International Civil Aviation Organization

THE FIRST MEETING OF SYSTEM WIDE INFORMATION MANAGEMENT TASK FORCE (SWIM TF/1)

Bangkok, Thailand, 10 – 12 May 2017

Agenda Item 3: f) Task 2-1-1**:** Promote new needs and new services and maintain database of publishers (ID/access points/services/interface/format..) pending registry implementation

SWIM CONCEPT APPLIED IN THE NEW METEOROLOGICAL INTERFACES TO AIRLINES' FLIGHT PLANNING SYSTEMS IN HONG KONG

(Presented by Hong Kong, China)

SUMMARY

This paper presents the SWIM concept utilized in the new meteorological interfaces to the flight planning systems of two major airlines in Hong Kong for the provision of on demand digital meteorological information.

1. INTRODUCTION

1.1 With the increasing amount of meteorological information available, the traditional way of providing standard weather information packages as part of the flight documentations to be carried onboard is becoming more challenging for both pilots and dispatch office of airlines. In fact, the legacy meteorological documents and charts with predefined options like aerodrome lists and chart coverages are unlikely to fit all the flights involved. To address the increasing need to provide custom made meteorological information for individual flights, the Hong Kong Observatory (HKO) has, based on the SWIM concept, implemented new meteorological interfaces in early 2017 for airlines to acquire flight specific meteorological information for flight planning purpose.

2. DISCUSSION

2.1 The SWIM concept is to change the conventional point-to-point data exchanges of ATM information to system-wide interoperability. With the implementation of a SWIM registry (also known as a catalog), consumers are able to discover from this repository of information what data services are provided and the set of available data products The consumers will then access the required information through inter-connected systems supporting Service Oriented Architecture (SOA).

2.2 More details on the concepts of how meteorological information can be discovered and exchanged in the SWIM environment can be found in the *Plan for Meteorology in System Wide Information Management (SWIM)*, or the MET-SWIM Plan, currently being developed by ICAO MET Panel (METP) Working Group on Meteorological Information Exchange (WG-MIE). Figure 1

shows possible mechanisms described in the MET-SWIM Plan by which meteorological data can flow from producers to consumers.

2.3 While the MET-SWIM concepts are still under development, the basic principles as defined in the MET-SWIM Plan including "Loose system coupling", "Use of open standards" and "Use of interoperable services" served as a good starting point to the development of new meteorological information exchange services. To support local airlines' pressing need to streamline the collection of meteorological information for flight document preparation and daily operation, the HKO has developed two interfaces to provide tailored, on demand meteorological information to support their operations. Details of the interfaces are as follows.

Interface 1: Provision of tailored weather charts for individual flights

2.4 For Interface 1 a RESTful[1] Application Programming Interface (API) is set up on a HKO server to provide "advanced discovery" of meteorological information available for a particular flight (Figure 2). The process started off with an airline server initiating a request of meteorological information to the RESTful API with an XML[2] document containing the flight plan of the flight involved, using industrial standards like ARINC 633 Air-Ground Data and Message Exchange Format and Aviation Information Data Exchange (AIDX), etc., where modern flight planning systems could provide directly. The API will return a collection of available resource locations on other HKO servers in terms of URI[3]. The airline server will then make requests to these URIs to retrieve the real-time generated customized products including flight specific wind and temperature charts (Figure 3) and significant charts (Figure 4) in PNG format.

Interface 2: Provision of selected OPMET information for individual flights

2.5 Another RESTful API is set up for provision of selected OPMET data for flights tailored according to its flight plan. Since the detail flight plan of 2 flights between the same city pair might differ, the RESTful API on Interface 2 is set up on HKO server to store the submitted request (Figure 5). The request in JSON[4] format consists of a flight plan, lists of relevant airports and Flight Information Regions (FIRs) and some selection parameters like time period. Treated as a "ticket", the request will be stored in the HKO system and will be used to match against messages in the OPMET database. Matched OPMET messages will be submitted to the airline's RESTful API immediately. The matching process will also be triggered every time when a new OPMET message is inserted into the OPMET database, thus providing a virtually event driven meteorological service to airlines.

Looking ahead

2.6 In addition to further develop the "Advance Discovery" feature of the RESTful API, services based on open standards like the Open Geospatial Consortium (OGC) Web Services including Web Feature Service (WFS) and Web Map Service (WMS) will be deployed to provide on demand OPMET messages, charts and imageries, which should facilitate maximum system-wide interoperability and allow different systems to exchange, interpret and use meteorological information more efficiently.

