



# WSO2 API Manager 3.2.0 Developer Fundamentals

Working with Analytics



WSO2 Training

CC BY 4.0



# API Manager Analytics



## WSO2 APIM Analytics - Overview

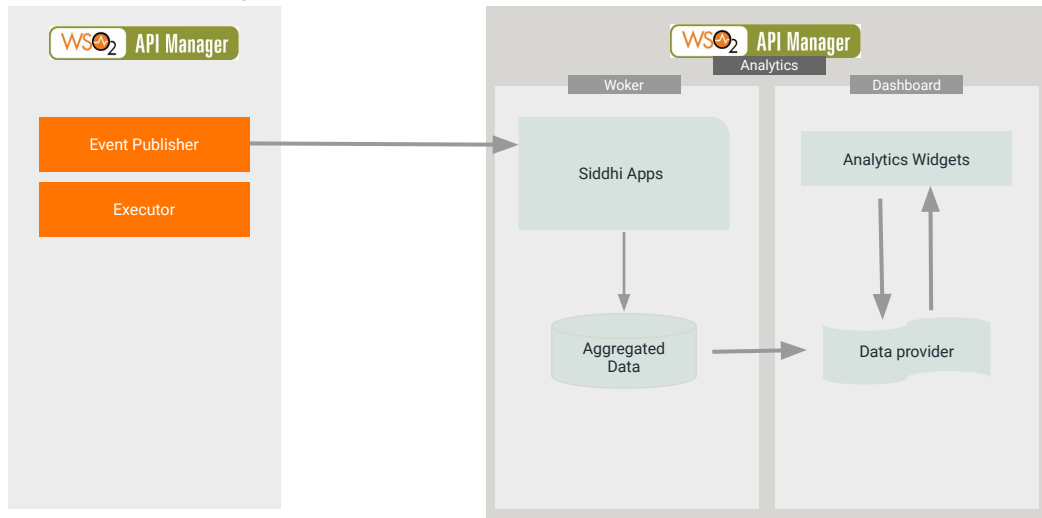
- Analytics provide reports, statistics and graphs on the APIs deployed in WSO2 API Manager.
- Consists with two main components.

Worker	The Server component which process data streams and publish statistics to the database.
Dashboard	Reads the stats published by worker and visualize them in UI



APIs are widely used in Business Integrations and are becoming a key part of driving an Organization's Business strategy. Ensuring the proper functioning of the APIs, getting feedback on the performance and deriving business insights from APIs are becoming equally important. WSO2 API Manager Analytics does this by integrating with WSO2 API Manager to provide statistics, reports, and graphs on the APIs deployed in WSO2 API Manager. It further allows configuring Alerts to notify about unusual behaviors and error conditions in near real-time.

## WSO2 API Manager Model



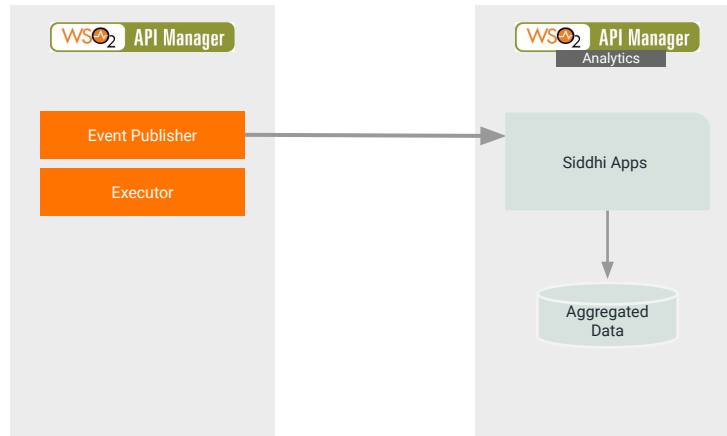
WSO2 API Manager analytics comes with set of execution plans and analytics scripts to generate summarized data. Execution plans handle real time events and store them in internal database. analytics scripts use this data to do the final summarization and put them in the shared database.

The internal API Manager component listens to the API Manager invocations and its behavior. Based on the request and responses, the event is generated and published to all the event receivers. This publisher publishes the following event streams,

- org.wso2.apimgt.statistics.request
- org.wso2.apimgt.statistics.response
- org.wso2.apimgt.statistics.fault
- org.wso2.apimgt.statistics.throttle
- org.wso2.apimgt.statistics.execution.time

**Workflow executor** : Execution plans in WSO2 API Manager Analytics server summarizes request and response events based on a per minute, per hour, per day basis and persist that data.

