DEVELOPMENT GUIDELINE

AI SERVICE

Document ID	: ai-service-development-guideline
Version	: 0.1.4
Number of pages	: 22

Revision History

Rev. No,	Date (YYYY-MM-DD)	Add/Delete/Update	Section No. changed	Changes	Author	Review by	Approved by
0.1.0	2024-05-15	Add	All	Init document	TienLN	LucVu	
0.1.1	2024-06-08	Update	All	Add filed in response Update stats API	TienLN	Tien-Tung (Tony) Bui	
0.1.2	2024-06-18	Update	2. section	Mechanism to upload data from AI service to S3	TienLN		
0.1.3	2024-06-20	Add	2.5 section	Guide to access S3	TienLN		
0.1.4	2024-07-05	Update	All	Add user-role to header of API	TienLN		

Table of Contents

1. Overview

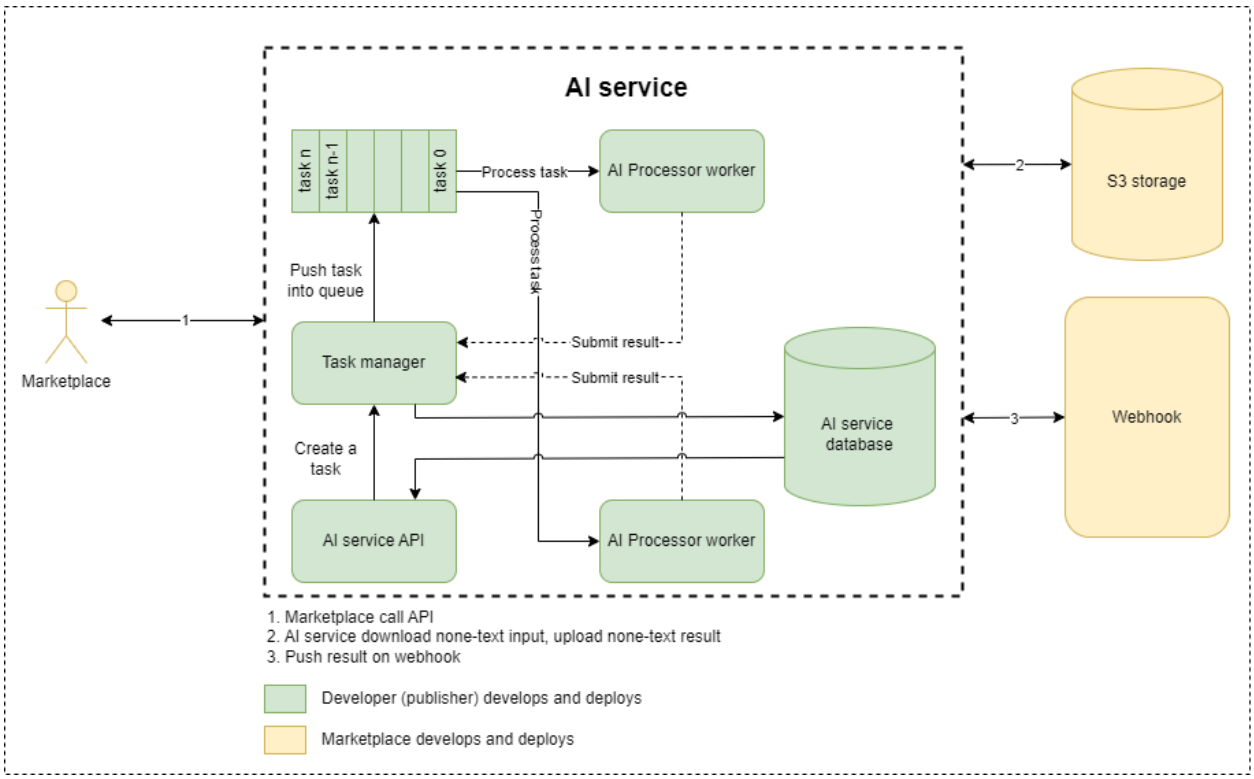


Figure 1.1. Architecture of the system overview

This document guides developers on the standards needed to develop an AI service for integration into the AI marketplace.The overall architecture is described in Figure 1:

