

# MET products versus MET information services – a short guide

## 1. Existing WMO & ICAO definitions

Source: WMO-182: International Meteorological Vocabulary

- Meteorological Information: Meteorological report, analysis, forecast and any other **statement** relating to existing or expected meteorological conditions.
- Meteorological Service: National or regional technical, scientific and **administrative organization** whose activities are concerned with the different theoretical and practical branches of meteorology.

Source: ICAO-Annex 3: Meteorological Service for International Air Navigation

- Meteorological Information: Meteorological report, analysis, forecast and any other **statement** relating to existing or expected meteorological conditions.
- Meteorological Products: No definition but products used in the context of World Area Forecast Service (WFS) products

Source: ICAO-9713: Vocabulary

- Meteorological Services: Those facilities and services that furnish aviation with meteorological forecasts, briefs and observations as well as SIGMET information, VOLMET broadcasting material and any other meteorological data provided by States for aeronautical use.

Source: WMO-49: Technical Regulations Vol. I

- Data & products: No definitions BUT data used in the sense of individual meteorological elements and products in the sense of analyses, plots and forecasts.

Source: METEOTERM database (<https://public.wmo.int/en/resources/meteoterm>):

- Product (oceanographic): Any analysis, forecast or summary of oceanographic conditions prepared and disseminated in a format, and according to a schedule, that meets the needs of some governmental, commercial, academic, or private user group. IGOSS service products include: analysis, forecasts and summaries for such parameters as sea-surface temperature, mixed layer depth, ocean frontal position, current, salinity and their anomalies. An operational product is prepared to reach the user in a timely fashion and is produced on a regular basis for more than a year. An operational product distributed by means other than through telecommunication channels is referred to as a delayed mode product. Products other than operational products may be issued for experimental programmes or for short-term operational programmes (less than one year). These products may be issued on an irregular basis according to user need and data availability.

<p>The above definitions are not really helpful in the context of information services and the difference between data/information on one hand and products/services on the other hand.</p>
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## 2. A more generic approach to the subject

### Products versus services

**Products and services** are two closely aligned concepts, and, in fact, most products have an element of service in them. However, there is a distinct difference between them and it is important to establish some working definitions. One way to think of them is from the **clients' point of view**. When a client asks "what can you make for me?" they are asking about **products**; when a client asks "what can you do for me?" they are asking about **services**. While a product is something that can be measured and counted, a service is often less concrete and is the result of the application of skills and expertise towards an identified need.

A good description of service delivery can be found via <https://public.wmo.int/en/bulletin/service-delivery-and-public-weather-services%E2%80%9494-overview> explaining the difference between a product.

A simple translation towards an aviation meteorology example is:

- a METAR report or bulletin = a product with a certain quality (e.g. accuracy)
- timely dissemination to the correct destinations = part of the overall service.

### Data versus information

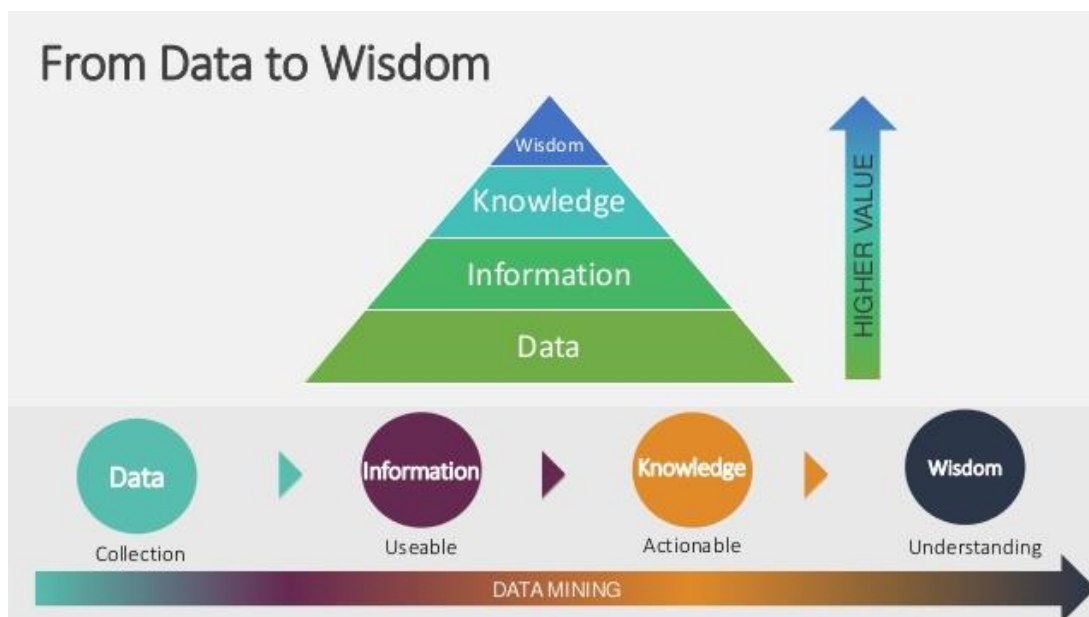
**Data** usually represents **unprocessed** numbers, pictures or statements; **information** is typically the **result of analyzing or processing the data**. Four examples of how data differs from information:

1. While data does not depend on information, information does depend on data.
2. Data is "input" and information is "output".
3. Data is raw material and information is the product.
4. Data is a single unit and information is a grouping of data.

