true,

"properties":{

"cache\_24h": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/cache\_24h",

"required":true,

"properties":{

"number\_of\_product\_instances": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/cache\_24h/number\_of\_product\_instances",

"required":true

},

"size\_of\_cache": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/cache\_24h/size\_of\_cache",

"required":true

},

"number\_of\_product\_instances\_missing\_metadata": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/cache\_24h/number\_of\_product\_instances\_missing\_metadata",

"required":true

},

"size\_of\_product\_instances\_missing\_metadata": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/cache\_24h/size\_of\_product\_instances\_missing\_metadata",

"required":true

},

"number\_of\_unique\_products\_missing\_metadata": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/cache\_24h/number\_of\_unique\_products\_missing\_metadata",

"required":true

},

"number\_of\_unique\_products\_missing\_metadata\_AoR": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/cache\_24h/number\_of\_unique\_products\_missing\_metadata\_AoR",

"required":true

}

}

},

"metadata\_catalogue": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/metadata\_catalogue",

"required":true,

"properties":{

"number\_of\_changes\_delete": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/metadata\_catalogue/number\_of\_changes\_delete",

"required":true

},

"number\_of\_changes\_insert\_modify": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/metadata\_catalogue/number\_of\_changes\_insert\_modify",

"required":true

},

"number\_of\_metadata": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/metrics/metadata\_catalogue/number\_of\_metadata",

"required":true

}

}

},

"services": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services",

"required":true,

"properties":{

"portal": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services/portal",

"required":true,

"properties":{

"status": {

"type":"boolean",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services/portal/status",

"required":true

}

}

},

"distribution\_system": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services/distribution\_system",

"required":true,

"properties":{

"status": {

"type":"boolean",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services/distribution\_system/status",

"required":true

}

}

},

"oaipmh": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services/oaipmh",

"required":true,

"properties":{

"status": {

"type":"boolean",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services/oaipmh/status",

"required":true

}

}

},

"sru": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services/sru",

"required":true,

"properties":{

"status": {

"type":"boolean",

"id": "http://wis.wmo.int/monitoring/monitor/metrics/services/sru/status",

"required":true

}

}

}

}

}

}

},

"remarks": {

"type":["string", "null"],

"id": "http://wis.wmo.int/monitoring/monitor/remarks",

"required":true

},

"timestamp": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/timestamp",

"required":true

},

"wmo\_wis\_monitoring": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/monitor/wmo\_wis\_monitoring",

"required":true

}

}

}

### An Minimum Example of the Monitor JSON message

This example presents a message providing minimum possible information, i.e. all Omissible fields are omitted and all Nullable fields are set to null.

{

"wmo\_wis\_monitoring": "1.1",

"centre": "GISC Tokyo [JP]",

"timestamp": "2014-11-10T00:00:00Z",

"gisc\_properties": {

"portal\_url": "http://www.wis-jma.go.jp/cms/",

"monitor\_url": null,

"oaipmh\_url": "http://www.wis-jma.go.jp/meta/oaiprovider.jsp",

"sru\_url": "http://www.wis-jma.go.jp/meta/sru.jsp",

"events\_url": null,

"cache\_url": "http://www.wis-jma.go.jp/json/cache.json",

"centres\_url": "http://www.wis-jma.go.jp/json/centres.json",

"backup\_giscs": [

],

"contact\_info": {

"voice": null,

"email": null

},

"rmdcn": {

"main": null,

"sub": null,

"DR\_main": null

}

},

"metrics": {

"metadata\_catalogue": {

"number\_of\_metadata": null,

"number\_of\_changes\_insert\_modify": null,

"number\_of\_changes\_delete": null

},

"cache\_24h": {

"number\_of\_product\_instances": null,

"size\_of\_cache": null,

"number\_of\_product\_instances\_missing\_metadata": null,

"size\_of\_product\_instances\_missing\_metadata": null,

"number\_of\_unique\_products\_missing\_metadata": null,

"number\_of\_unique\_products\_missing\_metadata\_AoR": null

},

"services": {

"oaipmh": {

"status": true

},

"portal": {

"status": true

},

"distribution\_system": {

"status": false

},

"sru": {

"status": false

}

}

},

"remarks": null

}

## Cache JSON message (cache.json)

The Cache JSON message provides stats calculated by performing Cache analysis against a GISC's 24-hour Cache for centres in the GISC's AoR. The Cache JSON message is mandatory.