- The AI service is an asynchronous service, therefore, developers need to design a queuing mechanism so that when a request is received, an immediate response is sent back to the client. In case there are no protocol-related errors or parameter violations, an AI task is created (associated with an ID) and pushed into the queue for processing. The AI service then responds to the client, indicating that the task has been created and is awaiting processing, with an errorCode indicating the "pending" status.
- Once the task is sent to the worker for processing, the task status changes from "pending" to "in progress". If at this point the client calls an API to retrieve the result based on the taskID, they will receive a response indicating that the task is currently in the "in progress" state.

- If the task is processed successfully, the task status will change to "success", and the result will be sent to the marketplace via a webhook. If the task encounters an error for any reason, it will be logged with an errorCode and a specific error description. In both cases of success or failure, information about the request is stored in the database for future analysis purposes.
- In case the marketplace does not find the result on the webhook, it can call an API to retrieve the result based on the taskID.

Developers can choose any technology to develop the AI service. However, they need to follow:

- The AI service will communicate with the marketplace via a RESTful API, which includes the following aspects:Endpoint, Number of Endpoints, Status Code, Header, Body Format, Error Code… (The following sections will provide detailed explanations for each item)
- All non-text data such as images, videos, audio files, etc., uploaded by users will be stored in S3. The client (Marketplace) will provide a shareable link for the AI service to download and process user requests. Therefore, developers need to specifically define the details in the body of the /call API.
- For all non-text results such as images, videos, audio files, etc. The AI service will store them in S3 and share a link via the API response for the marketplace to download the results.
- Developers need to follow a database schema to store the necessary information for use in the reporting process
- The AI service is packaged and run as a container.

2. Design API

No	API	URL	Description	Remark
1	Create a request	/call	Create an AI task	Developers need to develop
2	Get result	/result	Get the result after process completed	Developers need to develop
3	Get statistics	/stats	Serving the purpose of statistical analysis.	Developers need to develop
4	Push result	N/A	Pushing the results back to the marketplace when the processing is completed	The marketplace will develop and deploy.Developers need to define the request body.