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[1] Representational State Transfer
[2] eXtensible Markup Language
[3] Uniform Resource Identifier
[4] Javascript Object Notation

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matter as appropriate

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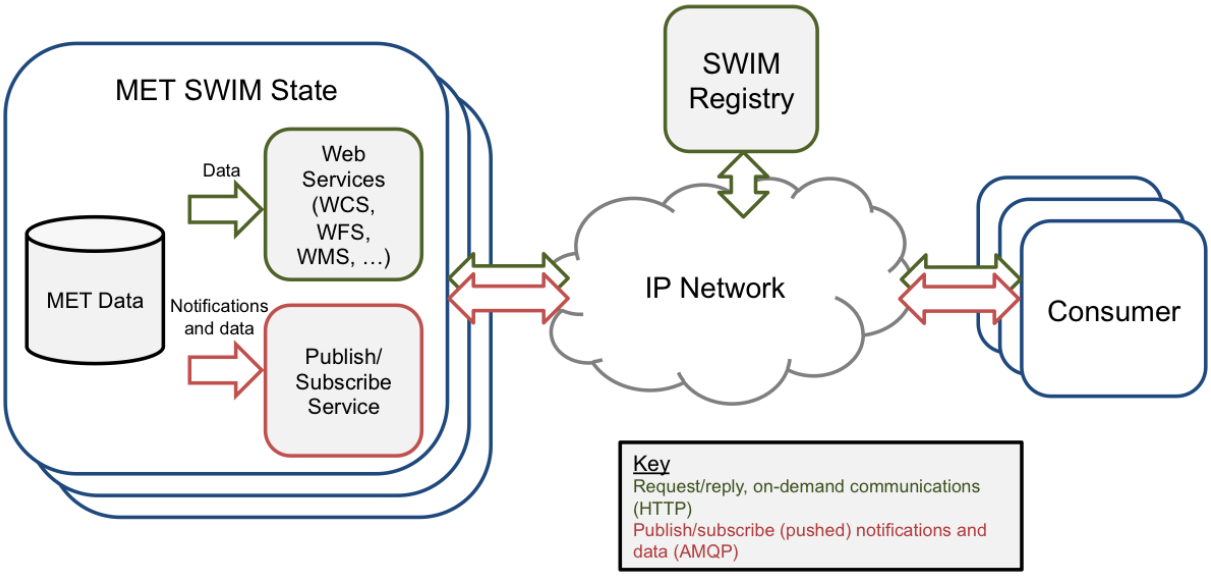

Figure 1. Possible mechanisms by which meteorological data can flow from producers to consumers under SWIM environment

