Apigee Edge Troubleshooting Guide

Self diagnose problems on Edge Private Cloud

Contents

Preface

The act of troubleshooting is both an art and a science. The constant effort of our technical support teams has been to demystify the art and expose the science behind problem identification and resolution. The value of this demystification is apparent to all the people involved.

➔ For customers using a service or a platform, it means quick and more effective solutions, and in many cases greater independence in solving problems - euphemistically termed as Self Serve.
➔ For Product Development and Support teams, it means a scalable and more efficient model of assisting customers and partnering in their success.

The Apigee Support team at Google constantly strives for this win-win situation through collaborative partnership with our customers. We offer this guide as the first step in demystifying the troubleshooting process for the Apigee Edge platform.

Specifically, this document aids in troubleshooting problems that might occur with API requests flowing through Apigee Edge for Private Cloud Release 4.17.01 or higher. The document provides a description of tools, commands, and APIs that can help in analyzing a problem. It also provides information about properties that can be configured to get desired behaviour or optimum performance.

Apigee Edge

Apigee Edge is a platform for developing and managing API proxies. Think of a proxy as an abstraction layer that "fronts" your backend service APIs and provides value-added features like security, rate limiting, quotas, analytics, and more.

Why Did We Write This Guide

For many years, we have had the privilege of supporting hundreds of our customers who have used the Apigee Edge platform as a part of their Digital Transformation journey. During this time, we have gained knowledge and key perspectives on common issues that customers face when using the Apigee Edge Private Cloud and the diagnostics that are most useful to troubleshoot these issues.

We have captured these insights in this guide and hope they will help you troubleshoot and resolve issues without having to contact Apigee customer support.

While our customer support teams remain available to assist you, this guide will help you to:

- Determine the source of issues
- Solve issues independently wherever feasible
- Perform the relevant diagnostics so that support teams can help resolve issues quicker

If you are able to troubleshoot and resolve a majority of issues that you encounter on Apigee Edge using this guide, we would consider our mission accomplished.

Who Should Use This Guide

The target audience for this document comprises developers who are working with Apigee Edge for Private Cloud Release 4.17.01 or higher, as well as support or administration personnel who maintain infrastructure and datastores that are associated with Apigee Edge.

This document is intended for readers with a high-level understanding of Apigee Edge and its architecture, as well as some understanding of basic Edge concepts such as policies, analytics, monetization, and datastores such as Cassandra and Postgres. In addition, it is assumed that the reader is reasonably proficient with the operating system where Apigee Edge is installed.

How This Guide Is Organized

This Troubleshooting Guide has been categorized into four parts:

PART 1 - Troubleshooting

➔ This part introduces general debugging techniques such as using trace and debug sessions in Apigee Edge.
➔ It also contains procedures to try when you encounter a problem with your APIs at runtime or during deployment, or any problem with analytics, developer portal, monetization, OpenLDAP, or ZooKeeper.

PART 2 - Commands Quick Reference

➔ This part provides information about some of the commonly used commands to start and stop Edge components, SQL queries in Postgres, and Cassandra datastores, or get information from ZooKeeper.

PART 3 - APIs Quick Reference

➔ This part provides information about some of the commonly used management APIs to get information about Edge entities, servers, or analytics.

PART 4 - Properties

➔ This part provides information about some of the important properties that can be configured on Edge components to get desired behaviour or optimum performance.

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PART 1 - Troubleshooting

General Edge Troubleshooting

This section does not describe how to solve a specific problem, but describes three general-purpose tools that can help you with many different problems:

- UI Trace
- Debug Sessions
- Component Logs

UI Trace

UI Trace is a tool for troubleshooting and monitoring API proxies running on Apigee Edge. Trace lets you probe the details of each step through an API proxy flow.

With Trace, you can record and inspect each step in the API proxy transaction. For example, you can view flow variables before and after a policy executes, inspect the request and response payloads, view headers and query parameters, and more.

The Trace tool has two modes:

- Online mode where you make a request to an API proxy and then inspect the results right away. You can make several calls to the proxy before examining the trace.

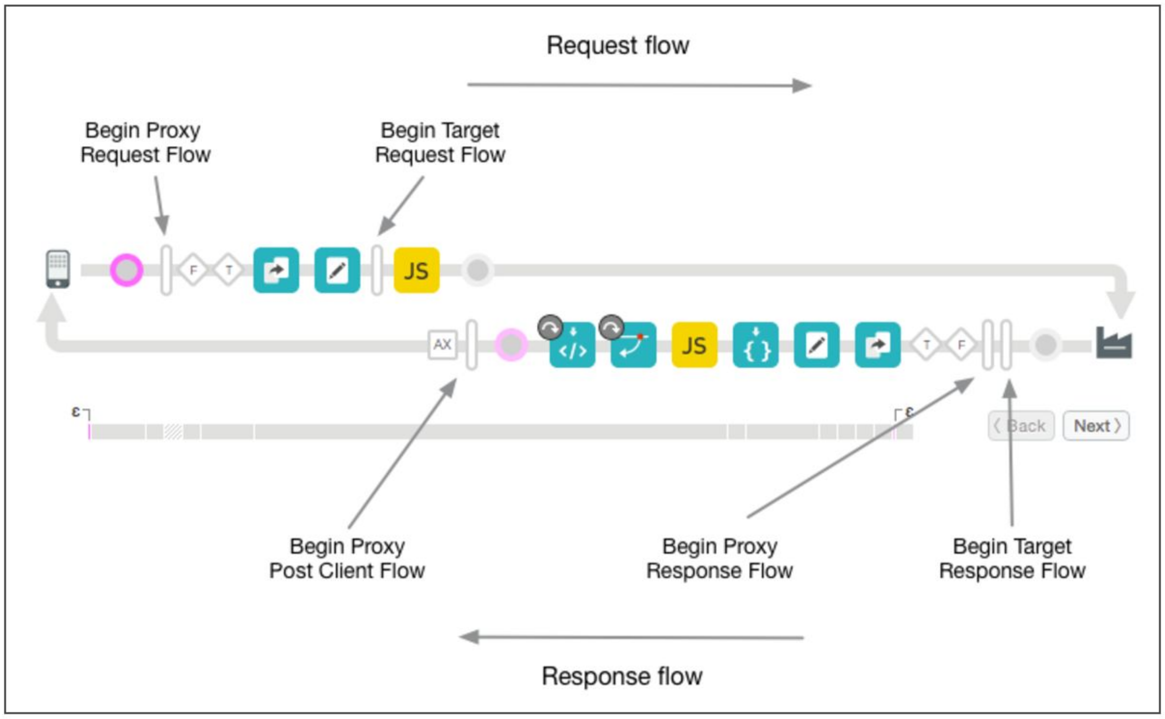
  One Trace session can support 10 request/response transactions per Message Processor. With two Messages Processors handling traffic, 20 request/response transactions are supported. A trace session automatically stops after 10 minutes if you don't manually stop it.

- The Offline Trace tool lets you view and analyze trace sessions that were previously saved. A saved trace session is essentially a "recording" of a trace session, and can be useful for cases where troubleshooting and further analysis is required. The UI for the Offline Trace tool is similar to the "live" Trace tool.

The trace tool has two main parts:

- **The transaction map** uses icons to mark each notable step that occurs during an API proxy transaction, including policy execution, conditional steps, and transitions. Hover over any icon to see summary information. The request flow steps appear along the top of the transaction map and response flow steps along the bottom.

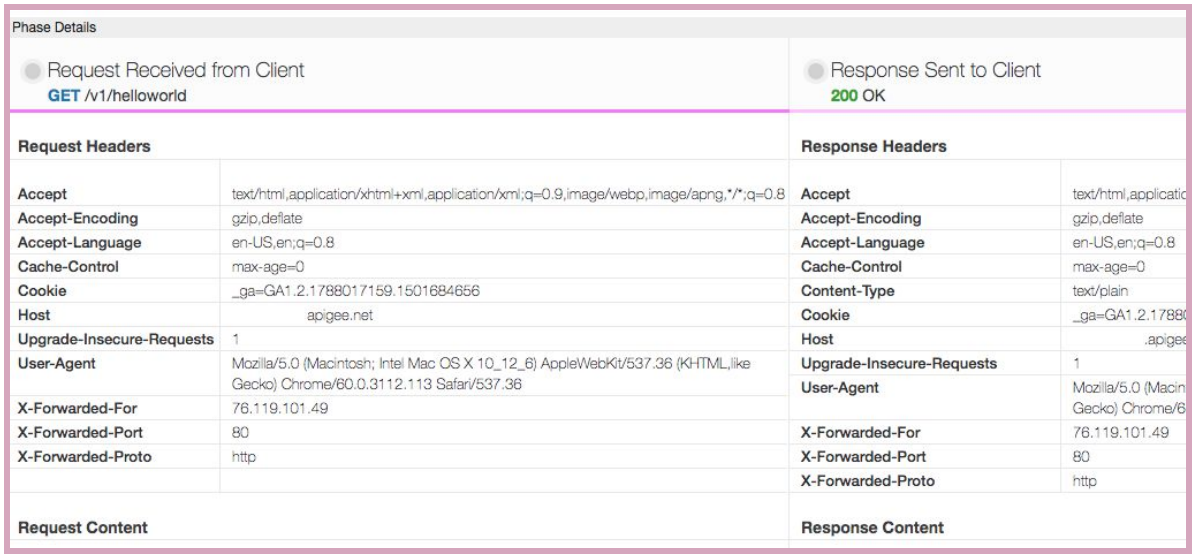
  Here's a sample transaction map with the main proxy processing segments labeled:

  
  Request flow
Begin Proxy Request Flow
Begin Target Request Flow
JS
AX
JS
Back
Next
Begin Proxy Post Client Flow
Begin Proxy Response Flow
Begin Target Response Flow
Response flow

  For a complete description of all symbols shown in the trace window above, see [Transaction map icons](#).

- **The phase details** section of the tool lists information about the proxy's internal processing, including variables that were set or read, request and response headers, and much more. Click any icon to see the phase details for that step.

Here's a sample of the phase details:



Phase Details

Request Received from Client
GET /v1/helloworld

Request Headers	
Accept	text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding	gzip,deflate
Accept-Language	en-US,en;q=0.8
Cache-Control	max-age=0
Cookie	_ga=GA1.2.1788017159.1501684656
Host	apigee.net
Upgrade-Insecure-Requests	1
User-Agent	Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.113 Safari/537.36
X-Forwarded-For	76.119.101.49
X-Forwarded-Port	80
X-Forwarded-Proto	http

Request Content

Response Sent to Client
200 OK

Response Headers	
Accept	text/html,applicatio
Accept-Encoding	gzip,deflate
Accept-Language	en-US,en;q=0.8
Cache-Control	max-age=0
Content-Type	text/plain
Cookie	_ga=GA1.2.1788
Host	.apigee
Upgrade-Insecure-Requests	1
User-Agent	Mozilla/5.0 (Macin Gecko) Chrome/6
X-Forwarded-For	76.119.101.49
X-Forwarded-Port	80
X-Forwarded-Proto	http

Response Content

For a complete description of all information shown in the phase details above, see Understanding the phase details.

References

Watch a video for an introduction to the Trace tool
Using the Trace tool
Using the Offline Trace tool

Debug Sessions

A debug session records detailed information for each step in the API proxy transaction, such as flow variables before and after a policy executes, request and response payloads, headers and query parameters, and more.

The data generated by a debug session is the same data that is used to generate the UI Trace display in the Edge UI. See UI Trace for more. The difference is that debug data is returned to you as an XML or JSON object that contains all the debug data for one call to an API proxy.

By default, a debug session captures a maximum of 10 messages per Message Processor for a 10 minute interval, whichever comes first. For example, if you have two Message

Processors, the the message maximum is 20 for a 10 minute interval. However, you can optionally extend the duration of the debug session.

The following procedure describes how to create a debug session:

1. Use the Create a debug session API to create a debug session, specifying the API proxy and environment that you want to debug. Once created, all calls to the API proxy generate debug data.

   Alternatively, you can create a debug session that captures only API calls with specific query parameters and/or HTTP headers. Filtering is particularly useful for troubleshooting. For more information, see Create a debug session with a filter.

2. Make a request to a deployed API proxy. Each call to the API proxy creates a debug object with a unique ID.

3. Use the Get debug session transaction IDs API to get a list of all debug IDs for the debug session.

4. Use the Get debug session transaction data API to retrieve the debug data associated with a specific debug ID.

5. Call the Delete debug session API to explicitly close the debug session. Closing the debug session discards all the associated data.

   Alternatively, all data is discarded when the debug session expires.

Component Logs

Apigee Edge is comprised of multiple processes, each of which emits messages into a system log. You can examine the logs to obtain information about the operation of the specific process, for example the management server, the UI server, or the message processor itself.

The log files for each component are contained in the `/opt/apigee/var/log` directory on the node hosting the component. Each component has its own subdirectory. For example, the logs for the Management Server are in the directory:

```
/opt/apigee/var/log/edge-management-server
```

By default, Edge components use a logging level of INFO. However, you can set the logging level for each Edge component. The available log levels are: ALL, DEBUG, ERROR, FATAL, INFO, OFF, TRACE, WARN.

To set the log level for the component, you have to edit the component's properties file to set a token, then restart the components. For example, you might want to set it to DEBUG for the Message Processor and to ERROR for the Management Server.

For information on setting log levels, see Setting the log level for an Edge component.

The following table lists the location of the log files on a node for each component installed on the node:

Components	**Location**
Management Server	`/opt/apigee/var/log/edge-management-server`

Router	`/opt/apigee/var/log/edge-router`
	
	The Edge Router is implemented by using Nginx. The Nginx logs are available in:
	
	`/opt/apigee/var/log/edge-router/nginx`
	`/opt/nginx/logs`

Message Processor	`/opt/apigee/var/log/edge-message-processor`
Apigee Qpid Server	`/opt/apigee/var/log/edge-qpid-server`
Apigee Postgres Server	`/opt/apigee/var/log/edge-postgres-server`
Edge UI	`/opt/apigee/var/log/edge-ui`
ZooKeeper	`/opt/apigee/var/log/apigee-zookeeper`
OpenLDAP	`/opt/apigee/var/log/apigee-openldap`
Cassandra	`/opt/apigee/var/log/apigee-cassandra`

Qpidd	`/opt/apigee/var/log/apigee-qpidd`
PostgreSQL database	`/opt/apigee/var/log/apigee-postgresql`

References

Log files
Setting the log level for an Edge component

Troubleshooting Runtime Problems

This section provides information and guidance on troubleshooting some commonly observed runtime problems such as 5XX Errors and SSL handshake failures in Apigee Edge.

500 Internal Server Error

Description

The client application gets an HTTP status code of **500** with the message **“Internal Server Error”** as a response for API calls. The 500 Internal Server error could be caused by an error during the execution of any policy within Edge or by an error on the target/backend server.

Error Messages

You may get the following error message:

```
HTTP/1.1 500 Internal Server Error
```

In some cases, you may observe another error message which has more details. Here is a sample error message:

```
{
"fault":
    { "detail":
          { "errorcode\":\"steps.servicecallout.ExecutionFailed\"},\"faultstring\":\"Execution of ServiceCallout
callWCSAuthServiceCallout failed. Reason: ResponseCode 400 is treated as error
          }
    }
}
```

Overview of 500 Internal Server Error

The HTTP status code 500 is a generic error response. It means that the server encountered an unexpected condition that prevented it from fulfilling the request. This error is usually returned by the server when no other error code is suitable.

Causes

The 500 Internal Server Error could be thrown due to a number of different causes. In Edge, the causes can be classified into two main categories based on where the error occurred:

Location of Error	Details
Execution Error in an Edge Policy	A Policy within the API proxy may fail for some reason.
Error in the Backend Server	The backend server may fail for some reason.

Let's now look at how to diagnose the situation further to determine the cause of the issue.

Determine whether the error occurred in a policy or in the backend server

As a first step, use one of the following procedures to determine if the 500 Internal Server Error was thrown during the execution of a policy within the API proxy or by the backend server.

Procedure 1: Using Trace in UI

1. If the issue is still active, enable the trace in UI for the affected API.

2. Once you have captured the trace, select the API request that shows the response code as 500.

3. Navigate through all the phases of the failing API request and check which phase returns the 500 Internal Server Error:
    a. If the error is thrown during the execution of a policy, then proceed to Execution Error in an Edge Policy.

b. If the backend server has responded back with 500 Internal Server, then proceed to Error in the Backend Server.

Procedure 2: Using Nginx Access Logs

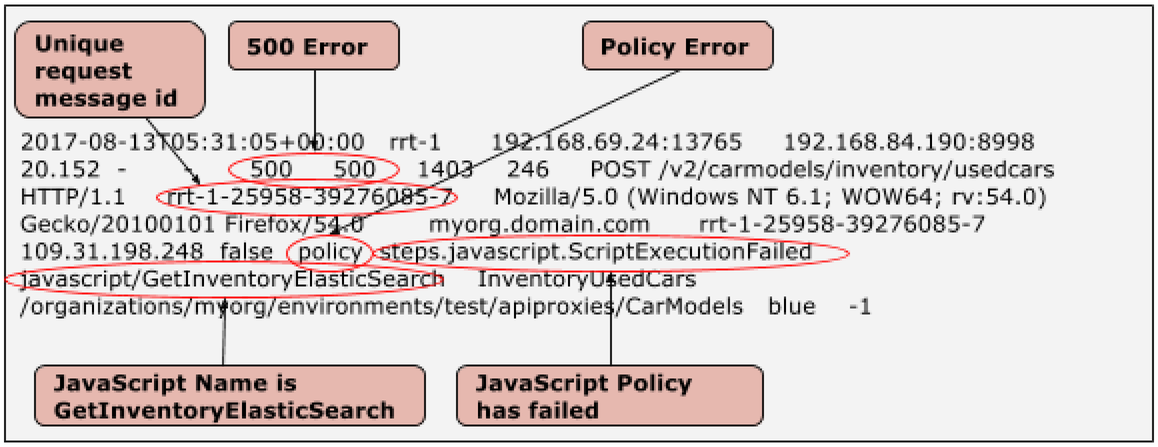
You can also refer to Nginx Access logs to determine whether the 500 status code was thrown during the execution of a policy within the API proxy or by the backend server. This is particularly useful if the issue has occurred in the past or if the issue is intermittent and you are unable to capture the trace in UI. Use the following steps to determine this information from Nginx access logs:

1. Check the Nginx access logs (`/opt/apigee/var/log/edge-router/nginx/<org>~<env>.<port#>_access_log`).

2. Search if there are any 500 Errors for the specific API proxy at the specific duration.

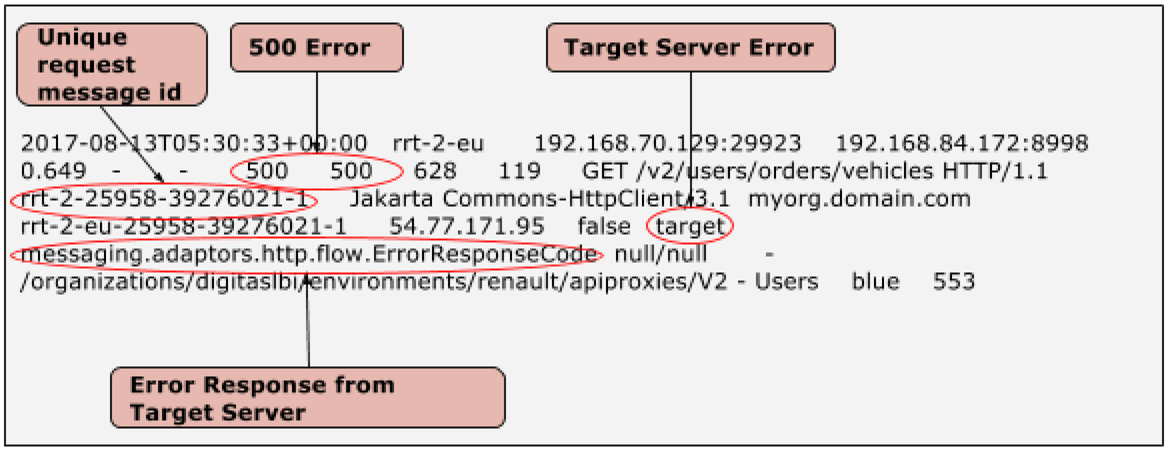
3. If there are any 500 Errors, then check if the error is a policy or a target server error, as shown below:

Sample Entry showing a Policy Error


Unique request message id
500 Error
Policy Error
JavaScript Name is GetInventoryElasticSearch
JavaScript Policy has failed

```
2017-08-13T05:31:05+00:00   rrt-1    192.168.69.24:13765    192.168.84.190:8998
20.152  -      500    500    1403    246    POST /v2/carmodels/inventory/usedcars
HTTP/1.1    rrt-1-25958-39276085-7    Mozilla/5.0 (Windows NT 6.1; WOW64; rv:54.0)
Gecko/20100101 Firefox/54.0      myorg.domain.com      rrt-1-25958-39276085-7
109.31.198.248  false  policy  steps.javascript.ScriptExecutionFailed
javascript/GetInventoryElasticSearch    InventoryUsedCars
/organizations/myorg/environments/test/apiproxies/CarModels   blue    -1
```

Sample Entry showing a Target Server Error



```
2017-08-13T05:30:33+00:00  rrt-2-eu    192.168.70.129:29923   192.168.84.172:8998
0.649  -    -     500    500   628    119    GET /v2/users/orders/vehicles HTTP/1.1
rrt-2-25958-39276021-1    Jakarta Commons-HttpClient/3.1  myorg.domain.com
rrt-2-eu-25958-39276021-1     54.77.171.95    false  target
messaging.adaptors.http.flow.ErrorResponseCode  null/null      -
/organizations/digitaslbi/environments/renault/apiproxies/V2 - Users    blue    553
```

4. Once you've identified whether it is a policy or target server error:
    a. Proceed to Execution Error in an Edge Policy if it is a policy error.
    b. Proceed to Error in Backend Server if it is a target server error.

Execution Error in an Edge Policy

Steps to Diagnose

If you have confirmed that one of the policies within the API proxy has failed, then perform the following steps:

1. If you have the trace UI session for the error, then:
    a. Select the API request that is failing with 500 Internal Server Error in the trace.
    b. Examine the request and select the specific policy that has failed or the flow named "Error" that is immediately following the failed policy in the trace.
    c. Get more details about the error either by checking the “error” field under the Properties section or the Error content.
    d. Using the details you've collected about the error, try to determine its cause.
    e. Fix the issue with the policy, if possible.

2. If you don't have the trace UI session, then:

a. Use the Nginx access logs as explained in the previous section to determine the failing policy in the API proxy and also the unique request message id
b. Check the Message Processor logs (`/opt/apigee/var/log/edge-message-processor/logs/system.log`) and search for the unique request message id in it.
c. If you do find the unique request message ID, see if you can get more information about the cause for the failure.
d. Fix the issue with the policy, if possible.

Since 500 Internal Server Error can be caused for different reasons, the following examples illustrate how to determine the cause and resolution for different types of issues.

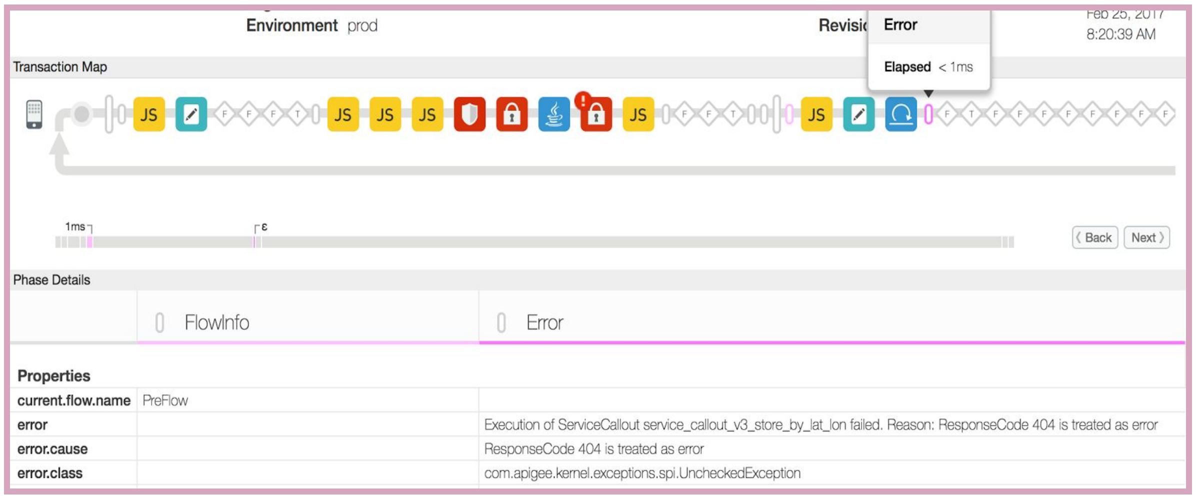
Example 1: Failure in Service Callout policy due to an error in the backend server

If the call to the backend server fails within the Service Callout policy with any error such as 4XX or 5XX, then it will be treated as 500 Internal Server Error.

