Overview of AsyncOS API for Cisco Security Management Appliances

The AsyncOS API for Cisco Security Management appliances (or AsyncOS API) is a representational state transfer (REST) based set of operations that provide secure and authenticated access to the Security Management appliance reports, report counters, tracking, quarantine, and configuration. You can retrieve the Security Management appliance reporting, tracking, and quarantine data (for Email Security appliances) using the API. In this release you can query for configuration information. Posting configuration changes is not supported in this release.

This chapter contains the following sections:

Prerequisites for Using AsyncOS API

To use AsyncOS API, you need:

- A Security Management appliance with AsyncOS 12.0.

- Knowledge of:

  - HTTP, which is the protocol used for API transactions. Secure communication over TLS.

  - JavaScript Object Notation (JSON), which the API uses to construct resource representations.

  - JSON Web Token (JWT)

- A client or programming library that initiates requests and receives responses from the AsyncOS API using HTTP or HTTPS, for example, cURL. The client or programming library must support JSON to interpret the response from the API.

- Authorization to access the AsyncOS API. See Authorization, on page 5.

• AsyncOS API enabled using web interface or CLI. See Enabling AsyncOS API, on page 2.

Enabling AsyncOS API

Before You Begin

Make sure that you are authorized to access the IP Interfaces page on the web interface or the `interfaceconfig` command on CLI. Only administrators, email administrators, cloud administrators, and operators are authorized.

You can also enable the AsyncOS API using the `interfaceconfig` command in CLI.

Step 1 Log in to the web interface.

Step 2 [New web interface only] Click the gear icon ⚙ to load the legacy web interface.

Step 3 Choose **Management Appliance Network** > **IP Interfaces**.

Step 4 Edit the Management interface.

Note You can enable AsyncOS API on any IP interface. However, Cisco recommends that you enable AsyncOS API on the Management interface.

Step 5 Under the AsyncOS API (Monitoring) section, depending on your requirements, select HTTP, HTTPS, or both and the ports to use.

Note AsyncOS API communicates using HTTP / 1.1.

If you have selected HTTPS and you want to use your own certificate for secure communication, see Securely Communicating with AsyncOS API, on page 2.

Note Cisco recommends that you always use HTTPS in the production environment. Use HTTP only for troubleshooting and testing the API.

Step 6 Submit and commit your changes.

Securely Communicating with AsyncOS API

You can communicate with AsyncOS API over secure HTTP using your own certificate.

Note Do not perform this procedure if you are already running the web interface over HTTPS and using your own certificate for secure communication. AsyncOS API uses the same certificate as web interface, for communicating over HTTPS.

Step 1 Set up a certificate using the `certconfig` command in the CLI. For instructions, refer the User Guide or Online Help.

Step 2 Change the HTTPS certificate used by the IP interface to your certificate using the `interfaceconfig` command in CLI. For instructions, refer the User Guide or Online Help.

Step 3 Submit and commit your changes.

AsyncOS API Authentication and Authorization

This section explains about the authentication methods, the user roles which can access APIs, and how to query for APIs accessible to a user.

Authentication

Submit the Security Management appliance's username and password with all the requests to the API, in the Base64-encoded format or with a JSON Web Token. The user inactivity timeout settings in the appliance apply to the validity of a JWT. If a request does not include valid credentials in the Authorization header, the API sends a 401 error message. You can use any base64 library to convert your credentials into base64-encoded format.

Note The appliance allows you to invoke AsyncOS APIs by including access tokens that are retrieved from Identity Providers (IDPs) that support OpenID Connect 1.0. For more details on how to use AsyncOS APIs with external IDPs, see the "Common Administrative Tasks" chapter of the User Guide for AsyncOS 13.8.1 for Cisco Content Security Appliances.

Authenticating API Queries with JSON Web Token

You can generate a JSON Web Token (JWT) and use it with your API queries.

Note The user inactivity timeout settings in the appliance applies to the validity of a JWT. The Web Security appliance checks every API query with a JWT, for its time validity. If a JWT is found to be within 5 minutes of time validity, after which it will time out, a new refresh JWT is sent with the response header. You must use this new refresh JWT with API queries, or generate a new one.

Synopsis	POST /wsa/api/v2.0/login Use the syntax below for two factor authentications: POST /wsa/api/v2.0/login/two_factor

Body Parameters	Use Base64 encoded credentials.
	
	`{`
	`    "data":`
	`    {`
	`        "userName":"YWRtaW4=",`
	`        "passphrase":"aXJvbnBvcnQ="`
	`    }`
	`}`	

Request Headers		Host, Accept, Authorization
Response Headers		Content-Type, Content-Length, Connection

This example shows a query to log in with Base64 encoded credentials, and generate a JWT.

