2.5 MSMQ Operations

2.5.1 Queue Endpoint

A names queue (MSMQ) should be created on 3rd party server, such as BHS server or provided by CRTC. The queue should be assigned to SITA AMS(AI). AMS(AI) will write live flight update message to the provided queue. Airport BHS is required to connect to the assigned queue to pick up the messages.

Requirement on the queue

1. Both parties can access the queue
2. Note on queue size may vary on different version of Windows
3. The queue should be private non-transactional MSMQ
4. Typically, leave default queue property
5. List of ports that must be open for MSMQ to communicate https://support.microsoft.com/en-us/help/178517/tcp-ports--udp-ports--and-rpc-ports-that-are-used-by-message-queuing
6. Message lifetime: 24 hours
7. Queue size: depends on message size, traffic and average updates per flight. To be determined to hold up to 24 hours messages.

2.5.2 Recommended Process

It is recommended the client to read every message from the assigned queue, store it at client side and then remove the message from the assigned queue. Another process responsible to parse the stored messages and mark it processed, failed or error.
It is to prevent message stack up in the queue and provide logging mechanism for every message received.

2.6 Error Handling

If AI or BHS fails to connect to the queue server or to read/write to the queue server, an error message is written to the local log for operator intervention and the interface is marked as Unavailable.

If the BHS is down, AI will continue write messages to the assigned queue for a configurable period of time and the BHS will process the queue message in order to catch up on reconnection. However, messages keep in the queue will be expired after a configurable time. If AI is down, the BHS will not see any message files in the assigned queue. On interface recovery, AI will resynchronise by writing a full set of the latest flights to the assigned queue.

When the BHS has successfully pick up a message, it removes the message from the assigned queue. If the processing fails part way through due to BHS failure, the message will still be removed from the assigned queue. The BHS should store the message and (re-)process when the BHS recovers.

3 DATA INFORMATION

3.1 Message Format

Data is provided in the form of XML messages complying to the AMS/APV schema known as “Connect” or ”ConnectXML Schema”. The root tag for AMS/APV Connect is the `<connect>` tag. All tag and attribute names are lower case.

The `<daily>` tag indicates that the message relates to the daily flight schedule. It takes the following attributes:

Attribute	Description
`action`	`insert` Used to add a new record. `update` Used to update an existing record. `delete` Used to delete an existing record. `replace` Updates the record if it exists, adds a new record if it does not exist
`soft-replace`	“True” means that fields that are not present in the message should not be cleared out by the receiving system
`adi`	“A”=Arrival at this airport, “D”=Departure from this airport
`schedule_date`	Scheduled date of Arrival/Departure in YYYY-MM-DD format (Local time)
`linecode`	Airline IATA code – 2 alpha
`number`	Flight number – up to 4 numeric
`site_iata`	IATA code of this airport – 3 alpha
`date_boundary`	“1” indicates an overnight flight i.e. an arrival that left the previous day or a departure that arrives the following day. Default is “0” if not provided

Table 1: Daily Tag Attributes

The following is an example message for an Arrival flight DL1397 into Denver airport.

```
<?xml version="1.0" encoding="utf-8"?>
<connect version="1.0" name="AMS">
  <daily action="replace" adi="A" linecode="DL" number="1397" schedule_date="2016-10-26" soft-replace="true" site_iata="DEN" date_boundary="0">
    <field name="schedule" instance="1" value="2016-10-26T10:18:00" />
    <field name="estimated" instance="1" value="2016-10-26T10:18:00" />
    <field name="actual" instance="1" value="2016-10-26T10:18:00" />
    <field name="domesticintcode" instance="1" value="I" />
    <field name="aircrafttype" instance="1" value="73H" />
    <field name="aircrafttypeicao" instance="1" value="B738" />
    <field name="allparkingbays" instance="1" value="" />
    <field name="gate" instance="1" value="" />
    <field name="claim" instance="1" value="" />
    <field name="displayfltno" instance="11" value="" />
    <field name="status" instance="1" value="ON" />
    <field name="totpax" instance="1" value="156" />
    <field name="mtow" instance="1" value="79016" />
    <field name="city" instance="1" value="CVG" />
  </daily>
</connect>
```

Although the above example only contains one `<daily>` node, a Connect message for a day’s worth of flight contains multiple child nodes.