## Publishing API Runtime Statistics



## API Manager Analytics Widgets

### **package.json**

Contains the dependencies required for the widget

### **widgetConf.json**

Contain the widget configuration; including widget name, id and the data provider configuration.

```
WidgetName (<WIDGET_ROOT>)
├─ package.json (dependency management)
├─ src
│   └─ <WidgetSource>.jsx (source code)
│       └─ resources
│           └─ widgetConf.json (widget configuration)
│               └─ locales (internationalization)
│                   └─ en.json
└─ webpack.config.js
```

### **webpack.config.js**

Contain instructions to bundle the widget source

### **<WidgetSource>.jsx**

Contain the implementation of the code. This may do the following;

- Register the widget (mandatory)
- Access the widgetConf.json and subscribe to a data provider (optional)
- Publish data to other widgets (optional)
- Subscribe to data published by other widget (optional)

### **locale**

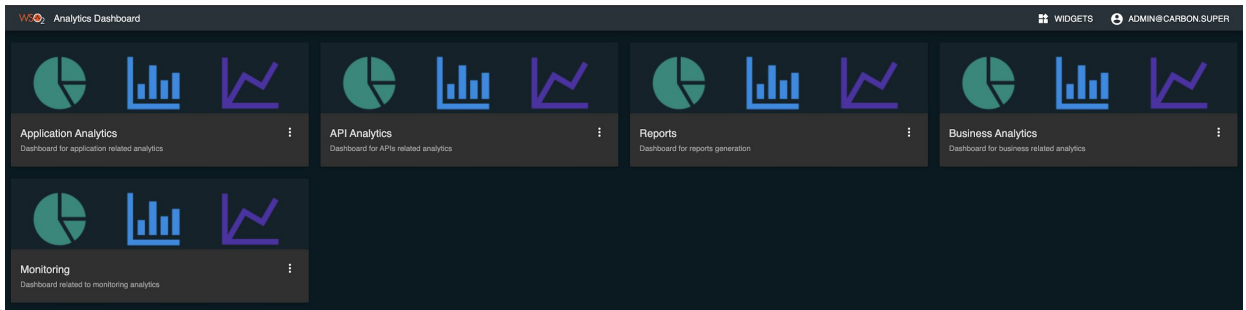
Contain the locale files used for internationalization

Link - [Creating a Custom Widget](#)



## API Manager Analytics Dashboards

- There are 4 main dashboards from Analytics 3.2.0 release onwards.
  - ◉ Monitoring Dashboard
  - ◉ Business Analytics Dashboard
  - ◉ API Analytics Dashboard
  - ◉ Application Analytics Dashboard
- Apart from the dashboards, obtaining an API Usage Report is also available.



Monitoring Dashboard : [Documentation](#)

Business Analytics : [Documentation](#)

API Analytics : [Documentation](#)

Application Analytics : [Documentation](#)

## Monitoring Dashboard

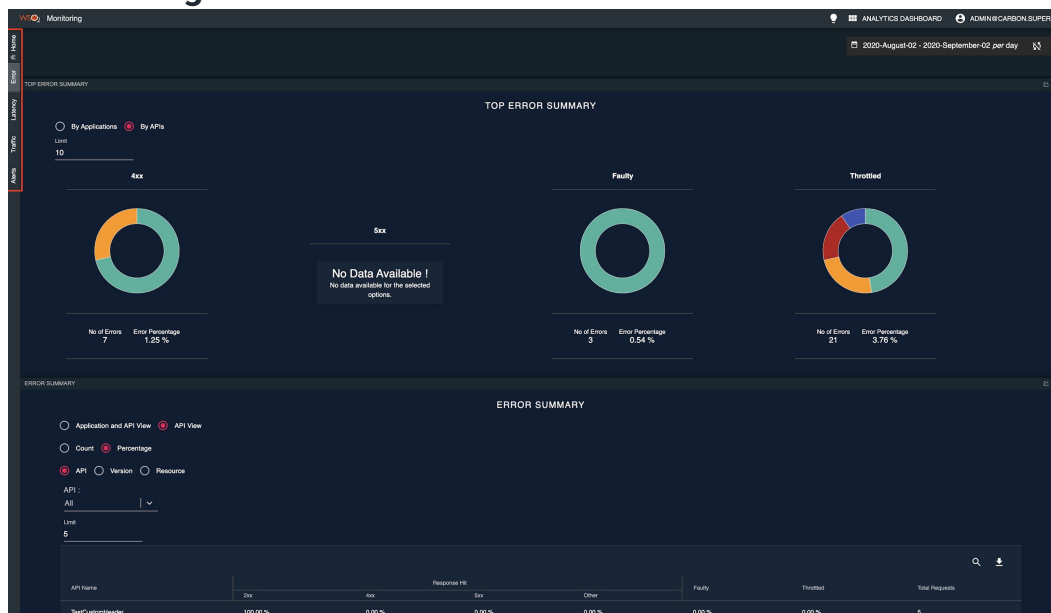
- Provides a short-term historical view about Latency, Traffic Volume, and Errors of APIs with drill-downs to narrow down errors and isolate the cause of the issues.
- Targeted for DevOps and SysAdmins who overlook the health and availability aspects of the APIs.