CREATE REQUEST FLOW

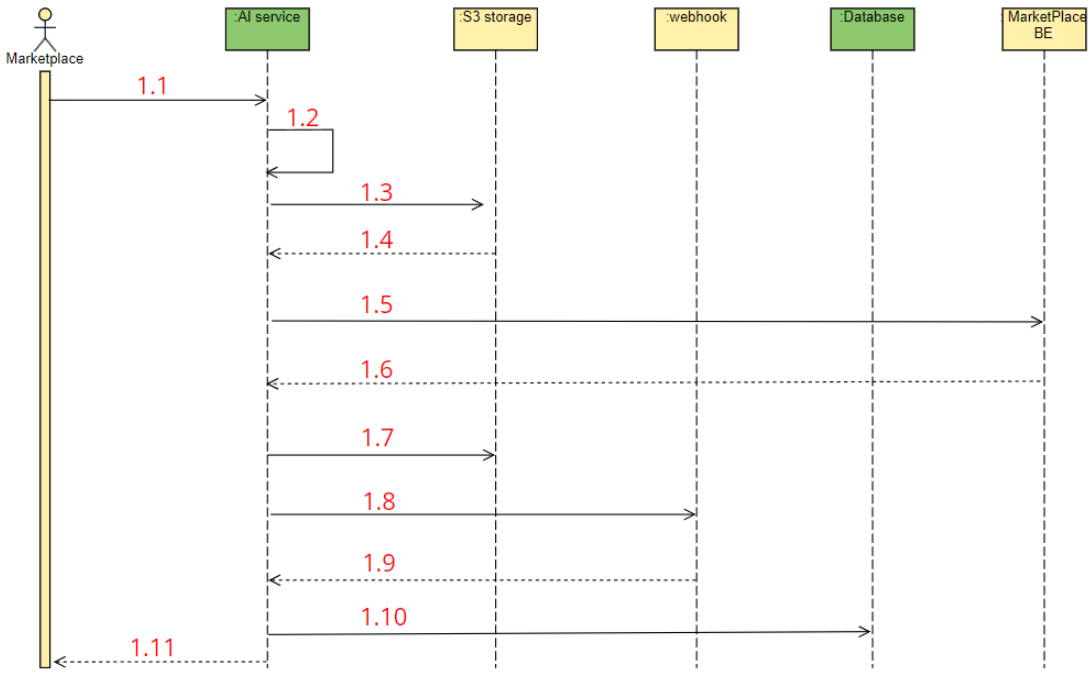


Figure 2.1. Call API sequence diagram

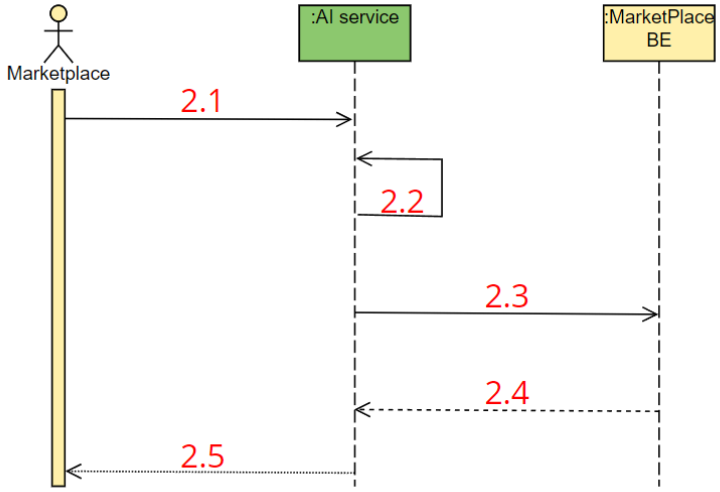
No.	Description
1.1	The client (marketplace) creates a request.
1.2	The AI service checks the rules of the parameters.
1.3	The AI service requests to download an image from S3 if it is included in the body
1.4	Response from the S3 server.
1.5	The AI service request to get a presigned URL on S3 from MarketPlace BE
1.6	The MarketPlace BE return an presigned URL
1.7	Save non-text results to the S3 server based on presigned URL
1.8	Push the results back to the marketplace.
1.9	Receive response from the marketplace.
1.10	Save the request information to the database.
1.11	The AI service responds to the marketplace

Information response rules

- If there are any protocol-related errors in the API, such as missing fields in the header or body, or incorrect data types defined, the AI service will return an HTTP status code indicating an error along with details.
- The AI service will validate the content of the body: if any field does not comply with the predefined rules, it will return an HTTP status code of 200 along with an error code defined by the developer (more details in section 2.5)
- The AI service will create a task and push it into a queue for processing by a worker. Simultaneously, it will immediately respond to the client with an HTTP status code of 200, providing a taskId that the client can use later to retrieve the results. This response will include an **errorCode** of "xxx_001" and a **reason** for "pending".
- Once the request has been processed, the results will be pushed back to the client (using the API provided by the client). This response will include an **errorCode** of "xxx_000" and a **reason** for "success".
- When a request is successfully processed, the request information will be saved in the database for future statistical purposes.

GET RESULT FLOW

Figure 2.2 Get result API sequence diagram



No.	Description
2.1	The client (marketplace) creates a request to retrieve the result

2.2	The AI service checks the rules of the parameters
2.3	AI service request a presinged S3 URL of an object from MarketPlace BE
2.4	MarketPlace BE response a presinged S3 URL
2.5	The AI service responds to the marketplace

Information response rules

- If there are any protocol-related errors in the API, such as missing fields in the header or body, or incorrect data types defined, the AI service will return an HTTP status code indicating an error along with details.
- The AI service will validate the content of the body: if any field does not comply with the predefined rules, it will return an HTTP status code of 200 along with an error code defined by the developer (more details in section 2.5)
- The AI service returns the result with an HTTP_STATUS_CODE=200 along with an errorCode in the following cases:
    - If the task is still in progress: errorCode="**xxx_002**", reason ="**in progress**"
    - If the task successfully processed.: errorCode="**xxx_000**", reason ="**success**"
    - If the task was not processed due to any specific error: Proper error code and error description.