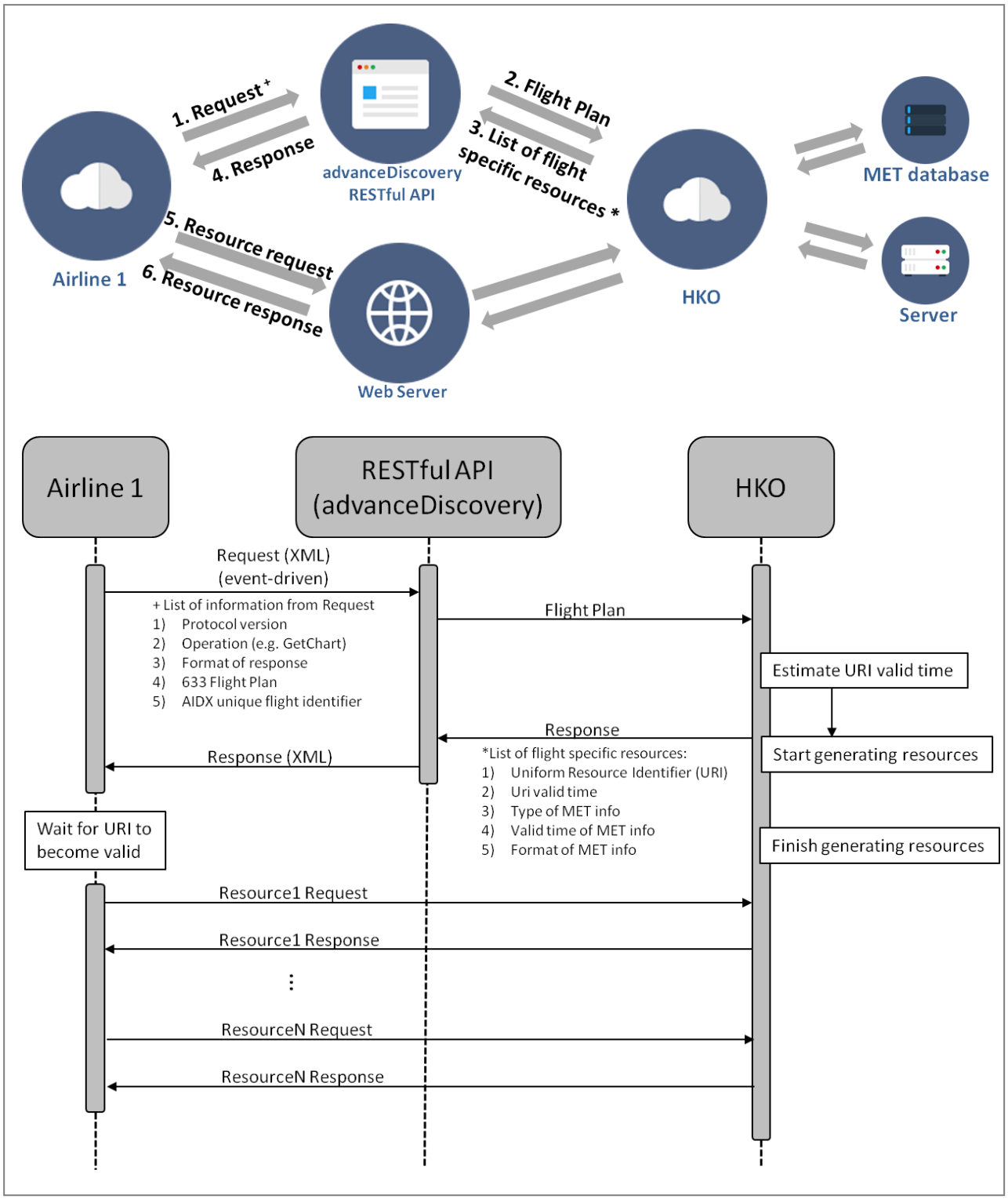

Figure 2: System diagram and sequence diagram showing request/response processes of MET information exchange service for Airline 1.