API Error Analysis, Top Error Summary, Error summary over time,  
API Latency Analysis, API Latency Summary  
API Usage Analysis, API usage summary  
Viewing API Health and System alert



# Monitoring Dashboard



## Business Analytics Dashboard

- Provides long-term historical trends about API Latency, Traffic Volume, Errors, and other statistics like most used APIs, API Subscribing frequency, and Developer Sign-Ups over time that shows different aspects of the API adoption.
- Targeted for Program Managers who need to see a holistic view of the APIs, Developers, and Application and shows data about all APIs without any restriction.



The business analytics dashboard provides business insights on APIs. This enables businesses to take proactive action to improve the profitability and the quality of the service provided.

The overview page comprises 4 summary widgets that shows an overview of the APIs during the past 30 days

# Business Analytics Dashboard



## API Analytics Dashboard

- Provides the ability to compare and contrast the usage of different APIs created by the logged-in user.
- Targeted for the API creators to view the statistics related to their APIs.
- Also provides the performance and fault statistics of individual APIs.
- When an API is restricted to a Publisher it wouldn't appear under this Dashboard.



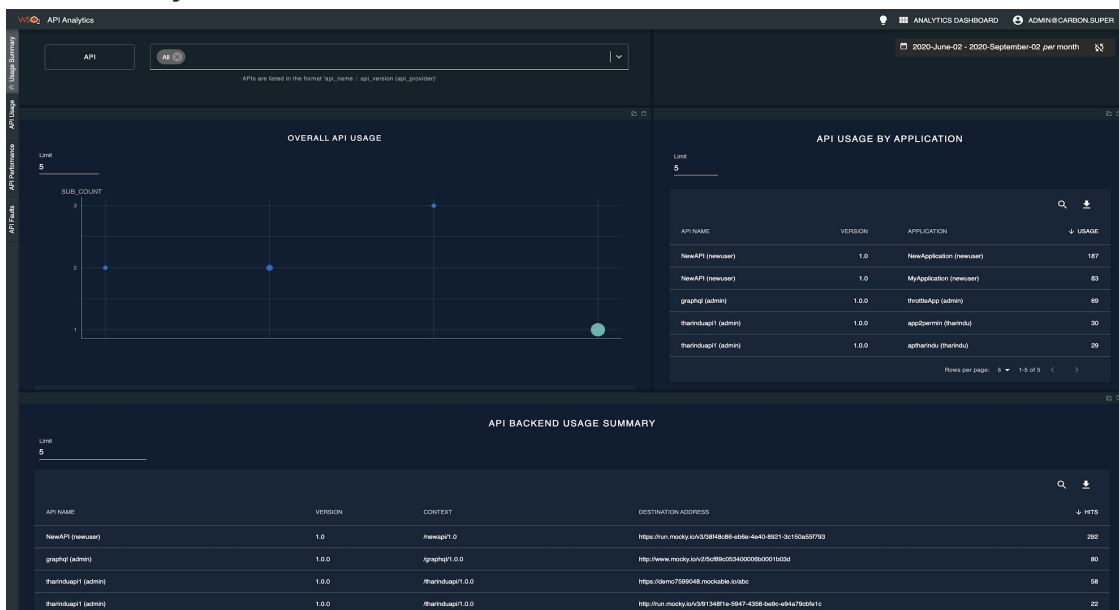
The API Analytics Dashboard provides business insights on APIs enabling users to take proactive actions to improve profitability and the quality of the service provided.

