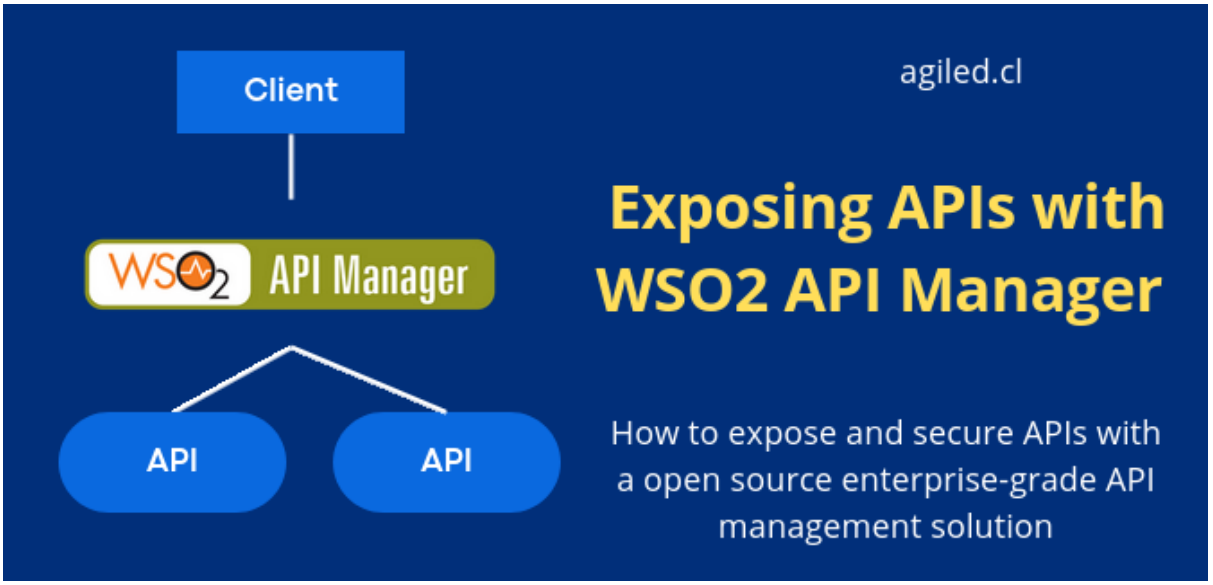


Rodrigo León Nanjarí | 28/12/2023

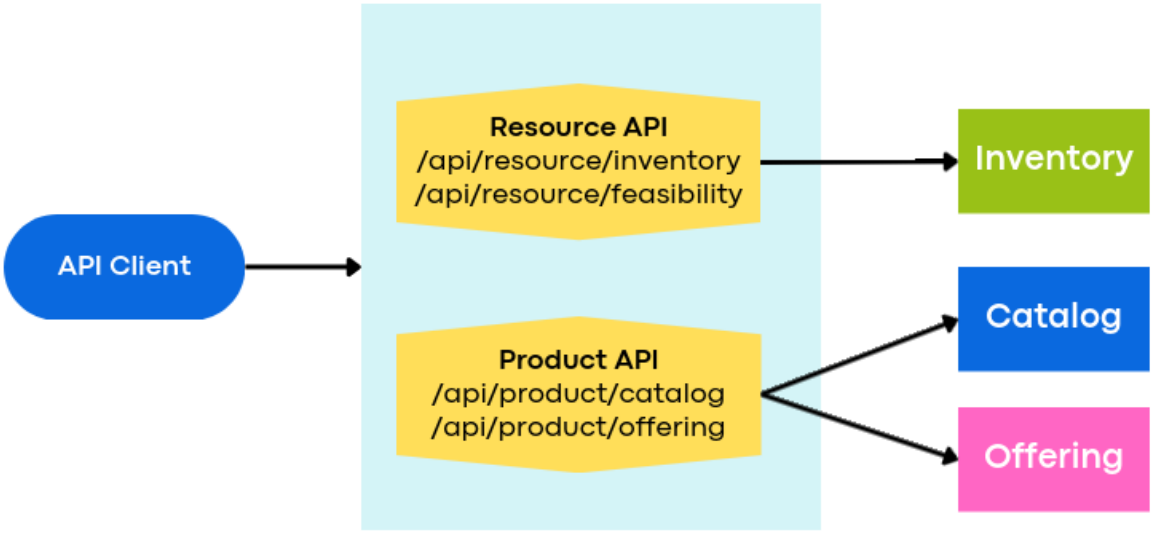
Exposing APIs with WSO2 API Manager

This article shows how to expose and secure APIs using WSO2 API Manager.

