WSO2 API Manager 3.2.0 Developer Fundamentals

Working with Analytics

WSO2 Training

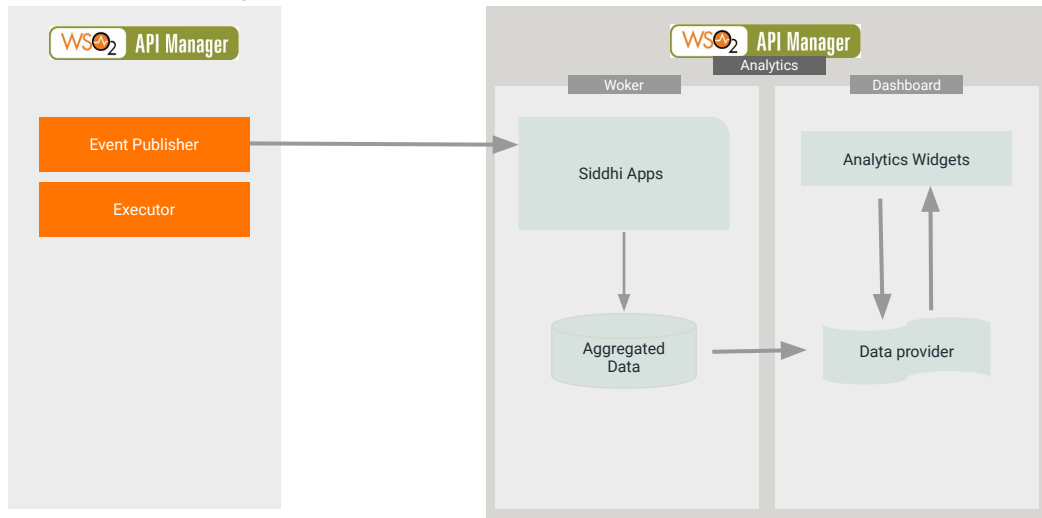# API Manager Analytics

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
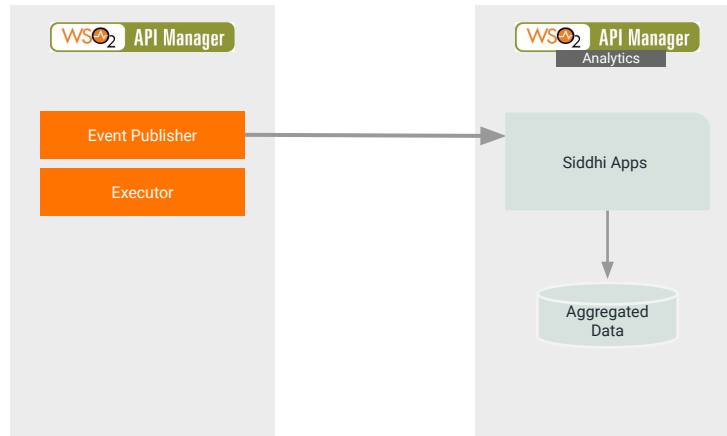
API Manager Analytics Widgets

<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)

package.json
Contains the dependencies required for the widget

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

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

webpack.config.js
Contain instructions to bundle the widget source

locale
Contain the locale files used for internationalization

Link - Creating a Custom Widget

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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.
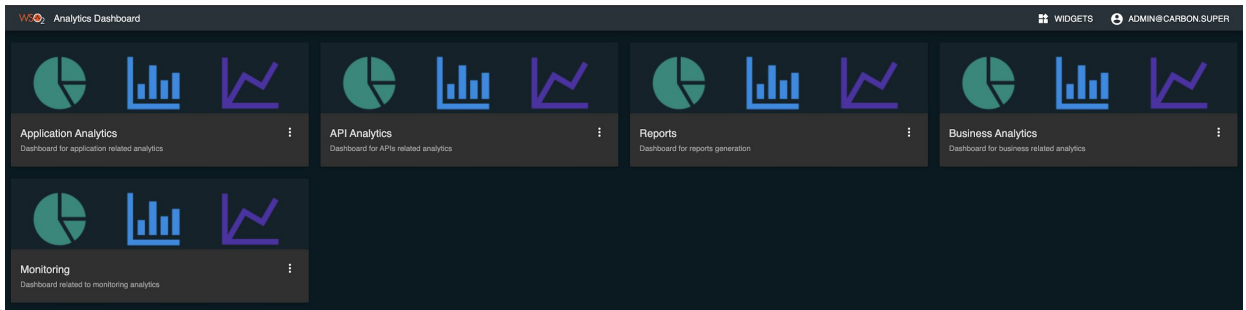
Monitoring Dashboard : [Documentation](#)
Business Analytics : [Documentation](#)
API Analytics : [Documentation](#)
Application Analytics : [Documentation](#)