**Overall API usage**

**API usage by application**

**API backend usage summary**

# API Analytics Dashboard



## Application Analytics Dashboard

- Provides statistics for Apps created by the viewer assuming a Developer role.
- Includes registered application users, top application users, API usage of an application statistics
- Targeted for Application Developers to view the statistics related to their Applications.



**Faulty Invocation per Application**

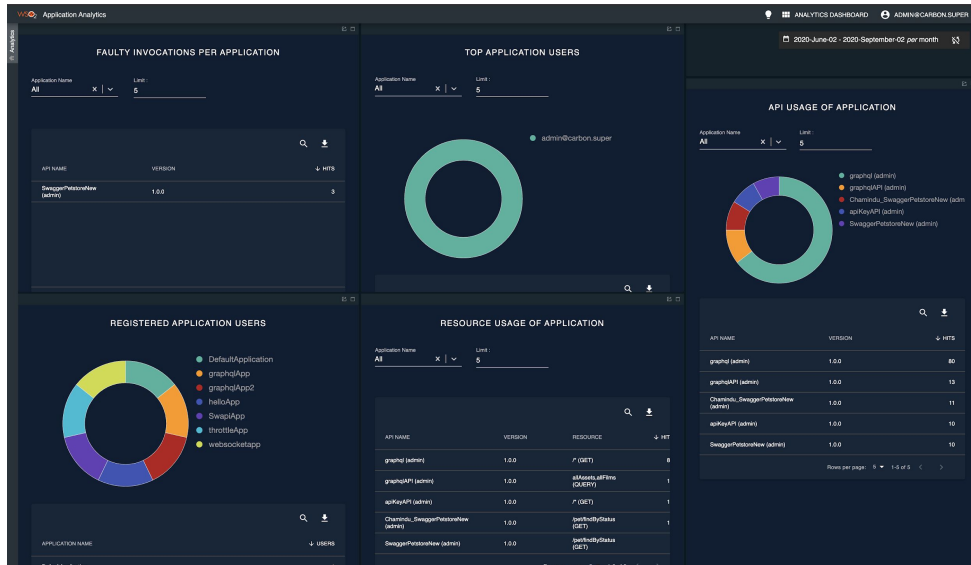
**Top Application Users**

**Registered Application Users**

**Resource Usage of Application**

**API Usage of Application**

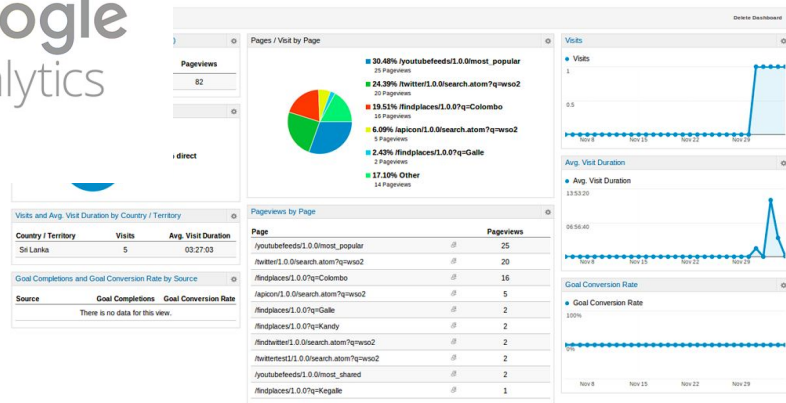
# Application Analytics Dashboard



# Google Analytics



Google  
Analytics



Doc Link : [Configure Google Analytics](#)

You can also configure the API Manager to track runtime statistics of API invocations through Google Analytics. Google Analytics is a service that allows you to track visits to a website and generate detailed statistics on them.