GET STATISTICS FLOW

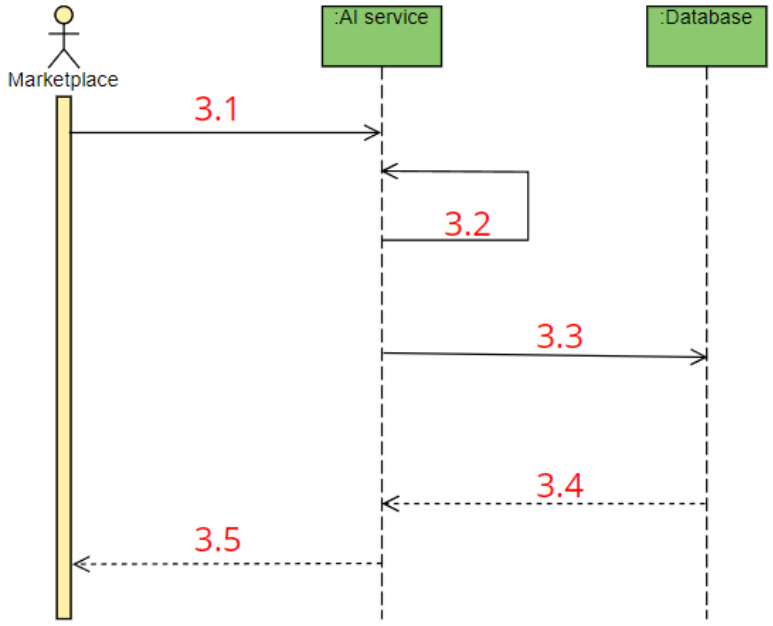


Figure 2.3. Get statistics API sequence diagram

No.	Description
3.1	The client (marketplace) creates a request to retrieve the result
3.2	The AI service checks the rules of the parameters
3.3	The AI service queries database
3.4	The AI service get data from database
3.5	The AI service responds to the marketplace

Information response rules

- If there are any protocol-related errors in the API, such as missing fields in the header or body, or incorrect data types defined, the AI service will return an HTTP status code indicating an error along with details.
- The AI service will validate the content of the body: if any field does not comply with the predefined rules, it will return an HTTP status code of 200 along with an error code defined by the developer (more details in section 2.5)
- The AI service will return the statistical information on the number of successful or failed requests from the user

2.1 Call API

This API is designed for marketplaces to call and create a request to process an AI task

2.1.1 Endpoint

Endpoint	/call
Method	POST

2.1.2 Request

Header

Json key	Type	Description	Required
x-marketplace-token	string	It is a token provided by the marketplace.	Y
x-request-id	string	A random string generated by the client (marketplace).	Y
x-user-id	string	Used for identification and tracing, statistics, and billing	Y

x-user-role	string	To identify user authorization for specific API requests Enum: [“admin”, “user”, “publisher”]	Y

Body

Json key		Type	Description	Required
method		string	If there are multiple sub-service options, the user will choose one of them. If there is only one service available, the name of that service will be used by default.	Y
payload		dict	Define the parameters required for the service.	Y
	Parameter-1	define-by-developer	Describe the meaning and rules of the field.	N/A
	Parameter-2	define-by-developer	Describe the meaning and rules of the field.	N/A

Example data

```
# Body
{
  "method": "music_gen",
  "payload": {
    "promt": "energetic EDM",
    "duration": 5
  }
}

# CURL command
curl -X 'POST' \
  'host:port/call' \
  -H 'accept: application/json' \
  -H 'x-marketplace-token: token_value' \
  -H 'x-request-id: request_id_value' \
  -H 'x-user-id: user_id_value' \
  -H 'Content-Type: application/json' \
  -d '{
  "method": "music_gen",
  "payload": {
    "promt": "energetic EDM",
    "duration": 5
  }
}'
```

