FullCAM Modernisation: Overview of the FullCAM External API’s

## What is an API?

An API (Application Programming Interface) is an interface that provides programmatic access to service functionality and data within an application or a database. In the context of APIs, Application refers to any software with a distinct function. Interface can be thought of as a contract of service between two applications. This contract defines how the two communicate with each other using requests and responses.

## How do APIs work?

API architecture is usually explained in terms of client and server. The application sending the request is called the client, and the application sending the response is called the server. FullCAM implemented its API in REST Architecture.

## What are REST APIs?

REST (Representational State Transfer) defines a set of functions like GET, PUT, POST, DELETE, etc. that clients can use to access server data. Clients and servers exchange data using HTTP. The main feature of REST API is statelessness, whereby servers do not save client data between requests. Client requests to the server are like URLs you type in your browser to visit a website and the response from the server is plain data, without the typical graphical rendering of a web page.

## FullCAM API

In order for external users to access the FullCAM application our team provides the FullCAM UI (User Interface) and FullCAM API. FullCAM UI is used to create plot files and run simulations and FullCAM API provides two set of APIs: a Data API which is used to get the spatial data, a Plot Simulation API to provision users to run the simulations using existing plot files.

Benefits of FullCAM API:

The Classic FullCAM application provides a downloadable .exe which allows users to run simulation only on windows OS (Operating System) and lacks the option to use the application on a non-windows platforms and web-based platforms. FullCAM2020PR APIs will provide the flexibility to use FullCAM in various web- and non-web based platforms. Users can utilize the API to gain Spatial data and run Simulations and can build applications which will remove the need to download and install an application to run simulations.

## Audience

This guide will outline how to use the FullCAM API to gain access to spatial data and run simulations. APIs are created for the use of technical developers who are planning to use the API in their Frontend or desktop-based applications. It is assumed that the reader has knowledge of technical application development.

## Access

You will need to send the FullCAM business team an email ([fullcam@dcceew.gov.au](mailto:fullcam@dcceew.gov.au)) requesting access with the below information.

1. Org. Name:
2. Email:
3. Phone No.:
4. Business use case:
5. (Details to include No. of requests per system that are intended, No. of users, Peak time of usage. Etc.,)
6. No. of Users:
7. How long do you need access:

Once the request is issued, FullCAM will issue a Unique API subscription key that will be used to consume the API in your application.

## How to use API:

The API Documentation in the Swagger Site provides a complete list of endpoints, and each endpoint will consist of the following:

* The parameters, both custom and standard supported (required and optional data which can be passed into the function call)
* The type of object the function will return. For example, the Service operation returns a ‘Service Model’ object.
* HTTP Status return codes supported (see section on HTTP Response Codes). Note that successful requests will return a ‘200’ status response code, even if no resources match the query (in which case an empty result set will be returned).

### FullCAM External Swagger Site:

* [FullCAM Plot Simulation API](https://www.dcceew.gov.au/themes/custom/awe/fullcam/plot_api/index.html)
* [FullCAM Data Builder API](https://www.dcceew.gov.au/themes/custom/awe/fullcam/data_api/index.html)

## Accessing API

All FullCAM API can be accessed using the subscription key provided in response to the request above. Each Organisation/User will be given one Subscription key for each version of the FullCAM Application.

To send a request and get the data, API should send the subscription key which will be validated as an authentication mechanism. The API Request Header should include the key value below:

Ocp-Apim-Subscription-Key: {{subscription-key}}

A close-up of a logo

Description automatically generated

## Sample Data API GET Request:

In order to use Data API GET Request, the API request should be sent as below

siteinfo API:

**Request URL:** {{base\_url}}/2020/data-builder/siteinfo

**Note:** Users will be provided with the base\_url as a part of the subscription key

## Sample Plot API POST Request

In order to use Plot API GET Request, API request should be sent as below

Plot Simulation API:

**Request URL:** {{base\_url}}/2020/fullcam-simulator/run-plotsimulation

**Note:** Users will be provided with the base\_url as a part of the subscription key

## Https Status Code

The HTTP status codes indicate the success or otherwise of the request.

* 200 means ‘OK’ - the request was processed successfully.
* 204 means it was successful but there were no results.
* 400 means the request was invalid because it contains incorrect inputs.
* 404 means that the end point resource wasn’t found.
* 401 means the request was blocked as the user was not authorised or missing subscription key.
* 429 Too Many Requests, FullCAM API have a rate limit of 1000 in 60 seconds, if the requests sent exceeds then API will respond with this error.
* 500 errors are server problems.

## Best Practice Guide to Development

1. Ensure you define model objects (according to the Swagger documentation) to handle the appropriate response from the API call.
2. Configure the API endpoint base URLs. Send these Web Service requests and package the response into sets (such as lists) of the relevant model objects returned.
3. To avoid a poor user experience of large delays, call the Web Services asynchronously rather than synchronously.
4. Ensure you know when the results from Web Service requests are OK and when there is a problem (and the nature of the problem) by defining mechanisms to handle the HTTP status codes results – e.g. detecting and responding to code 404, which means the requested endpoint wasn’t found.
5. To improve search performance, cache all relevant data such as run simulation locally, so you can search it quickly rather than have to do a request to the server for each request for information. Refresh your cache daily to get the latest data.