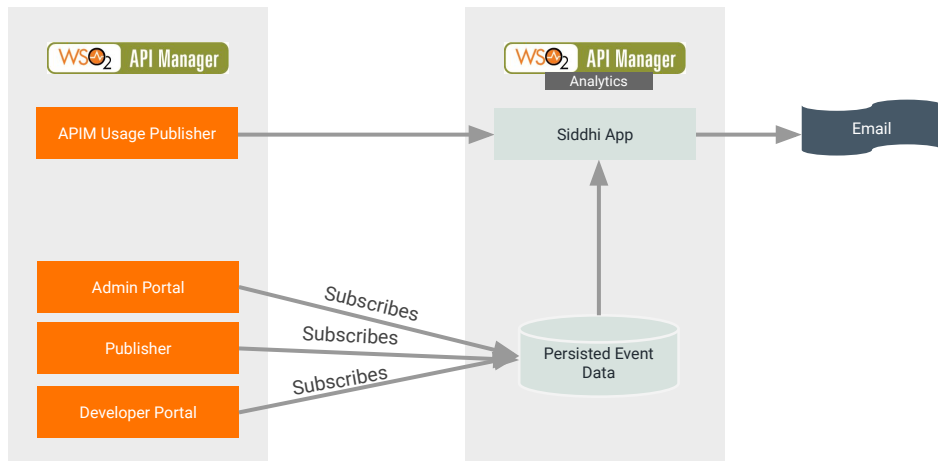




## API Manager Alerts



## Alert Model



- APIM usage publisher : publish events to API manager Analytics (save events mentioned in statistics)
- Subscribers : email subscribers are sent as event. **org.wso2.analytics.apim.alertStakeholderInfo** stream is used .
- Execution plans: Generate alerts using events. Generated events are stored in internal database. Email sending is happened using an execution plan.
- From 3.2.0 release onwards, information related to API availability and alert listing is moved to Monitoring Dashboard from Admin Portal.

## Alert Types

Abnormal Response Time

Abnormal Backend Time

Abnormal Request Counts

Abnormal Resource  
Access Pattern

Unseen Source IP Address

Availability of APIs (Health  
Monitoring)

Frequent Tier Limit Hitting  
(Tier Crossing)

Link - [Alert Types](#)



## Subscribe to Alerts: System Administrator

Manage Alerts

### Manage Alert Subscriptions

Select the alert types to subscribe/unsubscribe and click Save.

- ☐ **Abnormal Response Time**  
This alert gets triggered if the response time of a particular API is higher than the predefined value. These alerts could be treated as an indication of a slow WSO2 API Manager runtime or a slow backend.
- ☐ **Abnormal Backend Time**  
This alert gets triggered if the backend time corresponding to a particular API is higher than the predefined value. These alerts could be treated as an indication of a slow backend. In technical terms, if the backend time of a particular API of a tenant lies outside the predefined value, an alert will be sent out.
- ☐ **Abnormal Request Count**  
This alert is triggered if there is a sudden spike the request count within a period of one minute by default for a particular API for an application. These alerts could be treated as an indication of a possible high traffic, suspicious activity, possible malfunction of the client application, etc.
- ☐ **Abnormal Resource Access**  
This alert is triggered if there is a change in the resource access pattern of a user of a particular application. These alerts could be treated as an indication of a suspicious activity by a user over your application.
- ☐ **Unseen Source IP Access**  
This alert is triggered if there is either a change in the request source IP for a particular application by a user or if the request is from an IP used before a time period of 30 days (by default). These alerts could be treated as an indication of a suspicious activity by a user over an application.
- ☐ **Tier Crossing**  
This alert is triggered if at least one of the two cases below are satisfied; if a particular application gets throttled out for hitting the subscribed tier limit of that application more than 10 times (by default) within an hour (by default) or if a particular user of an application gets throttled out for hitting the subscribed tier limit of a particular API more than 10 times (by default) within a day (by default).
- ☐ **Health Availability**  
This alert gets triggered if at least one of the two cases below are satisfied; Response time of an API greater than Threshold response time value defined for that particular API or Response status code is in between 500 and 600 (by Default).