2.1.3 Response

Json key		Type	Description	Required
requestId		string	A random string generated by the client (marketplace).	Y
traceId		string	A random string generated by AI service	Y
apiVersion		string	API version	Y
service		string	Service name	Y
datetime		string	The time at which the response is sent to the client (iso8601 format)	Y
isResponseImmediate		boolean	Indicates whether this is a synchronous or asynchronous API response True: synchronous False: asynchronous	Y
extraType		string	Represents the response of type AI For chatting AI app: extraType=chat_app	Y
response		object		Y
	taskId	string	Used to retrieve the result after the process completes	Y
errorCode		object	The system error code is defined by the developer. (more detailed in 2.5 section)	Y
	status	string	An error code	Y
	reason	string	Specifically describe the error that occurred	Y

Example data

```
# Successful Request Response
# taskId used for calling the /result API.
{
    "requestId": "test-request",
    "traceId": "0242d77c-6079-4214-b0e3-676c35afbe22",
    "apiVersion": "1.0.1",
    "service": "AudioCraft",
    "datetime": "2024-05-16T07:16:12.689022",
    "isResponseImmediate": "false",
    "extraType": "others",
    "response": {
        "taskId": "45e667c3-75ac-41c5-b4d9-538e05cc88d6",
    },
    "errorCode": {
        "status": "AC_001",
```

```
        "reason": "pending"
    }
}

# Error Response: Incorrect method used
# Only support audio_gen or music_gen. “music” is not supported
{
    "requestId": "",
    "traceId": "",
    "apiVersion": "1.0.1",
    "service": "AudioCraft",
    "datetime": "2024-05-16T07:16:12.689022",
    "isResponseImmediate": "false",
    "extraType": "others",
    "response": {
        "taskId": ""
    },
    "errorCode": {
        "status": "AC_403",
        "reason": "unsupported method music"
    }
}
```

2.2 Callback API

After an AI task is processed, an API callback is triggered to push the processing results back to the marketplace. The API callback is defined and deployed by the marketplace. The developer needs to define certain fields in the request body that align with the application's requirements.

2.2.1 Endpoint

Endpoint	Marketplace provide
Method	POST

2.2.2 Request

Header

Json key	**Type**	**Description**	**Required**
x-marketplace-token	string	It is a token provided by the marketplace.	Y

x-request-id	string	A random string generated by the client (marketplace).	Y
x-user-id	string	Used for identification and tracing, statistics, and billing	Y
x-user-role	string	To identify user authorization for specific API requests Enum: [“admin”, “user”, “publisher”]	Y

Body

Json key		Type	Description	Required
apiVersion		string	API version	Y
service		string	Service name	Y
datetime		string	The time at which the response is sent to the client (iso8601 format)	Y
processDuration		float	Total processing time: the duration from when the data is pushed into the worker, excluding the time spent waiting in the queue for processing.	Y
taskId		string	Task ID, which corresponds to the taskId returned when calling the /call API.	Y
isResponseImmediate		boolean	Indicates whether this is a synchronous or asynchronous API response True: synchronous False: asynchronous	Y
extraType		string	Represents the response of type AI For chatting AI app: extraType=chat_app	
response		object	In this field, developers will define the fields that the returned results will have.	Y
	dataType	string	Type of response data **META_DATA**: If the result only contains metadata **S3_OBJECT**: If the result only contains a link to an S3 object. **HYBRID**: If the result contains both metadata and a link to an S3 object.	N/A
	field-1	define-by-developer	Developers need to describe the details of the field	N/A
	field-2	define-by-developer	Developers need to describe the details of the field	N/A
errorCode		object	The system error code is defined by the developer. (more detailed in 2.5 section)	Y
	status	string	An error code	Y
	reason	string	Specifically describe the error that occurred	Y