3.2 Data Fields

The Airport BHS requires the following fields to be provided in the Connect XML message:

Field Name	Description	Format
daily	The parent tag as described above	
schedule	Scheduled Date Time	Datetime local yyyy-MM-ddTHH:mm:ss
flighttype	International or Domestic flight	"I" or "D"
city	Origin or Destination airport Instanced for multiport routing instance="x"	3 letter IATA code Where x is 2 or above for more multiport routing
estimated	Most Confident Estimated time of arrival or departure	Datetime local yyyy-MM-ddTHH:mm:ss
actual	Actual time of arrival or departure	Datetime local yyyy-MM-ddTHH:mm:ss
claim	Baggage reclaim carousel ID for arrival flight	Text string
aircrafttype	Aircraft type IATA code	Text string
status	Code for flight status	Code (table below)
chute	Chute code	1, 2, 3, 4

Table 2: Field Names and Data

Notes:

1. A full list of flight information provides the flights for yesterday (D-1), today (D0) and tomorrow (D+1).
2. Flights are filtered according to scheduled date of arrival/departure.
3. Flights are sorted by adi then scheduled time i.e. all Arrivals followed by all Departures in time order
4. The "flight key" uniquely identifies a flight.
   - adi,
   - linecode,
   - number,
   - schedule_date (without time) in the daily tag, and
   - schedule (with time)

   Above all together to uniquely identify a flight.
5. Duplicate flight number on same day may happen.
6. Scheduled date time change is not allowed. It should be deleted and then re-created.
7. Times and dates are Local time at this airport.
8. Other fields may be included in the connect message but can be ignored if not required.

4 TRANSPORT AND SECURITY

4.1 Connectivity Details

A secure MSMQ Server to be provided by BHS or CRTC. Make sure AMS/AI is able to write message to the assigned queue and the BHS is able to read message from the assigned queue.

IP address, port, queue name, authentication will be provided to access the assigned queue. The credentials ensure that the access is only granted to the assigned queue.

As the data is destined for the BHS, encryption of message content is not required for this interface.

4.2 Audit Trail

Error messages and audit trail are written to a local error log by both AI and BHS to enable a site administrator to monitor and troubleshoot using a standard monitoring process. Error messages contain a date and timestamp and sufficient information to allow the administrator to understand and trace back to the original message in the logs.

Audit trail is kept for 7 days (configurable).

ABBREVIATIONS

Abbreviation	Description
AI	Airport Integrator
AMS	Airport Management System
AODB	Airport Operational Database
APV	AirportVision (FIDS system)
FIDS	Flight Information Display System
MSMQ	Microsoft Message Queue
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ICD	Interface Control Document
PAS	Public Address System
BHS	Baggage Handling System
WAN	Wide Area Network
CXR	Cam Ranh International Airport (IATA Code)

REFERENCES AND RELATED DOCUMENTS

	Document Name	Description
1.		

CONTACT INFORMATION

Name	Role	Company	System	Email	Phone
Nicky Lo	Project Manager	SITA	AMS	Nicky.Lo@sita.aero	+852 9787 0132
Man Cheuk	Business Consultant	SITA	AMS	Man.cheuk@sita.aero	+65 9018 5386

REVISION HISTORY

Version	Date	Author	Description	Status
0.1	28 Nov 2016	Chris Nixon	First Draft for internal review	Draft
0.1a	24 Sep 2017	Man Cheuk	Second Draft for internal review	Draft
0.2	22 Nov 2017	Man Cheuk	Field list changes	Draft
0.3	03 JUL 2020	Man Cheuk	Field list updated, Information flow between systems	Draft