1. Here's an example where the backend service fails with a 404 error within the Service Callout policy. The following error message is sent to the end user:

```
{
"fault":
    { "detail":
         { "errorcode":"steps.servicecallout.ExecutionFailed"
         },"faultstring":"Execution of ServiceCallout service_callout_v3_store_by_lat_lon
 failed. Reason: ResponseCode 404 is treated as error"
        }
    }
}
```

2. The following trace UI session shows 500 status code caused due to an error in Service Callout policy:



Properties		
current.flow.name	PreFlow	
error		Execution of ServiceCallout service_callout_v3_store_by_lat_lon failed. Reason: ResponseCode 404 is treated as error
error.cause		ResponseCode 404 is treated as error
error.class		com.apigee.kernel.exceptions.spi.UncheckedException

3. In this example, the "error" property lists the reason for the Service Callout policy failure as **"ResponseCode 404 is treated as error".** This error might occur if the resource being accessed via the backend server URL in the Service Callout policy is not available.

4. Check the availability of the resource on the backend server. It might not be available temporarily/permanently or it might have been moved to a different location.

Resolution

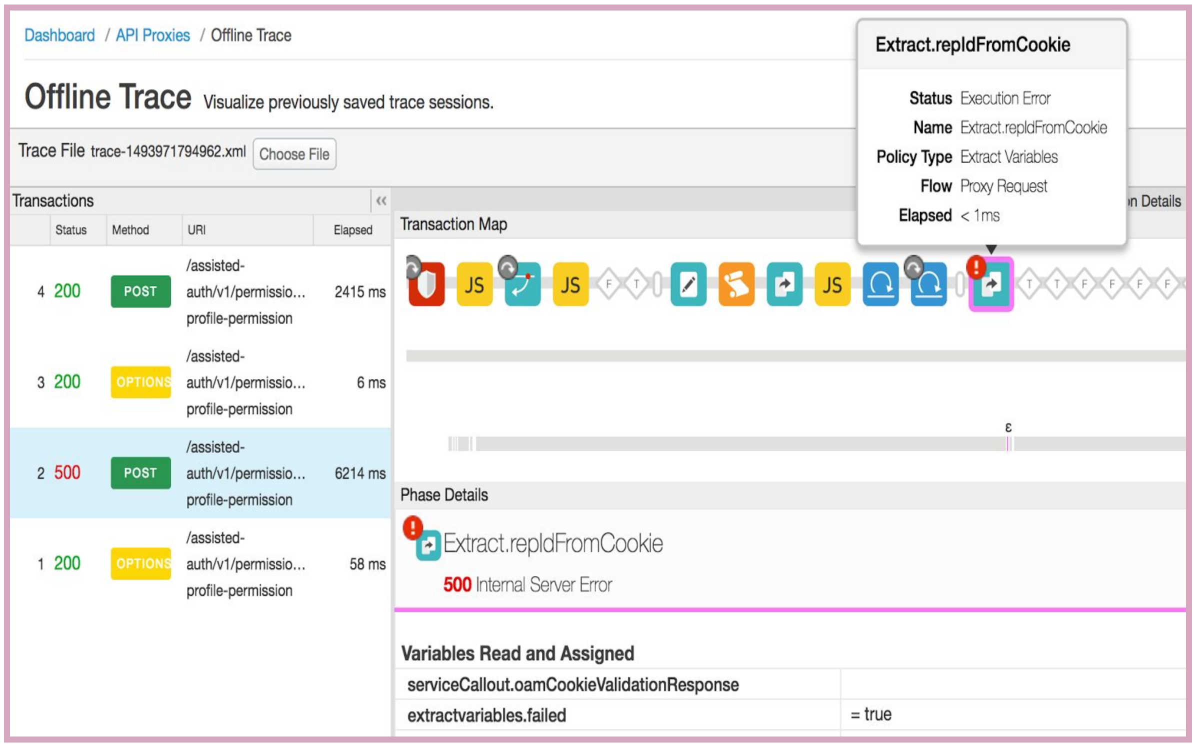
1. Check the availability of the resource on the backend server. It might not be available temporarily/permanently or it might have been moved to a different location.

2. Fix the backend server URL in the Service Callout policy.

Example 2: Failure in Extract Variables Policy

Let's now look at an example, where 500 Internal Server Error is caused due to an error in Extract Variables and see how to troubleshoot and resolve the issue.

1. The following trace in UI session shows 500 status code due to an error in Extract Variables policy:



Dashboard / API Proxies / Offline Trace

Offline Trace Visualize previously saved trace sessions.

Trace File trace-1493971794962.xml Choose File

Extract.repIdFromCookie

Status	Execution Error
Name	Extract.repldFromCookie
Policy Type	Extract Variables
Flow	Proxy Request
Elapsed	< 1ms

Transactions

	Status	Method	URI	Elapsed
4	200	POST	/assisted-auth/v1/permissio... profile-permission	2415 ms
3	200	OPTIONS	/assisted-auth/v1/permissio... profile-permission	6 ms
2	500	POST	/assisted-auth/v1/permissio... profile-permission	6214 ms
1	200	OPTIONS	/assisted-auth/v1/permissio... profile-permission	58 ms

Transaction Map

Phase Details

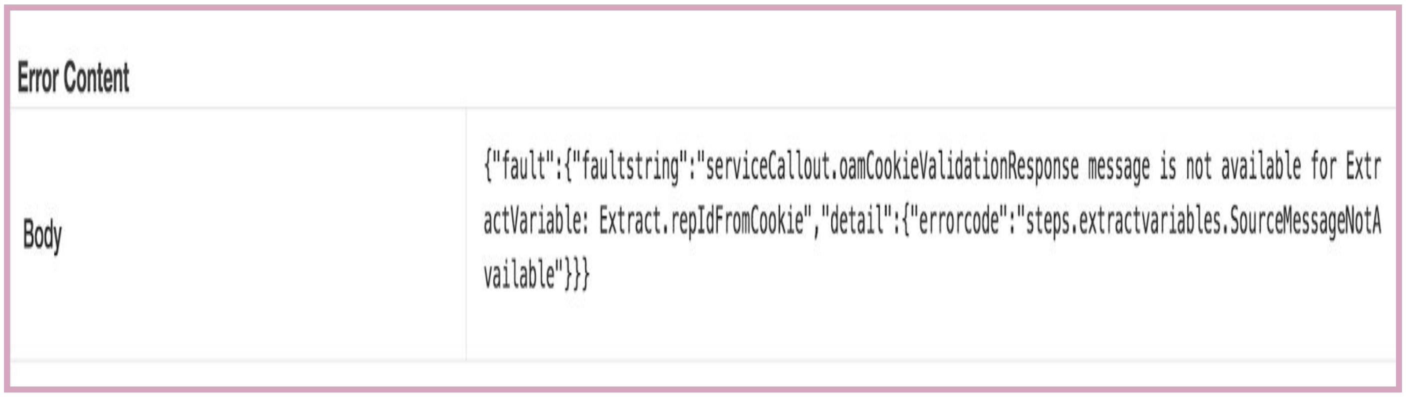
Extract.repIdFromCookie

500 Internal Server Error

Variables Read and Assigned

serviceCallout.oamCookieValidationResponse	
extractvariables.failed	= true

2. Select the failing Extract Variables policy, scroll down and look at the **“Error Content”** section for more details:



Error Content

Body	{"fault":{"faultstring":"serviceCallout.oamCookieValidationResponse message is not available for ExtractVariable: Extract.repIdFromCookie","detail":{"errorcode":"steps.extractvariables.SourceMessageNotAvailable"}}}

3. The Error Content indicates that the**“serviceCallout.oamCookieValidationResponse”** variable is not available in the Extract Variables policy.

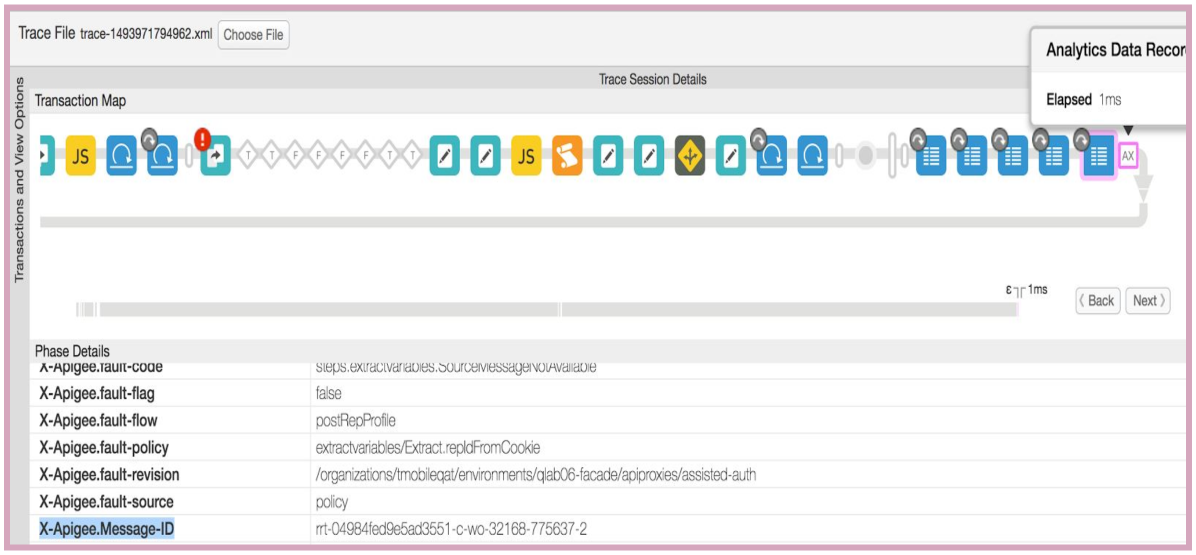
As the name of the variable indicates, it is possible that the variable should have been set by the preceding Service Callout policy.

4. If you check the Service Callout policy, you might find that the "**serviceCallout.oamCookieValidationResponse"** variable was not set.

   This indicates that the call to the backend service failed, resulting in an empty response variable.

5. Though the Service Callout policy has failed, the execution of the policies after Service Callout policy continue because the "continueOnError" flag in the Service Callout policy is set to true.

6. Note down the unique message id **"X-Apigee.Message-ID"** for this specific API request from the trace, as follows:
   a. Select the "Analytics Data Recorded" phase from the request.
   b. Scroll down and note the value of **X-Apigee.Message-ID.**



X-Apigee.fault-code	steps.extractvariables.SourceMessageNotAvailable
X-Apigee.fault-flag	false
X-Apigee.fault-flow	postRepProfile
X-Apigee.fault-policy	extractvariables/Extract.repIdFromCookie
X-Apigee.fault-revision	/organizations/tmobileqat/environments/qlab06-facade/apiproxies/assisted-auth
X-Apigee.fault-source	policy
X-Apigee.Message-ID	rrt-04984fed9e5ad3551-c-wo-32168-775637-2

7. View the Message Processor log (`/opt/apigee/var/log/edge-message-processor/system.log`) and search for the unique message id noted down in step #6. The following error message was observed for the specific API request:

```
2017-05-05 07:48:18,653 org:myorg env:prod api:myapi rev:834
messageid:rrt-04984fed9e5ad3551-c-wo-32168-77563  NIOThread@5 ERROR HTTP.CLIENT -
HTTPClient$Context.onTimeout() : ClientChannel[C:]@149081 useCount=1 bytesRead=0
bytesWritten=0 age=3002ms lastIO=3002ms .onConnectTimeout
connectAddress=mybackend.domain.com/XX.XX.XX.XX:443
resolvedAddress=mybackend.domain.com/XX.XX.XX.XX
```

The above error indicates that the Service Callout policy failed due to a connection timeout error while connecting to the backend server.

8. To determine the cause for the connection timeout error, executed the **telnet** command to the backend server from the Message Processor(s). The telnet command gave “Connection timed out” error as shown below:

```
telnet mybackend.domain.com 443
Trying XX.XX.XX.XX...
telnet: connect to address XX.XX.XX.XX: Connection timed out
```

Typically, this error is observed under the following circumstances:

➔ When the backend server is not configured to allow traffic from the Edge Message Processors.

➔ If the backend server is not listening on the specific port.

In the above illustrated example, though the Extract Variables policy failed, the actual cause was that Edge was unable to connect to the backend server in the Service Callout policy. And the cause for this failure was that the backend end server was not configured to allow traffic from the Edge Message Processors.

Your own Extract Variables policy will behave differently and may fail for a different reason. You can troubleshoot the issue appropriately depending on the cause for failure of your Extract Variables policy by checking the message in the **error** property.

Resolution

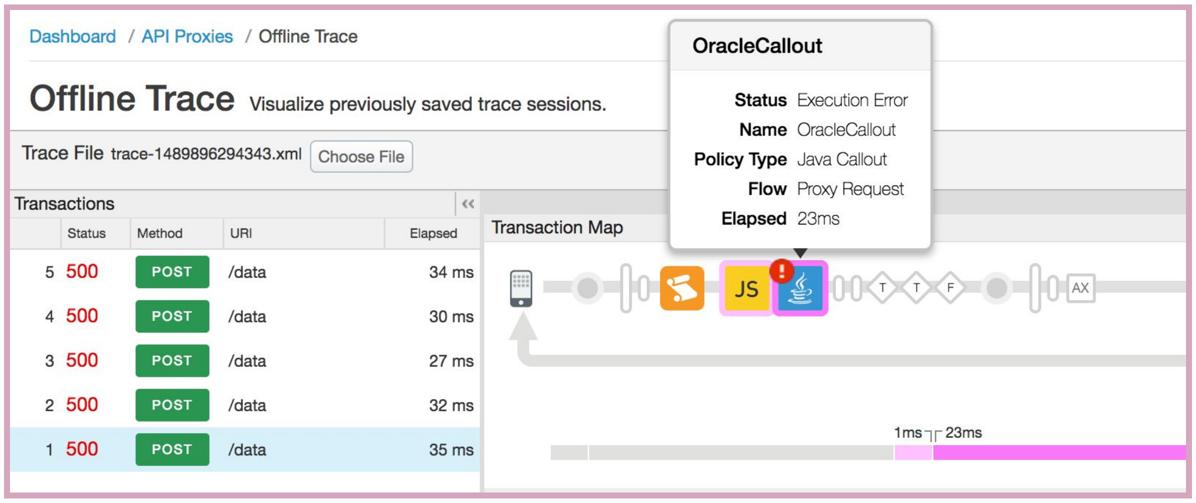
1. Fix the cause for error or failure in Extract Variables policy appropriately.

2. In the illustrated example above, the solution was to rectify the network configuration to allow the traffic from Edge Message Processors to your backend server. This was done by while listing the Message Processors' IP addresses on the specific backend server. For example, On Linux, you could use **iptables** to white list or allow the traffic from Message Processor's IP addresses on the backend server.

Example 3: Failure in JavaCallout policy

Let's now look at an example, where 500 Internal Server Error is caused due to an error in Java Callout policy and see how to troubleshoot and resolve the issue.

1. The following UI trace shows 500 status code due to an error in Java Callout Policy:

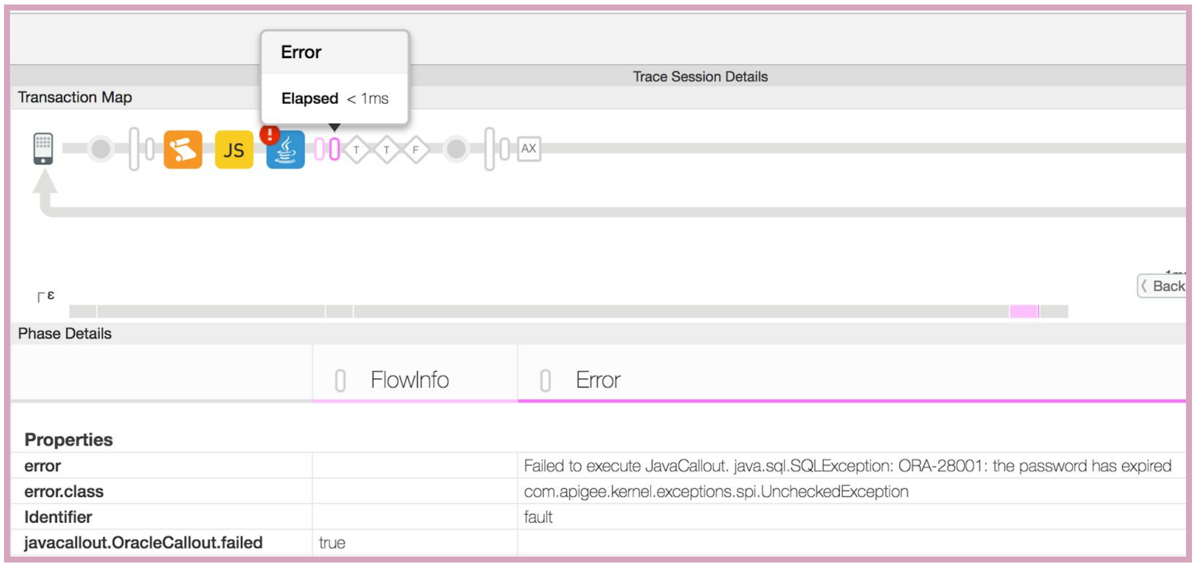

Dashboard / API Proxies / Offline Trace
Offline Trace Visualize previously saved trace sessions.
Trace File trace-1489896294343.xml
Choose File
Transactions
Transaction Map
JS
T
T
F
AX
1ms
23ms

OracleCallout

Status	Execution Error
Name	OracleCallout
Policy Type	Java Callout
Flow	Proxy Request
Elapsed	23ms

	Status	Method	URI	Elapsed
5	500	POST	/data	34 ms
4	500	POST	/data	30 ms
3	500	POST	/data	27 ms
2	500	POST	/data	32 ms
1	500	POST	/data	35 ms

2. Select the Flow named **"Error"** followed by the failed Java Callout Policy to get the error details as shown in the figure below:



Properties		
error		Failed to execute JavaCallout. java.sql.SQLException: ORA-28001: the password has expired
error.class		com.apigee.kernel.exceptions.spi.UncheckedException
Identifier		fault
javacallout.OracleCallout.failed	true	

3. In this example, the **"error"** property under the Properties section reveals that the failure is due to expired password being used while connecting to the Oracle Database from within the JavaCallout policy. Your own Java callout will behave differently and will populate a different message in the **error** property.

4. Check the JavaCallout policy code and confirm the correct configuration that needs to be used.

Resolution

Fix the Java callout code or configuration appropriately to avoid the runtime exception. In the illustrated Java callout failure example above, one would need to use the correct password for connecting to the Oracle database to resolve the issue.

Error in the Backend Server

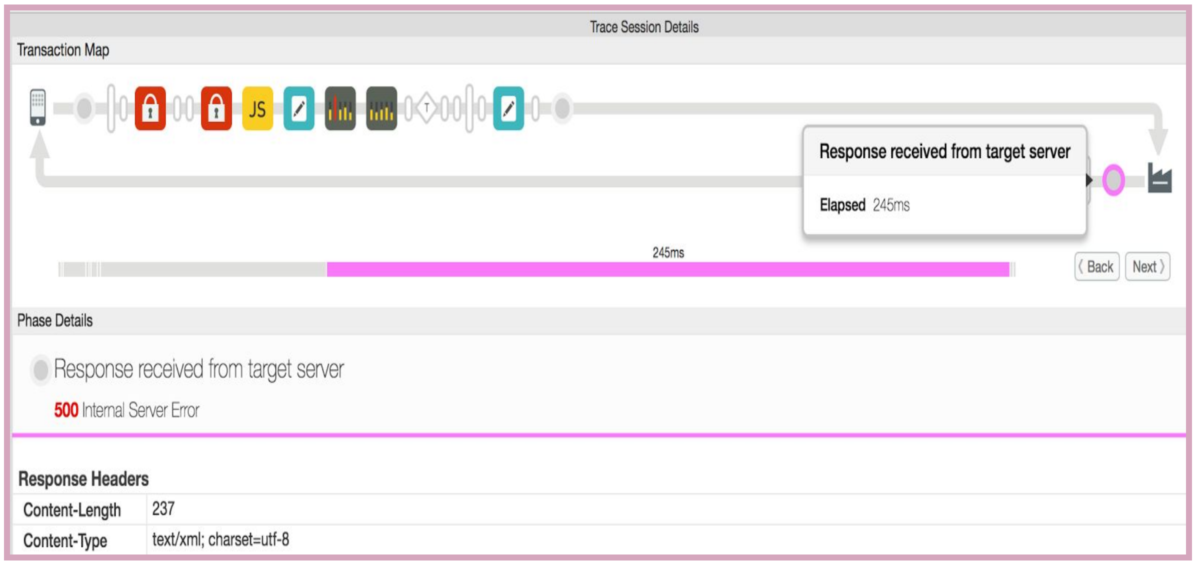
Steps to Diagnose

If you have confirmed that the 500 Internal Server Error is coming from the backend server, perform the following steps:

1. If you have the UI trace for the error, then:

    a. Select the API request that has failed with 500 Internal Server Error.

    b. Select the **"Response received from target server"** phase from the failing API request as shown in the figure below:



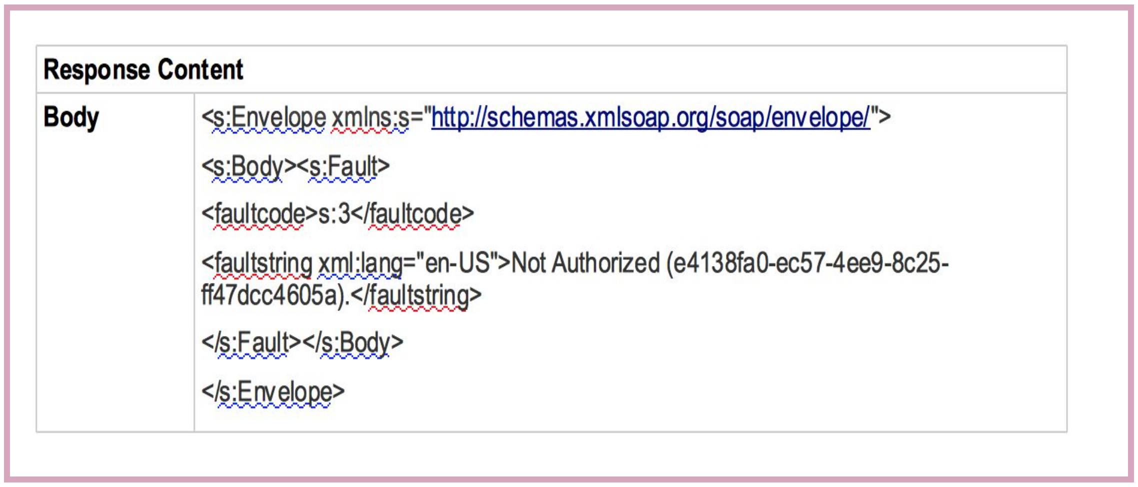
Response received from target server

500 Internal Server Error

Response Headers

Content-Length	237
Content-Type	text/xml; charset=utf-8

    c. Check the **"Response Content"** section to get details about the error.



Response Content	
Body	<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"> <s:Body><s:Fault> <faultcode>s:3</faultcode> <faultstring xml:lang="en-US">Not Authorized (e4138fa0-ec57-4ee9-8c25-ff47dcc4605a).</faultstring> </s:Fault></s:Body> </s:Envelope>

In this example, the Response Content which is a SOAP Envelope, shows the fault string as **"Not Authorized"** message**.** The most likely cause for this issue is that the proper credentials (username/password, access token, etc.) are not passed to the backend server by the user.
The cause of other backend errors can vary widely. You will need to diagnose each situation independently.

d. Check the backend server logs to see if there are any more details about the error.

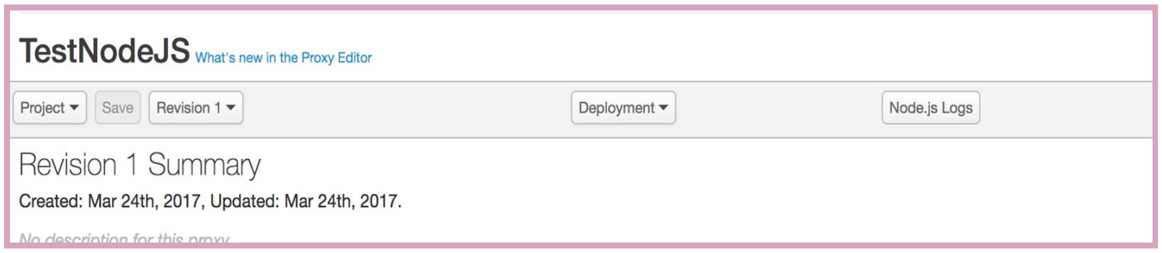
e. Proceed to step #4.

2. If the UI trace is not available for the failing request, then check the backend server logs to get details about the error.

3. If possible, enable the debug mode on the backend server to get more details about the error and the cause.

4. If it is a **NodeJS Backend Server**, then check the NodeJS logs for the specific API Proxy in the UI or Message Processor logs (`/opt/apigee/var/log/edge-message-processor/logs/system.log`) for more details about the error.

NodeJS Logs option in the Edge UI - Overview Tab of API Proxy



Revision 1 Summary

Created: Mar 24th, 2017, Updated: Mar 24th, 2017.

No description for this proxy

Resolution

1. Once you've identified the cause of the error, fix the issue in your backend server.
2. If it's a NodeJS backend server:
    a. Check if the error is thrown from your custom code and fix the issue, if possible.
    b. If the error is not thrown from your custom code or if you need assistance, contact Apigee Support.