Example data

```
# body
{
    "apiVersion": "1.0.1",
    "service": "AudioCraft",
    "datetime": "2024-05-16T07: 30: 08.592007",
    "processDuration": 5812.790632247925,
    "taskId": "15204bff-02cb-4b04-8ab0-f0dffd9c44fd",
    "isResponseImmediate": "false",
    "extraType": "others",
    "response": {
        "dataType": "S3_OBJECT",
        "data": "A shared link of music file saved on S3"
    },
    "errorCode": {
        "status": "AC_000",
        "reason": "success"
    }
}

# CURL example
curl -X POST \
  https://<The_market_place_webhook_endpoint> \
  -H "x-marketplace-token: token_value" \
  -H "x-request-id: request_id_value" \
  -H "x-user-id: user_id_value" \
  -H "Content-Type: application/json" \
  -d '{
    "apiVersion": "1.0.1",
    "service": "AudioCraft",
    "datetime": "2024-05-16T07:30:08.592007",
    "processDuration": 5812.790632247925,
    "taskId": "15204bff-02cb-4b04-8ab0-f0dffd9c44fd",
    "isResponseImmediate": "false",
    "extraType": "others",
    "response": {
            "dataType": "S3_OBJECT",
            "data": "A shared link of music file saved on S3"
    },
    "errorCode": {
      "status": "AC_000",
      "reason": "success"
    }
  }'

# Any errors encountered during processing will be described in the
errorCode.
```

2.2.3 Response

If the request is successful, it will return an HTTP status code 201.

2.3 Result API

This API is used by the marketplace to retrieve results based on the taskId returned in the /call API.

2.3.1 Endpoint

Endpoint	/result
Method	POST

2.3.2 Request

Header

Json key	Type	Description	Required
x-marketplace-token	string	It is a token provided by the marketplace.	Y
x-user-id	string	Used for identification and tracing, statistics, and billing	Y
x-user-role	string	To identify user authorization for specific API requests Enum: [“admin”, “user”, “publisher”]	Y

Body

Json key	Type	Description	Required
taskId	string	Used to retrieve the result after the process completes. This is the taskId received from the /call API.	Y

Example data

```
# body
{
  "taskId": "the_taskId_from_call_api_response"
}

# CURL example
curl -X 'POST' \
```

```
  'host:port/result' \
  -H 'accept: application/json' \
  -H 'x-marketplace-token: token_value' \
  -H 'x-user-id: user_id_value' \
  -H 'Content-Type: application/json' \
  -d '{
  "taskId": "the_taskId_from_call_api_response"
}'
```

2.3.3 Response

Json key		**Type**	**Description**	**Required**
apiVersion		string	API version	Y
service		string	Service name	Y
datetime		string	The time at which the response is sent to the client (iso8601 format)	Y
processDuration		float	Total processing time: the duration from when the data is pushed into the worker, excluding the time spent waiting in the queue for processing.	Y
isResponseImmediate		boolean	Indicates whether this is a synchronous or asynchronous API response True: synchronous False: asynchronous	Y
response		object	In this field, developers will define the fields that the returned results will have.	Y
extraType		string	Represents the response of type AI For chatting AI app: extraType=chat_app	Y
	dataType	string	Type of response data **META_DATA**: If the result only contains metadata **S3_OBJECT**: If the result only contains a link to an S3 object. **HYBRID**: If the result contains both metadata and a link to an S3 object.	Y
	field-1	define-by-developer	Developers need to describe the details of the field	N/A
	field-2	define-by-developer	Developers need to describe the details of the field	N/A
errorCode		object	The system error code is defined by the developer. (more detailed in 2.5 section)	Y

	status	string	An error code	Y
	reason	string	Specifically describe the error that occurred	Y

Example data

```
# Successful Request Response
{
    "apiVersion": "1.0.1",
    "service": "AudioCraft",
    "datetime": "2024-05-16T07:30:08.591039",
    "processDuration": 5812.790632247925,
    "isResponseImmediate": "false",
    "extraType": "others",
    "response": {
        "dataType": "S3_OBJECT",
        "data": ""
    },
    "errorCode": {
        "status": "AC_000",
        "reason": "success"
    }
}
# Response for a request with a non-existent taskId.
{
    "apiVersion": "1.0.1",
    "service": "AudioCraft",
    "datetime": "2024-05-16T07:30:08.591039",
    "processDuration": -1,
    "isResponseImmediate": "false",
    "extraType": "others",
    "response": {
        "dataType": "S3_OBJECT",
        "data": null
    },
    "errorCode": {
        "status": "AC_404",
        "reason": "taskId: a_random_taskid is not exist"
    }
}
```

2.4 Stats API

The API is designed to allow the marketplace to retrieve statistics about user requests.