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 Latenvy Analysis, API Latency Summary
API Usage Analysis, API usage summary
Viewing API Health and System alert

Monitoring Dashboard
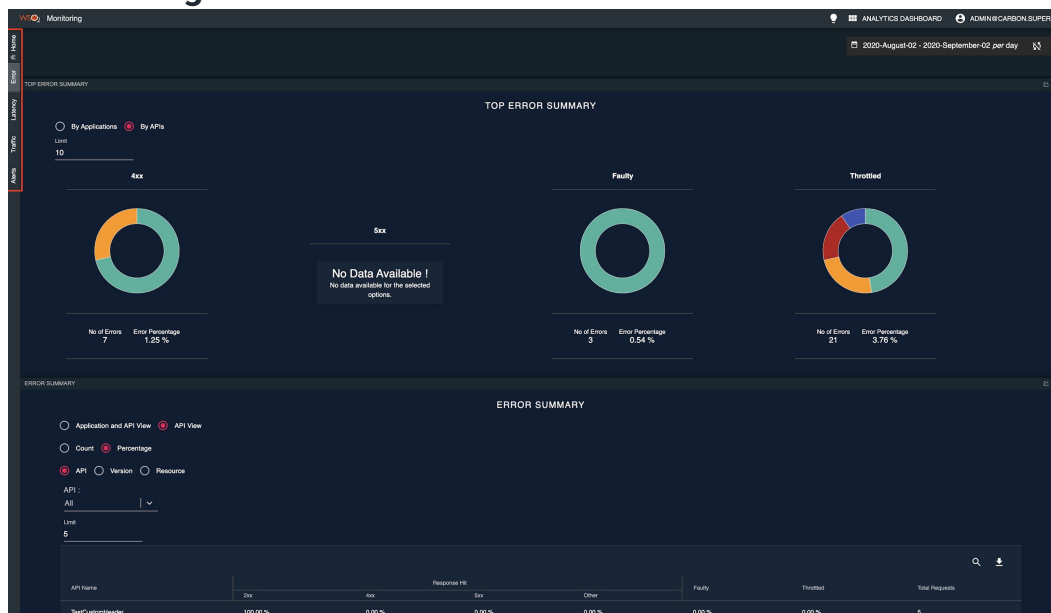
Business Analytics Dashboard

- 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
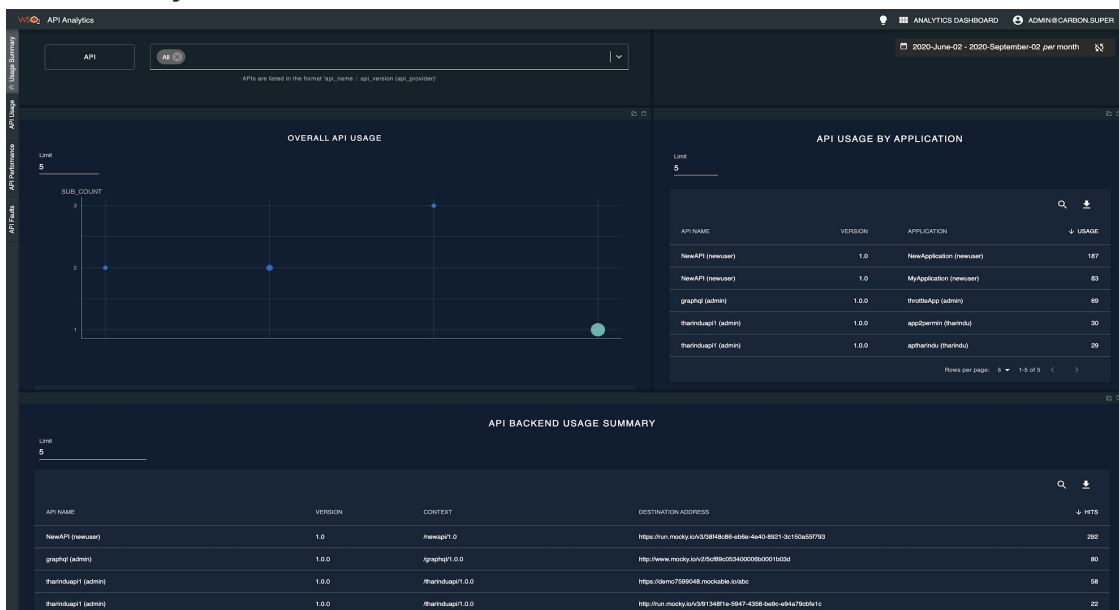
Application Analytics Dashboard