If you need further assistance in troubleshooting 500 Internal Server Error or you suspect that it's an issue within Edge, contact Apigee Support.

502 Bad Gateway

Description

The client application gets an HTTP status code of **502** with the message **“Bad Gateway”** as a response for API calls.

Error Messages

Client application gets the following response code:

```
HTTP/1.1 502 Bad Gateway
```

In addition, you may observe the following error message:

```
{
  "fault": {
    "faultstring": "Unexpected EOF at target",
    "detail": {
        "errorcode": "messaging.adaptors.http.UnexpectedEOFAtTarget"
     }
   }
}
```

Overview of 502 Bad Gateway

The HTTP status code 502 means that the client is not receiving a valid response from the backend servers that should actually fulfill the request.

Causes

One of the typical causes for 502 Bad Gateway Error is the **“Unexpected EOF”** error, which can be caused due to following reasons:

Cause	Details
Incorrectly configured Target Server	Target server is not properly configured to support TLS/SSL connections.
EOFException from Backend Server	The backend server may send EOF abruptly.

Incorrectly configured Target Server

Steps to Diagnose

1. Enable the trace in UI for the affected API.

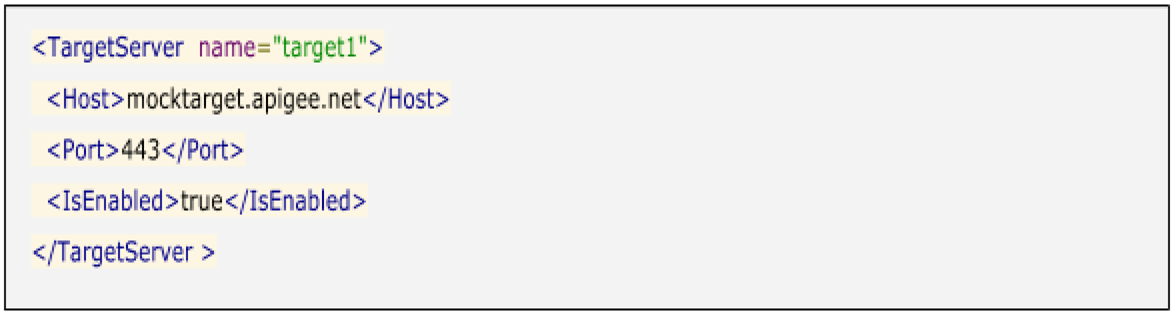
2. If the trace for the failing API request shows the following:
    a. The 502 Bad Gateway error is seen as soon as the Target Flow request started.
    b. The error.class displays **messaging.adaptors.http.UnexpectedEOF.**

    Then it is very likely that this issue is caused by an incorrect target server configuration.

3. Get the target server definition using the following Edge management API call:

```
curl -v
http://management:8080/v1/organizations/<orgname>/environme
nts/<envname>/targetservers/<targetservername>
```

Sample Faulty Target Server Definition



```
<TargetServer  name="target1">
  <Host>mocktarget.apigee.net</Host>
  <Port>443</Port>
  <IsEnabled>true</IsEnabled>
</TargetServer >
```

4. The illustrated target server definition is an example for one of the typical mis configurations which is explained as follows:

   Let's assume that the target server **"mocktarget.apigee.net"** is configured to accept **secure (HTTPS)** connections on port # 443. However, if you look at the target server definition, there are no other attributes/flags that indicate that it is meant for secure connections. This causes Edge to treat the API requests going to the specific target server as **HTTP (non-secure) requests**. So Edge will not initiate the SSL Handshake process with this target server.

   Since the target server is configured to accept only HTTPS (SSL) requests on 443, it will reject the request from Edge or close the connection. As a result, you get an UnexpectedEOF error on the Message Processor. The Message Processor will send 502 Bad Gateway response to the client.

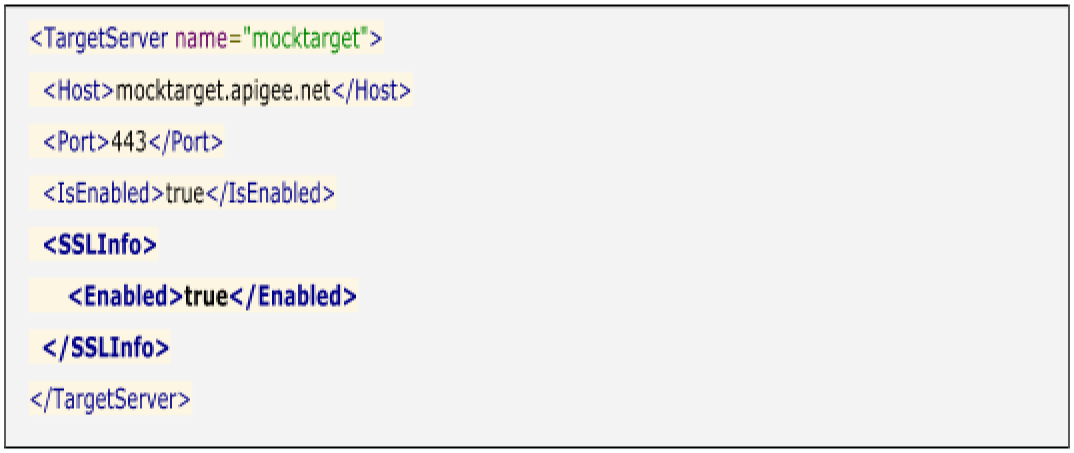
Resolution

Always ensure that the target server is configured correctly as per your requirements.

For the illustrated example above, if you want to make requests to a secure (HTTPS/SSL) target server, you need to include the SSLInfo attributes with the **"enabled"** flag set to true. While it is allowed to add the SSLInfo attributes for a target server in the target endpoint definition itself, it is recommended to add the SSLInfo attributes as part of the target server definition to avoid any confusion.

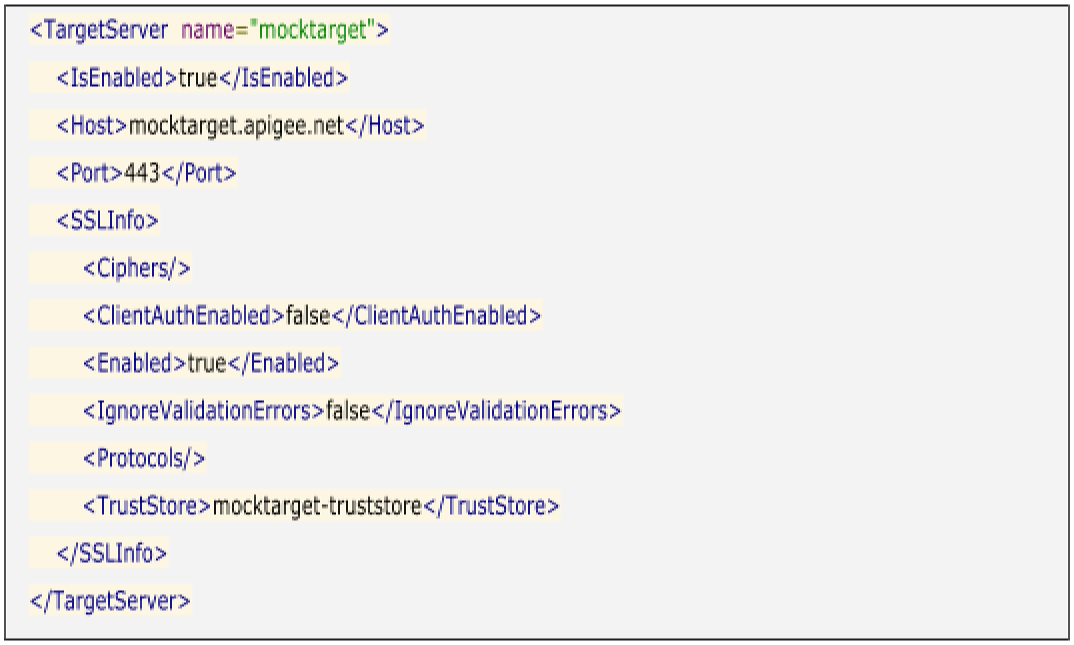
1. If the backend service requires **one-way SSL communication**, then:

   a. You need to enable the TLS/SSL in the target server definition by including the SSLInfo attributes where "enabled" flag is set to true as shown below:



```
<TargetServer name="mocktarget">
 <Host>mocktarget.apigee.net</Host>
 <Port>443</Port>
 <IsEnabled>true</IsEnabled>
 <SSLInfo>
   <Enabled>true</Enabled>
 </SSLInfo>
</TargetServer>
```

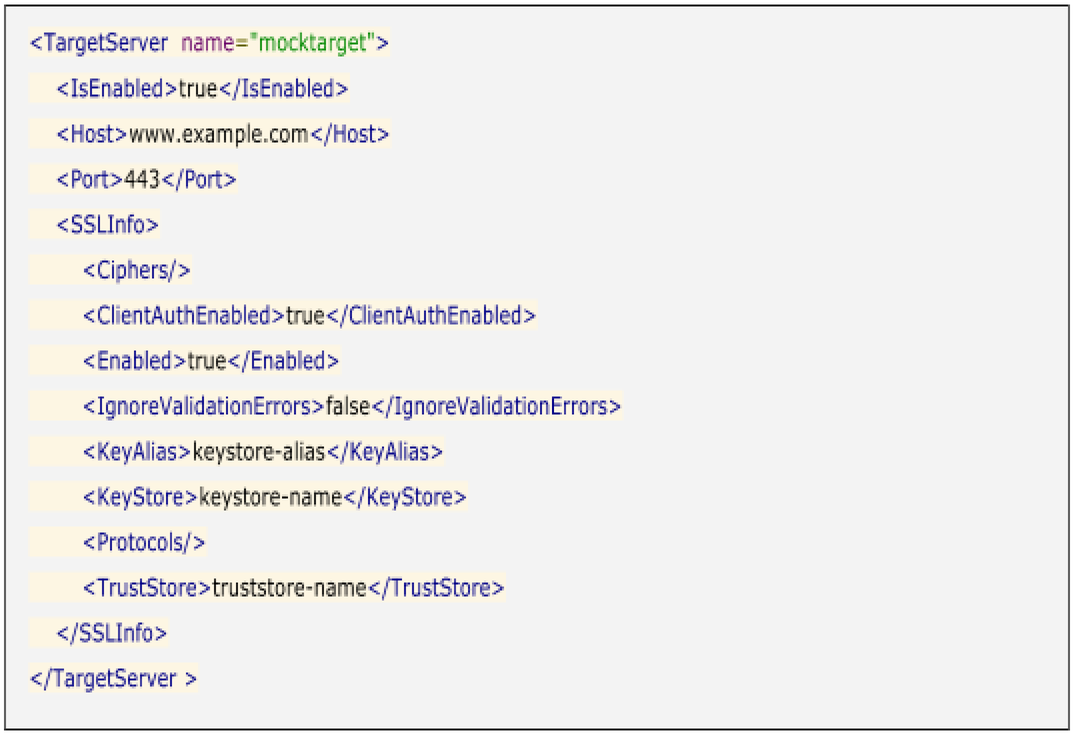
b. If you want to validate the target server's certificate in Edge, then we also need to include the truststore (containing the target server's certificate) as shown below:



```
<TargetServer  name="mocktarget">
   <IsEnabled>true</IsEnabled>
   <Host>mocktarget.apigee.net</Host>
   <Port>443</Port>
   <SSLInfo>
      <Ciphers/>
      <ClientAuthEnabled>false</ClientAuthEnabled>
      <Enabled>true</Enabled>
      <IgnoreValidationErrors>false</IgnoreValidationErrors>
      <Protocols/>
      <TrustStore>mocktarget-truststore</TrustStore>
   </SSLInfo>
</TargetServer>
```

2. If the backend service requires **two-way SSL communication**, then:

   a. You need to have SSLInfo attributes with ClientAuthEnabled, Keystore, KeyAlias, and Truststore flags set appropriately, as shown below:



```
<TargetServer  name="mocktarget">
  <IsEnabled>true</IsEnabled>
  <Host>www.example.com</Host>
  <Port>443</Port>
  <SSLInfo>
    <Ciphers/>
    <ClientAuthEnabled>true</ClientAuthEnabled>
    <Enabled>true</Enabled>
    <IgnoreValidationErrors>false</IgnoreValidationErrors>
    <KeyAlias>keystore-alias</KeyAlias>
    <KeyStore>keystore-name</KeyStore>
    <Protocols/>
    <TrustStore>truststore-name</TrustStore>
  </SSLInfo>
</TargetServer >
```

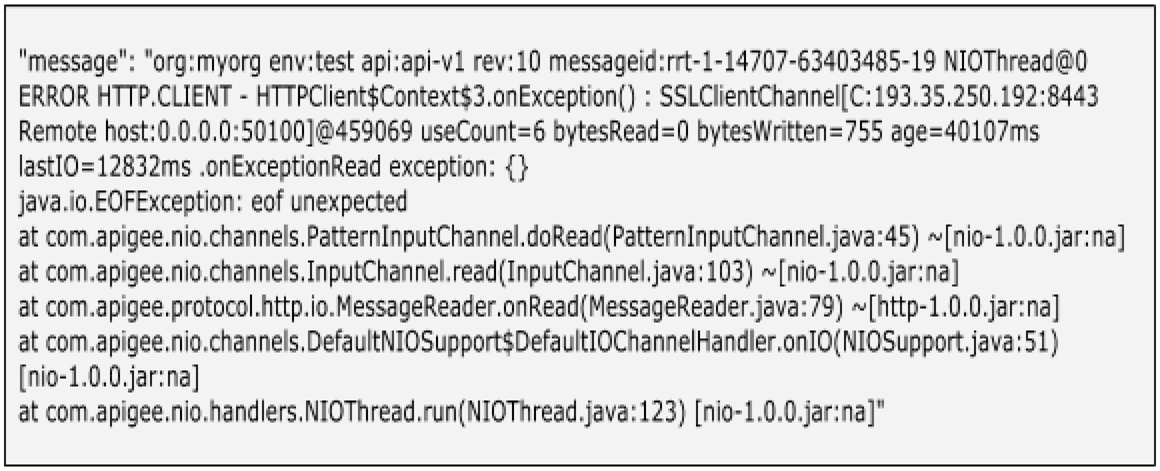
References

Load balancing across backend servers

EOFException from the Backend Server

1. Check the Message Processor logs (`/opt/apigee/var/log/edge-message-processor/logs/system.log`) and search if you have got "eof unexpected" for the specific API or if you have the unique messageid for the API request, then you can search for it.

Sample exception stack trace from Message Processor log



```
"message": "org:myorg env:test api:api-v1 rev:10 messageid:rrt-1-14707-63403485-19 NIOThread@0
ERROR HTTP.CLIENT - HTTPClient$Context$3.onException() : SSLClientChannel[C:193.35.250.192:8443
Remote host:0.0.0.0:50100]@459069 useCount=6 bytesRead=0 bytesWritten=755 age=40107ms
lastIO=12832ms .onExceptionRead exception: {}
java.io.EOFException: eof unexpected
at com.apigee.nio.channels.PatternInputChannel.doRead(PatternInputChannel.java:45) ~[nio-1.0.0.jar:na]
at com.apigee.nio.channels.InputChannel.read(InputChannel.java:103) ~[nio-1.0.0.jar:na]
at com.apigee.protocol.http.io.MessageReader.onRead(MessageReader.java:79) ~[http-1.0.0.jar:na]
at com.apigee.nio.channels.DefaultNIOSupport$DefaultIOChannelHandler.onIO(NIOSupport.java:51)
[nio-1.0.0.jar:na]
at com.apigee.nio.handlers.NIOThread.run(NIOThread.java:123) [nio-1.0.0.jar:na]"
```

In the above example, you can see that the **"java.io.EOFException: eof unexpected"** error occurred while Message Processor is trying to read a response from the backend server. This exception indicates the the end of file (EOF), or the end of stream has been reached unexpectedly.

That is, the Message Processor sent the API request to the backend server and was waiting or reading the response. However, the backend server terminated the connection abruptly before the Message Processor got the response or could read the complete response.

2. Check your backend server logs and see if there are any errors or information that could have led the backend server to terminate the connection abruptly. If you find any errors/information, then go to Resolution step and fix the issue appropriately in your backend server.

3. If you don't find any errors or information in your backend server, collect the tcpdump output on the Message Processor(s):

    a. If your backend server has a single IP address then use the following command:

    ```
    tcpdump -i any -s 0 host <IP address> -w <File name>
    ```

b. If your backend server has multiple IP addresses, then use the following command:

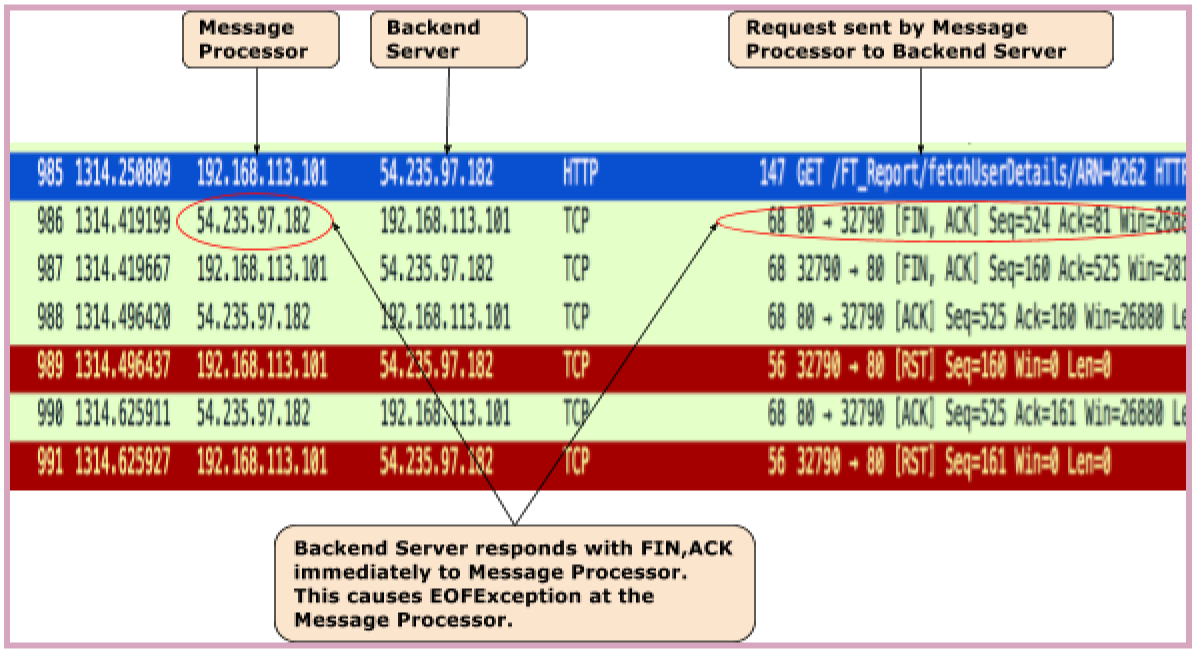
```
tcpdump -i any -s 0 host <Hostname> -w <File name>
```

Note: If you are running this command on the Message Processor, use the IP address/hostname of the backend server. You can also take the tcpdump on the backend server. If you are running the command on the backend server, use the IP address of the Message Processor.

Typically, this error is caused because the backend server responds back with [FIN,ACK] as soon as the Message Processor sends the request to the backend server.

4. Consider the following tcpdump example.

Sample tcpdump taken when 502 Bad Gateway Error (Unexpected EOF) occurred



```
985 1314.250809   192.168.113.101   54.235.97.182     HTTP   147 GET /FT_Report/fetchUserDetails/ARN-0262 HTTP
986 1314.419199   54.235.97.182     192.168.113.101   TCP    68 80 → 32790 [FIN, ACK] Seq=524 Ack=81 Win=268
987 1314.419667   192.168.113.101   54.235.97.182     TCP    68 32790 → 80 [FIN, ACK] Seq=160 Ack=525 Win=281
988 1314.496420   54.235.97.182     192.168.113.101   TCP    68 80 → 32790 [ACK] Seq=525 Ack=160 Win=26880 Le
989 1314.496437   192.168.113.101   54.235.97.182     TCP    56 32790 → 80 [RST] Seq=160 Win=0 Len=0
990 1314.625911   54.235.97.182     192.168.113.101   TCP    68 80 → 32790 [ACK] Seq=525 Ack=161 Win=26880 Le
991 1314.625927   192.168.113.101   54.235.97.182     TCP    56 32790 → 80 [RST] Seq=161 Win=0 Len=0
```

Message Processor
Backend Server
Request sent by Message Processor to Backend Server
Backend Server responds with FIN,ACK immediately to Message Processor. This causes EOFException at the Message Processor.

5. From the TCPDump output, you notice the following sequence of events:
   a. The Message Processor sends the API request to the backend server.
   b. The backend server immediately responds back with [FIN,ACK].

c. This is followed by the Message Processor responding with [FIN,ACK] to the backend server.
d. Eventually the connections are closed with [ACK] and [RST] from both the sides.
e. Since the backend server sends [FIN,ACK], you get the exception **"java.io.EOFException: eof unexpected"** exception on the Message Processor.

6. This can happen if there's a network issue at the backend server. Engage your network operations team to investigate this issue further.

Resolution

Fix the issue on the backend server appropriately.

If the issue persists and you need assistance troubleshooting 502 Bad Gateway Error or you suspect that it's an issue within Edge, contact Apigee Support.

503 Service Unavailable

Description

The client application receives an HTTP status code of **503** with the message **“Service Unavailable”** as a response for the API calls.

Error Messages

Client application gets one of the following response codes:

```
HTTP/1.1 503 Service Unavailable
```

OR

```
HTTP/1.1 503 Service Unavailable: Back-end server is at capacity
```

The following error message may also be observed:

```
{
  "fault": {
    "faultstring": "The Service is temporarily unavailable",
    "detail": {
        "errorcode": "messaging.adaptors.http.flow.ServiceUnavailable"
     }
   }
}
```

Overview of 503 Service Unavailable

The HTTP status code of 503 means that the server is currently unavailable. Most of the time this error occurs because the server is too busy or the server is temporarily under maintenance. It could also occur if the client is unable to connect to the server or the SSL handshake fails between the client and the server.

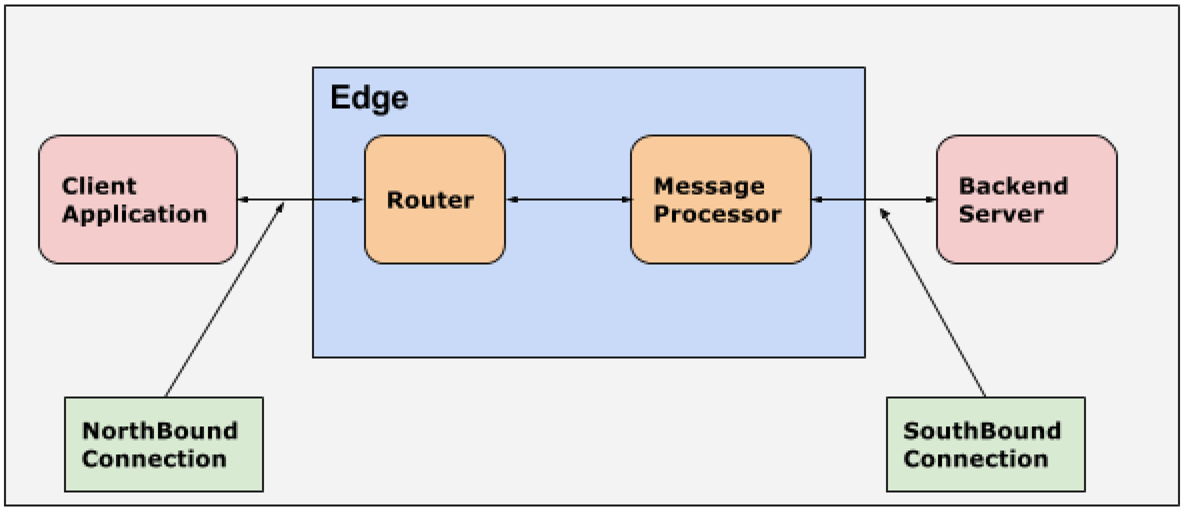
Northbound and Southbound Connection

Before diving into diagnosing the problem, review the following information about Northbound and Southbound connections in Edge.

In Edge, the 503 Service Unavailable error can be seen either in the:

- ➔ **Incoming/Northbound** connection that is between the client application and Edge Router.
- ➔ **Outgoing/Southbound** connection that is between the Edge Message Processor and the backend server.

Sample Diagram showing Northbound and Southbound connections



Determine whether the 503 Service Unavailable error occurred at northbound or southbound connection

First, use one of the following procedures to determine if the 503 Service Unavailable error occurred at the northbound or southbound connection.

Procedure 1: Using UI Trace

1. If the issue is still active, enable the UI trace for the affected API.

2. If the UI trace for the failing API request shows that the 503 Service Unavailable error occurs during the target request flow or is sent by the backend server, then the issue is southbound, between the Message Processor and the backend server.

3. If you don't get the trace for the specific API call, then the issue is northbound, between the client application and the Router.