2.4.1 Endpoint

Endpoint	/stats
Method	POST

2.4.2 Request

Header

Json key	Type	Description	Required
x-marketplace-token	string	It is a token provided by the marketplace.	Y
x-request-id	string	A random string generated by the client (marketplace).	Y
x-user-id	string	Used for identification and tracing, statistics, and billing	Y
x-user-role	string	To identify user authorization for specific API requests Enum: [“admin”, “user”, “publisher”]	Y

Body

Json key	Type	Description	Required
N/A			

2.4.3 Response

Json key		Type	Description	Required
apiVersion		string	API version	Y
service		string	Service name	Y
datetime		string	The time at which the response is sent to the client (iso8601 format)	Y
response		object	In this field, developers will define the fields that the returned results will have.	Y
	numRequestSuccess	int	The number of successfully completed requests by the user	Y
	numRequestFailed	int	The number of failed requests	Y

errorCode		object	The system error code is defined by the developer. (more detailed in 2.5 section)	Y
	status	string	An error code	Y
	reason	string	Specifically describe the error that occurred	Y

2.5 Accession

No.	Type	Value
1	x-marketplace-token	1df239ef34d92aa8190b8086e89196ce41ce364190262ba71964e9f84112bc45
2	Marketplace callback	https://marketplace-api-user.dev.devsaitech.com/api/v1/ai-connection/callback
3	S3 upload	https://marketplace-api-user.dev.devsaitech.com/docs#/AI%20resource/ai-app-presigned-upload-to-s3
4	S3 download	https://marketplace-api-user.dev.devsaitech.com/docs#/AI%20resource/ai-app-get-presigned-download-to-s3
5	S3 delete	https://marketplace-api-user.dev.devsaitech.com/docs#/AI%20resource/ai-app-delete-resource-s3
6	x-product-api-key	UK24XC7qjGpeUqPo69tL6fxyt4cSXvmwZ7sYFu4nH7mKjXZyHeyHXTMVtup48hSf

2.5.1 Upload object

Get presigned

```
curl -X 'POST' \

'https://marketplace-api-user.dev.devsaitech.com/api/v1/ai-resource/presigned-upload' \
  -H 'accept: application/json' \
  -H 'x-publisher-key: UK24XC7qjGpeUqPo69tL6fxyt4cSXvmwZ7sYFu4nH7mKjXZyHeyHXTMVtup48hSf' \
  -H 'Content-Type: application/json' \
  -d '{
  "s3Key": "file_name.extension"
}'
```

Response

```
{
  "code": 0,
  "message": "success",
  "data": {
    "presignedUrl":
```

```
"https://dev-aitech-marketplace-blob-storage.s3.ap-southeast-1.amazonaws.com/0029781988958338526/8a19ac42-7ace-463e-9e0f-a70f165964fb-file_name.extension?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Content-Sha256=UNSIGNED-PAYLOAD&X-Amz-Credential=AKIAVRUVRKXLOODYDPP7%2F20240620%2Fap-southeast-1%2Fs3%2Faws4_request&X-Amz-Date=20240620T102419Z&X-Amz-Expires=3600&X-Amz-Signature=ef59496065d0a9f147c9743037fb8849e559da3e19d74b03f509d11ebc709dba&X-Amz-SignedHeaders=host&x-id=PutObject",
    "key":
"0029781988958338526/8a19ac42-7ace-463e-9e0f-a70f165964fb-file_name.extension"
  }
}
```