- 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

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
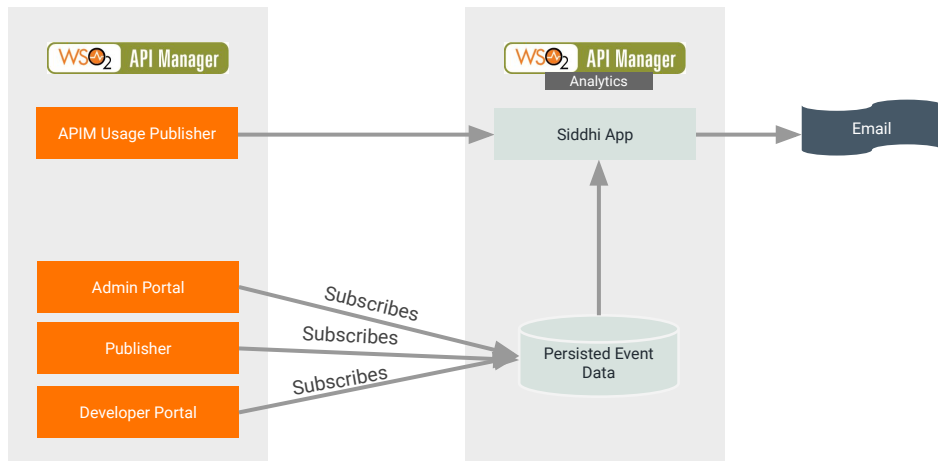
- APIM usage publisher : publish events to API manager Analytics (save events mentioned in statistics)
- Subscribers : email subscribers are sent as event. **org.wso2.analytics.apim.alertStakeholderInfo** stream is used .
- Execution plans: Generate alerts using events. Generated events are stored in 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

Link - <u>Subscribing to Alerts</u>

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

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

Link - <u>Subscribing to Alerts : Subscriber</u>

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:/order 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:/order 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 SportsApp owned by user1@abc.com for api :SportsAPI, abnormal requst count:10.	2020-Aug-07 02:50:44 PM
FoodAPI	AbnormalRequestsPerMin	Moderate	Abnormal request count detected during last minute using application FoodApp owned by user1@abc.com for api :FoodAPI, abnormal requst count:9.	2020-Aug-07 02:49:44 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 method of resource template:/* in api:SportsAPI of tenant domain:abc.com, threshold value:1ms.	
FoodAPI	AbnormalRequestsPerMin	Moderate	Abnormal request count detected during last minute using application FoodApp owned by user1@abc.com for api :FoodAPI, abnormal requst count:9.	
FoodAPI	ApiHealthMonitor	Moderate	API:FoodAPI 1.0.0-Response time is higher than 1 ms continuously for 5 or more responses.	
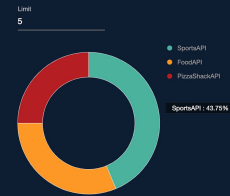
API AVAILABILITY

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)

Limit: 5

- SportsAPI
- FoodAPI
- PizzaShackAPI

SportsAPI : 43.75%

API NAME	↓ COUNT
SportsAPI	7
FoodAPI	5
PizzaShackAPI	4

Rows per page: 5 ▼   1-3 of 3   ‹   ›

Reporting Capabilities and Exporting Data
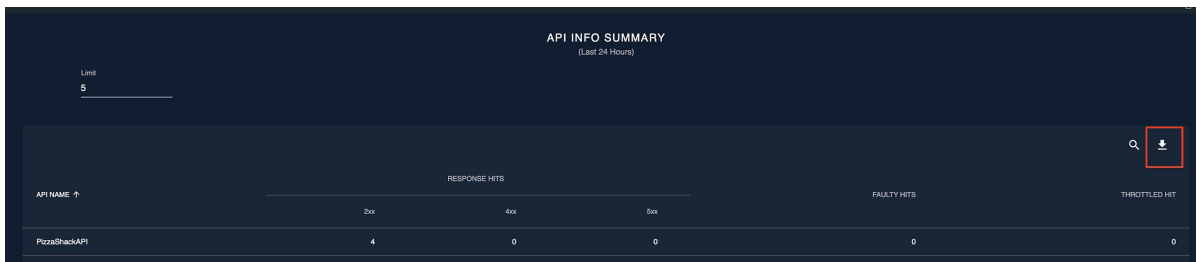
Monthly API Usage Report

- 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 - <u>Monthly API Usage Report</u>

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.

Let's try it out

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