There are many vendors in the market that provide API Gateway functionality including products from well-known companies like AWS, Oracle, IBM, Microsoft and Apigee. These products provide support to design, deployment and secure APIs. However, an increasing number of companies are using open source API technologies like Kong and WSO2, with enterprise support and comprehensive documentation, which makes a valuable alternative to expose APIs at minor cost.

Concept of API Gateway

An API Gateway accepts API requests from a client, processes them based on defined policies and directs these requests to the appropriate backend services. It can also combine the responses from one or more backend services for a simplified user experience.



In general, an API Gateway is a middleware component that offers mediation functionality between the client and the backend services. It serves as a central point of access of all APIs that a company exposes to clients, so the clients only have one access entry to all API inventory. In this way, all security configurations can be centralized in one point - the API Gateway, liberating the business APIs from implementing security concerns.

An API Gateway can also transform the request from the client before sending to the backend API. Examples of transformations are:

- Change the HTTP Method (GET, POST, PUT, DELETE)
- Change the protocol to HTTPS to HTTP.
- Add or remove HTTP headers.
- Add or remove HTTP parameters.

In context to security, an API Gateway can implement several standards to allow only authorized clients to access the API functionality. Examples of security capabilities include:

- Implement authentication with user / password.
- Implement authorization with a token or access key.
- Support for security standards like SAML, OAuth2 and OpenID.

In short, an API gateway commonly implement capabilities that include:

- **Security**: Authentication, authorization, access control, and encryption.
- **Routing:** Routing, conversion and protocol transformation.
- **Control:** Rate limiting, circuit breaker and error handling.
- **Deployment:** blue-green deployments and testing mode.
- **Load Balancing:** Load balancer and health checks.
- **Monitoring**: Metrics, logging, and tracing of messages.

API Gateway Benefits

Deploying an API gateway can help to:

- Reduce complexity and deployment of application releases by encapsulating the internal application architecture and providing APIs tailored for each client type
- Streamline and simplify request processing and policy enforcement by centralizing the point of control and offloading non-functional requirements to the infrastructure layer.
- Simplify troubleshooting with granular real-time and historical metrics and dashboards.

WSO2 API Manager

WSO2 API Manager is an open source API management platform for building, integrating, securing, and exposing managed APIs in cloud, on-premises, and hybrid architectures. It allows API developers to design, publish, and manage the lifecycle of APIs and API product managers to create API products from one or more APIs.

The following are some of the main capabilities of the product:

Develop, Deploy and Manage APIs/API Products

A well-designed API can make your APIs easy to use. WSO2 API Manager's API Publisher guides you through API creation to API Publishing, while adhering to the respective API's specification.

API-driven integration

You can implement an API-led integration strategy by easily combining the API management layer and the integration layer of the product's platform.

Make your APIs Discoverable

Making your APIs easy to find will help you grow your customer base. You can use the WSO2 API Manager API Publisher to create categories or use tags to categorize the APIs. The API Developer Portal includes a text-full search engine that helps your customers find APIs easily.

Secure your APIs

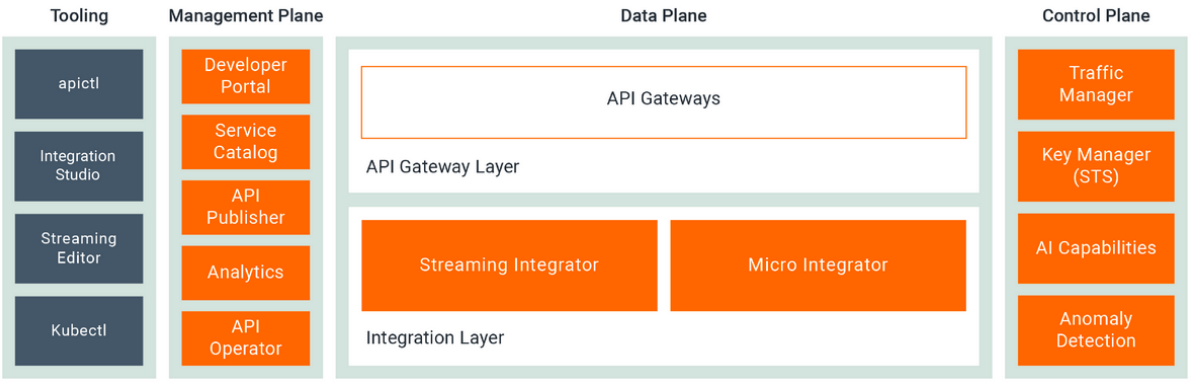
You can secure your APIs fully by using visibility control, threat protection, API payload validation, adhering to well-defined protocols, applying rate limiting policies, and verifying APIs against specifications in addition to API authentication and authorization.