Procedure 2: Using Nginx Access Logs

If the issue has happened in the past or if the issue is intermittent and you are unable to capture the trace, then perform the following steps:

1. Check the Nginx access logs (`/opt/apigee/var/log/edge-router/nginx/<org>~<env>.<port#>_access_log`).

2. Search if there are any 503 Errors for specific API proxy.

3. If you can identify any 503 Errors for the specific API at the specific time, then the issue occurred at the southbound between the Message Processor and the backend server.

4. If not, then the issue occurred at the northbound connection between the client application and the Router.

Causes

The typical causes for the HTTP status code - **503 Service Unavailable** are:

Cause	Details
Overloaded Server	Server is overloaded and cannot handle any new incoming requests.

Connection Errors	Server could not be connected due to network/connectivity issues.
SSL Handshake Failures	SSL handshake failure between the client and server.

Overloaded Server

1. Typically you will see the following error when the server is overloaded or cannot handle any more requests:

```
HTTP/1.1 503 Service Unavailable: Back-end server is at capacity
```

2. Determine whether the 503 Service Unavailable error occurred at northbound or southbound connection:

    a. If the error is on the northbound, then check if the Average Load/CPU/Memory usage is high on the Edge Router.
    b. If the error is on the southbound, then check if the Average Load/CPU/Memory usage is high on the backend server.

Resolution

If the Edge router or backend server is overloaded, then:

1. Restart the appropriate server (Edge Router or backend server) and then monitor the server to see if the problem is resolved.

2. If the problem persists, then check if you need to increase the capacity of the appropriate server.

Connection Errors

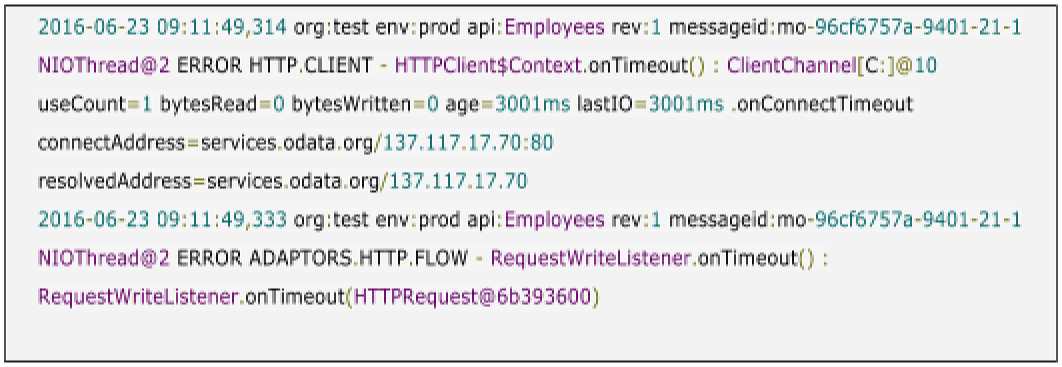
You get the connection errors when the Message Processor attempts to connect to the backend server and if:

- It is unable to connect within the preset connection timeout period (**Default connection timeout period**-3 seconds), OR
- If the connection is refused by the backend server.

Steps to Diagnose

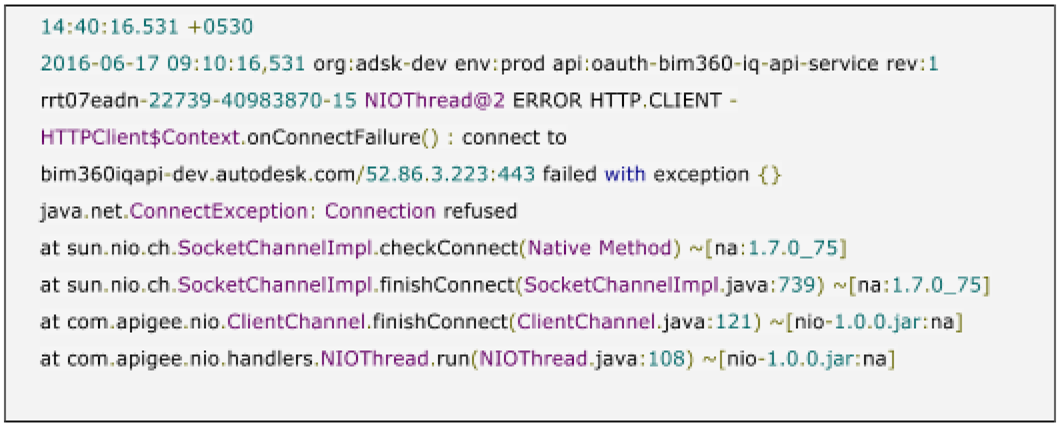
1. Check the `/opt/apigee/var/log/edge-message-processor/logs/system.log` on Message Processors for any of the following errors:

   a. **onConnectTimeout Error** indicates that Message Processor was unable to connect to the backend server within the preset connection time out period.



```
2016-06-23 09:11:49,314 org:test env:prod api:Employees rev:1 messageid:mo-96cf6757a-9401-21-1
NIOThread@2 ERROR HTTP.CLIENT - HTTPClient$Context.onTimeout() : ClientChannel[C:]@10
useCount=1 bytesRead=0 bytesWritten=0 age=3001ms lastIO=3001ms .onConnectTimeout
connectAddress=services.odata.org/137.117.17.70:80
resolvedAddress=services.odata.org/137.117.17.70
2016-06-23 09:11:49,333 org:test env:prod api:Employees rev:1 messageid:mo-96cf6757a-9401-21-1
NIOThread@2 ERROR ADAPTORS.HTTP.FLOW - RequestWriteListener.onTimeout() :
RequestWriteListener.onTimeout(HTTPRequest@6b393600)
```

   b. **java.net.ConnectException: Connection refused** indicates the connection was refused by the backend server.



```
14:40:16.531 +0530
2016-06-17 09:10:16,531 org:adsk-dev env:prod api:oauth-bim360-iq-api-service rev:1
rrt07eadn-22739-40983870-15 NIOThread@2 ERROR HTTP.CLIENT -
HTTPClient$Context.onConnectFailure() : connect to
bim360iqapi-dev.autodesk.com/52.86.3.223:443 failed with exception {}
java.net.ConnectException: Connection refused
at sun.nio.ch.SocketChannelImpl.checkConnect(Native Method) ~[na:1.7.0_75]
at sun.nio.ch.SocketChannelImpl.finishConnect(SocketChannelImpl.java:739) ~[na:1.7.0_75]
at com.apigee.nio.ClientChannel.finishConnect(ClientChannel.java:121) ~[nio-1.0.0.jar:na]
at com.apigee.nio.handlers.NIOThread.run(NIOThread.java:108) ~[nio-1.0.0.jar:na]
```

2. Check if you are able to connect to the specific backend server directly from each of the Message Processors using the telnet command:

    a. If the backend server resolves to a single IP address, then use the following command:

        `telnet <BackendServer-IPaddress> 443`

    b. If the backend server resolves to multiple IP addresses, then use the following command:

        `telnet <BackendServer-HostName> 443`

3. If you are able to connect to the backend server, then you may see message like “Connected to <BackendServer>”. If you are unable to connect to the backend server, this might be because the Message Processors’ IP addresses are not whitelisted on the specific backend server.

Resolution

Whitelist the Message Processors’ IP addresses on the specific backend server to allow the traffic from Edge Message Processors to your backend server. For example, On Linux, you could use **iptables** to white list or allow the traffic from Message Processor’s IP addresses on the backend server.

SSL Handshake Failures

Description

A failure that is observed during SSL handshake process between two processes is known as **SSL Handshake Failure**.

Error Messages

```
HTTP/1.1 503 Service Unavailable
```

The following error messages may also be observed:

```
Received fatal alert: handshake_failure
```

Overview of SSL Handshake

SSL Handshake is a process that enables the SSL/TLS client and server to establish the secret keys with which they can communicate. During this process they

1. Agree on the version of the protocol to use.
2. Select the cryptographic algorithm to be used.
3. Authenticate each other by exchanging and validating digital certificates.

If the SSL Handshake succeeds, then the SSL/TLS client and server transfer the data to each other. Otherwise, if SSL Handshake failure occurs the connection will be terminated. The end user will usually see a 503 Service Unavailable error in Apigee Edge setup.

Causes

The typical causes for SSL Handshake failure are:

Cause	Details
Protocol mismatch	Protocol used by the client is not supported by the server.
Cipher Suite mismatch	Cipher suite used by the client is not supported by the server.
Incorrect Certificate	Hostname in the URL used by the client does not match the hostname in the certificate stored at the server end.
	Incomplete/invalid certificate chain is stored at the client/server end.
	Incorrect/expired certificate is sent by the client to the server or vice versa.
SNI Enabled Server	Backend server is SNI enabled, however, the client is not able to communicate with the SNI servers.

Protocol Mismatch

The SSL Handshake failure can occur if the protocol used by the client is not supported by the server either at the northbound or the southbound connection in Edge.

Steps to Diagnose

1. Determine whether the 503 Service Unavailable error occurred at northbound or southbound connection.

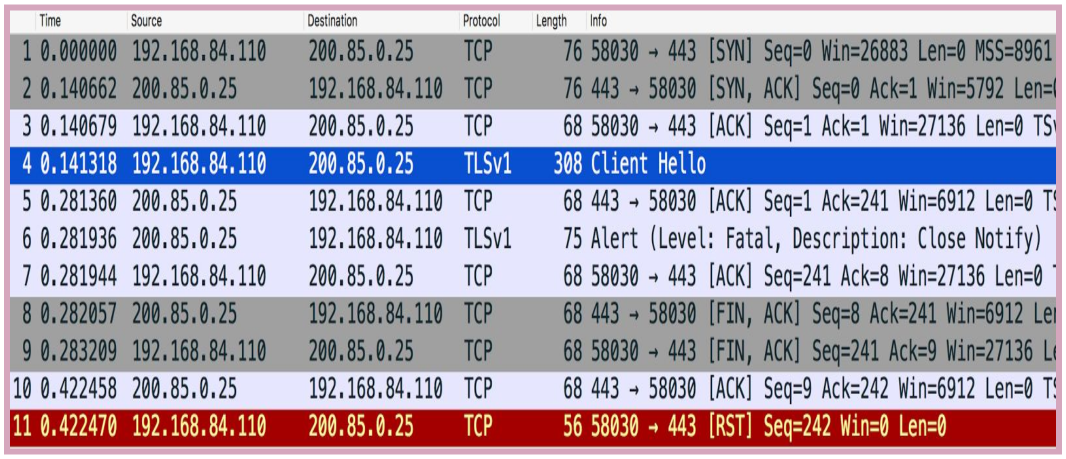
2. Collect the tcpdump data at the relevant server (Edge router or Message Processor) based on the results from step #1.

```
tcpdump -i any -s 0 host <IP address> -w <File name>
```

3. Analyse the tcpdump data using the Wireshark tool or a similar tool that you are familiar with.

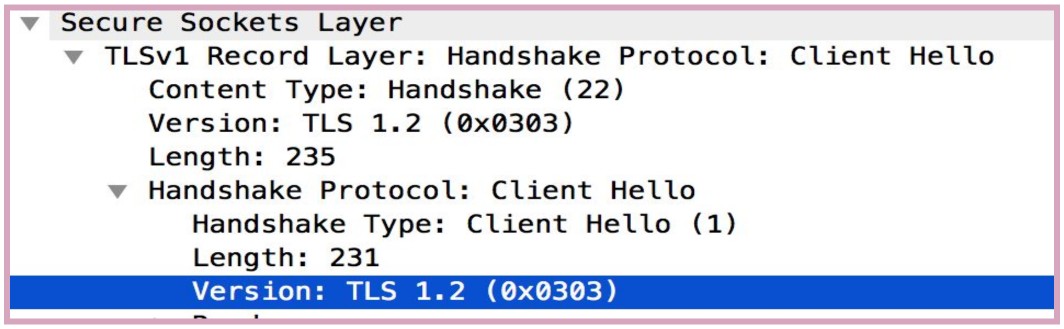
4. Here's the sample analysis of the tcpdump using Wireshark:

- In this example, the SSL handshake failure occurred between the Message Processor and the backend server (southbound connection).
- The message #4 in the tcpdump below shows that the Message Processor (source) sent a “Client Hello” message to the backend server (destination) .



```
   Time      Source          Destination     Protocol  Length  Info
 1 0.000000  192.168.84.110  200.85.0.25     TCP       76 58030 → 443 [SYN] Seq=0 Win=26883 Len=0 MSS=8961
 2 0.140662  200.85.0.25     192.168.84.110  TCP       76 443 → 58030 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=
 3 0.140679  192.168.84.110  200.85.0.25     TCP       68 58030 → 443 [ACK] Seq=1 Ack=1 Win=27136 Len=0 TS
 4 0.141318  192.168.84.110  200.85.0.25     TLSv1     308 Client Hello
 5 0.281360  200.85.0.25     192.168.84.110  TCP       68 443 → 58030 [ACK] Seq=1 Ack=241 Win=6912 Len=0 T
 6 0.281936  200.85.0.25     192.168.84.110  TLSv1     75 Alert (Level: Fatal, Description: Close Notify)
 7 0.281944  192.168.84.110  200.85.0.25     TCP       68 58030 → 443 [ACK] Seq=241 Ack=8 Win=27136 Len=0
 8 0.282057  200.85.0.25     192.168.84.110  TCP       68 443 → 58030 [FIN, ACK] Seq=8 Ack=241 Win=6912 Le
 9 0.283209  192.168.84.110  200.85.0.25     TCP       68 58030 → 443 [FIN, ACK] Seq=241 Ack=9 Win=27136 L
10 0.422458  200.85.0.25     192.168.84.110  TCP       68 443 → 58030 [ACK] Seq=9 Ack=242 Win=6912 Len=0 T
11 0.422470  192.168.84.110  200.85.0.25     TCP       56 58030 → 443 [RST] Seq=242 Win=0 Len=0
```

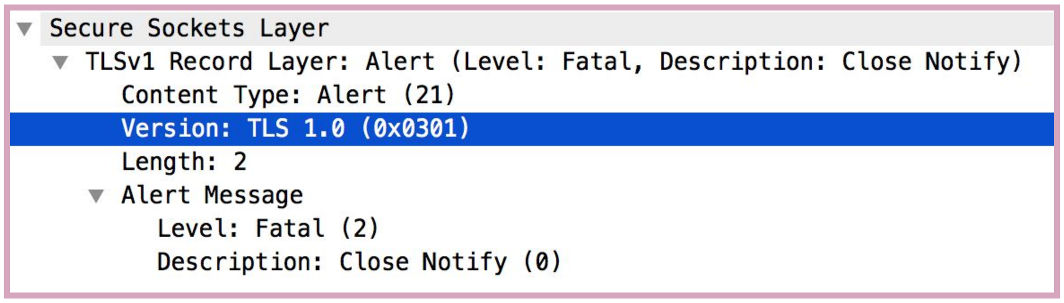
- Selecting the Client Hello message shows that the Message Processor is using the TLSv1.2 protocol.



```
▼ Secure Sockets Layer
  ▼ TLSv1 Record Layer: Handshake Protocol: Client Hello
      Content Type: Handshake (22)
      Version: TLS 1.2 (0x0303)
      Length: 235
    ▼ Handshake Protocol: Client Hello
        Handshake Type: Client Hello (1)
        Length: 231
        Version: TLS 1.2 (0x0303)
```

- The message #5 shows that the backend server acknowledges the Client Hello message from the Message Processor.
- Backend server immediately sends a **Fatal Alert : Close Notify** to the Message Processor (message #6). This means the SSL Handshake failed and the connection will be closed.
- Looking further into message #6 shows that cause for SSL handshake failure is that the backend server supports only TLSv1.0 protocol as shown

in the figure below:



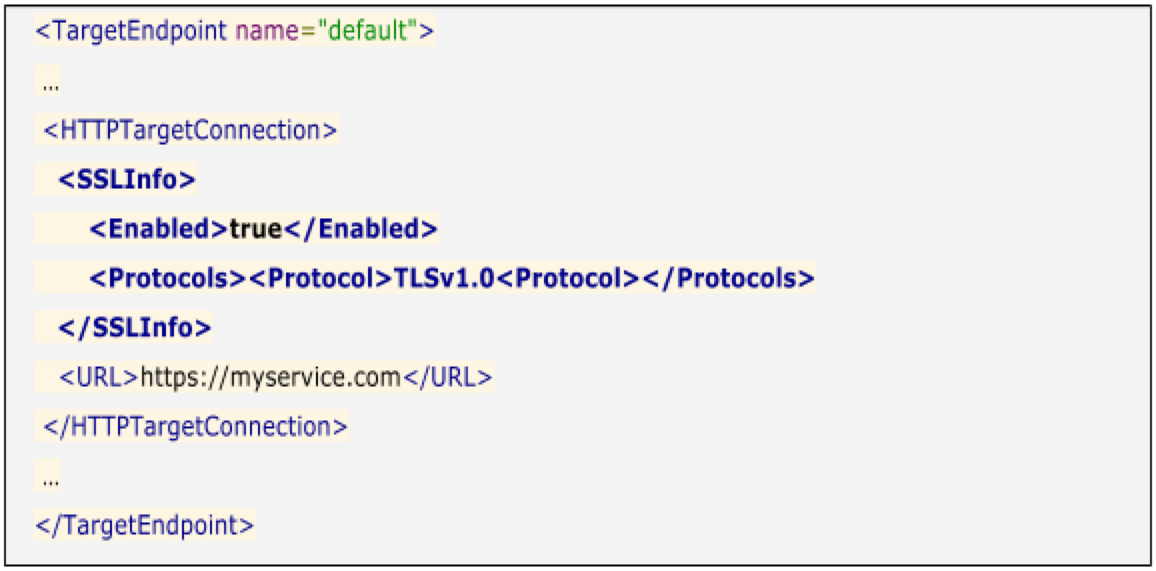
```
▼ Secure Sockets Layer
  ▼ TLSv1 Record Layer: Alert (Level: Fatal, Description: Close Notify)
      Content Type: Alert (21)
      Version: TLS 1.0 (0x0301)
      Length: 2
    ▼ Alert Message
        Level: Fatal (2)
        Description: Close Notify (0)
```

- Since there is a mismatch between the protocol used by the Message Processor and the backend server, the backend server sent the Fatal Alert Message: Close Notify.

Resolution

The Message Processor runs on Java 8 and uses TLSv1.2 protocol by default. If the backend server does not support TLSv1.2 protocol, then you need to update the Message Processor to use TLSv1.0 protocol for communicating with the backend server. Here are the steps to enforce the Message Processor to use TLSv1.0 protocol:

1. If you are using a target server, then set the Protocol as TLSv1.0 in the target server configuration; otherwise, set it in the target endpoint definition. The following figure shows how to set the protocol to TLSv1.0 in the target endpoint:



```
<TargetEndpoint name="default">
...
 <HTTPTargetConnection>
   <SSLInfo>
       <Enabled>true</Enabled>
       <Protocols><Protocol>TLSv1.0<Protocol></Protocols>
   </SSLInfo>
   <URL>https://myservice.com</URL>
 </HTTPTargetConnection>
...
</TargetEndpoint>
```

Cipher Mismatch

The SSL handshake failure can be seen if the cipher suite algorithm used by the client is not supported by the server either at the northbound or the southbound connection in Edge.

Steps to Diagnose

1. Determine whether the 503 Service Unavailable error occurred at northbound or southbound connection.

2. Collect the tcpdump data at the relevant server (Edge Router or Message Processor) based on the results from step #1:

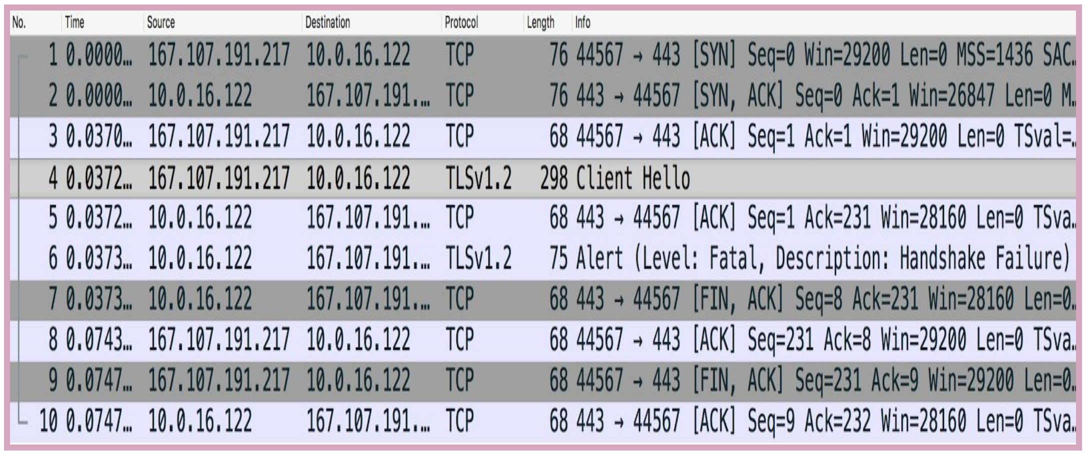
   ```
   tcpdump -i any -s 0 host <IP address> -w <File name>
   ```

3. Analyse the tcpdump data using the Wireshark tool or any other tool that you are familiar with.

4. Here's the sample analysis of the tcpdump using Wireshark:

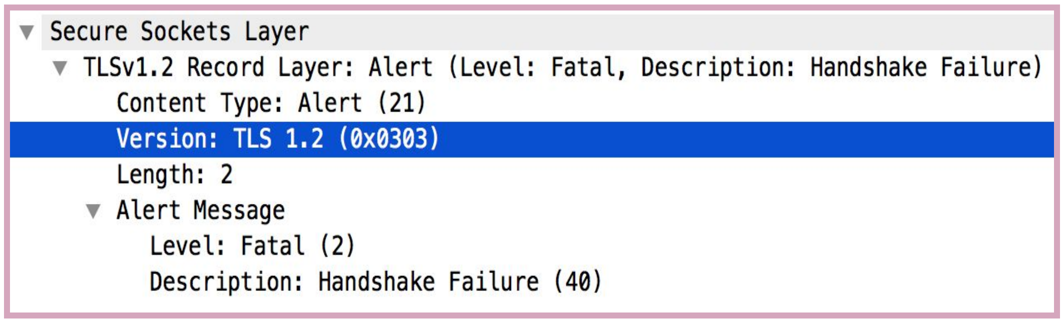
- In this example, the SSL Handshake failure occurred between the Client application and Edge router (northbound connection).

- The message #4 in the tcpdump below shows that the client application (source) sent a “Client Hello” message to the Edge Router (destination).



```
No. Time     Source           Destination    Protocol Length Info
 1 0.0000… 167.107.191.217 10.0.16.122     TCP      76 44567 → 443 [SYN] Seq=0 Win=29200 Len=0 MSS=1436 SAC…
 2 0.0000… 10.0.16.122     167.107.191…   TCP      76 443 → 44567 [SYN, ACK] Seq=0 Ack=1 Win=26847 Len=0 M…
 3 0.0370… 167.107.191.217 10.0.16.122     TCP      68 44567 → 443 [ACK] Seq=1 Ack=1 Win=29200 Len=0 TSval=…
 4 0.0372… 167.107.191.217 10.0.16.122     TLSv1.2 298 Client Hello
 5 0.0372… 10.0.16.122     167.107.191…   TCP      68 443 → 44567 [ACK] Seq=1 Ack=231 Win=28160 Len=0 TSva…
 6 0.0373… 10.0.16.122     167.107.191…   TLSv1.2  75 Alert (Level: Fatal, Description: Handshake Failure)
 7 0.0373… 10.0.16.122     167.107.191…   TCP      68 443 → 44567 [FIN, ACK] Seq=8 Ack=231 Win=28160 Len=0…
 8 0.0743… 167.107.191.217 10.0.16.122     TCP      68 44567 → 443 [ACK] Seq=231 Ack=8 Win=29200 Len=0 TSva…
 9 0.0747… 167.107.191.217 10.0.16.122     TCP      68 44567 → 443 [FIN, ACK] Seq=231 Ack=9 Win=29200 Len=0…
10 0.0747… 10.0.16.122     167.107.191…   TCP      68 443 → 44567 [ACK] Seq=9 Ack=232 Win=28160 Len=0 TSva…
```

- Selecting the Client Hello message shows that the client application is using the TLSv1.2 protocol.



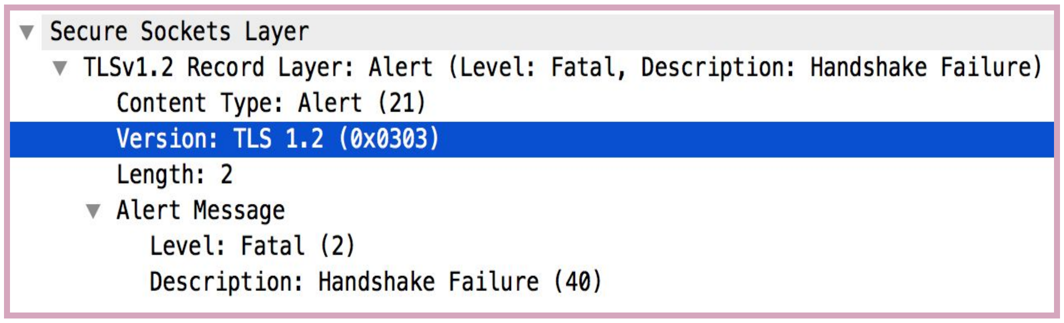
```
▼ Secure Sockets Layer
  ▼ TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Handshake Failure)
      Content Type: Alert (21)
      Version: TLS 1.2 (0x0303)
      Length: 2
    ▼ Alert Message
        Level: Fatal (2)
        Description: Handshake Failure (40)
```

- The message #5 shows that the Edge Router acknowledges the Client Hello message from the client application.