**The schedule reporting time for this message is every 24 hours at 00 UTC.**

### An Example of Cache JSON message

Below is an example of Centres JSON message (See section 5 for rules to define and name WIS centres). Non-Nullable elements are shown in bold font.

{

**"wmo\_wis\_monitoring": "1.1",**

**"centre": "GISC Melbourne [AU]",**

**"timestamp": "2014-11-10T00:00:00Z",**

**"centres": [**

{

**"centre" : "DCPC WMC (Melbourne) [AU]",**

**"metrics": {**

**"number\_of\_product\_instances": 7772,**

**"size\_of\_product\_instances": 56295410,**

"number\_of\_product\_instances\_missing\_metadata": 540,

"size\_of\_product\_instances\_missing\_metadata ": 4,

"number\_of\_unique\_products\_missing\_metadata": 5

**}**

},

{

**"centre" : "DCPC JATWC [AU]",**

**"metrics": {**

**"number\_of\_product\_instances": 42,**

**"size\_of\_product\_instances": 20102,**

"number\_of\_product\_instances\_missing\_metadata": 3,

"size\_of\_product\_instances\_missing\_metadata ":345,

"number\_of\_unique\_products\_missing\_metadata": 1

**}**

},

{

**"centre" : "DCPC NCC [AU]",**

**"metrics": {**

**"number\_of\_product\_instances": 150,**

**"size\_of\_product\_instances": 120345,**

"number\_of\_product\_instances\_missing\_metadata": 31,

"size\_of\_product\_instances\_missing\_metadata ": 4135,

"number\_of\_unique\_products\_missing\_metadata": 6

}

**}**

**]**

}

### Fields of the Cache JSON message

The following table describes each field in the Cache JSON message. Note that all Nullable elements are marked with "Yes" in the "Nullable" column. Additionally, **Non-Nullable and Non-Omissible** fields are shown in bold font. Object and Array type fields are indicated by light grey and aqua shadings, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Field** | **Description** | **Type** | **Nullable** | **Example** | **Remarks** |
| **1** | **wmo\_wis\_monitoring** | **The version of the Spec that the JSON message conforms.** | **string** | **No** | **"1.1"** | **As WIS monitoring progresses, data for new metrics can be added to the JSON message and the version number is updated accordingly. This enables backward compatibility.** |
| **2** | **centre** | **The name of Centre that issues the JSON message** | **string** | **No** | **"GISC Melbourne [AU]"** |  |
| **3** | **timestamp** | **The UTC timestamp of the required reporting time** | **string (RFC 3339)** | **No** | **"2014-11-10T00:00:00Z"** |  |
| **4** | **centres** | **An array of object elements with each element describing a WIS centre and its corresponding stats in the reporting GISC's AoR.** | **array** | **No** |  | **including following fields 5 – 11**  **Although the field is mandatory but its value can be an empty array, which suffices the minimum requirement.** |
| 5 | centre | Name of the centre | string | No | "DCPC NCC [AU]" | This field is required for each item in the array of "centres". If the array itself is empty, this field is then not necessary. |
| 6 | metrics | A list of metrics measured for the centre | object | No |  | including following fields 7 – 11  This field is required for each item in the array of "centres". |
| 7 | number\_of\_product\_instances | Number of product instances that came from the WIS centre and are **stored** in the reporting GISC’s Cache during last monitoring period (**excluding any product instances without associated metadata**). | number | No | 7772 | cumulative value  This field is required if metrics are to be reported for a centre.  Renamed from "count" (v0.2) |
| 8 | size\_of\_product\_instances | The size of product instances (in bytes) that came from the WIS centre and **stored** in the GISC’s cache during last monitoring period (**excluding any product instances without associated metadata**). | number | No | 56295410 | cumulative value  This field is required if metrics are to be reported for a centre.  Renamed from "volumesize" (v0.2). |
| 9 | number\_of\_product\_instances\_missing\_metadata | Number of product instances with no associated metadata that were **received** from the WIS centre in the last monitoring period. | number | Yes | 72 | cumulative value  This metric plus " number\_of\_product\_instances" yields the number of product instances that shall be stored in the reporting GISC's Cache when every incoming product instance has an associated metadata (the ideal situation).  New in v1.1 |
| 10 | size\_of\_product\_instances\_missing\_metadata | The size of product instances (in bytes) with no associated metadata **received** from the WIS centre in the last monitoring period. | number | Yes | 35779 | cumulative value  This metric plus "size\_of\_product\_instances" yields the size of product instances in the ideal case when every incoming product instance has an associated metadata.  New in v1.1 |
| 11 | number\_of\_unique\_products\_missing\_metadata | Number of unique products with no associated metadata that were **received** from the WIS centre in the last monitoring period. | number | Yes | 5 | cumulative value  New in v1.1 |