Rate Limiting

Balancing the load of your system is critical to avoid system outages. WSO2 API Manager provides the capability to add rate limiting policies to your APIs. Furthermore, you can use these policies to monetize your APIs and bring revenue to your organization.

WSO2 API Manager Architecture

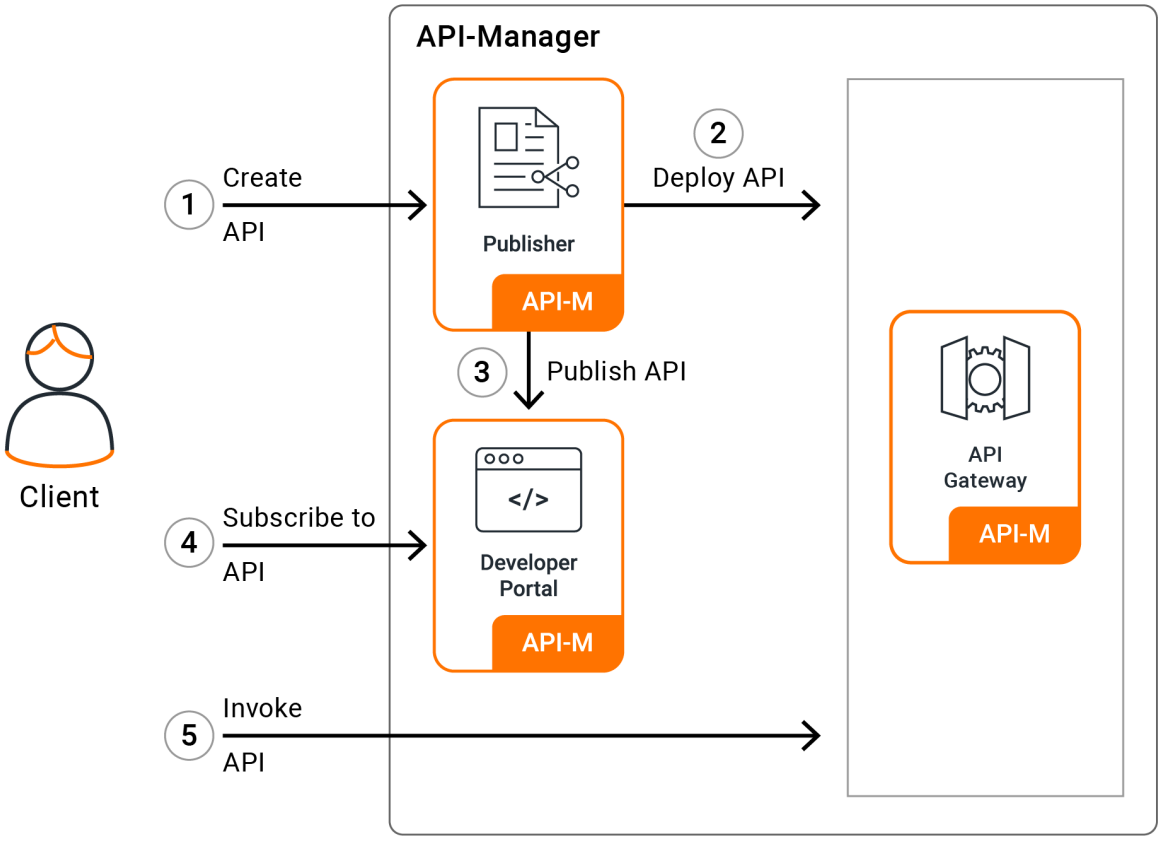
The diagram below is a high-level snapshot of WSO2 API Manager and their various components:



The API Manager consists of an API management layer and an integration layer where the above components all fit into and mesh together to address the various use cases of the product. The API management layer contains several components, which you can use in your deployment according to your requirement.