Comparing **structured data vs unstructured data** is a practical way of illustrating the different forms of data. Structured data is ideally represented by a fixed field in a file or record. Unstructured data doesn't fit in the "neat little box" or data field. One clear benefit of structured data is that it is more easily searchable — the ability to find data with a simple search operation is always relevant and important.

Before you can convert data into information, you must collect, organize, store, analyze and manage the raw data.

The diagram below shows the relation between data, information, knowledge and wisdom.



- Data is **raw** and “useless” as such, e.g. [dBZ values for different geolocation coordinates](#).
- Information provides a **meaning** to data, e.g. [different values visualized with colours on a map](#).
- Knowledge comes when the information is put in a given **context**, e.g. the interpretation of the values in combination with a certain location and the evolution thereof in time, e.g. [a thunderstorm with hail is in the vicinity of a given airport and is moving towards it](#).
- Wisdom is the **application** of the knowledge that leads to effective decision making, e.g. [a warning needs to be issued to the airport operator to ensure people on the tarmac can timely take shelter](#).

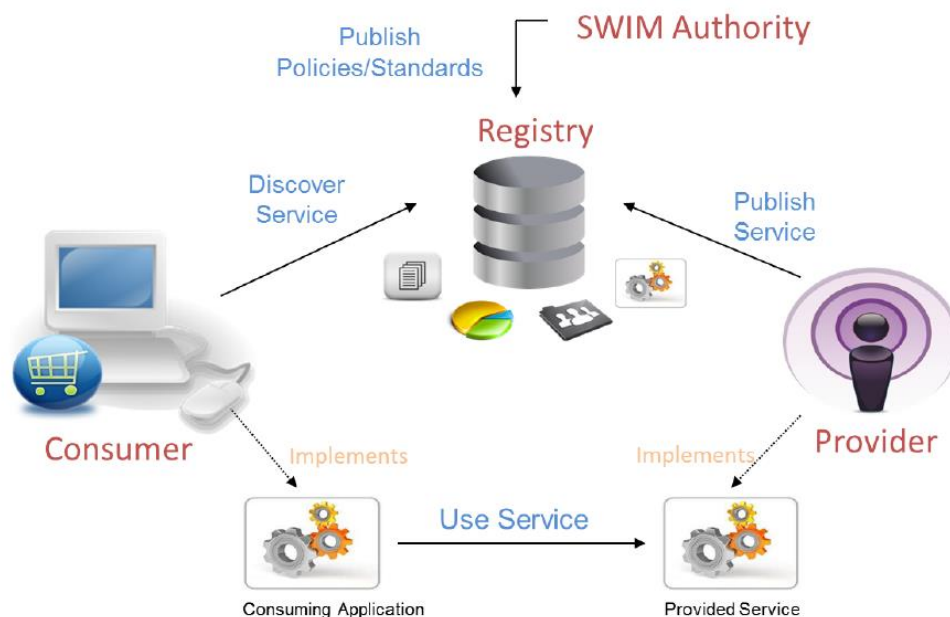
## Information Services

An **information service** provides information consumers (person, application or system) access to one or more applications or systems by means of the SWIM core services (= functional capabilities of the SWIM Infrastructure such as interface management, request-reply and publish-subscribe messaging, service security, and enterprise service management). It encapsulates a distinct set of operations logic within a well-defined functional boundary. *Source: ICAO Doc 10039 – Manual on System Wide Information Management (SWIM) Concept.*

With the notion of information services, information providers and information consumers (users) are decoupled, which allows for reuse in different contexts. For example, MET forecast information provided by a MET Service provider via a MET information service can be consumed by an airport operator or ATC organization, e.g. as input into an automated processing system which combines this MET information with other operational information and translates it into a capacity impact forecast. This capacity forecast information can in turn be provided to other consumers as a new information service. In this example the airport operator or ATC organization plays the role of both a consumer (of MET information) and provider (of capacity information).

It is clear that Information Services are defined with user needs in mind. Information Services also involve metadata information such as delivery format and quality of service characteristics (e.g. accuracy, frequency).

Information services made available by providers need to be discoverable for consumers. Here the concept of SWIM registry comes into play (ref. *ICAO Doc 10039 – Manual on System Wide Information Management (SWIM) Concept*):



More detailed information on SWIM and on the exchange if digital exchange of MET information (and in particular on the IWXXM model) can be found in two dedicated ICAO publications:

- ICAO Doc 10003: Manual on the Digital Exchange of Aeronautical Meteorological Information
- ICAO Doc 10039: Manual on System Wide Information Management (SWIM) Concept

## MET Information Services vs (traditional) MET products

The main differences between traditional MET products and MET information services (and at the same time highlighting the advantages of MET information services) from a users' perspective can be summarized as follows:

<b>Traditional MET Products</b>	<b>MET Information Services</b>
Fixed contents/MET elements, e.g. in METAR or TAF	Selectable contents & easy to extend to include additional MET elements
Fixed update cycle and intermediate time steps	Selectable update cycle and time steps
Fixed dissemination method (push) irrespective of intended use	User selectable dissemination method (push, request/reply, discover/access/retrieval) dependent on intended use
Separate MET display or even paper print-out	Integration in end-users systems and combination with other operational information
Fixed and MET-centric thresholds included in product	Flexible and user-centric thresholds configurable in end-user system
End-to-end => further processing difficult and in some cases even impossible	Fit for further processing and re-use
Old-fashioned MET codes (requiring specialization) often prone to errors	Open data formats & web services
MET expert focus on production	MET expert focus on providing added-value advice and participation in decision making process

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