Emails \*

Email address to receive alerts of selected Alert types. Type email address and press enter to add

Link - [Subscribing to Alerts](#)

Can subscribe to events as

- System Administrator
- Publisher
- Subscriber

Administrators can manage alerts through “Manage Alert Subscriptions” Page in Admin Portal

Publisher and Subscribers can manage through Publisher and Developer Portal apps

Can define list of users to receive alerts through emails

# Subscribe to Alerts: Publisher

The screenshot shows the 'Settings' page in the WSO2 API Manager Publisher interface. The page title is 'Settings' with a subtitle 'View and Configure API Publisher Settings'. The main section is 'Manage Alert Subscriptions', which includes a sub-header 'Select the Alert types to subscribe/unsubscribe and click Save.' Below this, there are three alert types, each with a checkbox and a description: 'Abnormal Response Time' (checkbox unchecked), 'Abnormal Backend Time' (checkbox unchecked), and 'API Health Monitor' (checkbox unchecked). Each alert type has a gear icon for configuration. At the bottom, there is an 'Emails \*' input field with a placeholder 'Email address to receive alerts of selected Alert types. Type email address and press Enter to add.' and a 'Please fill out this field.' error message. Below the input field are three buttons: 'Save', 'Unsubscribe All', and 'Cancel'.

Link - [Subscribing to Alerts : Publisher](#)

## Publisher

- Can subscribe to Abnormal response time, Abnormal backend time, API Health Monitor alerts
- Subscription is managed through Publisher
- Can define list of users to receive alerts through emails

# Subscribe to Alerts: Subscriber

**Settings**  
View and Configure Developer Portal Settings

**Manage Alert Subscriptions**  
Select the Alert types to subscribe/unsubscribe and click Save.

☐ **Abnormal Requests per Minute**  
This alert is triggered if there is a sudden spike in the request count within a period of one minute by default for a particular API for an application. These alerts could be treated as an indication of a possible high traffic, suspicious activity, possible malfunction of the client application, etc.

☐ **Abnormal Resource Access**  
This alert is triggered if there is a change in the resource access pattern of a user of a particular application. These alerts could be treated as an indication of a suspicious activity by a user over your application.

☐ **Unusual IP Access**  
This alert is triggered if there is either a change in the request source IP for a particular application by a user or if the request is from an IP used before a time period of 30 days (default). These alerts could be treated as an indication of a suspicious activity by a user over an application.

☐ **Frequent Tier Limit Hitting**  
This alert is triggered if at least one of the two cases below are satisfied. If a particular application gets throttled out for hitting the subscribed tier limit of that application more than 10 times (By default) within an hour (By default) or if a particular user of an application gets throttled out for hitting the subscribed tier limit of a particular API more than 10 times (By default) within a day (By default).

Emails \*

Email address to receive alerts of selected Alert types. Type email address and press Enter to add

Link - [Subscribing to Alerts : Subscriber](#)

## Subscriber

- Can subscribe to Abnormal requests per Minute, Abnormal Resource Access, Unusual IP Access and Frequent Tier Limit Hitting alerts
- Subscription is managed through Developer Portal application
- Can define list of users to receive alerts through emails

## Viewing Alerts

- Information related to API availability and alert listing has been moved to the Monitoring Dashboard from the API Manager Admin Portal in 3.2.0 Release.
- It provides an overview of the API availability and filtering based on the availability status.



Alerts can be viewed in the Monitoring Dashboard's Alert page.

System administrators, API publishers as well as API subscribers receive alerts via notification emails if they have subscribed to one or more alert type.