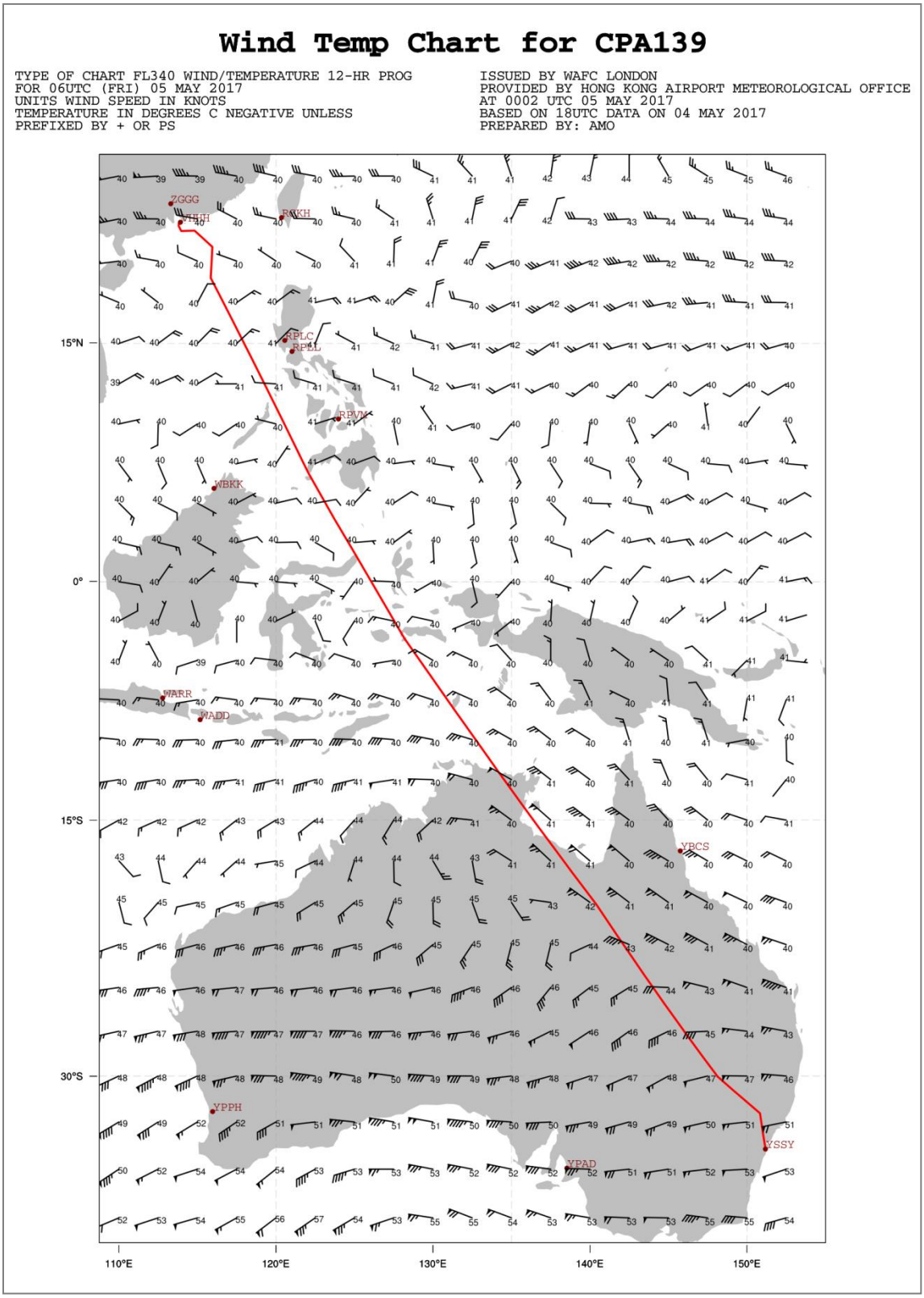

Figure 3: Flight specific wind and temperature chart provided to Airline 1 via the request/response process of the MET information exchange service.

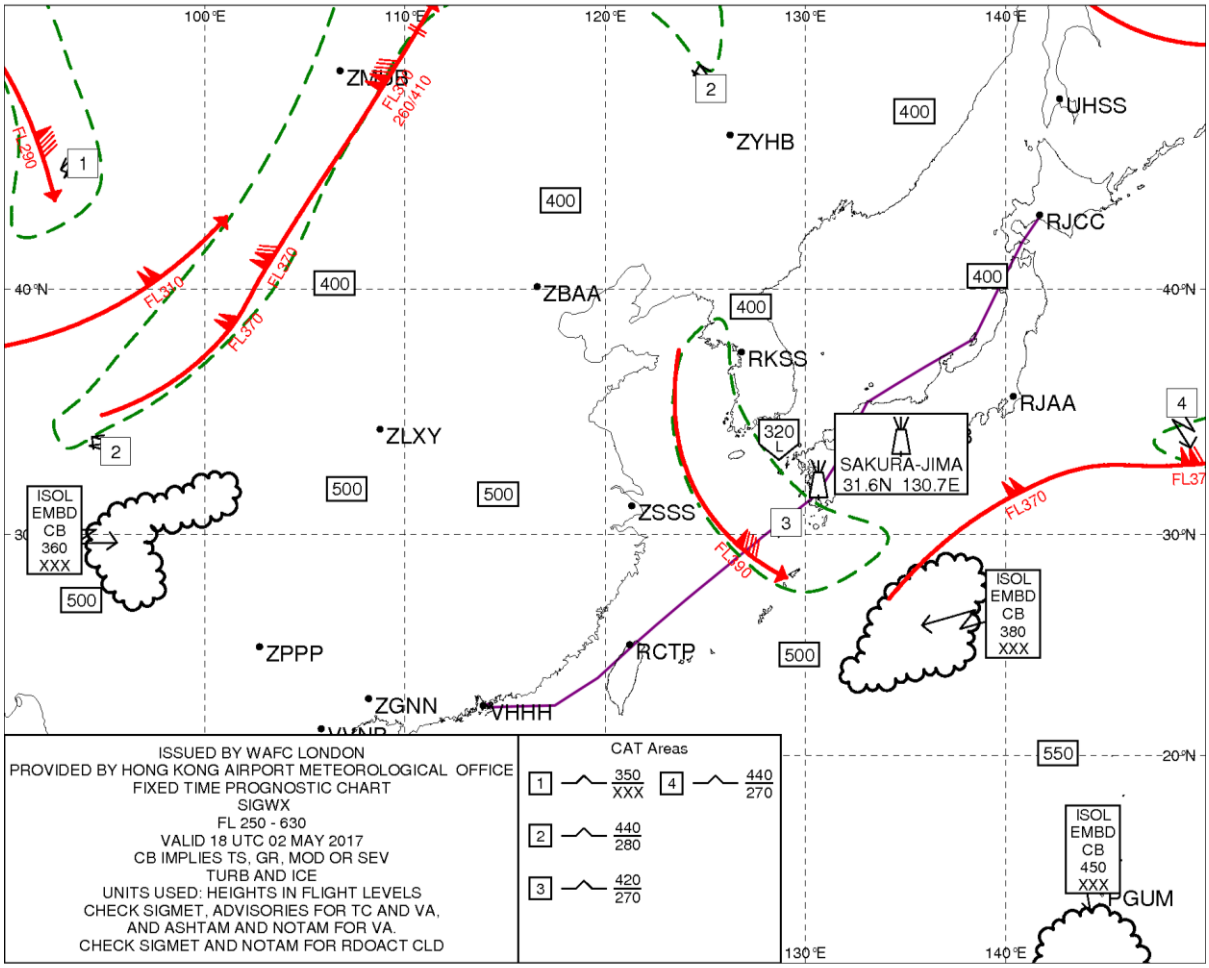

Figure 4: Flight specific significant weather chart provided to Airline 1 via the request/response process of the MET information exchange service.