API Design and Deployment

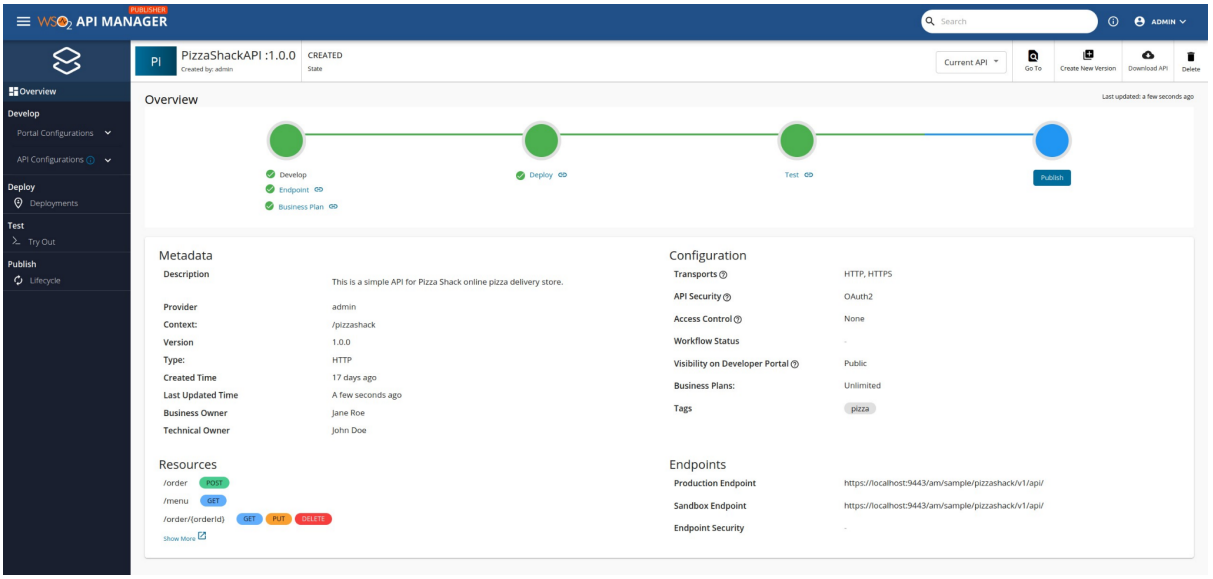
The diagram below show the process of design, implement and deploy an API into WSO2 API Manager:



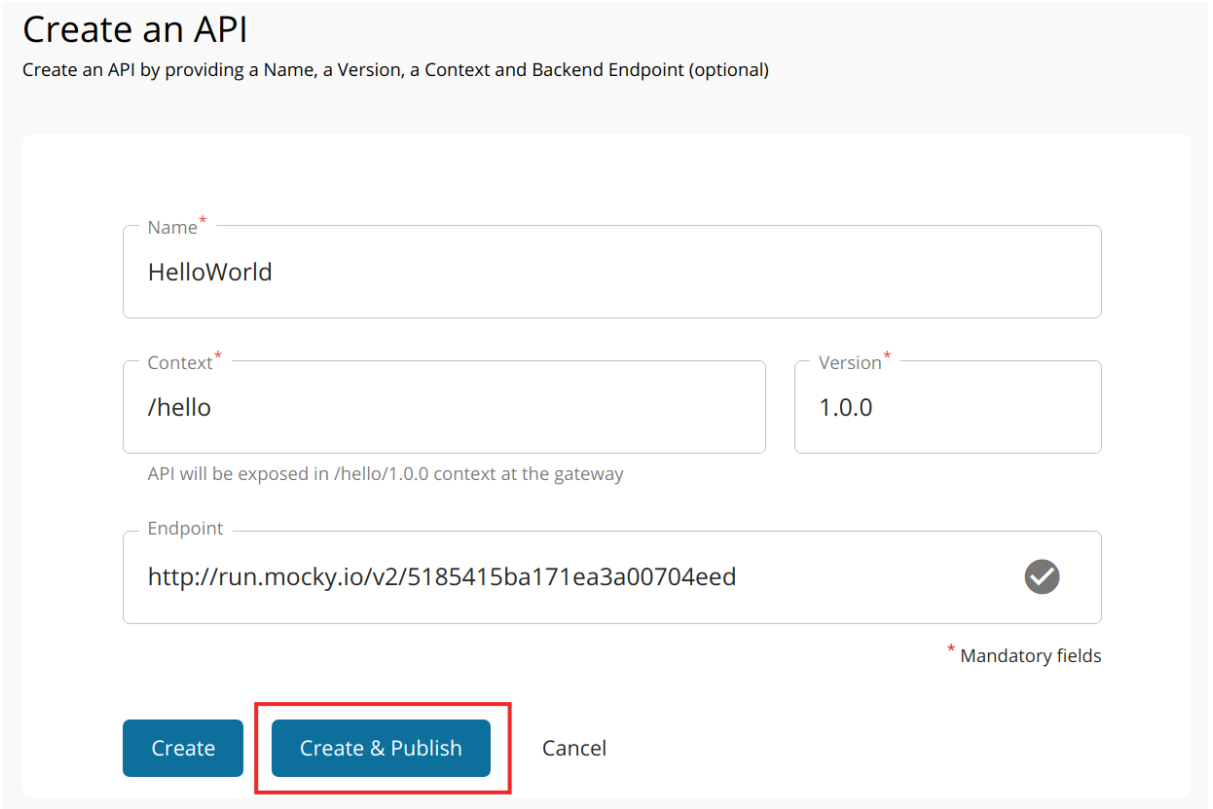
1. Creating and publishing an API via the Publisher Portal.
2. Deploy the API in a Gateway environment.
3. Publish the API in the Developer Portal.
4. Subscribing to the API via the Developer Portal and generating keys.
5. Invoking the API with the generated keys.