- The Edge router immediately sends a **Fatal Alert : Handshake Failure** to the client application (message #6). This means the SSL Handshake failed and the connection will be closed.

- Looking further into message #6 shows the following information:

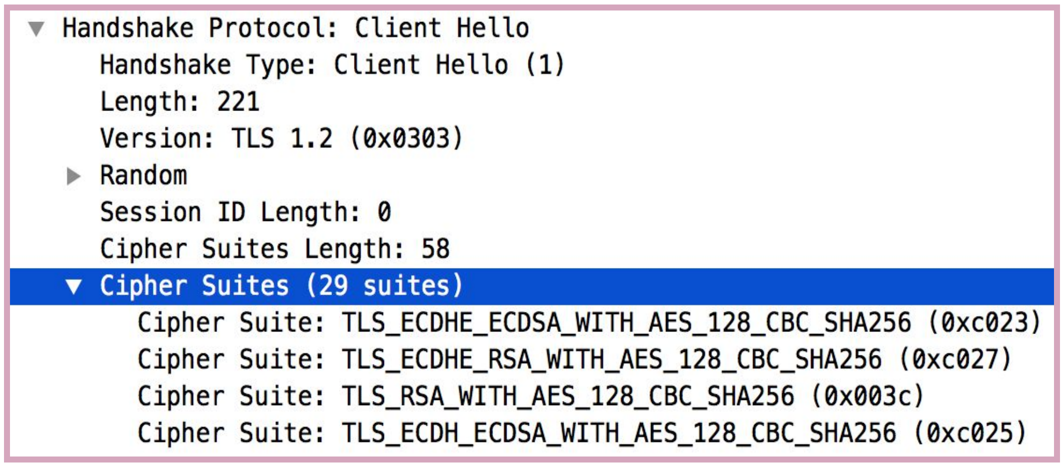
- The Edge Router supports TLSv1.2 protocol. This means that the protocol matches between the client application and the Edge Router.
- However, the Edge router still sends the **Fatal Alert: Handshake Failure** to the client application as shown in the figure below:



```
▼ Secure Sockets Layer
  ▼ TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Handshake Failure)
      Content Type: Alert (21)
      Version: TLS 1.2 (0x0303)
      Length: 2
    ▼ Alert Message
        Level: Fatal (2)
        Description: Handshake Failure (40)
```

- The error could be the result of one of the following issues:
  - The client application is not using the cipher suite algorithms supported by the Edge Router.
  - The Edge Router is SNI-enabled, but the client application is not sending the server name.

- Message #4 in the tcpdump lists the cipher suite algorithms supported by the client application.

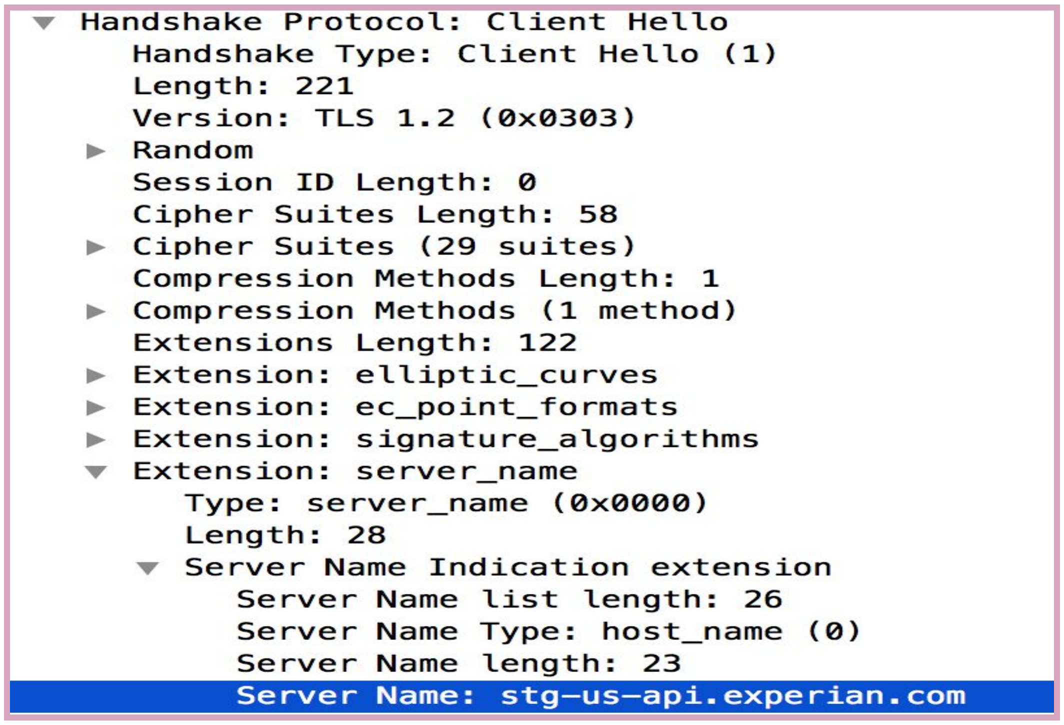


```
▼ Handshake Protocol: Client Hello
    Handshake Type: Client Hello (1)
    Length: 221
    Version: TLS 1.2 (0x0303)
  ▶ Random
    Session ID Length: 0
    Cipher Suites Length: 58
  ▼ Cipher Suites (29 suites)
      Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256 (0xc023)
      Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256 (0xc027)
      Cipher Suite: TLS_RSA_WITH_AES_128_CBC_SHA256 (0x003c)
      Cipher Suite: TLS_ECDH_ECDSA_WITH_AES_128_CBC_SHA256 (0xc025)
```

- The list of cipher suite algorithms supported by the Edge Router are listed in the `/opt/nginx/conf.d/0-default.conf` file. In this example, the Edge Router supports only the High Encryption cipher suite algorithms.

- The client application does not use any of the High Encryption cipher suite algorithms. This indicates that the mismatch of the cipher suite algorithms supported is the cause for SSL handshake failure.

- Since the Edge Router is SNI-enabled, scroll down to message #4 in the tcpdump and confirm that the client application is sending the server name correctly, as shown in the figure below:



```
▼ Handshake Protocol: Client Hello
    Handshake Type: Client Hello (1)
    Length: 221
    Version: TLS 1.2 (0x0303)
  ▶ Random
    Session ID Length: 0
    Cipher Suites Length: 58
  ▶ Cipher Suites (29 suites)
    Compression Methods Length: 1
  ▶ Compression Methods (1 method)
    Extensions Length: 122
  ▶ Extension: elliptic_curves
  ▶ Extension: ec_point_formats
  ▶ Extension: signature_algorithms
  ▼ Extension: server_name
      Type: server_name (0x0000)
      Length: 28
    ▼ Server Name Indication extension
        Server Name list length: 26
        Server Name Type: host_name (0)
        Server Name length: 23
        Server Name: stg-us-api.experian.com
```

- Since this name is valid, you can confirm that the cause for the SSL handshake failure is because the cipher suite algorithms used by the client application are not supported by the Edge Router.

Resolution

1. Ensure that the client uses the cipher suite algorithms that are supported by the server.

2. In the example illustrated above, the following steps were taken to resolve the issue:

a. Confirmed that both client application and Edge Router were using Java 8.

b. As identified above, the Edge Router was using the High Encryption cipher suite algorithms.

c. However, the client was using the default Java 8 installation so the High Encryption cipher suite algorithms were not available.

d. The solution was to download and install the [Java Cryptography Extension (JCE)]() package and include it in the Java installation to support High Encryption cipher suite algorithms.

Incorrect Certificate

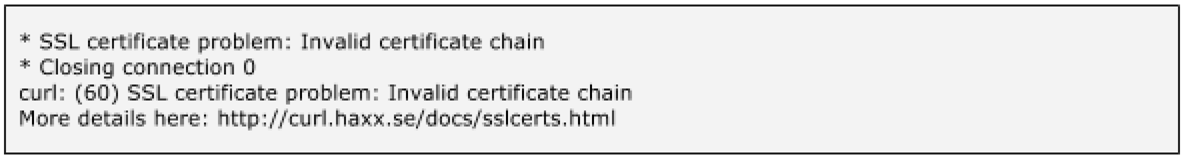
If you have incorrect certificates in the keystore/truststore, either at the northbound or the southbound connection, then the SSL handshake failure occurs.

If the problem is northbound, then you may get different error messages depending on the underlying cause.

The following sections list example error messages and the steps to diagnose and resolve the issue.

Error

You might see different error messages depending on the cause for the SSL handshake failure. Here's a sample error message that you may observe while running the API using the cURL command:



```
* SSL certificate problem: Invalid certificate chain
* Closing connection 0
curl: (60) SSL certificate problem: Invalid certificate chain
More details here: http://curl.haxx.se/docs/sslcerts.html
```

Causes
The typical causes for this issue are:

Cause	Details
Hostname Mismatch	The hostname used in the URL and the certificate in the keystore of the router does not match. For example, if the host name used in the URL is `myorg.domain.com` while the certificate has the hostname in its CN as `CN=something.domain.com.`
Incomplete or Incorrect certificate chain	Certificate chain is not complete or not correct.
Expired/Unknown Certificate sent by the Server/Client	Expired/unknown certificate is sent by the server/client either at the northbound or at the southbound connection.

Hostname Mismatch

Steps to Diagnose

1. Note down the hostname used in the URL returned by the following Edge management API call:

```
curl -v https://myorg.domain.com/v1/getinfo
```

2. Get the CN used in the certificate stored in the specific keystore. You can use the following Edge management APIs to get the details of the certificate:

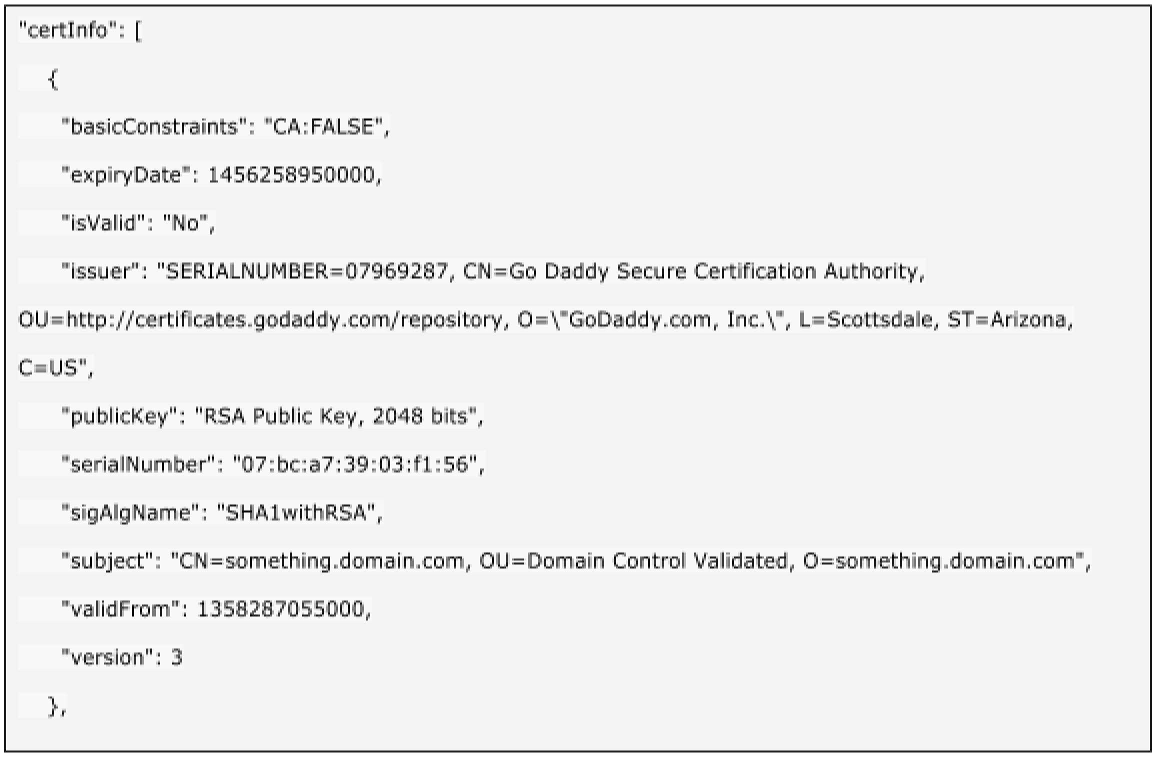
    a. Get the certificate name in the keystore.

```
curl -v
http://<management-server-IPaddress>:<port#>/v1/organi
zations/<org-name>/environments/<env-name>/keystores/<
keystore-name>/certs
```

b. Get the details of the certificate in the keystore.

```
curl -v
http://<management-server-IPaddress>:<port#>/v1/organi
zations/<org-name>/environments/<env-name>/keystores/<
keystore-name>/certs/<cert-name>
```

For example, here's a sample cert:



```
"certInfo": [
  {
    "basicConstraints": "CA:FALSE",
    "expiryDate": 1456258950000,
    "isValid": "No",
    "issuer": "SERIALNUMBER=07969287, CN=Go Daddy Secure Certification Authority,
OU=http://certificates.godaddy.com/repository, O=\"GoDaddy.com, Inc.\", L=Scottsdale, ST=Arizona,
C=US",
    "publicKey": "RSA Public Key, 2048 bits",
    "serialNumber": "07:bc:a7:39:03:f1:56",
    "sigAlgName": "SHA1withRSA",
    "subject": "CN=something.domain.com, OU=Domain Control Validated, O=something.domain.com",
    "validFrom": 1358287055000,
    "version": 3
  },
```

The subject name in the primary certificate has the CN as `something.domain.com.`

Since the hostname used in the API request URL (refer to step#1 above) and the subject name in the certificate don't match, you get the SSL Handshake failure.

Resolution

This issue can be resolved in one of the following two ways:

1. Obtain a certificate (if you don't have one already) with subject CN having a wildcard certificate, then upload the new complete certificate chain to the keystore. For example:

   ```
   "subject": "CN=*.domain.com, OU=Domain Control Validated,
   O=*.domain.com",
   ```

2. Obtain a certificate (if you don't have one already) with existing subject CN, but having `myorg.domain.name` as a subject alternative name, then upload the complete certificate chain to the keystore.

References

Keystores and Truststores

Incomplete or Incorrect certificate chain

Steps to Diagnose

1. Get the complete certificate chain used in the certificate stored in the specific keystore. You can use the following Edge management APIs to get the details of the certificate:

   a. Get the certificate name in the keystore.

      ```
      curl -v
      http://<management-server-IPaddress>:<port#>/v1/organizations/<org-name>/environments/<env-name>/keystores/<keystore-name>/certs
      ```

   b. Get the details of the certificate in the keystore.

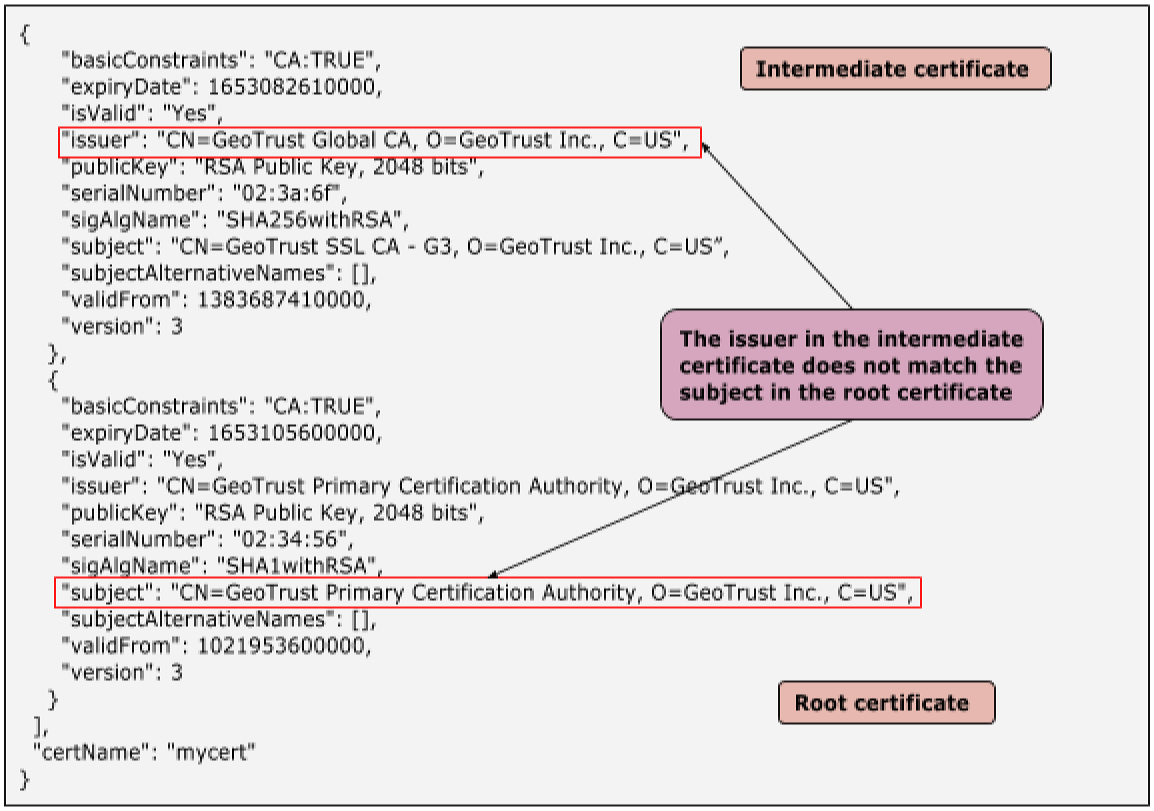
      ```
      curl -v
      http://<management-server-IPaddress>:<port#>/v1/organizations/<org-name>/environments/<env-name>/keystores/<keystore-name>/certs/<cert-name>
      ```

2. Validate the certificate and its chain and verify that it adheres to the guidelines provided here to ensure it's a valid and complete certificate chain.

3. If the certificate chain stored in the keystore is either incomplete or invalid, then you see the SSL Handshake failure.

4. Here's a sample certificate with an invalid certificate chain:

   Sample Intermediate and Root Certificate having mismatch of issuer and subject



```
{
    "basicConstraints": "CA:TRUE",
    "expiryDate": 1653082610000,
    "isValid": "Yes",
    "issuer": "CN=GeoTrust Global CA, O=GeoTrust Inc., C=US",
    "publicKey": "RSA Public Key, 2048 bits",
    "serialNumber": "02:3a:6f",
    "sigAlgName": "SHA256withRSA",
    "subject": "CN=GeoTrust SSL CA - G3, O=GeoTrust Inc., C=US",
    "subjectAlternativeNames": [],
    "validFrom": 1383687410000,
    "version": 3
  },
  {
    "basicConstraints": "CA:TRUE",
    "expiryDate": 1653105600000,
    "isValid": "Yes",
    "issuer": "CN=GeoTrust Primary Certification Authority, O=GeoTrust Inc., C=US",
    "publicKey": "RSA Public Key, 2048 bits",
    "serialNumber": "02:34:56",
    "sigAlgName": "SHA1withRSA",
    "subject": "CN=GeoTrust Primary Certification Authority, O=GeoTrust Inc., C=US",
    "subjectAlternativeNames": [],
    "validFrom": 1021953600000,
    "version": 3
  }
 ],
 "certName": "mycert"
}
```

Intermediate certificate
The issuer in the intermediate certificate does not match the subject in the root certificate
Root certificate

Resolution

1. Obtain a certificate (if you don't have one already) that includes a complete and valid certificate chain.

2. Run the following openssl command to verify that the certificate chain is correct and complete:

   ```
   openssl verify -CAfile <root-cert> -untrusted
   <intermediate-cert> <main-cert>
   ```

3. Upload the validated certificate chain to the keystore.

Expired/Unknown Certificate sent by the Server/Client

If an incorrect/expired certificate is sent by the server/client either at the northbound or at the southbound connection, then the other end (server/client) rejects the certificate leading to an SSL handshake failure.

Steps to Diagnose

1. Determine whether the 503 Service Unavailable error occurred at the northbound or southbound connection.

2. Collect the tcpdump data at the relevant server (Edge Router or Message Processor) based on the outcome from step #1:

   ```
   tcpdump -i any -s 0 host <IP address> -w <File name>
   ```

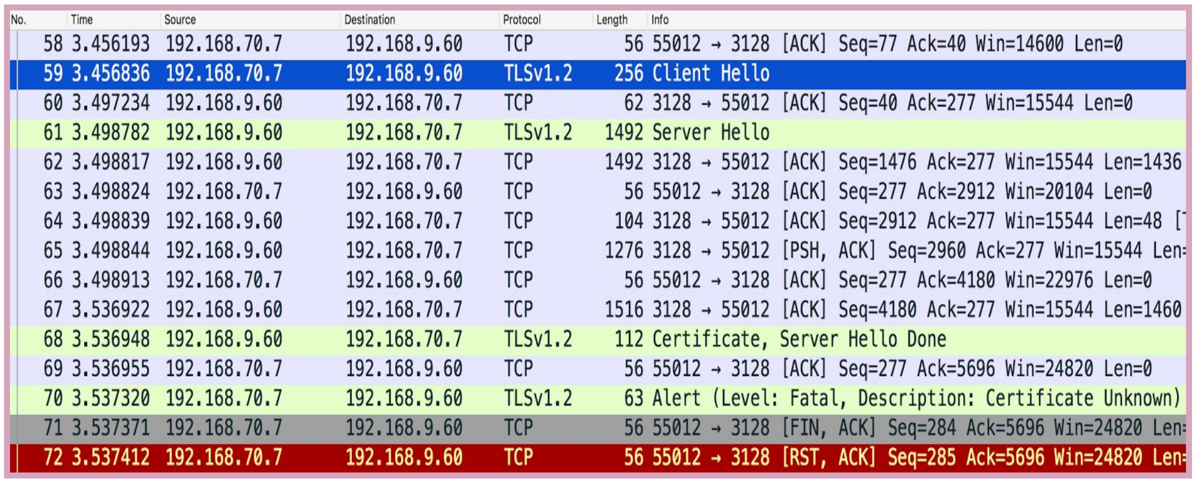
3. Analyze the tcpdump data using Wireshark or a similar tool that you are familiar with.

4. From the tcpdump, determine the host (client or server) that is rejecting the certificate during the verification step.

5. You can retrieve the certificate sent from the other end from the tcpdump, provided the data is not encrypted. This will be useful to compare if this certificate matches with the certificate available in the truststore.

6. Review the sample tcpdump for the SSL communication between the Message Processor and the backend server and understand how to get the information mentioned in step#4 and #5.

Sample tcpdump showing Certificate Unknown Error



```
No. Time     Source        Destination   Protocol Length Info
58 3.456193  192.168.70.7  192.168.9.60  TCP        56 55012 → 3128 [ACK] Seq=77 Ack=40 Win=14600 Len=0
59 3.456836  192.168.70.7  192.168.9.60  TLSv1.2   256 Client Hello
60 3.497234  192.168.9.60  192.168.70.7  TCP        62 3128 → 55012 [ACK] Seq=40 Ack=277 Win=15544 Len=0
61 3.498782  192.168.9.60  192.168.70.7  TLSv1.2  1492 Server Hello
62 3.498817  192.168.9.60  192.168.70.7  TCP      1492 3128 → 55012 [ACK] Seq=1476 Ack=277 Win=15544 Len=1436
63 3.498824  192.168.70.7  192.168.9.60  TCP        56 55012 → 3128 [ACK] Seq=277 Ack=2912 Win=20104 Len=0
64 3.498839  192.168.9.60  192.168.70.7  TCP       104 3128 → 55012 [ACK] Seq=2912 Ack=277 Win=15544 Len=48 [
65 3.498844  192.168.9.60  192.168.70.7  TCP      1276 3128 → 55012 [PSH, ACK] Seq=2960 Ack=277 Win=15544 Len=
66 3.498913  192.168.70.7  192.168.9.60  TCP        56 55012 → 3128 [ACK] Seq=277 Ack=4180 Win=22976 Len=0
67 3.536922  192.168.9.60  192.168.70.7  TCP      1516 3128 → 55012 [ACK] Seq=4180 Ack=277 Win=15544 Len=1460
68 3.536948  192.168.9.60  192.168.70.7  TLSv1.2   112 Certificate, Server Hello Done
69 3.536955  192.168.70.7  192.168.9.60  TCP        56 55012 → 3128 [ACK] Seq=277 Ack=5696 Win=24820 Len=0
70 3.537320  192.168.70.7  192.168.9.60  TLSv1.2    63 Alert (Level: Fatal, Description: Certificate Unknown)
71 3.537371  192.168.70.7  192.168.9.60  TCP        56 55012 → 3128 [FIN, ACK] Seq=284 Ack=5696 Win=24820 Len=
72 3.537412  192.168.70.7  192.168.9.60  TCP        56 55012 → 3128 [RST, ACK] Seq=285 Ack=5696 Win=24820 Len=
```

a. The Message Processor (client) sends the Client Hello to the backend server (server) in message #59.