### Cache JSON message Schema

Cache JSON message schema is created using version 3 of the draft of json-schema.org (<http://json-schema.org/>)

{

"type":"object",

"$schema": "http://json-schema.org/draft-03/schema",

"id": "http://wis.wmo.int/monitoring/cache",

"required":true,

"properties":{

"centre": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/cache/centre",

"required":true

},

"centres": {

"type":"array",

"id": "http://wis.wmo.int/monitoring/cache/centres",

"required":true,

"items":

{

"type":"object",

"id": "http://wis.wmo.int/monitoring/cache/centres/0",

"required":true,

"properties":{

"centre": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/cache/centres/0/centre",

"required":true

},

"metrics": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/cache/centres/0/metrics",

"required":true,

"properties":{

"number\_of\_product\_instances": {

"type":"number",

"id": "http://wis.wmo.int/monitoring/cache/centres/0/metrics/number\_of\_product\_instances",

"required":true

},

"size\_of\_product\_instances": {

"type":"number",

"id": "http://wis.wmo.int/monitoring/cache/centres/0/metrics/size\_of\_product\_instances",

"required":true

},

"number\_of\_product\_instances\_missing\_metadata": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/cache/centres/0/metrics/number\_of\_product\_instances\_missing\_metadata",

"required":true

},

"size\_of\_product\_instances\_missing\_metadata": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/cache/centres/0/metrics/size\_of\_product\_instances\_missing\_metadata",

"required": true

},

"number\_of\_unique\_products\_missing\_metadata": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/cache/centres/0/metrics/number\_of\_unique\_products\_missing\_metadata",

"required": true

}

}

}

}

}

},

"timestamp": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/cache/timestamp",

"required":true

},

"wmo\_wis\_monitoring": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/cache/wmo\_wis\_monitoring",

"required":true

}

}

}

### An Minimum Example of the Cache JSON message

This example presents a message providing minimum possible information, i.e. all Omissible fields are omitted and all Nullable fields are set to null.

{

"wmo\_wis\_monitoring": "1.1",

"centre": "GISC Melbourne [AU]",

"timestamp": "2016-04-18T00:00:00Z",

"centres": []

}

## Centres JSON message (centres.json)

The Centres JSON message is mandatory. It provides stats about other WIS centres (including centres of all types other than the reporting GISC) and is expected to be published in a higher frequency of **10 minutes**. The stats reported in this message are typically NOT from Cache analysis. For an example, the response time from the centre's portal URL. By combining these stats from multiple publishing centres, it is possible to get an overall picture for the connection status of the WIS network.

**The timeout of a HTTP request shall be set to 20 seconds**. The reporting GISC shall try a **maximum of three times** before reporting connection failure for a centre. Therefore the maximum time for trying to connect to a centre is 60 seconds (3 x 20). It is recommended to send these requests in parallel so that the overall measurement can be finished in a reasonable amount of time (e.g. one or two minutes).

**If this JSON message is to be provided, it shall include stats for all operational GISCs excluding the reporting GISC. It is also encouraged to include metrics for DCPCs and NCs in the reporting GISC's AoR.**

**The schedule reporting time for this message is every 10 minute starting from 00 UTC.**

### An Example of Centres JSON message

Here is an example of Centres JSON message (See section 5 for rules to define and name WIS centres). Non-Nullable elements are shown in bold font.

