



ICAO

*International Civil Aviation Organization***The Fourth Meeting of System Wide Information Management Task Force (SWIM TF/4)**

Web-conference, 3 – 6 November 2020

Agenda Item 7: State, Regional and Global SWIM Updates**GENERATION AND LIFE CYCLE MANAGEMENT OF GUFİ AND RELATED ISSUES**

(Presented by China)

SUMMARY

This paper presents a brief overview of the practice of using GUFİ to exchange flight information between systems in China and some possible issues in exchanging flight information in future SWIM environment.

1. INTRODUCTION

1.1 The wide-area surveillance network function verification system is a comprehensive surveillance network. Data sources include AFS message system, satellite/ground-based ADS-B system, surveillance radar system, ACARS, etc. The system provides multi-category data services for airlines, airports, ATC units, administration, GADSS-related organizations and other data users.

1.2 GUFİ is used in flight data management in the system, a UUID-based global unique flight identifier is usually generated in the flight planning stage, and it is managed in the entire life cycle of a flight. It is generated by the simulated ATM role and participate in the subsequent data exchange. It is used to realize the persistent storage of FIXM format flight data in the system, and the management and retrieval is realized through GUFİ.

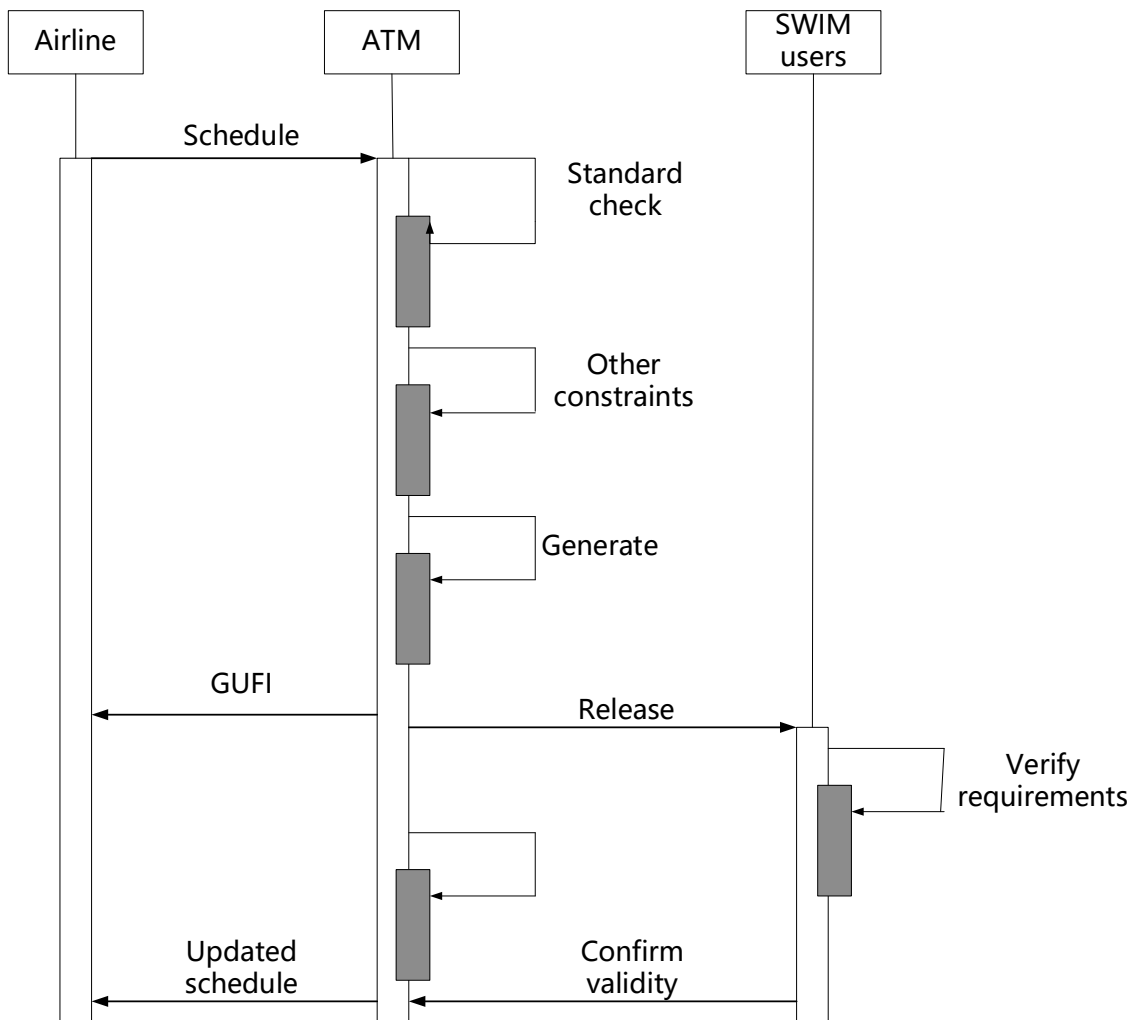


Figure 1: Timing diagram of the generation of GUFIs

1.3 According to the relevant documents of UUID, GUFIs are defined as a string primary key, in its textual representation, the 16 octets of a UUID are represented as 32 hexadecimal (base-16) digits, displayed in five groups separated by hyphens, in the form 8-4-4-4-12 for a total of 36 characters (32 hexadecimal characters and 4 hyphens). For example:

GUFIs from `String("94D2523A-FB09-9B4C-091A-8F908A25BC04")`.

UUID encoding rules:

- a) 1~8 bits adopt system time, and the system time is accurate to the millisecond level to ensure the uniqueness of time;
- b) 9-16 bits adopt the underlying IP address, which is unique in the server cluster;
- c) 17~24 bits adopt the Hash Code value of the current object, which is unique on an internal object; and
- d) 25~32 bits adopt a random number calling the method, uniqueness in milliseconds within an object.

1.4 The system accesses various flight-related data. Part is generated in realtime, another part is generated after the flight. By using NoSQL database technology, a flight identification database is established and maintained. At each flight data access point, a GUFU management component is set up. This component serves two functions, it determines whether the received flight data has been allocated to an existing GUFU judged by Aircraft Identification, Registration Number Origin and Destination, Departure Time. If there is an existing GUFU, it will append data to this record, else a new GUFU will be generated and registered in the system.

2. DISCUSSION

2.1 Although UUID can ensure that GUFU is generated simultaneously in multiple countries/regions without duplication and the data exchange uniformly uses GUFU as the flight identifier inside the system. However, there are many different data exchanges between different systems. Is it necessary to determine how to exchange data between systems in different countries/regions? For example, a flight is flying from Beijing to Hong Kong, airline might submit data independently to both Beijing and Hong Kong.

2.2 Following the discussion on the previous issue, is it necessary to ensure the global uniqueness of GUFU in this case? At this stage, it is difficult to uniformly generate GUFU on a global scale. After conflicts are discovered, the conflicting data should be correlated, or is this situation allowed currently?

2.3 In order to ensure data integrity and compatibility, the concept of data quality evaluation is introduced into the system. In the service provision stage, a service includes multiple quality levels at the same time, and data users choose according to their own needs. There may be problematic data in low-quality data services, such as fake ADS-B targets. Should this type of flight be assigned a GUFU?

2.4 Is it allowed using GUFU to exchange flight data in the transition environment? Although flight data access point supports two-way conversion between the legacy system and the GUFU-enabled system, frequent conversions still have risks, such as increased system pressure, abnormal flight records will appear more frequently.

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