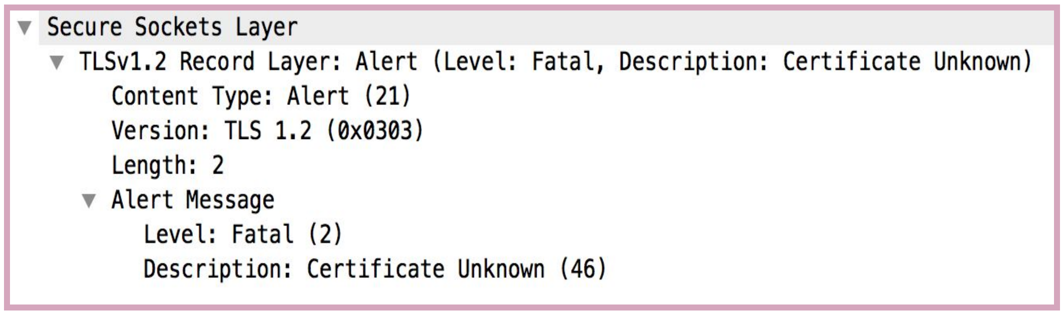
b. The backend server sends the Server Hello to the Message Processor in message #61.

c. They mutually validate the protocol and cipher suite algorithms used.

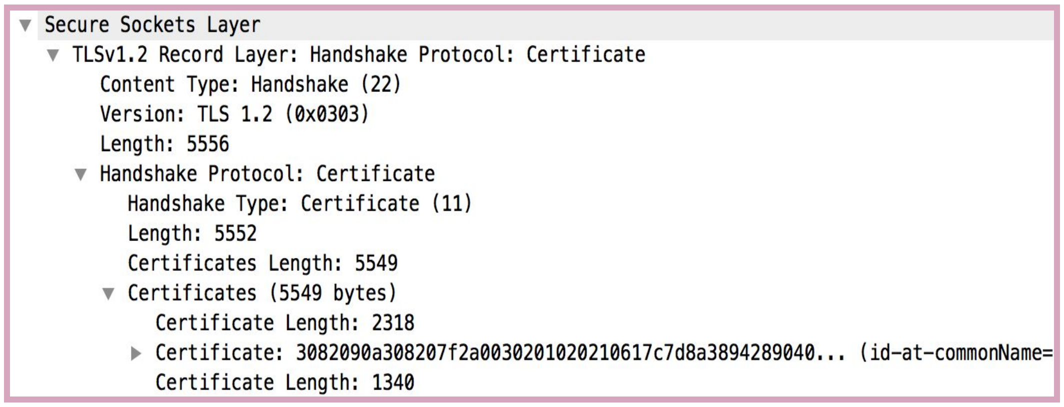
d. The backend server sends the Certificate and Server Hello Done message to the Message Processor in message #68.

e. The Message Processor sends the Fatal Alert **"Description: Certificate Unknown"** in message #70.

f. Looking further into message #70, there are no additional details details other than alert message as shown below:


```
▼ Secure Sockets Layer
  ▼ TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Certificate Unknown)
      Content Type: Alert (21)
      Version: TLS 1.2 (0x0303)
      Length: 2
    ▼ Alert Message
        Level: Fatal (2)
        Description: Certificate Unknown (46)
```

g. Review message #68 to get the details about the certificate sent by the backend server.


```
▼ Secure Sockets Layer
  ▼ TLSv1.2 Record Layer: Handshake Protocol: Certificate
      Content Type: Handshake (22)
      Version: TLS 1.2 (0x0303)
      Length: 5556
    ▼ Handshake Protocol: Certificate
        Handshake Type: Certificate (11)
        Length: 5552
        Certificates Length: 5549
      ▼ Certificates (5549 bytes)
          Certificate Length: 2318
        ▶ Certificate: 3082090a308207f2a0030201020210617c7d8a3894289040... (id-at-commonName=
          Certificate Length: 1340
```

h. The backend server's certificate and its complete chain are all available underneath "Certificates," as shown in the above figure.

7. If the certificate is found to be unknown either by the Router (northbound) or the Message Processor (southbound) as in the example illustrated above, then follow these steps:

   a. Get the certificate and its chain that is stored in the specific truststore. (Refer to the virtual host configuration for the Router and target endpoint configuration for the Message Processor). You can use the following APIs to get the details of the certificate:

      i. [Get the certificate name in the truststore.]()

```
curl -v
http://<management-server-IPaddress>:<port#>/v1/o
rganizations/<org-name>/environments/<env-name>/k
```

```
eystores/<truststore-name>/certs
.
```

ii. Get the details of the certificate in the truststore

```
curl -v
http://<management-server-IPaddress>:<port#>/v1/o
rganizations/<org-name>/environments/<env-name>/k
eystores/<truststore-name>/certs/<cert-name>
```

b. Check if the certificate stored in the truststore of the Router (northbound) or Message Processor (southbound) matches with the certificate that is stored in the keystore of the client application (northbound) or target server (southbound), or the one that is obtained from the tcpdump. If there’s a mismatch, then that’s the cause for the SSL Handshake failure.

8. If the certificate is found to be unknown either by the client application (northbound) or the target server (southbound), then follow these steps:

   a. Get the complete certificate chain used in the certificate stored in the specific keystore. (Refer to the virtual host configuration for the Router and target endpoint configuration for the Message Processor.) You can use the following APIs to get the details of the certificate:

      i. Get the certificate name in the keystore.

```
curl -v
http://<management-server-IPaddress>:<port#>/v1/o
rganizations/<org-name>/environments/<env-name>/k
eystores/<keystore-name>/certs
```

      ii. Get the details of the certificate in the keystore.

```
curl -v
http://<management-server-IPaddress>:<port#>/v1/o
rganizations/<org-name>/environments/<env-name>/k
eystores/<keystore-name>/certs/<cert-name>
```

   b. Check if the certificate stored in the keystore of the Router (northbound) or Message Processor (southbound) matches the certificate stored in the truststore of the client application (northbound) or target server (southbound), or the one that is obtained from the tcpdump. If there's a mismatch, then that's the cause for the SSL handshake failure.

9. If the certificate sent by a server/client is found to be expired then the receiving client/server rejects the certificate and you will see the following alert message in the tcpdump:
   Alert (Level: Fatal, Description: Certificate expired)

10. Verify that the certificate in the keystore of the appropriate host is expired.

Resolution

To resolve the issue identified in the example above, upload the valid backend server's certificate to the trustore on the Message Processor.

The following table summarizes the steps to resolve an issue based on a number of causes.

Cause	**Details**	**Steps to Resolve**
Expired Certificate	**NorthBound** ● Certificate stored on the keystore of the router is expired. ● Certificate stored on the keystore of the client application is expired (2-way SSL).	Upload a new certificate and its complete chain to the keystore on the appropriate host.
	SouthBound ● Certificate stored on the keystore of the Target Server is expired. ● Certificate stored on the keystore of the Message Processor is expired (2-way SSL).	Upload a new certificate and its complete chain to the keystore on the appropriate host.
Unknown Certificate	**NorthBound** ● Certificate stored on the truststore of the client application does not match the Router's certificate. ● Certificate stored on the truststore	Upload the valid certificate to the truststore on the appropriate host.

	of the router does not match the client application’s certificate (2 way SSL).	
	SouthBound ● Certificate stored on the truststore of the target server does not match the Message Processor’s certificate. ● Certificate stored on the truststore of the Message Processor does not match the target server’s certificate (2-way SSL).	Upload the valid certificate to the truststore on the appropriate host.

SNI Enabled Server

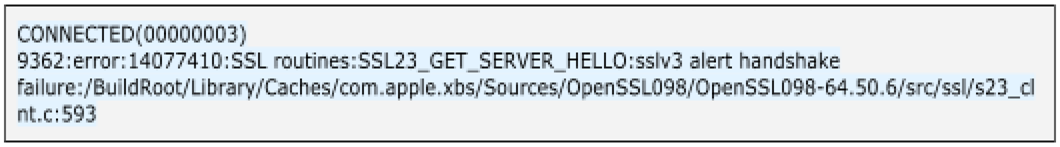
The SSL handshake failure can occur when the client is communicating with a SNI Enabled Server, but the client is not SNI enabled. This could happen either at the northbound or the southbound connection in Edge.

First, you need to identify the hostname and port # of the server being used and check if it is SNI enabled or not.

Identification of SNI enabled server

1. Execute the openssl command and try to connect to the relevant server hostname (Edge Router or backend server) **without passing the server name**, as shown below:
   `openssl s_client -connect <hostname>:<port#>`

   a. You may get the certificates and sometimes you may observe the handshake failure in the openssl command, as shown in the figure below:



```
CONNECTED(00000003)
9362:error:14077410:SSL routines:SSL23_GET_SERVER_HELLO:sslv3 alert handshake
failure:/BuildRoot/Library/Caches/com.apple.xbs/Sources/OpenSSL098/OpenSSL098-64.50.6/src/ssl/s23_cl
nt.c:593
```

2. Execute the the openssl command and try to connect to the relevant server hostname (Edge router or backend server) by **passing the server name** as shown below:

   ```
   openssl s_client -connect <hostname>:<port#> -servername
   <hostname>
   ```

3. If you get a handshake failure in step #1 or get different certificates in step #1 and step #2, then it indicates that the specified Server is SNI enabled.

Once you've identified that the server is SNI enabled, you can follow the steps below to check if the SSL handshake failure is caused by the client not being able to communicate with the SNI server.

Steps to Diagnose

1. Determine whether the 503 Service Unavailable error occurred at the northbound or southbound connection.

2. Collect the tcpdump at the relevant server (Edge Router or Message Processor) based on the outcome from step #1:

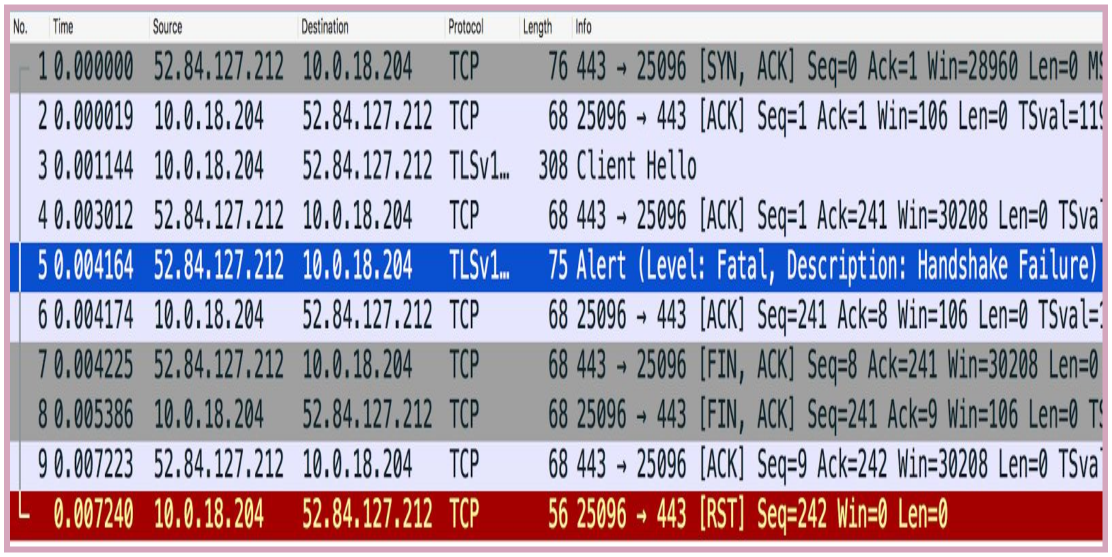
   ```
   tcpdump -i any -s 0 host <IP address> -w <File name>
   ```

3. Analyze the tcpdump using Wireshark or a similar tool that you are familiar with.

4. Here's the sample analysis of tcpdump using Wireshark:

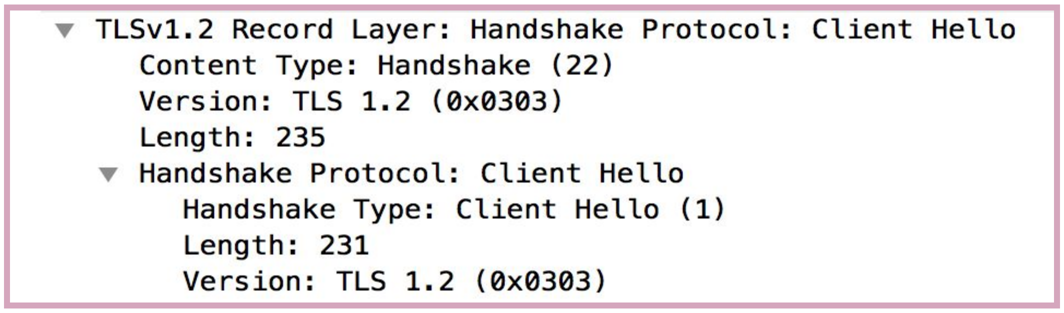
   a. In this example, the SSL handshake failure occurred between the Edge Message Processor and backend server (southbound connection).

   b. The message #4 in the tcpdump below shows that the Message Processor (source) sent a "Client Hello" message to the backend server (destination).



```
No. Time     Source        Destination   Protocol Length Info
 1 0.000000 52.84.127.212 10.0.18.204   TCP       76 443 → 25096 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MS
 2 0.000019 10.0.18.204   52.84.127.212 TCP       68 25096 → 443 [ACK] Seq=1 Ack=1 Win=106 Len=0 TSval=11
 3 0.001144 10.0.18.204   52.84.127.212 TLSv1…   308 Client Hello
 4 0.003012 52.84.127.212 10.0.18.204   TCP       68 443 → 25096 [ACK] Seq=1 Ack=241 Win=30208 Len=0 TSva
 5 0.004164 52.84.127.212 10.0.18.204   TLSv1…    75 Alert (Level: Fatal, Description: Handshake Failure)
 6 0.004174 10.0.18.204   52.84.127.212 TCP       68 25096 → 443 [ACK] Seq=241 Ack=8 Win=106 Len=0 TSval=
 7 0.004225 52.84.127.212 10.0.18.204   TCP       68 443 → 25096 [FIN, ACK] Seq=8 Ack=241 Win=30208 Len=0
 8 0.005386 10.0.18.204   52.84.127.212 TCP       68 25096 → 443 [FIN, ACK] Seq=241 Ack=9 Win=106 Len=0 T
 9 0.007223 52.84.127.212 10.0.18.204   TCP       68 443 → 25096 [ACK] Seq=9 Ack=242 Win=30208 Len=0 TSva
   0.007240 10.0.18.204   52.84.127.212 TCP       56 25096 → 443 [RST] Seq=242 Win=0 Len=0
```

c. Selecting the **Client Hello** message shows that the Message Processor is using the TLSv1.2 protocol.



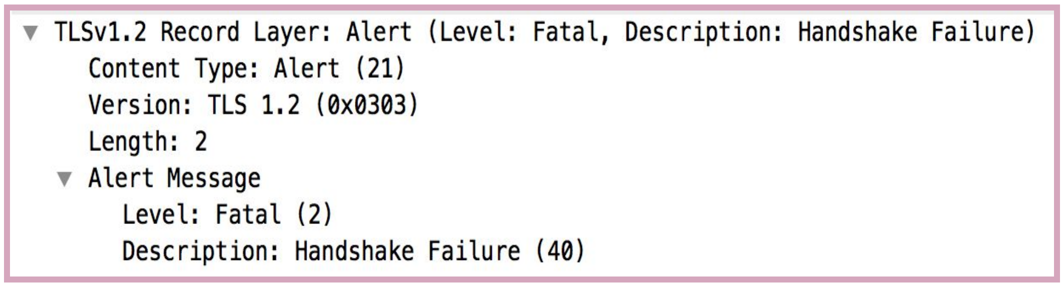
```
▼ TLSv1.2 Record Layer: Handshake Protocol: Client Hello
    Content Type: Handshake (22)
    Version: TLS 1.2 (0x0303)
    Length: 235
  ▼ Handshake Protocol: Client Hello
      Handshake Type: Client Hello (1)
      Length: 231
      Version: TLS 1.2 (0x0303)
```

d. The message #4 shows that the backend server acknowledges the Client Hello message from the Message Processor.

e. The backend server immediately sends a **Fatal Alert : Handshake Failure** to the Message Processor (message #5). This means the SSL handshake failed and the connection will be closed.

f. Review message #6 to discover the following information
   - The backend server does support TLSv1.2 protocol. This means that the protocol matched between the Message Processor and the backend server.

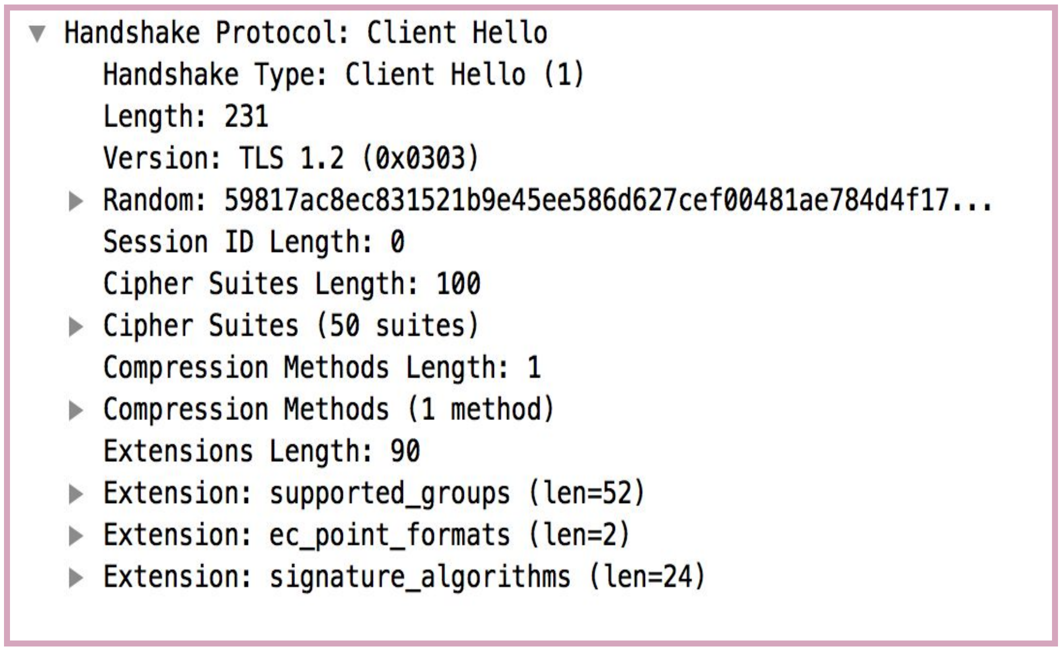
- However, the backend server still sends the **Fatal Alert: Handshake Failure** to the Message Processor as shown in the figure below:



```
▼ TLSv1.2 Record Layer: Alert (Level: Fatal, Description: Handshake Failure)
    Content Type: Alert (21)
    Version: TLS 1.2 (0x0303)
    Length: 2
  ▼ Alert Message
      Level: Fatal (2)
      Description: Handshake Failure (40)
```

g. This error might occur for one of the following reasons:
   - The Message Processor is not using the cipher suite algorithms supported by the backend server.
   - The backend server is SNI enabled, but the client application is not sending the server name.

h. Review the message #3 (Client Hello) in the tcpdump in more detail. Note that the **Extension: server_name** is missing, as shown below:



```
▼ Handshake Protocol: Client Hello
    Handshake Type: Client Hello (1)
    Length: 231
    Version: TLS 1.2 (0x0303)
  ▶ Random: 59817ac8ec831521b9e45ee586d627cef00481ae784d4f17...
    Session ID Length: 0
    Cipher Suites Length: 100
  ▶ Cipher Suites (50 suites)
    Compression Methods Length: 1
  ▶ Compression Methods (1 method)
    Extensions Length: 90
  ▶ Extension: supported_groups (len=52)
  ▶ Extension: ec_point_formats (len=2)
  ▶ Extension: signature_algorithms (len=24)
```

i. This confirms that the Message Processor did not send the **server_name** to the SNI-enabled backend server.

j. This is the cause for the SSL handshake failure and the reason that the backend server sends the **Fatal Alert: Handshake Failure** to the Message Processor.

5. Verify that the `jsse.enableSNIExtension property` in `system.properties` is set to false on the Message Processor to confirm that the Message Processor is not enabled to communicate with the SNI-enabled server.

Resolution

Enable the Message Processor(s) to communicate with SNI enabled servers by performing the following steps:

1. Create the`/opt/apigee/customer/application/message-processor.properties` file (if it does not exist already).

2. Add the following line into this file:
   ```
   conf_system_jsse.enableSNIExtension=true
   ```

3. Chown the owner of this file to apigee:apigee.
   ```
   chown apigee:apigee
   /opt/apigee/customer/application/message-processor.properties
   ```

4. Restart the Message Processor.
   ```
   /opt/apigee/apigee-service/bin/apigee-service
   message-processor restart
   ```

5. If you have more than one Message Processor, repeat the steps #1 through #4 on all the Message Processors.

504 Gateway Timeout

Description

The client application receives an HTTP status code of **504** with the message **“Gateway Timeout”** as a response for the API calls.

Error Messages

Client application gets the following response code:

```
HTTP/1.1 504 Gateway Timeout
```

In some cases, the following error message may also be observed:

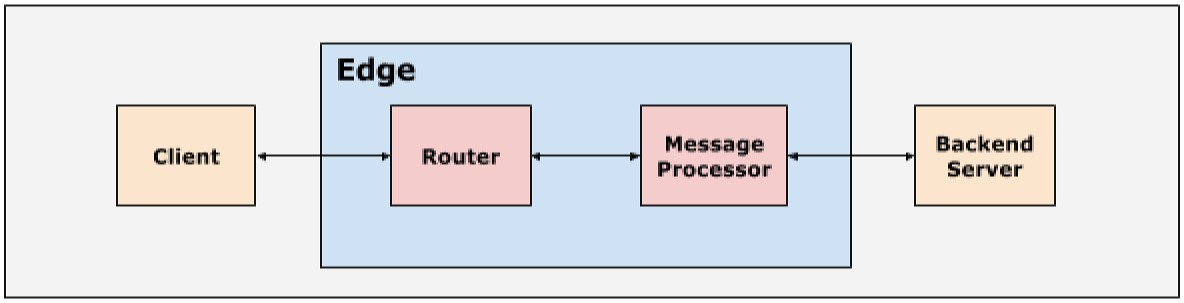
```
{
  "fault": {
    "faultstring": "Gateway Timeout",
    "detail": {
        "errorcode": "messaging.adaptors.http.flow.GatewayTimeout"
     }
   }
}
```

Overview of 504 Gateway Timeout

The HTTP status code - **504 Gateway Timeout** error indicates that the client did not receive a timely response from the Edge Gateway or backend server during the execution of an API.

How does the Timeout Occur ?

Typical path for an API request via the Edge platform will be **Client -> Router -> Message Processor -> Backend Server** as shown in the below figure:



The client application, routers, and Message Processors within Edge platform are set up with suitable timeout values. The Edge platform expects a response to be sent within a certain period of time for every API request based on the timeout values. If you don't get the response within the specified period of time, then **504 Gateway Timeout Error** is returned.

The following table provides more details about when timeouts may occur:

Timeout Occurrence	Details
Timeout occurs on Message Processor	• Backend server does not respond back to Message Processor within a specified timeout period on the Message Processor. • Message Processor times out and sends the response status as **504 Gateway Timeout** to the Router.
Timeout occurs on Router	• Message Processor does not respond back to router within the specified timeout period on the Router. • Router times out and sends the response status as **504 Gateway Timeout** to the client application.
Timeout occurs on client application	• Router does not respond back to client application within the specified timeout period on the router.

	● The Client application times out and ends the response status as **504 Gateway Timeout** to the end user**.**

Causes

In Edge, the typical causes for 504 Gateway Timeout error are:

Cause	Details
Slow Backend Server	The backend server that is processing the API request is too slow due to high load or poor performance.
Slow API Proxy processing by Edge	Edge takes a long time to process the API request due to high load or poor performance.

Slow Backend Server

If the backend server is very slow and/or taking a long time to process the API request, then you will get a 504 Gateway Timeout error. As explained in the section above, the timeout can occur under one of the following scenarios:

1. Message Processor times out before backend server responds.
2. Router times out before Message Processor/backend server responds.
3. Client application times out before Router/Message Processor/backend server responds.

The following sections describe how to diagnose and resolve the issue under each of these scenarios.

Scenario #1 Message Processor times out before Backend Server responds

Steps to Diagnose

You can use the following procedures to diagnose if the 504 Gateway Timeout error has occurred because of the slow backend server.

Procedure #1 Using Trace

If the issue is still active (504 Errors are still happening), then follow the below steps:

1. Trace the affected API in Edge UI.Either wait for the error to occur or if you have the API call, then make some API calls and reproduce the 504 Gateway Timeout Error.

