KOMPSAT OPEN API FOR SATELLITE INFORMATION SERVICE

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ABSTRACT: KOMPSAT satellite image can collect meteorological data and provide image search. An additional procedure for ordering the images retrieved by the user in the API providing only an existing catalogue search is needed. In this paper, we design a linkage framework for providing open satellite information service. It also defines a standard interface for joint operation of domestic and international satellite information. We expect to support the industrialization of satellite information service. It provides easy access to the specific type of library that the user wants to use function and service to use rules.

1. INTRODUCTION

The area of cooperative service support of early earth observation satellites is gradually expanding to include a wide range of private services. Earth observation satellites provide users with satellite image search and various processing levels. The Open API refers to the 'Application Programming Interface', which is open so that users can directly develop applications and services of a User Interface(UI). Attempts have been made in map services and various services. In recent years, KOMPSAT integrated information search system is providing open service that interconnects satellite resources with the emergence of constellation service with greatly improved observation period. KOMPSAT only provides catalogue search API based on EOLi(Earth Observation Link), so user needs additional procedure to order the searched image[1].

Table 1. Users status of satellite information utilization support system

Division	2015	2016	2017	2018
Direct use of web pages[1]	57,322	89,377	662,341	345,582
Open API connection[2]	48	251,494	289,736	1,697,132
Total	57,370	340,871	952,077	2,042,714

1) Number of direct connection of satellite information integrated search system - webpage[2]
2) Perform search by linking database of satellite information retrieval system in user platform

It is necessary to develop a standard API interface linking image search, ordering, and distribution database to solve the inconvenience of KOMPSAT information users and develop multi-satellite based linkage service. KARI recently provides raw data, correction image data, theme and overseas image data with satellites such as KOMPSAT. It is collected and processed by the satellite information order search API. As such, Open API promotes the use of various satellite images. The data are classified into KOMPSAT satellite image data and catalogue images (thumb/browse) and finally distributed. It is provided in the form of archive order, imaging order, proposal information, and theme image. Image that belongs to data provided by sample.

2. OVERVIEW OF SYSTEM CONCEPTUAL

KARI developed a satellites and overseas satellites, as Perusat, all have primitive, calibrated, theme, and overseas imaging data. Satellite images, orders, and image information are collected

and entered into the database of each processing system. The data is reflected in the API service and provided to the user in various ways.
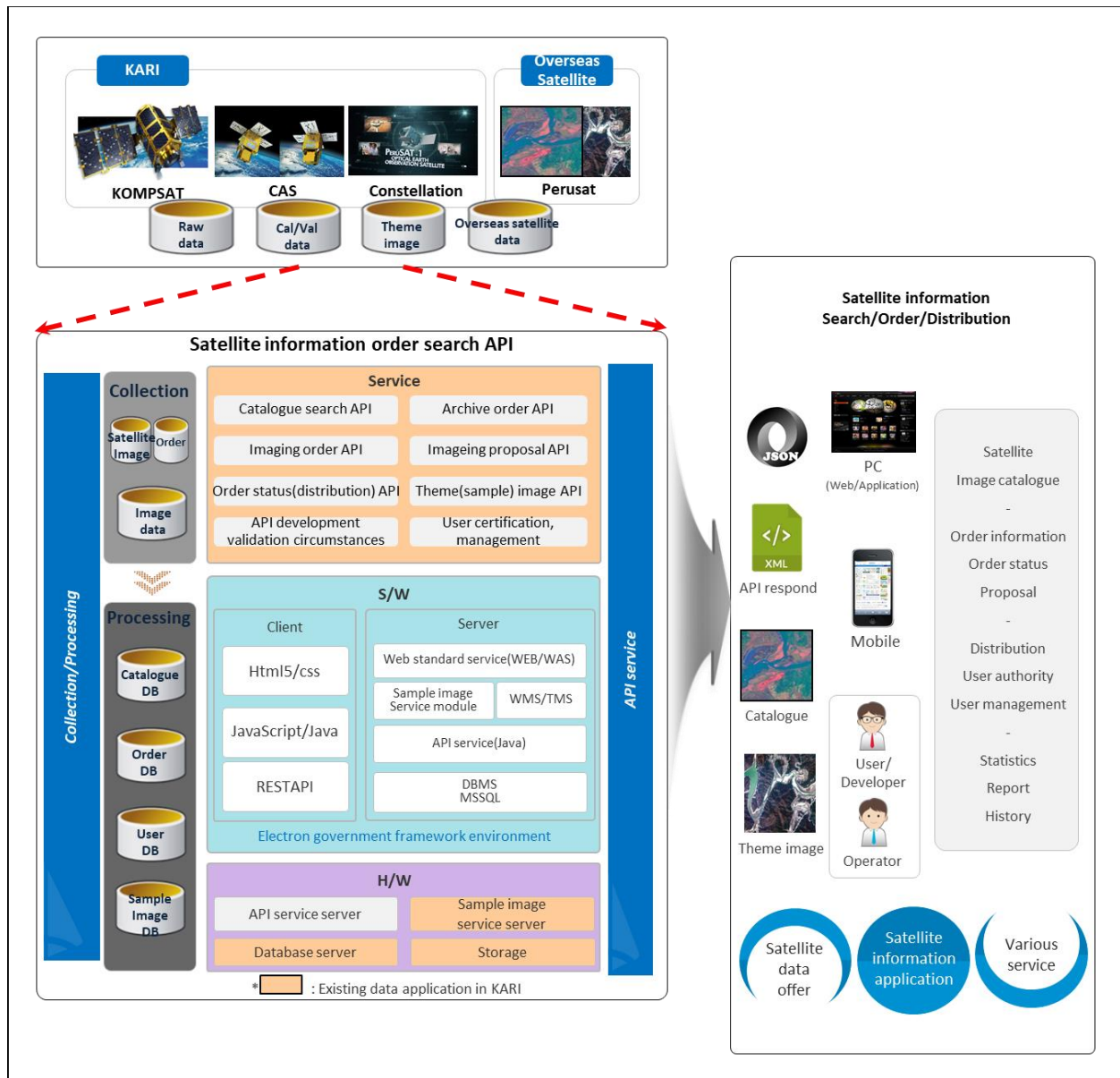