WSO2 API Publisher

WSO2 API Publisher is a state-of-the-art GUI based tool for API development and management. The GUI is designed for API creators to develop, document, secure, test, and version APIs with ease. It's also able to cater to more API management-related tasks such as publishing APIs, monetizing APIs, and applying rate limiting policies.

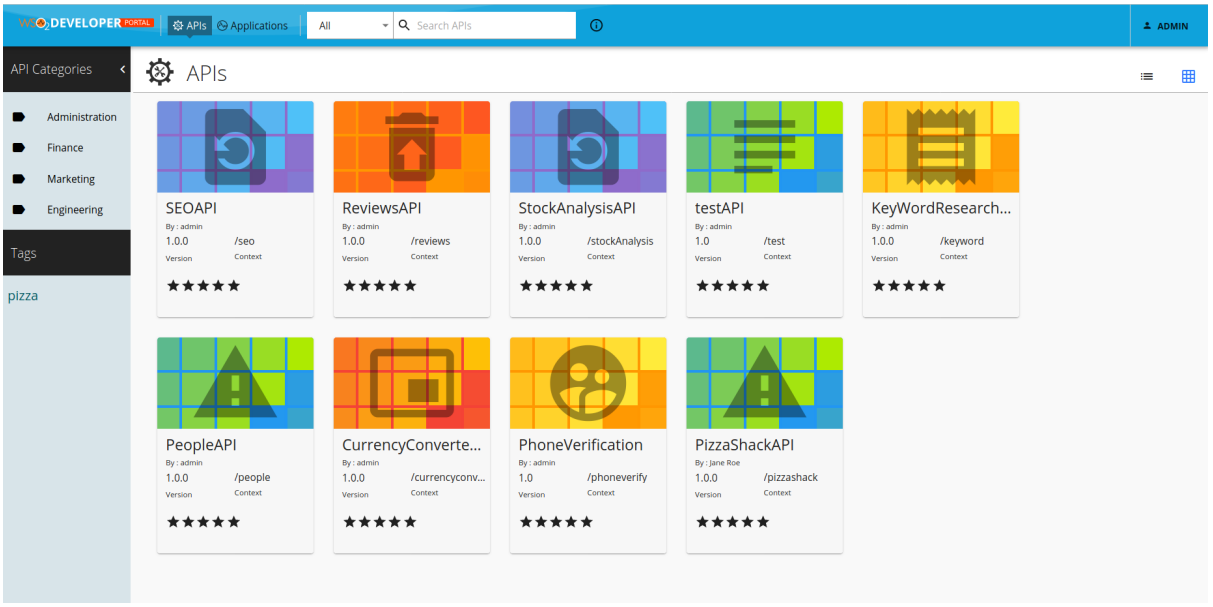


With the API Publisher you can configure a new API like this:



WSO2 Developer Portal

The Developer Portal is a state-of-the-art web interface that allows API publishers to host and advertise their APIs while allowing API consumers to self-register, discover, evaluate, subscribe to, and consume APIs securely and easily.