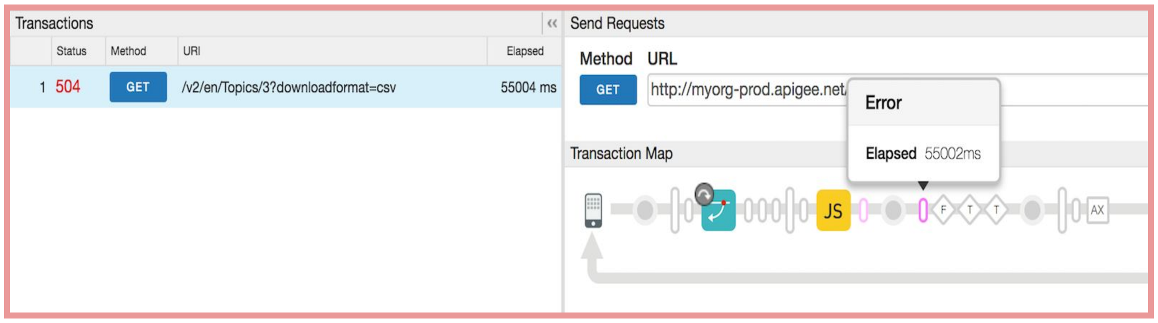
2. Once the error has occurred, examine the specific request which shows the response code as 504.

3. Check the elapsed time at each phase and make a note of the phase where most time is spent.

4. If you observe the “Error” with the longest elapsed time immediately after one of the following phases, then it indicates that the backend server is slow or taking a long time to process the request:

    - “Request sent to target server”
    - Service Callout policy

The following provides a sample Trace showing that the backend server did not respond even after 55 seconds resulting in a 504 Gateway Timeout Error:



Transactions

	Status	Method	URI	Elapsed
1	504	GET	/v2/en/Topics/3?downloadformat=csv	55004 ms

Send Requests

Method URL

GET http://myorg-prod.apigee.net/

Error

Elapsed 55002ms

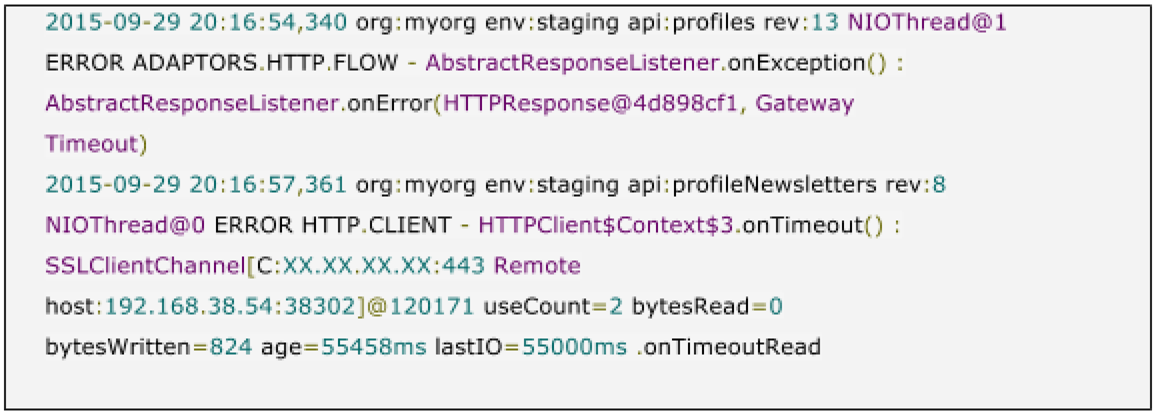
In the above trace, the Message Processor times out after 55002 ms as the backend server does not respond.

Procedure #2 Using Message Processor Logs

1. Check the Message Processor's log (`/opt/apigee/var/log/edge-message-processor/logs/system.log`)

2. If you find "Gateway Timeout" and "onTimeoutRead" errors for the specific API proxy request at the specific time, then it indicates that the Message Processor has timed out.

   Sample Message Processor log showing Gateway Timeout Error



```
2015-09-29 20:16:54,340 org:myorg env:staging api:profiles rev:13 NIOThread@1
ERROR ADAPTORS.HTTP.FLOW - AbstractResponseListener.onException() :
AbstractResponseListener.onError(HTTPResponse@4d898cf1, Gateway
Timeout)
2015-09-29 20:16:57,361 org:myorg env:staging api:profileNewsletters rev:8
NIOThread@0 ERROR HTTP.CLIENT - HTTPClient$Context$3.onTimeout() :
SSLClientChannel[C:XX.XX.XX.XX:443 Remote
host:192.168.38.54:38302]@120171 useCount=2 bytesRead=0
bytesWritten=824 age=55458ms lastIO=55000ms .onTimeoutRead
```

   In the above Message Processor log, you notice that the backend server denoted with the IP address XX.XX.XX.XX did not respond even after 55 seconds (**lastIO=55000ms**). As a result, the Message Processor timed out and sent 504 Gateway Timeout Error.

CHECK THIS

How is timeout controlled on Message Processor

- ➔ Message Processors are usually set with a **default timeout value** of 55 seconds) via the property "**HTTPTransport.io.timeout.millis**". This timeout value is applicable for all the API Proxies that belong to an organization served by this Message Processor.
  - ◆ If the backend server does not respond back within 55 seconds, then the Message Processor times out and sends 504 Gateway Timeout error to the client.
- ➔ The timeout value specified in the Message Processor can be ***overridden*** by the property **"io.timeout.millis"** specified within the API Proxy. This timeout value is applicable to a specific API Proxy in which the above mentioned property is specified. For example, if the **io.timeout.millis** is set to 10 seconds within the API Proxy, then the timeout value of 10 seconds will be used for this specific API Proxy.
  - ◆ If the backend server does not respond back within 10 seconds for the specific API Proxy, then the Message Processor times out and sends 504 Gateway Timeout error to the client.

Resolution

1. Check why the backend server is taking more than 55 seconds and see if it can be fixed/optimized to respond faster.

2. If it is not possible to fix/optimize the backend server or it is known that the backend server takes a longer time than the configured timeout, then Increase the timeout value on Router and Message Processor to a suitable value.

Scenario #2 - Router times out before Message Processor/Backend Server responds

You might get 504 Gateway Timeout Errors if the router times out before the Message Processor/backend server responds. This can happen under one of the following circumstances:

- The timeout value set on the Router is shorter than the timeout value set on the Message Processor. For example, let's say the timeout on Router is 50 seconds, while the Message Processor is 55 seconds.

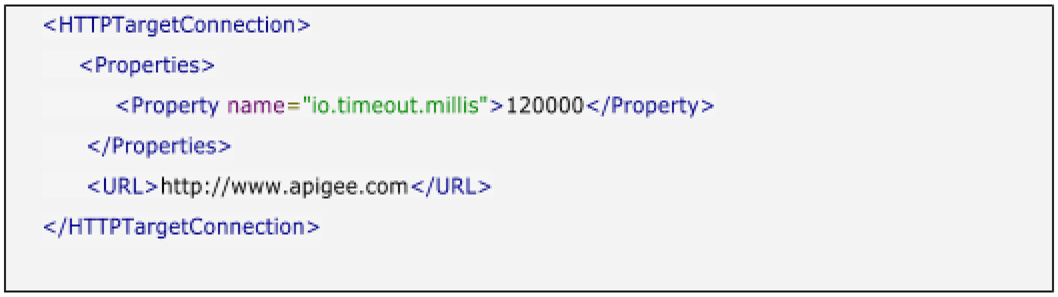
Timeout on Router	Timeout on Message Processor
50 seconds	55 seconds

- The timeout value on the Message Processor is overridden with a higher timeout value using the **"io.timeout.millis"** property set within the target endpoint configuration of the API Proxy:

  For example, if the following timeout values are set:

Timeout on Router	Timeout on Message Processor	Timeout within API Proxy
57 seconds	55 seconds	120 seconds

  But the io.timeout.millis is set to 120 seconds in the API Proxy:



```
<HTTPTargetConnection>
    <Properties>
        <Property name="io.timeout.millis">120000</Property>
     </Properties>
     <URL>http://www.apigee.com</URL>
</HTTPTargetConnection>
```

  Then, the Message Processor will not timeout after 55 seconds even though it's timeout value (55 seconds) is less than the timeout value on the router (57 seconds).

This is because the timeout value of 55 seconds on the Message Processor is overridden by the the value of 120 seconds that is set within the API Proxy. So the timeout value of the Message Processor for this specific API Proxy will be 120 seconds.

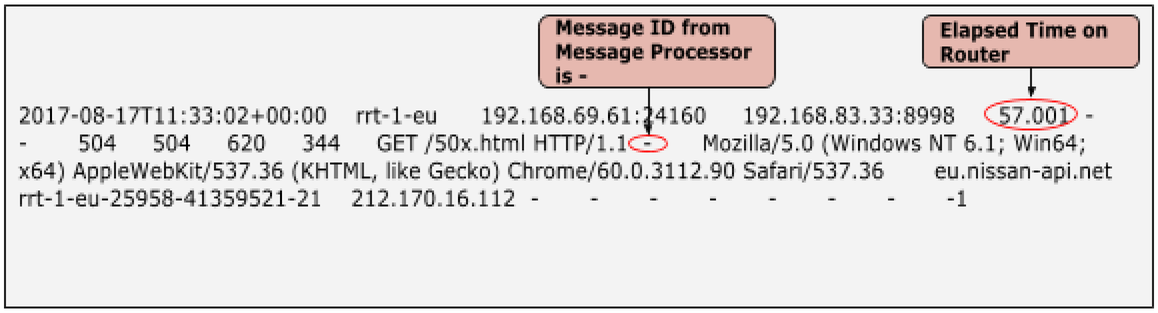
Since the Router has a lower timeout value (57 seconds) compared to 120 seconds set within the API Proxy, the router will timeout if the backend server does not respond back after 57 seconds.

Steps to Diagnose

1. Check the Nginx access log (`/opt/apigee/var/log/edge-router/nginx/<org>~<env>.<port#>_access_log`)

2. If the router times out before the Message Processor, then you will see the status of 504 on the Nginx access logs for the specific API request and the **message id** from the Message Processor will be set as “-”. This is because the Router didn’t get any response from the Message Processor within the timeout period set on the router.

   Sample Nginx Log Entry showing 504 due to Router timing out

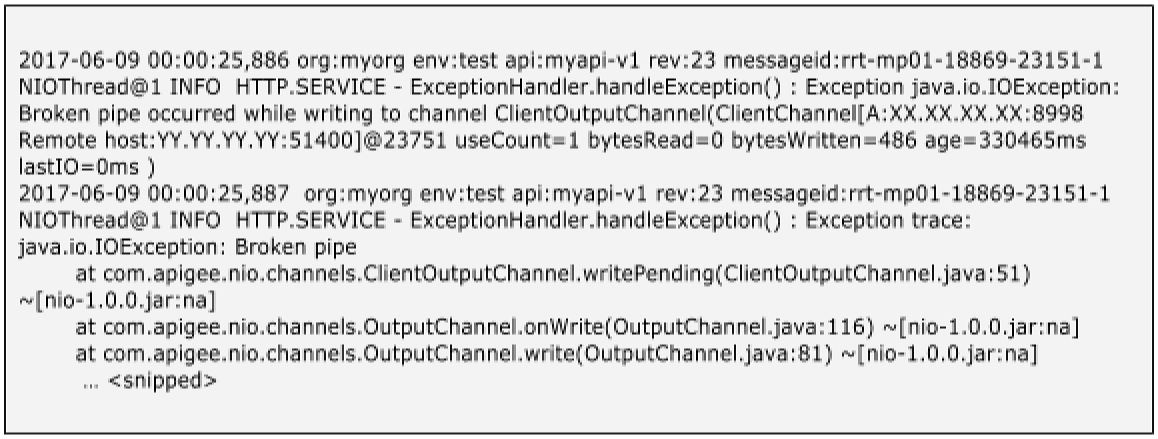


```
2017-08-17T11:33:02+00:00   rrt-1-eu    192.168.69.61:24160    192.168.83.33:8998    57.001 -
-     504    504    620    344    GET /50x.html HTTP/1.1 -     Mozilla/5.0 (Windows NT 6.1; Win64;
x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/60.0.3112.90 Safari/537.36      eu.nissan-api.net
rrt-1-eu-25958-41359521-21    212.170.16.112 -     -     -     -     -     -     -     -1
```

3. In the above example, notice the status of 504 on Nginx, the message id from the Message Processor is “-” and total time elapsed is 57.001 seconds. This is because the router timed out after 57.001 seconds and we didn’t get any response from the Message Processor.

4. In this case, you will see **“Broken Pipe”** Exceptions in the Message Processor logs

(`/opt/apigee/var/log/edge-message-processor/logs/system.log`)
.



```
2017-06-09 00:00:25,886 org:myorg env:test api:myapi-v1 rev:23 messageid:rrt-mp01-18869-23151-1
NIOThread@1 INFO  HTTP.SERVICE - ExceptionHandler.handleException() : Exception java.io.IOException:
Broken pipe occurred while writing to channel ClientOutputChannel(ClientChannel[A:XX.XX.XX.XX:8998
Remote host:YY.YY.YY.YY:51400]@23751 useCount=1 bytesRead=0 bytesWritten=486 age=330465ms
lastIO=0ms )
2017-06-09 00:00:25,887  org:myorg env:test api:myapi-v1 rev:23 messageid:rrt-mp01-18869-23151-1
NIOThread@1 INFO  HTTP.SERVICE - ExceptionHandler.handleException() : Exception trace:
java.io.IOException: Broken pipe
        at com.apigee.nio.channels.ClientOutputChannel.writePending(ClientOutputChannel.java:51)
~[nio-1.0.0.jar:na]
        at com.apigee.nio.channels.OutputChannel.onWrite(OutputChannel.java:116) ~[nio-1.0.0.jar:na]
        at com.apigee.nio.channels.OutputChannel.write(OutputChannel.java:81) ~[nio-1.0.0.jar:na]
         ... <snipped>
```

This error is displayed because once the router times out, it closes the connection with the Message Processor. When the Message Processor completes its processing, it attempts to write the response to the router. Since the connection to the router is already closed, you get the **Broken Pipe exception** on the Message Processor.

This exception is expected to be seen under the circumstances explained above. So the actual cause for the 504 Gateway Timeout error is still the backend server taking longer time to respond and you need to address that issue.

Resolution

1. If it's a custom backend server, then
    a. Check why the backend server is taking a long time to respond and see if it can be fixed/optimized to respond faster.

    b. If it is not possible to fix/optimize the backend server or it is a known fact that the backend server takes a long time, then Increase the timeout value on Router and Message Processor.

idea!

Set the timeout value on the different components in the following order:

Timeout on Client > Timeout on Router > Timeout on Message Processor > Timeout within API Proxy

2. If it's a NodeJS backend server, then:
    a. Check if the NodeJS code makes calls to any other backend server(s) and if it's taking a long time to return a response. Check why those backend server(s) is taking longer time.
    b. Check if the Message Processor(s) is experiencing high CPU or Memory usage:
        i. If any Message Processor is experiencing high CPU usage, then generate three thread dumps every 30 seconds using the following command:

```
<JAVA_HOME>/bin/jstack -l <pid> > <filename>
```

        ii. If any Message Processor is experiencing high memory usage then generate a heap dump using the following command:

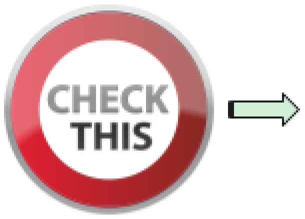
```
sudo -u apigee <JAVA_HOME>/bin/jmap
-dump:live,format=b,file=<filename> <pid>
```

        iii. Restart the Message Processor will bring down the CPU and Memory:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-message-processor restart
```

        iv. Monitor the API calls to confirm if the problem still exists.

        v. Contact Apigee Support and provide the thread dumps, heap dump, and Message Processor logs (`/opt/apigee/var/log/edge-message-processor/logs/system.log`) to help them investigate the cause for the high CPU/memory usage.



How is timeout controlled for NodeJS backend servers on Message Processor

- ➔ The NodeJS backend server runs within the JVM process of Message Processor. The timeout value for NodeJS backend servers is controled via the property "**http.request.timeout.seconds**" in nodejs.properties file. This property is set to 0 by default i.e., the timeout is disabled by default for all the API Proxies that belong to an organization served by this Message Processor. So even if a NodeJS backend server takes long time, the Message Processor will not timeout.
- ➔ However, if the NodeJS backend server takes long and if the time taken by the API request is > 57 seconds, then the Router will timeout and sends 504 Gateway Timeout Error to the client.

Scenario #3 - Client Application times out before Router/Message Processor/Backend Server responds

You might get 504 Gateway Timeout Errors if the client application times out before the backend server responds. This situation can happen if:

1. The timeout value set on the client application is lower than the timeout value set on the router and Message Processor:

   For example, if the following timeout values are set:.

Timeout on Client	Timeout on Router	Timeout on Message Processor
50 seconds	57 seconds	55 seconds

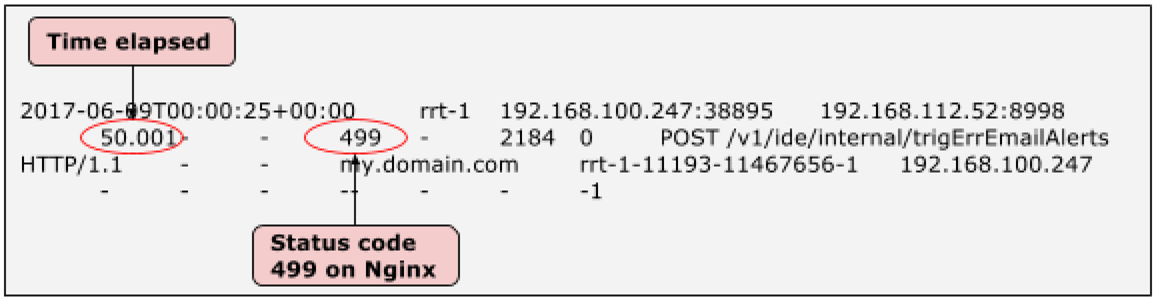
   If the backend server does not respond back to the Message Processor within 50 seconds, then the client will timeout and close the connection with the router. The client will get the response code of 504.

   This will cause the Nginx to set a status code of 499 indicating the client closed the connection.

Steps to Diagnose

1. If the client application times out before the backend server responds, then it will close the connection with the router. In this situation, you will see a status code of 499 in the Nginx access logs for the specific API request.

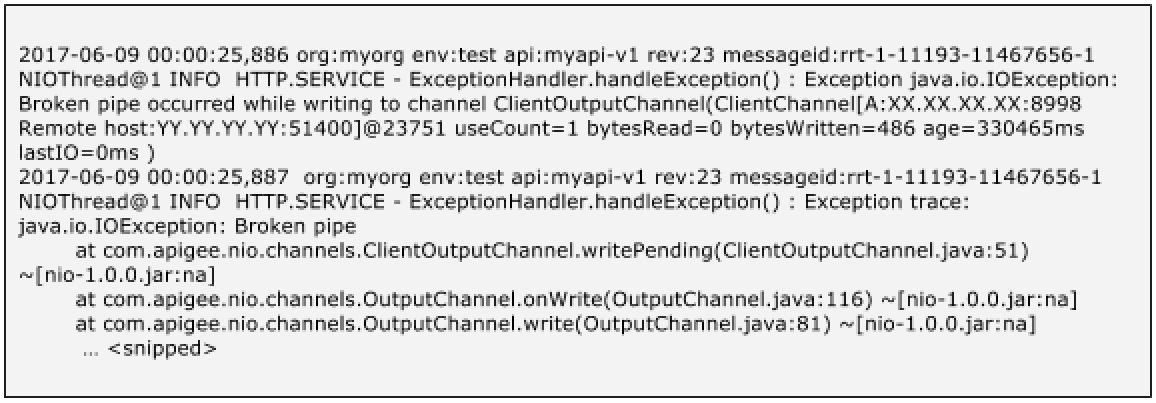
   Sample Nginx Log Entry showing status code 499



```
2017-06-09T00:00:25+00:00     rrt-1   192.168.100.247:38895     192.168.112.52:8998
      50.001  -     -     499   -     2184   0       POST /v1/ide/internal/trigErrEmailAlerts
HTTP/1.1      -     -     my.domain.com       rrt-1-11193-11467656-1      192.168.100.247
      -       -     -     --    -     -       -1
```

3. In the above example, note that the status of 499 on the Nginx and total time elapsed is 50.001 seconds. This indicates that the client timed out after 50.001 seconds.

4. In this case, you will see **"Broken Pipe"** Exceptions in the Message Processor logs (`/opt/apigee/var/log/edge-message-processor/logs/system.log`).



```
2017-06-09 00:00:25,886 org:myorg env:test api:myapi-v1 rev:23 messageid:rrt-1-11193-11467656-1
NIOThread@1 INFO  HTTP.SERVICE - ExceptionHandler.handleException() : Exception java.io.IOException:
Broken pipe occurred while writing to channel ClientOutputChannel(ClientChannel[A:XX.XX.XX.XX:8998
Remote host:YY.YY.YY.YY:51400]@23751 useCount=1 bytesRead=0 bytesWritten=486 age=330465ms
lastIO=0ms )
2017-06-09 00:00:25,887  org:myorg env:test api:myapi-v1 rev:23 messageid:rrt-1-11193-11467656-1
NIOThread@1 INFO  HTTP.SERVICE - ExceptionHandler.handleException() : Exception trace:
java.io.IOException: Broken pipe
        at com.apigee.nio.channels.ClientOutputChannel.writePending(ClientOutputChannel.java:51)
~[nio-1.0.0.jar:na]
        at com.apigee.nio.channels.OutputChannel.onWrite(OutputChannel.java:116) ~[nio-1.0.0.jar:na]
        at com.apigee.nio.channels.OutputChannel.write(OutputChannel.java:81) ~[nio-1.0.0.jar:na]
         ... <snipped>
```

5. After the Router times out, it closes the connection with the Message Processor. When the Message Processor completes its processing, it attempts to write the

response to the Router. Since the connection to the Router is already closed, you get the Broken Pipe exception on the Message Processor.

6. This exception is expected under the circumstances explained above. So the actual cause for the 504 Gateway Timeout error is still that the backend server takes a long time to respond and you need to address that issue.

Resolution

1. If it's your custom backend server then:
    a. Check the backend server to determine why it is taking more than 57 seconds and see if it can be fixed/optimized to respond faster.

    b. If it is not possible to fix/optimize the backend server or if you know that the backend server will take a long time, then increase the timeout value on router and Message Processor.

idea!

Set the timeout value on the different components in the following order:

Timeout on Client > Timeout on Router > Timeout on Message Processor > Timeout within API Proxy

2. If it's a NodeJS backend, then:

    a. Check if the NodeJS code makes calls to any other backend server(s) and if that's taking a long time to return. Check why those backend server(s) is taking longer time.

    b. Check if the Message Processor(s) is experiencing high CPU or memory usage:

        i. If a Message Processor is experiencing high CPU usage, then generate three thread dumps every 30 seconds using the following command:

```
<JAVA_HOME>/bin/jstack -l <pid> > <filename>
```

ii. If a Message Processor is experiencing high memory usage, then generate a heap dump using the following command:

```
sudo -u apigee <JAVA_HOME>/bin/jmap
-dump:live,format=b,file=<filename> <pid>
```

iii. Restarting the Message Processor will ensure that the CPU and Memory will drop down:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-message-processor restart
```

iv. Monitor the API calls to confirm if the problem still exists.

v. Contact Apigee Support and provide the thread dumps, heap dump, and Message Processor logs (`/opt/apigee/var/log/edge-message-processor/logs/system.log`) to help them investigate the cause for the high CPU/memory usage.

Increase the timeout value on Router and Message Processor

Choose the timeout values to be set on the Router and Message Processor carefully depending on your requirements. Don't set arbitrarily large timeout values. If you need assistance, contact Apigee Support.

Router

1. Create the `/opt/apigee/customer/application/router.properties` file on the Router machine, if it does not already exist.

2. Add the following line to this file:

   ```
   conf_load_balancing_load.balancing.driver.proxy.read.timeou
   t=<time in seconds>
   ```

   For example, if you want to set the timeout value of 120 seconds, then set it as follows:

```
conf_load_balancing_load.balancing.driver.proxy.read.timeou
t=120
```

3. Ensure this file is owned by apigee:

```
chown apigee:apigee
/opt/apigee/customer/application/router.properties
```

4. Restart the router:

```
/opt/apigee/apigee-service/bin/apigee-service edge-router
restart
```

5. If you have more than one router, repeat the above steps on all the routers.

Message Processor

1. Create `/opt/apigee/customer/application/message-processor.properti es` file on the Message Processor machine, if it does not already exist.