# Viewing Alerts

ALERT SUMMARY

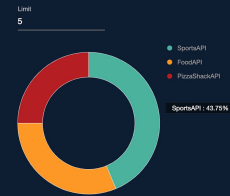
API

All

Limit

10

API NAME	ALERT TYPE	SEVERITY	DETAILS	ALERT TIME
PizzaShackAPI	ApiHealthMonitor	Moderate	API PizzaShackAPI 1.0.0-Server error occurred continuously for 5 or more times.	2020-Aug-07 02:55:10 PM
PizzaShackAPI	ApiHealthMonitor	Moderate	API PizzaShackAPI 1.0.0-Response time is higher than 1 ms continuously for 5 or more responses.	2020-Aug-07 02:51:09 PM
PizzaShackAPI	AbnormalResponseTime	Moderate	Abnormal response time detected for http POST method of resource template/Jordan in api PizzaShackAPI of tenant domain abc.com. Threshold value: 1ms.	2020-Aug-07 02:51:07 PM
PizzaShackAPI	AbnormalBackendTime	Severe	Abnormal backend time detected for http POST method of resource template/Jordan in api PizzaShackAPI of tenant domain abc.com. Threshold value: 1ms.	2020-Aug-07 02:51:07 PM
SportsAPI	AbnormalRequestsPerMin	Moderate	Abnormal request count detected during last minute using application DesktopApp owned by user 1@abc.com for api SportsAPI. Abnormal request count:10.	2020-Aug-07 02:50:44 PM
FoodAPI	AbnormalRequestsPerMin	Moderate	Abnormal request count detected during last minute using application DesktopApp owned by user 1@abc.com for api FoodAPI. Abnormal request count:8.	2020-Aug-07 02:50:44 PM
SportsAPI	AbnormalBackendTime	Severe	Abnormal backend time detected for http GET method of resource template/* in api SportsAPI of tenant domain abc.com. Threshold value: 1ms.	2020-Aug-07 02:49:01 PM
SportsAPI	AbnormalResponseTime	Moderate	Abnormal response time detected for http GET resource template/* in api SportsAPI of tenant domain abc.com. Threshold value: 1ms.	
FoodAPI	AbnormalRequestsPerMin	Moderate	Abnormal request count detected during last 1 application DesktopApp owned by user 1@abc.com for api FoodAPI. Abnormal request count:8.	
FoodAPI	ApiHealthMonitor	Moderate	API FoodAPI 1.0.0-Response time is higher than 1 ms continuously for 5 or more responses.	



API AVAILABILITY

Status

All

Limit

5

API NAME	VERSION	STATUS
FoodAPI (user1@abc.com)	1.0.0	Limited
NewsAPI (user1@abc.com)	1.0.0	Available
PizzaShackAPI (user1@abc.com)	1.0.0	Limited
SportsAPI (user1@abc.com)	1.0.0	Limited

Response time is higher than 1 ms continuously for 5 or more responses.

Rows per page: 5 1-4 of 4

## TOP API BY ALERT COUNT

(Last 7 Days)

API NAME	COUNT
SportsAPI	7
FoodAPI	5
PizzaShackAPI	4

Rows per page: 5 1-3 of 3





## Reporting Capabilities and Exporting Data



## Monthly API Usage Report

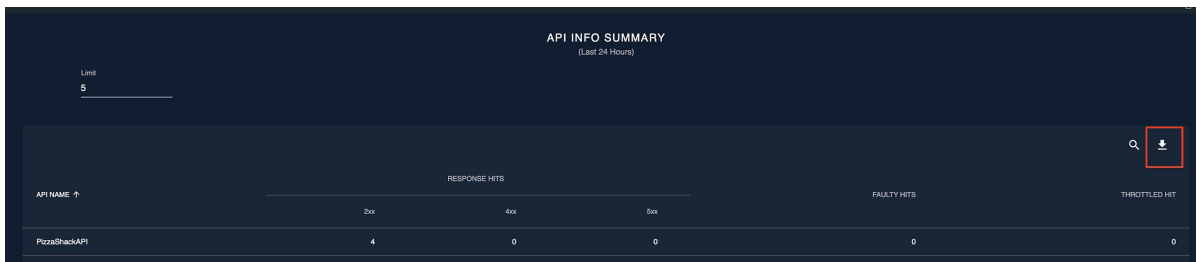
- Can be accessed via Reports Dashboard
- APIM Monthly API Usage Report Widget supports generating a PDF report of a specific year, month combination. The report can be downloaded by clicking on the download button.
- PDF report represents a table with the following information.
  - ◉ API Name
  - ◉ API Version
  - ◉ Application Name
  - ◉ Application Owner
  - ◉ Request Count

Link - [Monthly API Usage Report](#)



## Exporting Data in CSV and PDF Formats

- This is a new feature that is introduced from 3.2.0 release to widgets in order to export data as a CSV or PDF.
- It supports all the widgets with tabular data.
- Users can export the current view and can share, analyze, or compare it with different views.
- It helps to export custom or selected data sets.



The screenshot shows a dark-themed dashboard widget titled "API INFO SUMMARY (Last 24 Hours)". It features a "Limit" input set to "5". Below is a table with columns for "API NAME", "RESPONSE HTS" (2xx, 4xx, 5xx), "FAULTY HTS", and "THROTTLED HT". A red box highlights a search icon and a download/export icon in the top right corner of the table area.

API NAME ↑	RESPONSE HTS			FAULTY HTS	THROTTLED HT
	2xx	4xx	5xx		
PizzaShackAPI	4	0	0	0	0





# Let's try it out

**View Monitoring and Analytics Dashboards**  
**Managing Alerts with Real-Time Analytics**