Figure 1. KOMPSAT Open API

The catalogue is a catalogue image of satellite image, in thumb/browse format. Ordering information is archive order, imaging order, proposal. The theme image is a high resolution satellite image. User information is user(developer) authentication/authorization information. It is documented as the parent API service. Open API development technology uses RESTAPI to send and receive the state of the resource. It is an architectural style that can take full advantage of the web by utilizing web technology and HTTP protocol. Along with the specification for Open Geospatial Consortium (OGC), an international standardization organization. Promote flexible services with open standards such as geospatial content, services, sensors, and the web.

3. DESIGN AND DEPLOYMENT

The KOMPSAT Open API provides API-based search services for catalogue databases of KOMPSAT 1/2/3/5/3A and subsequent satellites. Also, the service will be extended to subsequent and heterogeneous catalogue databases like Compact Advanced Satellite(CAS), constellation. The

user request after selecting an imaging order or archive order for a desired image. Set the region and institution with the satellite, and then proceed with the order request. The imaging order list requested by the API user is registered in the imaging order database of the order search system. The operator receives the user's order and analysis whether the user can take pictures under the relevant conditions through the Order Analysis System. In this case, the feasibility information of the requested new imaging order should be provided to the user. This is an imaging proposal API, which is a condition of viewing information corresponding to an imaging order requested by a user in the proposal database of an order search system using the API. If it is not necessary to take new imaging, the existing images may be directly provided. This is called an archive order. When the API user inputs processing conditions such as type, the contents are also registered in the archive order database of the order search system.
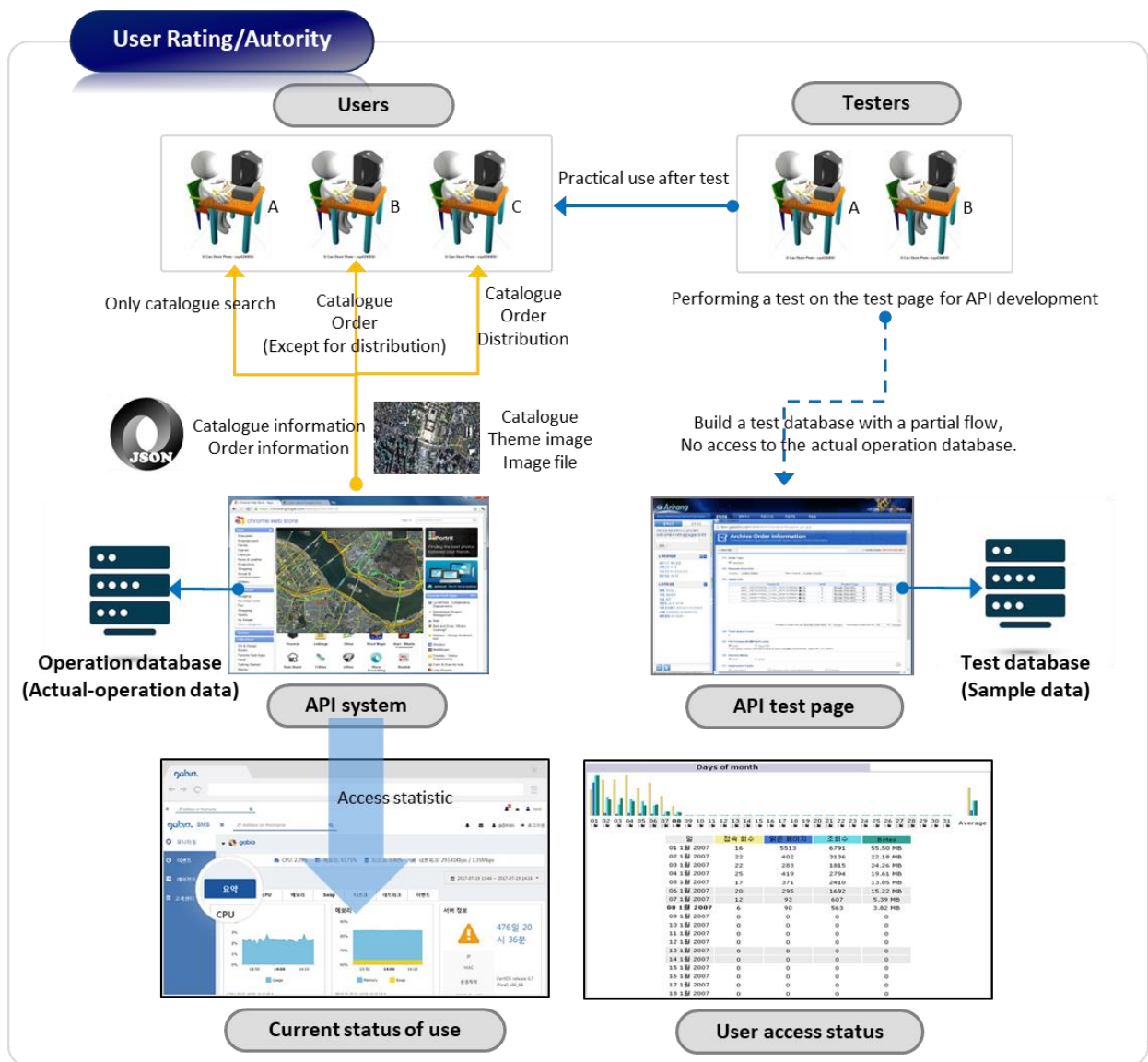

Figure 2. User rating and authorization - process

The KOMPSAT Open API users are divided into administrator, operator, general user(reseller), and tester. Administrators account create and manage users and operators. Moreover, system-wide management and continuous monitoring work. The operator issues user authentication keys and can set user groups and permissions. Users are divided into three categories (For example, called A, B, C). A user who has been granted authority A will only use the catalogue and theme image search. Users who have been granted authority B can search and order (catalogue, theme image, order). Third user can search, order, distribute (catalogue, theme image, order, download). The

tester only has the authority to test the API. Administrators and operators do not need separate authentication, and users are authenticated using API. Tester undergoes interim certification process for testing. in this case, besides Open API developer verification environment, First, a PDF file provides an overview of the system and procedures for each function. The user can view and download it. The test method shows the basic source code written in 'GeoJSON', a feature, open standard format. Then, download the test program and proceed.