Use **presignedUrl** to create an uploading request. The object is stored as 0029781988958338526/8a19ac42-7ace-463e-9e0f-a70f165964fb-file_name.extension

2.5.2 Download object

Get presigned

```
curl -X 'GET' \

'https://marketplace-api-user.dev.devsaitech.com/api/v1/ai-resource/presigned-download?s3Key=0029781988958338526%2F8a19ac42-7ace-463e-9e0f-a70f165964fb-file_name.extension' \
  -H 'accept: application/json' \
  -H 'x-publisher-key:
UK24XC7qjGpeUqPo69tL6fxyt4cSXvmwZ7sYFu4nH7mKjXZyHeyHXTMVtup48hSf'
```

Response


```
{
  "code": 0,
  "message": "success",
  "data": {
    "url":
"https://dev-aitech-marketplace-blob-storage.s3.ap-southeast-1.amazonaws.com/0029781988958338526/8a19ac42-7ace-463e-9e0f-a70f165964fb-file_name.extension?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Content-Sha256=UNSIGNED-PAYLOAD&X-Amz-Credential=AKIAVRUVRKXLOODYDPP7%2F20240620%2Fap-southeast-1%2Fs3%2Faws4_request&X-Amz-Date=20240620T103611Z&X-Amz-Expires=3600&X-Amz-Signature=9442371e55e2c8ca35e14112595c8e008412f4434877b9fe739e79c026813cea&X-Amz-SignedHeaders=host&x-id=GetObject"
  }
}
```

Use url in response to download object

2.5.3 Delete object

```
curl -X 'POST' \

'https://marketplace-api-user.dev.devsaitech.com/api/v1/ai-resource/delete'
\
  -H 'accept: application/json' \
  -H 'x-publisher-key:
UK24XC7qjGpeUqPo69tL6fxyt4cSXvmwZ7sYFu4nH7mKjXZyHeyHXTMVtup48hSf' \
  -H 'Content-Type: application/json' \
  -d '{
  "s3Key":
"0029781988958338526/8a19ac42-7ace-463e-9e0f-a70f165964fb-file_name.extensi
on"
}'
```

2.6 Error Code

All errors related to the API protocol will return an HTTP status code. However, system-related errors such as exceeding size limits or incorrect parameter content will be returned based on the defined error codes below.

Note that: The error code represents a group of errors, so developers need to describe specific errors in the "reason" field to facilitate easier debugging in case of errors.

XXX: Write the abbreviation of the service name. For example **FaceDetection** will be **FD**

No.	Error code	Description
1	XXX_000	Indicates the task was processed successfully. Ready to get result
2	XXX_001	Indicates the task is waiting to be processed
3	XXX_002	Indicates that the task is in progress
4	XXX_400	Indicates invalid request, maybe some fields are empty, invalid
5	XXX_401	Indicates that the request exceeds the allowed resources: the server only allows generating 5 minutes of audio but the client requests 6 minutes
6	XXX_402	Indicates that the client does not have permission to use the API
7	XXX_403	Indicates unsupported errors: service not supported, image format not supported, video format not supported...

8	XXX_404	Indicates not found errors: for example, taskId not found
9	XXX_500	
10	XXX_501	Indicates an error from the server
11	XXX_502	Indicates error from rabbit: Connection failed for example
12	XXX_503	Indicates error from Redis: Connection failed for example
13	XXX_504	Indicates error from S3: Connection failed for example

3. Design database

The database is used to store information about requests to facilitate reporting (via the /stats API).

Stack: Developers can use databases like MongoDB, MySQL, or others for this purpose. However, the required fields of information to be met are as shown in the table below.

NO.	Field	Type	Description	Required
1	user_id	string	The ID of the user who created the request.	Y
2	task_id	string	This is the taskId returned by the AI service in the /call API.	Y
3	status	Boolean	The status of the request: whether it was successful or failed.	Y
4	processing_duration	float	The total processing time of the task, excluding the time spent in the queue.	Y
5	datetime	DateTime	The timestamp when the information is inserted into the database.	Y

4. Appendix