Installation of WSO2 API Manager

The installation of WSO2 API Manager can be realized in different ways. In this article, we explain a standalone configuration on a Linux server with a user named “wso2am”.

WSO2 API Manager Version: 3.2.0

Step 1: Install API Manager
/opt/wso2am-3.2.0

Step 2: Install Open JDK 11
sudo apt-get install openjdk-11-jdk

Step 3: Setting JAVA_HOME
JAVA_HOME=/usr/lib/jvm/java-11-openjdk-amd64

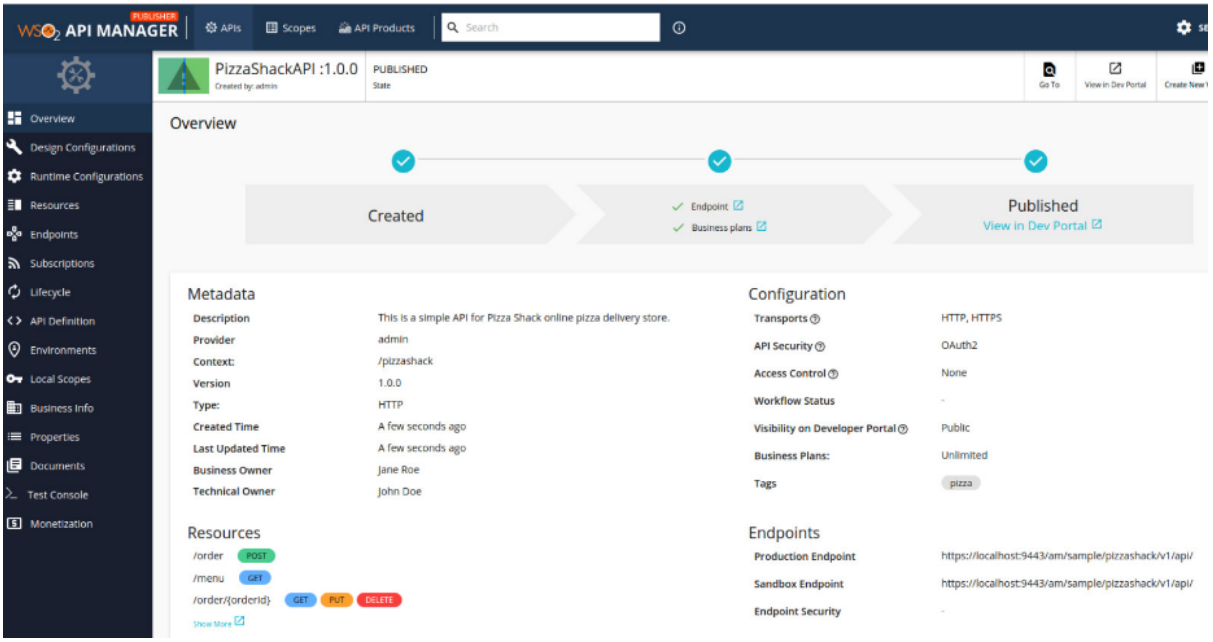
Step 4: Edit file deployment.toml
vi /opt/wso2am-3.2.0/repository/conf/deployment.toml