Sample Request

```
POST /wsa/api/v2.0/login
HTTP/1.1
Content-Type: application/json
cache-control: no-cache
User-Agent: curl/7.54.0
Accept: */*
Host: wsa.cisco.com:6080
accept-encoding: gzip, deflate
content-length: 95
Connection: keep-alive
{
    "data":
    {
        "userName":"YWRtaW4=",
        "passphrase":"aXJvbnBvcnQ="
    }
}
```

Sample Response

```
HTTP/1.1 200 OK
Server: API/2.0
Date: Mon, 26 Nov 2018 07:22:47 GMT
Content-type: application/json
Content-Length: 618
Connection: close
Access-Control-Allow-Origin: *
Access-Control-Allow-Headers: content-type, jwttoken, mid, h, email
Access-Control-Allow-Credentials: true
Access-Control-Allow-Methods: GET, POST, DELETE, OPTIONS
Access-Control-Expose-Headers: Content-Disposition, jwtToken

{
    "data": {
        "userName": "admin",
        "is2FactorRedirectRequired": "false",
        "role": "Administrator",
        "email": [],
        "jwtToken": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJ1c2VyTmFtZSI6ImFkbWluIiwiaXM
        yRmFjdG9yQ2hlY2tSZXF1aXJlZCI6ImFsc2UsImNvb2tpZSI6IlRucEZOVTFFWTNwTlZFMDlDDanRMYVR
        oeENqdFpiV1J6VFVSQk5VMURNWGRpTWxGMVddUSnNlbGt5T0hWWk1qbDBBUMnBaZDA5RVFUMEtcbk8xVkh
        PWHBrUnppbGteEtNV0p1VW5CaVYxVjJUUlbmswTUV4cVFUMEtPMVJVUlhkTlJsazNUUJKZFFUxRE5IZE1
        WRWw1VFddweklFMXFFcblNUVlNhazVDVDBBWRk1rOUVaM2xTUlVreVRYcGtaSazFwTVVVSTlZFMHpUbFZZXUjA1
    }
}
```

```
          }
     }
```

Authorization

The AsyncOS API is a role based system, the scope of API queries is defined by the role of the user. Cisco Content Security Management appliance users with the following roles can access the AsyncOS API:

- Administrator
- Operator
- Technician
- Read-Only Operator
- Guest
- Web Administrator
- Web Policy Administrator
- URL Filtering Administrator
- Email Administrator
- Help Desk User

Note
- Externally authenticated users can access the API.
- Custom roles, delegated by the administrator can also access the APIs.

AsyncOS API Requests and Responses

Note
For complete list of APIs, see *AsyncOS API - Addendum to the Getting Started Guide for Cisco Content Security Management Appliances*.

AsyncOS API Requests

Requests made to the API have the following characteristics:

- Requests are sent over HTTP or HTTPS
- Each request must contain a valid URI in the following format:

```
http://{appliance}:{port}/sma/api/v2.0/{resource}/{resource_attributes}
https://{appliance}:{port}/sma/api/v2.0/{resource}/{resource_attributes}
```
where:

- {appliance}:{port}

  is the FQDN or the IP address of the appliance and the TCP port number on which the appliance is listening.

- {resource}

  is the resource you are attempting to access, for example, reports, tracking, quarantine, configuration, or other counters.

- {resource_attributes}

  are the supported attributes for a resource, for example, duration, and so on.

- Each request must contain user credentials, or a valid authorization header.
- Each request must be set to accept:

  application/json

- Requests sent over HTTPS (using your own certificate) must contain your CA certificate. For example, in case of cURL, you can specify the CA certificate in the API request as follows:

  curl --cacert <ca_cert.crt> -u"username:password"

  https://<fqdn>:<port>/sma/api/v2.0/{resource}/{resource_attributes}

Note   API requests are case sensitive and should be entered as shown in this guide.

AsyncOS API Responses

This section explains the key components of the responses, and various HTTP error codes.

Key Components of Responses

Components		Values	Description
Status Code and Reason		See HTTP Response Codes, on page 7.	HTTP response code and the reason.
Message Header	Content-Type	application/json	Indicates the format of the message body.
	Content-Length	n/a	The length of the response body in octets.
	Connection	close	Options that are desired for the connection.

Components	Values	Description

Message Body	n/a	The message body is in the format defined by the Content-Type header. The following are the components of the message body:
		
		 1. URI. The URI you specified in the request to the API.
		
		 Example
		
		 `:"/api/v2.0/config/"`
		
		 2. Counter group and/or counter name
		
		 Example
		
		 `reporting/mail_security_summary`
		
		 3. Query parameters
		
		 Example
		
		 `startDate=2017-01-30T00:00:00.000Z&endDate=2018-01-30T14:00:00.000Z`
		
		 4. Error (Only for Error Events). This component includes three subcomponents—message, code, and explanation.
		
		 Example
		
		 `"error": {"message": "Unexpected attribute`
		
		`- starts_with.","code": "404", "explanation": "404 = Nothing matches the given URI."}`
		
		 If the message body contains empty braces ({}), it means that the API could not find any records matching the query.

HTTP Response Codes

The following is a list of HTTP response codes returned by AsyncOS API:

- 200
- 202
- 300
- 301
- 307
- 400
- 401
- 403
- 404

- 406
- 413
- 414
- 500
- 501
- 503
- 505

For descriptions of these HTTP response codes, refer the following RFCs:

- RFC1945
- RFC7231

Comparing API Data with the Web Interface Data

The new web interface uses the AsyncOS APIs to fetch data with the duration attribute specified in the GMT time zone. If you plan to compare the data from your API query with the new web interface data, ensure that your API query has the same time range (in ISO8601 time format) as the new web interface API query.

Related Documentation

In addition to the topics covered in this document, you can find more information about the APIs in the following documents:

Table 1: Related Documentation

Document	Located At:
Addendum to the Getting Started Guide for Cisco Security Management Appliances.	https://www.cisco.com/c/en/us/support/security/content-security-management-appliance/products-programming-reference-guides-list.html
API Help (Swagger UI)	On the new web interface, hover over the help icon, and click **API Help: Swagger**. **Note** The API Help (Swagger UI) also allows you to test the API calls directly from your web browser using the **Try it out** button.