{

**"wmo\_wis\_monitoring": "1.1",**

**"centre": "GISC Offenbach [DE]",**

**"timestamp": "2014-11-10T00:00:00Z",**

**"centres":** [

{

**"centre" : "GISC Melbourne [AU]",**

**"metrics": {**

**"oaipmh\_response\_time": 1.08,**

"portal\_response\_time": 1.35,

"sru\_response\_time": 1.28

**}**

},

{

**"centre" : "GISC Toulouse [FR]",**

**"metrics": {**

**"oaipmh\_response\_time": 0.54,**

"portal\_response\_time": 0.50,

"sru\_response\_time": 0.67

**}**

},

{

**"centre" : "GISC Tokyo [JP]",**

**"metrics": {**

**"oaipmh\_response\_time": 1.53,**

"portal\_response\_time": 1.50,

"sru\_response\_time": 1.38

**}**

}

**]**

}

### Fields of the Centres JSON message

The following table describes each field in the Centres JSON message. Note that all Nullable elements are marked with "Yes" in the "Nullable" column. Additionally, **Non-Nullable and Non-Omissible** fields are shown in bold font. Object and Array type fields are indicated by light grey and aqua shadings, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Field** | **Description** | **Type** | **Nullable** | **Example** | **Remarks** |
| **1** | **wmo\_wis\_monitoring** | **The version of the Spec that the JSON message conforms.** | **string** | **No** | **"1.1"** | **As WIS monitoring progresses, data for new metrics can be added to the JSON message and the version number is updated accordingly. This enables backward compatibility.** |
| **2** | **centre** | **The name of Centre that issues the JSON message** | **string** | **No** | **"GISC Offenbach [DE]"** |  |
| **3** | **timestamp** | **The UTC timestamp of the required reporting time** | **string (RFC 3339)** | **No** | **"2014-11-10T00:00:00Z"** |  |
| **4** | **centres** | **An array of object elements with each element being a centre name and its relevant metrics object** | **array** | **No** |  | **including following fields 5 – 9**  **Although the field is mandatory but its value can be an empty array, which suffices the minimum requirement.** |
| 5 | centre | The name of the centre | string | No | "GISC Melbourne [AU]" | This field is required for each item in the array of "centres". If the array itself is empty, this field is then not necessary. |
| 6 | metrics | A list of metrics measured for the centre | object | No |  | including following fields 7 – 9 |
| 7 | portal\_response\_time | The response time in seconds of the centre's portal URL. It is measured by calculate the total time passed between issuing a HTTP request to the centre's portal URL and getting a response from the request.  **In the case when a WIS centre does not have a portal but is connected to the reporting GISC via some other link, the status of this link can be reported in using this metric. It could be a ping value or some other comparable measurements. If no comparable measurement is possible, the WIS centre has to be skipped at this stage.**  If the response does not come back after the maximum retries or in case of a failed request (e.g. status code 4XX, 5XX), the value of this field is set to -1. | number | No | 1.08 | instantaneous value |
| 8 | oaipmh\_response\_time | The response time in seconds of the centre's OAI-PMH provider. It is measured by calculate the total time passed between issuing a HTTP request to the centre's OAI-PMH URL and getting a response from the request.  If the response does not come back after the maximum retries or in case of a failed request (e.g. status code 4XX, 5XX), the value of this field is set to -1. | number | Yes | 1.35 | instantaneous value  This field is required if metrics are to be reported for a centre. |
| 9 | sru\_response\_time | The response time in seconds of the centre's SRU provider. It is measured by calculate the total time passed between issuing a HTTP request to the centre's SRU URL and getting a response from the request.  If the response does not come back after the maximum retries or in case of a failed request (e.g. status code 4XX, 5XX), the value of this field is set to **-1**. | number | Yes | 1.28 | instantaneous value |

### Centres JSON message Schema

Centres JSON message schema is created using version 3 of the draft of json-schema.org (<http://json-schema.org/>)