Identify users (classes) using encryption keys and IP address information and set API usage restrictions. The user will only use the available APIs according to the level given. it records in the database to monitor user usage status (user access status, API usage status) and provides a monitoring page. This is the detailed state up to the pre-deployment stage, not the physical distribution provided to the user. That is, the order status (ex. 'Cancel', no longer in process).
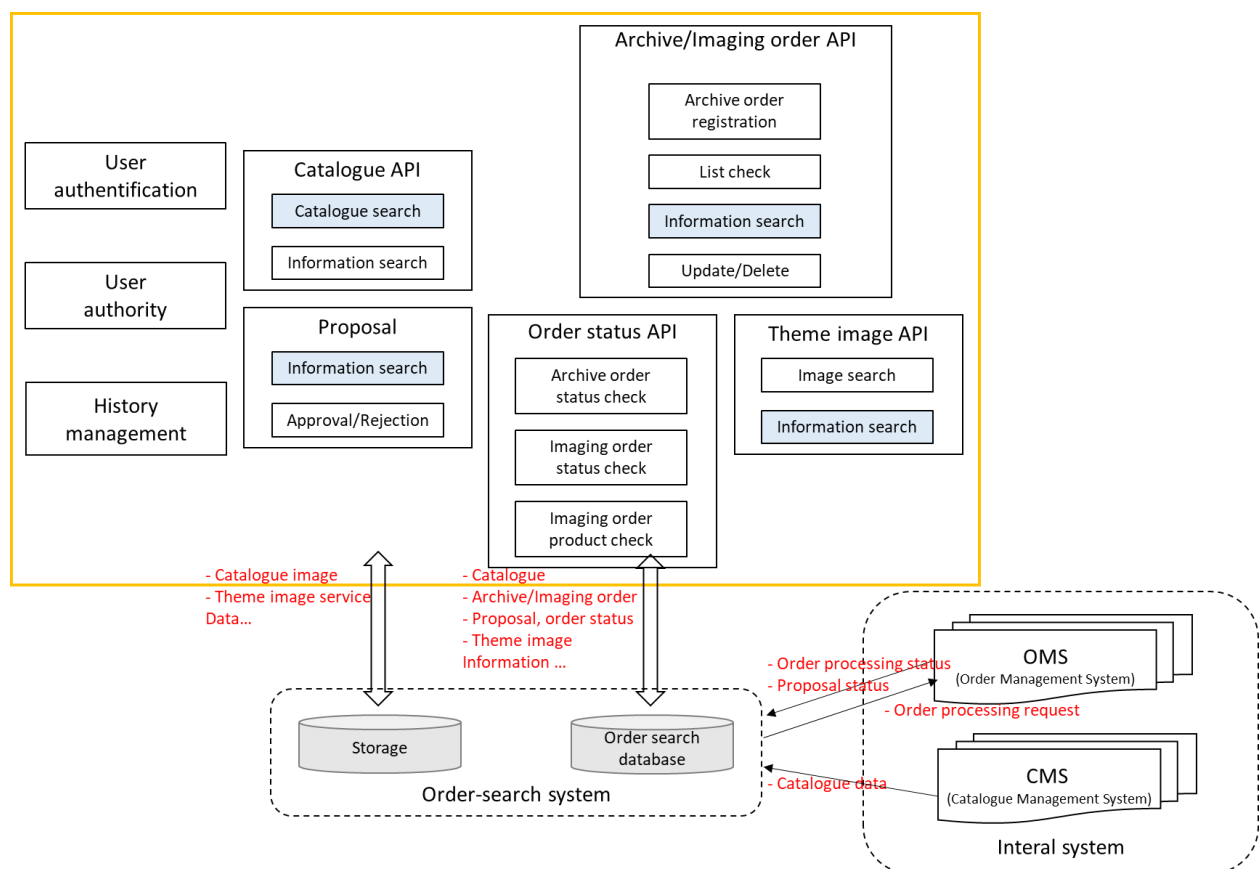

Figure 3. System structure

Open API service is interworked with the order search system's storage and database. Send and receive catalogue images and other information. The order search system is also linked to the Order Management System. The API service requests the order processing to the database of the order search system linked with the Order Management System when registering an order. The Order Management System returns the order processing and proposal status through the corresponding database[3]. The order processing status is largely divided into continuous imaging, imaging completion, etc., and is classified into a process of validity or not. It is associated with the retake of the region of interest and catalogue reprocessing. Order retrieval is isolated from the internal business system and synchronized in an existing offline manner. The Catalogue Management System uses the same database to provide catalogue data as an API service. Construct API data through periodic update by providing internally produced catalogue information. The processing result is returned and responds to the received API request. The API service shows the end result to the user on screen. The Order Management System returns the order processing and proposal status through the database. The processing result is returned and responds to the received API request.

4. CONCLUSIONS

Currently, only the EOLi-based catalogue search for KOMPSAT is offered, so it was necessary to co-operate multi-satellite information at domestic and overseas country. Advanced satellite imaging services continue to emerge. In order to satisfy this, it is necessary to establish a service that interconnects satellite resources. Development of a standard interface for multi-satellite ordering and distribution services was a priority. It consists of a linkage system based on the standard interface (Open API). We considered satellites such as optics and radar. It can be extended to subsequent satellites. By using the order search API with web standard technology, users can easily implement the service, reducing development time and costs. The qualitative effect promotes the use of KOMPSAT information. It is expected to increase the convenience by establishing a support system for utilizing satellite images based on multi-satellite and satisfying current user requirements. It will maximize the creation of new value in the satellite image service industry. Using the KOMPSAT Open API like this will satisfy the various satellite information provision needs of users. In addition, it resolves user inconvenience caused by the use of satellite information and supports domestic and international service industrialization.

REFERENCES

From websites:
[1] https://ksatdb.kari.re.kr/eoli/
[2] https://ksatdb.kari.re.kr/arirang

[3] Jang, Y., G. Jeun, D. Chung, 2018. Development for KOMPSAT API Based-on HMA, Proceedings of the KSRS Fall Conference 2018, Muju, Korea, Oct 25-26, pp. 148-151.