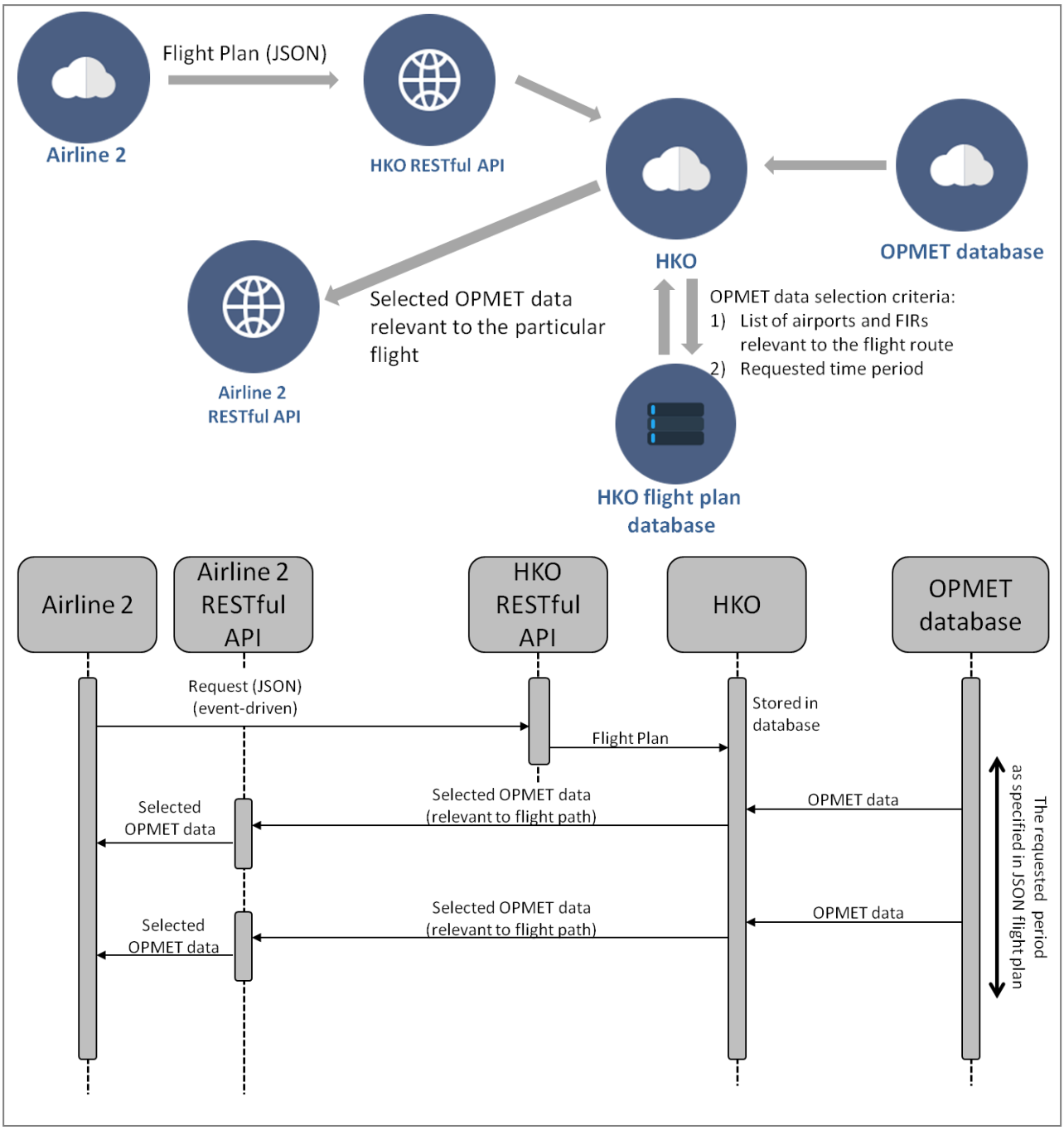

Figure 5: System diagram and sequence diagram showing request/response processes of MET information exchange service for Airline 2.