{

"type":"object",

"$schema": "http://json-schema.org/draft-03/schema",

"id": "http://wis.wmo.int/monitoring/centres",

"required":true,

"properties":{

"centre": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/centres/centre",

"required":true

},

"centres": {

"type":"array",

"id": "http://wis.wmo.int/monitoring/centres/centres",

"required":true,

"items":

{

"type":"object",

"id": "http://wis.wmo.int/monitoring/centres/centres/0",

"required":true,

"properties":{

"centre": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/centres/centres/0/centre",

"required":true

},

"metrics": {

"type":"object",

"id": "http://wis.wmo.int/monitoring/centres/centres/0/metrics",

"required":true,

"properties":{

"portal\_response\_time": {

"type":"number",

"id": "http://wis.wmo.int/monitoring/centres/centres/0/metrics/portal\_response\_time",

"required":true

},

"oaipmh\_response\_time": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/centres/centres/0/metrics/oaipmh\_response\_time",

"required":true

},

"sru\_response\_time": {

"type":["number", "null"],

"id": "http://wis.wmo.int/monitoring/centres/centres/0/metrics/sru\_response\_time",

"required":true

}

}

}

}

}

},

"timestamp": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/centres/timestamp",

"required":true

},

"wmo\_wis\_monitoring": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/centres/wmo\_wis\_monitoring",

"required":true

}

}

}

### An Minimum Example of the Monitor JSON message

This example presents a message providing minimum possible information, i.e. all Omissible fields are omitted and all Nullable fields are set to null.

{

"wmo\_wis\_monitoring": "1.1",

"centre": "GISC Melbourne [AU]",

"timestamp": "2016-04-18T00:00:00Z",

"centres": []

}

## Events JSON message (events.json)

The Events JSON message is the only optional message. It is used to announce important activities to be performed by the reporting GISC, such as maintenance, upgrade, service disruption, etc.

**Update to this message shall be event driven** for the reporting GISC, i.e. the message is updated whenever an event needs to be reported. It is recommended that an Aggregation Application pulls this message at a higher frequency of 10 minute to achieve a semi-real-time effect.

### An Example of Events JSON message

Here is an example of Events JSON message. Non-Nullable elements are shown in bold font.

{

**"wmo\_wis\_monitoring": "1.1",**

**"centre": "GISC Offenbach [DE]",**

**"timestamp": "2014-11-10T00:00:00Z",**

**"events" : [**

{

**"id": 1,**

**"title": "GISC Offenbach @ Maintenance",**

**"text": "Database update, OAI Provider will function while catalogue is down",**

**"start": "2014-11-10T00:00:00Z",**

**"end": "2014-11-10T02:00:00Z"**

},

{

**"id": 2,**

**"title": "GISC Offenbach @ Maintenance",**

**"text": "OAI Provider update",**

**"start": "2014-12-10T00:00:00Z",**

**"end": "2014-12-10T02:00:00Z"**

}

**]**

}

### Fields of the Events JSON message

The following table describes each field in the Events JSON message. Note that all Nullable elements are marked with "Yes" in the "Nullable" column. Additionally, **Non-Nullable and Non-Omissible** fields are shown in bold font. Object and Array type fields are indicated by light grey and aqua shadings, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Field** | **Description** | **Type** | **Nullable** | **Example** | **Remarks** |
| **1** | **wmo\_wis\_monitoring** | **The version of the Spec that the JSON message conforms.** | **string** | **No** | **"1.1"** | **As WIS monitoring progresses, data for new metrics can be added to the JSON message and the version number is updated accordingly. This enables backward compatibility.** |
| **2** | **centre** | **The name of Centre that issues the JSON message** | **string** | **No** | **"GISC Offenbach [DE]"** |  |
| **3** | **timestamp** | **The UTC timestamp of the required reporting time** | **string (RFC 3339)** | **No** | **"2014-11-10T00:00:00Z"** |  |
| **4** | **events** | **An array of object elements with each element being an event object** | **array** | **No** |  | **including following fields 5 – 9**  **Although the field is mandatory but its value can be an empty array, which suffices the minimum requirement.** |
| 5 | id | The ID of the event | number | No | 1 | It must be unique in the Events JSON message.  This field is required if an event is to be reported, i.e. non-empty "events" array. |
| 6 | title | Title of the GISC’s event such as maintenance | string | No | "GISC Offenbach @ Maintenance" | This field is required if an event is to be reported, i.e. non-empty "events" array. |
| 7 | text | Detail explanation of the GISC’s event | string | No | "OAI Provider update" | This field is required if an event is to be reported, i.e. non-empty "events" array. |
| 8 | start | Scheduled start time in UTC of the event (RFC 3339) | string | No | "2014-12-10T00:00:00Z" | This field is required if an event is to be reported, i.e. non-empty "events" array. |
| 9 | end | Scheduled end time in UTC of the event (RFC 3339) | string | No | "2014-12-10T02:00:00Z" | This field is required if an event is to be reported, i.e. non-empty "events" array. |