[server]
hostname = "server.example.com" # localhost

node_ip = "<IP>" # 127.0.0.1

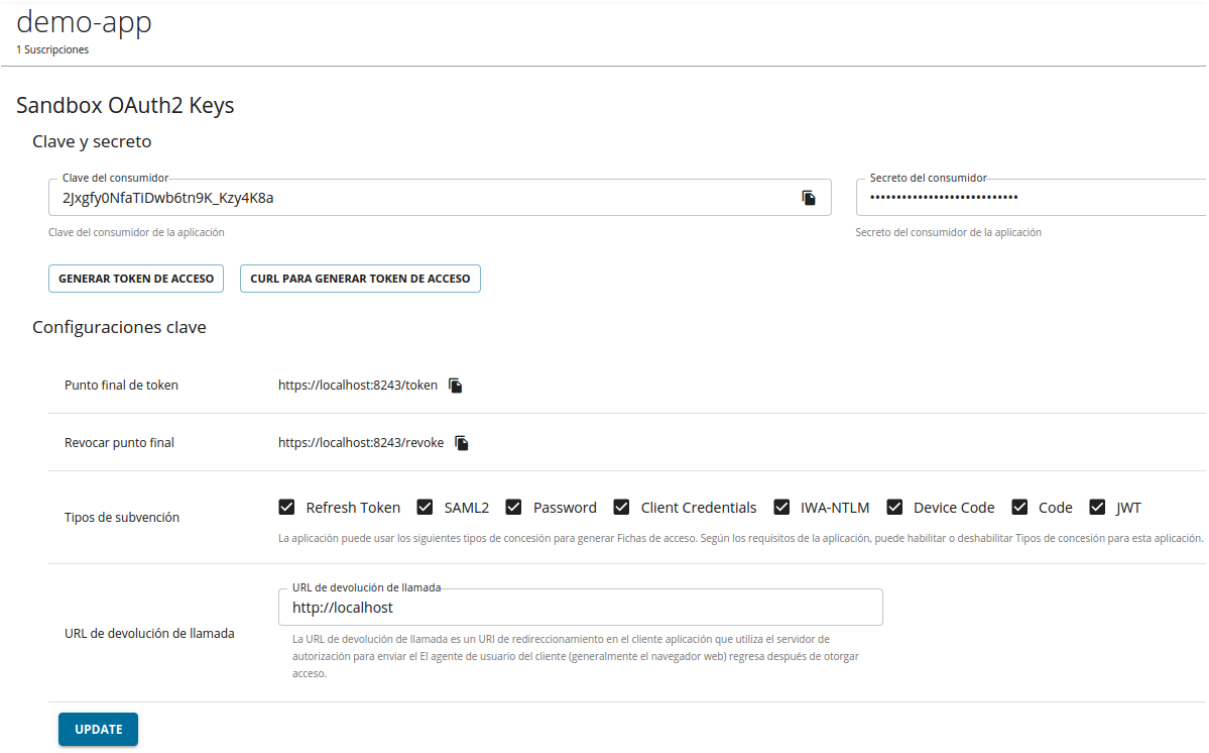
Step 5. Configuración Identity Manager

- Connect to https://server.example.com:9443/carbon (admin/admin)
- Service Providers -> List
- Click Edit en apim_publisher
- Select Inbound Authentication Configuration > OAuth/OpenID Connect Configuration
- Click Edit
- Change localhost to server.example.com. Press Update
- Connect to https://server.example.com:9443/publisher/ (admin/admin)

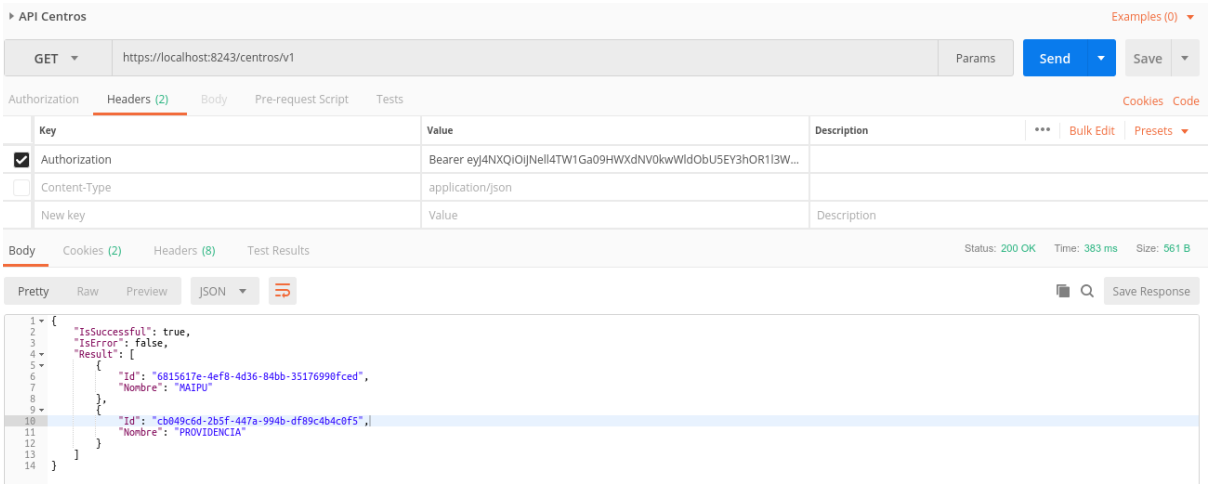


Next step is create a subscription:

Then we configure the OAuth access keys:



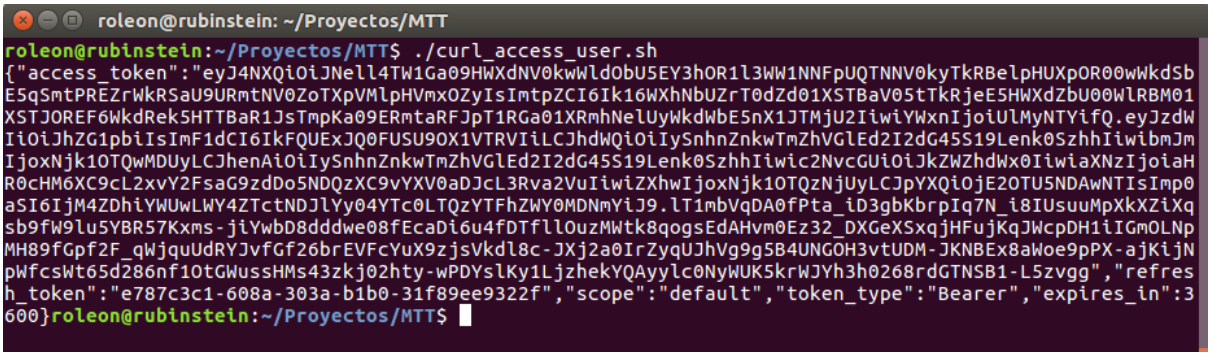
Finally, we use a generated token to consume the API using Postman:



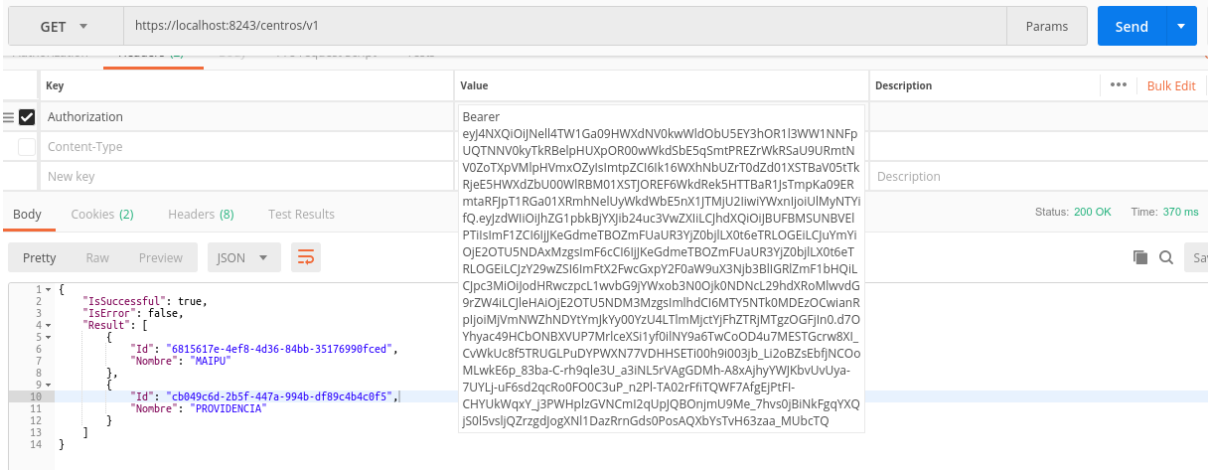
Consume APIs with OAuth2

In order to enforce security, WSO2 API Manager allows client applications to get an access token to later invoke an API. The first step is generate a token:

```
curl -k -X POST https://localhost:8243/token -d "grant_type=password&
username=Username&password=Password"
-H "Authorization: Basic Base64(consumer-key:consumer-secret)"
```



The you can use the generated token to consume the API with Postman or a client application:



Summary

This article shows an introduction to the API Gateway concept and simple steps to install and start working with WSO2 API Manager.

We hope that this article will invite you to start using WSO2 API Manager as an open source alternative to expose and secure your APIs either in the development and testing environment as a production platform.

Bibliography

- WSO2 API Manager Documentation
  https://wso2.com/api-manager/

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