### Events JSON message Schema

Events JSON message schema is created using version 3 of the draft of json-schema.org (<http://json-schema.org/>)

{

"type":"object",

"$schema": "http://json-schema.org/draft-03/schema",

"id": "http://wis.wmo.int/monitoring/events",

"required":false,

"properties":{

"centre": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/events/centre",

"required":true

},

"events": {

"type":"array",

"id": "http://wis.wmo.int/monitoring/events/events",

"required":true,

"items":

{

"type":"object",

"id": "http://wis.wmo.int/monitoring/events/events/0",

"required":true,

"properties":{

"end": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/events/events/0/end",

"required":true

},

"id": {

"type":"number",

"id": "http://wis.wmo.int/monitoring/events/events/0/id",

"required":true

},

"start": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/events/events/0/start",

"required":true

},

"text": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/events/events/0/text",

"required":true

},

"title": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/events/events/0/title",

"required":true

}

}

}

},

"timestamp": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/events/timestamp",

"required":true

},

"wmo\_wis\_monitoring": {

"type":"string",

"id": "http://wis.wmo.int/monitoring/events/wmo\_wis\_monitoring",

"required":true

}

}

}

# Define and Name a WIS Centre

It is necessary to a set of rules to define and name a WIS centre for the JSON messages. The uniform names contribute to the interoperability of different reporting GISCs.

## Grammar

The grammar for the name of a WIS centre is defined in following EBNF[[1]](#footnote-1):

**identifier** = **classifier**, whitespace, **description**, whitespace, "[", **member**, "]" ;

**classifier** = "GISC" | "DCPC" | "NC" ;

**description** = character, { character } ;

**member** = country\_code | org\_acronym ;

whitespace = " " ;

character = ? anything except square brackets ("[" and "]") ? ;

country\_code = ? ISO-3166-1 2-letter country code ? ;

org\_acronym = ? Acronym of an organisation on WMO WIS centres page (see below) ? ;

* If the "classifier" is "GISC", the description is the city name of the GISC. If the "classifier" is "DCPC" or "NC", the description is the "Function" column from the table on **WMO WIS centres webpage** (<http://www.wmo.int/pages/prog/www/WIS/centres/index_en.php>).
* The "member" field is either the ISO-3166-1 2-letter country code OR acronym for multinational organisations as identified from the wiki. Here are a few examples:
  + AU -- Australia
  + US -- United States
  + ECMWF – ECMWF
  + ACMAD -- African Centre of Meteorological Application for Development

## Examples

* GISCs
  + GISC Melbourne [AU]
  + GISC Toulouse [FR]
  + GISC Exeter [UK]
  + GISC Offenbach [DE]
  + GISC Tokyo [JP]
* DCPC
  + DCPC WMC (Melbourne) [AU]
  + DCPC NCC [AU]
  + DCPC JATWC [AU]
  + DCPC IPS (Space Weather) [AU]
  + DCPC WMC [US]
  + DCPC RSMC-Medium-Range-Forecasting (ECMWF) [ECMWF]
* NC
  + NC NMC [AU]
  + NC WSO (Christmas Island) [AU]
  + NC WSO (Puerto Rico) [US]
  + NC WSO (Guam) [US]

1. https://en.wikipedia.org/wiki/Extended\_Backus%E2%80%93Naur\_Form#External\_links [↑](#footnote-ref-1)