2. Add the following line to this file:

```
conf_http_HTTPTransport.io.timeout.millis=<time in
milliseconds>
```

For example, if you want to set the timeout value of 120 seconds, then set it as follows:

```
conf_http_HTTPTransport.io.timeout.millis=120000
```

3. Ensure this file is owned by apigee:

```
chown apigee:apigee
/opt/apigee/customer/application/message-processor.properti
es
```

4. Restart the Message Processor:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-message-processor restart
```

5. If you have more than one Message Processor, repeat the above steps on all the Message Processors.

idea!

Set the timeout value on the different components in the following order:

Timeout on Client > Timeout on Router > Timeout on Message Processor > Timeout within API Proxy

Slow API Request Processing by Edge

If Edge is very slow and/or taking a long time to process the API request, then you will get a 504 Gateway Timeout error.

Steps to Diagnose

1. Trace the affected API in Edge UI.

2. Either wait for the error to occur or if you have the API call, then make some API calls and reproduce the 504 Gateway Timeout Error.

3. Note, in this case, you may see a successful response in the Trace.

    a. The Router/client times out as the Message Processor does not respond back within the specified timeout period on the Router/client (whichever has the lowest time out period).

       However, the Message Processor continues to process the request and may complete successfully.

    b. In addition, the **HTTPTransport.io.timeout.millis** value set on the Message Processor triggers only if the Message Processor communicates with a HTTP/HTTPS backend server.

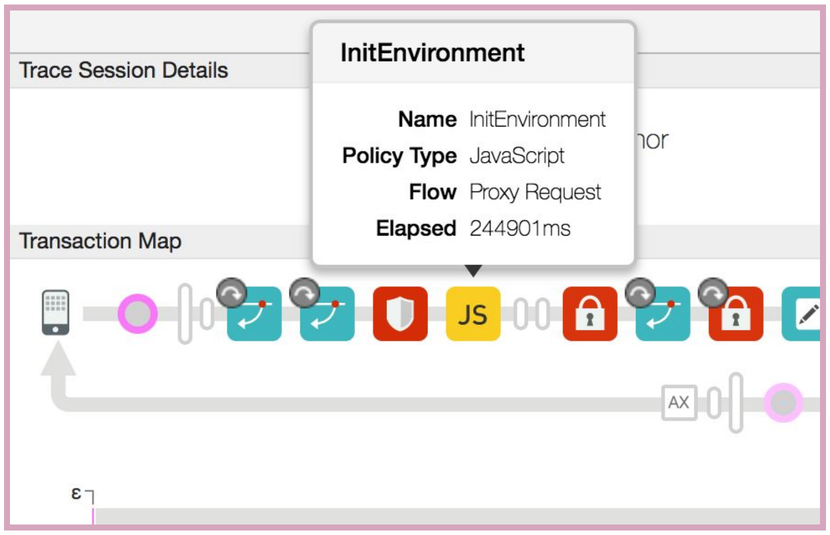
In other words, this timeout will not get triggered when any policy (other than Service Callout policy) within API Proxy is taking a long time.

4. After the error has occurred, examine the specific request that has the **longest elapsed time**.

5. Check the elapsed time at each phase and make a note of the phase where the most time is spent.

6. If you observe the longest elapsed time in any of the policies other than the Service Callout policy, then that indicates that Edge is taking a long time to process the request.

7. Here's a sample UI trace showing very high elapsed time on JavaScript Policy:



Name	InitEnvironment
Policy Type	JavaScript
Flow	Proxy Request
Elapsed	244901ms

8. In the above example, you notice that the JavaScript policy takes an abnormally long amount of time of ~ 245 seconds.

Resolution

1. Check if the policy that took a long time to respond has any custom code that might require a long time to process. If there is any such code, then see if you can fix/optimize the identified code.

2. If there is no custom code that might cause high processing time, then check if the Message Processor(s) is experiencing high CPU or memory usage:

    a. If any Message Processor is experiencing high CPU usage, then generate three thread dumps every 30 seconds using the following command:

    ```
    <JAVA_HOME>/bin/jstack -l <pid> > <filename>
    ```

    b. If any Message Processor is having high Memory usage, then generate a heap dump using the following command:

    ```
    sudo -u apigee <JAVA_HOME>/bin/jmap
    -dump:live,format=b,file=<filename> <pid>
    ```

    c. Restarting the Message Processor will bring down the CPU and memory usage:

    ```
    /opt/apigee/apigee-service/bin/apigee-service
    edge-message-processor restart
    ```

    d. Monitor the API calls and confirm if the problem still exists.

    e. Contact Apigee Support and provide the thread dumps, heap dump, and Message Processor logs (`/opt/apigee/var/log/edge-message-processor/logs/system.log`) to help them investigate the cause for the high CPU/memory usage.

Troubleshooting Analytics Problems

This section provides information and guidance on procedures for troubleshooting commonly observed analytics problems.

Data not showing up on analytics dashboards in Edge

Description

The analytics dashboards (Proxy Performance, Target Performance, etc.) are not showing any data in the Edge UI. All the dashboards show the following message:

"No traffic in the selected date range"

Error Messages

No Errors are observed.

Causes

The typical causes for this error are:

Cause
No API Traffic for Organization-Environment
Data available in Postgres Database, but not shown up in UI
Analytics Data not being pushed to Postgres Database
Postgres Server running out of disk space
Incorrect Analytics Deployment
Stale Analytics Server UUIDs

The following sections describe how to diagnose and resolve each issue.

No API Traffic for Organization-Environment

Steps to Diagnose

1. Check if there is traffic for the API Proxies on the specific organization-environment for the specific duration that you are trying to view the analytics data using one of the following methods:

    a. Enable the trace for any of your APIs that is currently being used by your users and check if you are able to get any requests in the trace.

       Note: This technique will be useful only if you want to check if there is traffic at this point in time rather than in the past.

    b. View the Nginx access logs (`/opt/apigee/var/log/edge-router/nginx/logs/access.log`) and see if there any new entries for API Proxies for the specific duration.

    c. If you log information from API Proxies to a log server such as Syslog, Splunk, Loggly, etc., then you can check if there are any entries in these log servers for API Proxies for the specific duration.

2. If there’s no traffic (no API requests) for the specific duration, then analytics data is not available. You will see “No traffic in the selected date range” in the analytics dashboard.

Resolution

1. Make some calls to one or more API proxies in the specific organization-environment.

2. Wait for a few seconds, and then view the analytics dashboards in the Hour tab and see if the data appears.

3. If the issue persists, then proceed to Data available in Postgres Database, but not displaying in UI.

Data available in Postgres database, but not displaying in the Edge UI

Determine the availability of latest Analytics data in Postgres database

Follow the below steps to check if the latest Analytics data is available in the Postgres Master node:

1. Log in to each of the Postgres servers and run the following command to validate if you are on the Master Postgres node:

   ```
   /opt/apigee/apigee-service/bin/apigee-service
   apigee-postgresql postgres-check-master
   ```

2. On the Master Postgres node, log in to PostgresSQL:

   ```
   psql -h /opt/apigee/var/run/apigee-postgresql -U apigee
   apigee
   ```

3. Check if the table exists for your org-env using the following SQL query in the Postgres database:

   ```
   \d analytics."<orgname>.<envname>.fact"
   ```

   Note: Replace *orgname* and *envname* with your organization and environment names.

4. Check if the latest data is available in the Postgres database using the following SQL query:

   ```
   select max(client_received_start_timestamp) from
   analytics."<orgname>.<envname>.fact";
   ```

5. If the latest timestamp is very old (or null), then this indicates that data is not available in the Postgres database. The likely cause for this issue would be that the data is not pushed from the Qpid Server to the Postgres database. Proceed to Analytics Data not being pushed to Postgres Database.

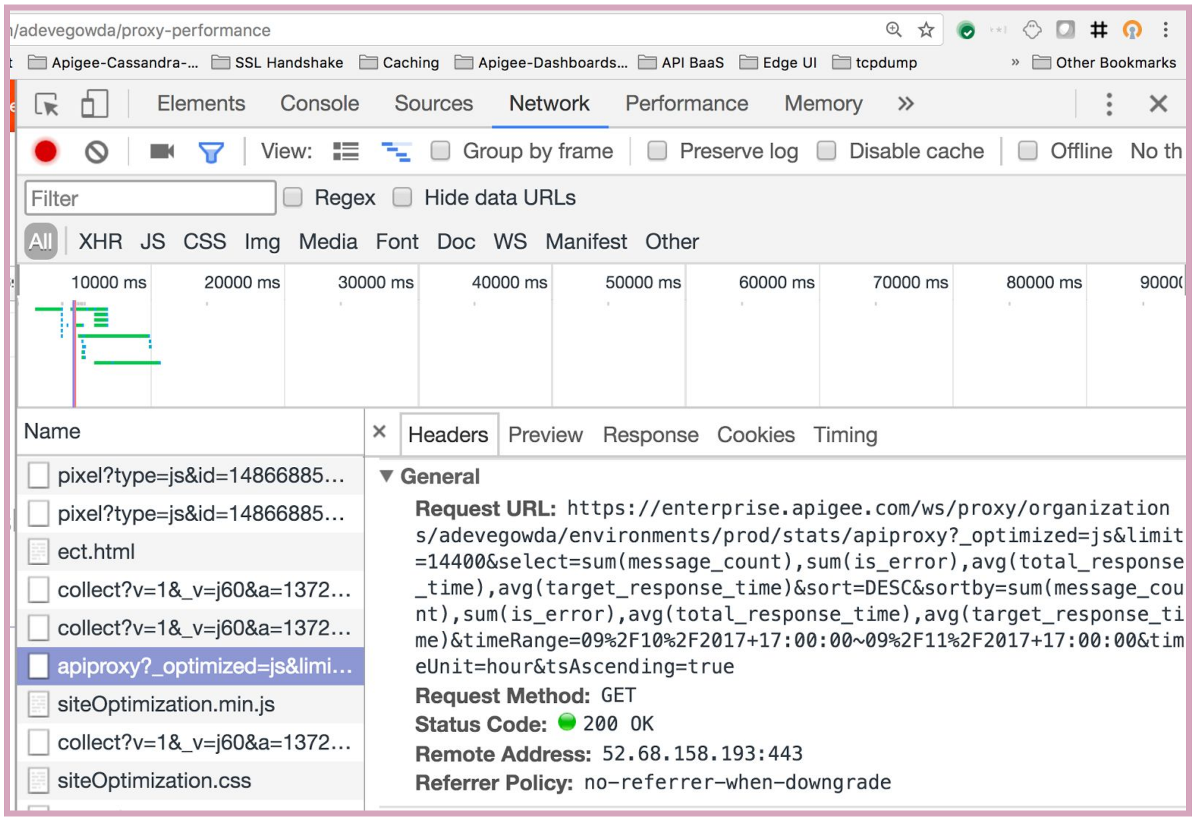
6. If the latest data is available in the Postgres database on the Master node, then follow the below steps to diagnose why the data is not displaying in the Edge UI.

Steps to Diagnose

1. Enable Developer Tools in the browser and get the API used from one of the analytics dashboards using the below steps:
    a. Select the Network tab from the Developer Tools.
    b. Start Recording.
    c. Reload the Analytics dashboard.
    d. On the left hand panel in the Developer Tools, select the row having **"apiproxy?_optimized…".**
    e. On the right hand panel in the Developer Tools, select the "Headers" tab and note down the "Request URL".

2. Here's a sample output from the Developer Tools:

    Sample output showing the API used in Proxy Performance dashboard from Network Tab of Developer Tools for Proxy Performance dashboard


/adevegowda/proxy-performance
Apigee-Cassandra-... SSL Handshake Caching Apigee-Dashboards... API BaaS Edge UI tcpdump Other Bookmarks
Elements Console Sources Network Performance Memory
View: Group by frame Preserve log Disable cache Offline No th
Filter Regex Hide data URLs
All XHR JS CSS Img Media Font Doc WS Manifest Other
10000 ms 20000 ms 30000 ms 40000 ms 50000 ms 60000 ms 70000 ms 80000 ms 9000(
Name
Headers Preview Response Cookies Timing

```
pixel?type=js&id=14866885…
pixel?type=js&id=14866885…
ect.html
collect?v=1&_v=j60&a=1372…
collect?v=1&_v=j60&a=1372…
apiproxy?_optimized=js&limi…
siteOptimization.min.js
collect?v=1&_v=j60&a=1372…
siteOptimization.css
```

▼ General

```
Request URL: https://enterprise.apigee.com/ws/proxy/organization
s/adevegowda/environments/prod/stats/apiproxy?_optimized=js&limit
=14400&select=sum(message_count),sum(is_error),avg(total_response
_time),avg(target_response_time)&sort=DESC&sortby=sum(message_cou
nt),sum(is_error),avg(total_response_time),avg(target_response_ti
me)&timeRange=09%2F10%2F2017+17:00:00~09%2F11%2F2017+17:00:00&tim
eUnit=hour&tsAscending=true
Request Method: GET
Status Code: ● 200 OK
Remote Address: 52.68.158.193:443
Referrer Policy: no-referrer-when-downgrade
```

3. Run the management API call directly and check if you get the results. Here's a sample API call for the Day tab in the Proxy Performance dashboard:

```
curl -u user:pass
"http://<management-server-IPaddress>:8080/v1/organizations
/<org-name>/environments/<env-name>/stats/apiproxy?limit=144
00&select=sum(message_count),sum(is_error),avg(total_respon
se_time),avg(target_response_time)&sort=DESC&sortby=sum(mes
sage_count),sum(is_error),avg(total_response_time),avg(targ
et_response_time)&timeRange=08%2F9%2F2017+18:00:00~08%2F10%
2F2017+18:00:00&timeUnit=hour&tsAscending=true
```

4. If you see a successful response but without any data, then it indicates that the Management Server is unable to fetch the data from the Postgres server due to network connectivity issues.

5. Check if you are able to connect to the Postgres server from the Management Server:

```
telnet <Postgres-Server-IPaddress> 5432
```

6. If you are unable to connect to the Postgres server, check if there are any firewall restrictions on port 5432.

7. If there are firewall restrictions, then that could be the cause for the Management Server being unable to pull the data from the Postgres server.

Resolution

1. If there are firewall restrictions, then remove them so that the Management Server can communicate with the Postgres server.

2. If there are no firewall restrictions, then this issue could be due to network glitch.

3. If there was any network glitch on the Management Server, then restarting it might fix the issue.

4. Restart all the Management Servers one by one using the below command:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-management-server restart
```

5. Check if you are able to see the analytics data in the Edge UI.

If you still don’t see the data, contact Apigee Support.

Analytics Data not being pushed to Postgres Database

Steps to Diagnose

If the data is not pushed from Qpid Server to Postgres Database as determined in Determine the availability of latest Analytics data in Postgres database, then perform the following steps:

1. Check if each of the Qpid Server is up and running by executing the below command:

```
/opt/apigee/bin/apigee-service edge-qpid-server status
```

2. If any Qpid Server is down, then restart it. If not, jump to step #5.

```
/opt/apigee/bin/apigee-service edge-qpid-server restart
```

3. Wait for some time and then re-check if the latest data is available in Postgres database.
    a. Log in to PostgresSQL:

    ```
    psql -h /opt/apigee/var/run/apigee-postgresql -U
    apigee apigee
    ```

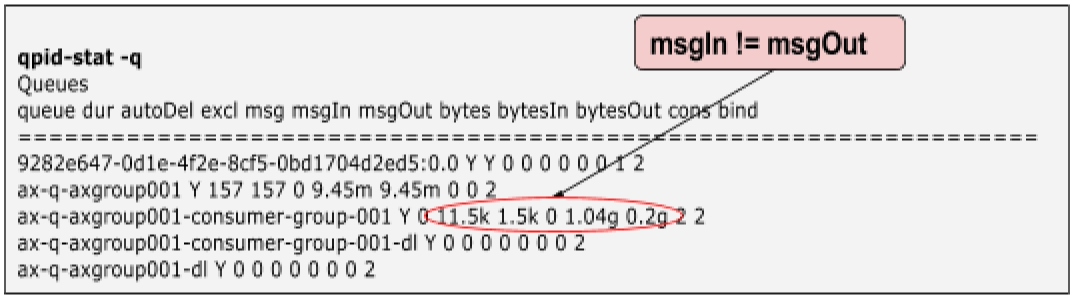
    b. Run the below SQL query to check if the latest data is available:

    ```
    select max(client_received_start_timestamp) from
    analytics."<orgname>.<envname>.fact";
    ```

4. If the latest data is available, then skip the following steps and proceed to last step in Resolution section. If the latest data is not available, then proceed with the following steps.

5. Check if the messages from Qpid server queues are being pushed to Postgres database.
    a. Execute the **qpid-stat -q command** and check the *msgIn* and *msgOut* column values.

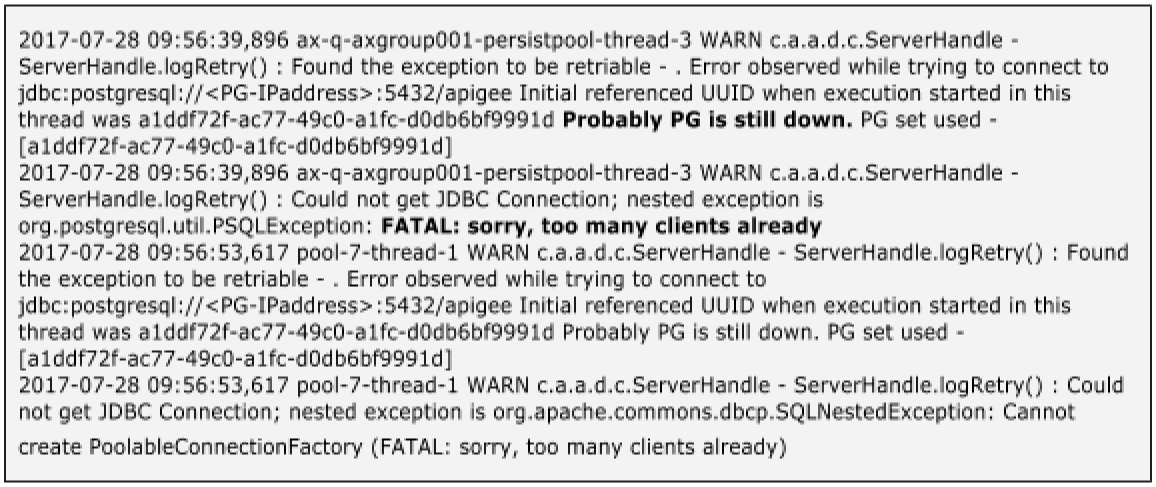
b. Here’s a sample output that shows the msgIn and msgOut are not equal. This indicates that messages are not being pushed from Qpid Server to Postgres Database.



```
qpid-stat -q
Queues
queue dur autoDel excl msg msgIn msgOut bytes bytesIn bytesOut cons bind
==========================================================================
9282e647-0d1e-4f2e-8cf5-0bd1704d2ed5:0.0 Y Y 0 0 0 0 0 0 1 2
ax-q-axgroup001 Y 157 157 0 9.45m 9.45m 0 0 2
ax-q-axgroup001-consumer-group-001 Y 0 11.5k 1.5k 0 1.04g 0.2g 2 2
ax-q-axgroup001-consumer-group-001-dl Y 0 0 0 0 0 0 0 2
ax-q-axgroup001-dl Y 0 0 0 0 0 0 0 2
```

6. If there’s a mismatch in *msgIn* and *msgOut* columns, then check the Qpid Server logs `/opt/apigee/var/log/edge-qpid-server/system.log` and see if there are any errors.

7. You may see error messages such as **“Probably PG is still down”** or **“FATAL: sorry, too many clients already”** as shown in the figure below:



```
2017-07-28 09:56:39,896 ax-q-axgroup001-persistpool-thread-3 WARN c.a.a.d.c.ServerHandle -
ServerHandle.logRetry() : Found the exception to be retriable - . Error observed while trying to connect to
jdbc:postgresql://<PG-IPaddress>:5432/apigee Initial referenced UUID when execution started in this
thread was a1ddf72f-ac77-49c0-a1fc-d0db6bf9991d Probably PG is still down. PG set used -
[a1ddf72f-ac77-49c0-a1fc-d0db6bf9991d]
2017-07-28 09:56:39,896 ax-q-axgroup001-persistpool-thread-3 WARN c.a.a.d.c.ServerHandle -
ServerHandle.logRetry() : Could not get JDBC Connection; nested exception is
org.postgresql.util.PSQLException: FATAL: sorry, too many clients already
2017-07-28 09:56:53,617 pool-7-thread-1 WARN c.a.a.d.c.ServerHandle - ServerHandle.logRetry() : Found
the exception to be retriable - . Error observed while trying to connect to
jdbc:postgresql://<PG-IPaddress>:5432/apigee Initial referenced UUID when execution started in this
thread was a1ddf72f-ac77-49c0-a1fc-d0db6bf9991d Probably PG is still down. PG set used -
[a1ddf72f-ac77-49c0-a1fc-d0db6bf9991d]
2017-07-28 09:56:53,617 pool-7-thread-1 WARN c.a.a.d.c.ServerHandle - ServerHandle.logRetry() : Could
not get JDBC Connection; nested exception is org.apache.commons.dbcp.SQLNestedException: Cannot
create PoolableConnectionFactory (FATAL: sorry, too many clients already)
```

This could happen if the Postgres Server is running too many SQL queries or the CPU running high and hence unable to respond to Qpid Server.

Resolution

1. Restart the Postgres Server and PostgreSQL as shown below:

```
/opt/apigee/bin/apigee-service edge-postgres-server restart
/opt/apigee/bin/apigee-service apigee-postgresql restart
```

2. This restart ensures that all the previous SQL queries are stopped and should allow new connections to the Postgres database.

3. Reload the Analytics dashboards and check if the Analytics data is being displayed.

If the problem persists, contact Apigee Support.

Incorrect Analytics Deployment

Steps to Diagnose

1. Get the analytics deployment status by using the following API call:

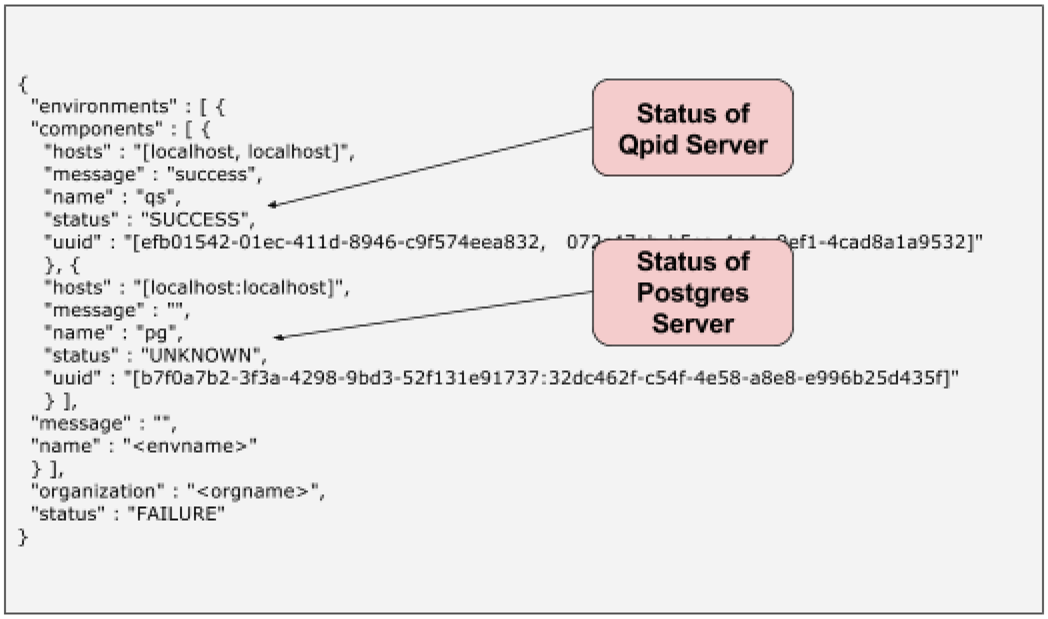
```
curl -u <userEmail>:<password>
http://<management-server-host>:<port>/v1/organizations/<or
gname>/environments/<envname>/provisioning/axstatus
```

2. Check the status of the Qpid and Postgres servers from the results of the API call.

    a. If the status of Qpid and Postgres servers are shown as "SUCCESS", then it indicates the analytics servers are wired properly. Proceed to **Scenario #2 Stale Analytics Server UUIDs**.

    b. If the status of Qpid/Postgres servers is shown as "UNKNOWN" or "FAILURE", then it indicates an issue with the corresponding server.

       For example, the following scenario shows the status of the Postgres servers as "UNKNOWN"



```
{
  "environments" : [ {
  "components" : [ {
    "hosts" : "[localhost, localhost]",
    "message" : "success",
    "name" : "qs",
    "status" : "SUCCESS",
    "uuid" : "[efb01542-01ec-411d-8946-c9f574eea832,  07[illegible]ef1-4cad8a1a9532]"
    }, {
    "hosts" : "[localhost:localhost]",
    "message" : "",
    "name" : "pg",
    "status" : "UNKNOWN",
    "uuid" : "[b7f0a7b2-3f3a-4298-9bd3-52f131e91737:32dc462f-c54f-4e58-a8e8-e996b25d435f]"
    } ],
  "message" : "",
  "name" : "<envname>"
  } ],
  "organization" : "<orgname>",
  "status" : "FAILURE"
}
```

This may happen if there is a failure during the onboarding of analytics. This failure prevents the messages from Management Servers reaching the Postgres servers.

Resolution

This issue can be typically resolved by restarting the servers which showed the “FAILURE” or “UNKNOWN”.

1. Restart each of the servers whose analytics wiring status indicated “FAILURE” or “UNKNOWN” using the following command:

   ```
   /opt/apigee/apigee-service/bin/apigee-service <component>
   restart
   ```

2. For example:
   a. If you see the issue on Qpid Servers, then restart the Qpid Servers:

      ```
      /opt/apigee/apigee-service/bin/apigee-service
      edge-qpid-server restart
      ```

b. If you see the issue on Postgres Servers, then restart both the Master and Slave Postgres Server nodes:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-postgres-server restart
```

3. In the example above, the “UNKNOWN” message is shown for the Postgres servers, so you need to restart both the Master and Slave Postgres servers:

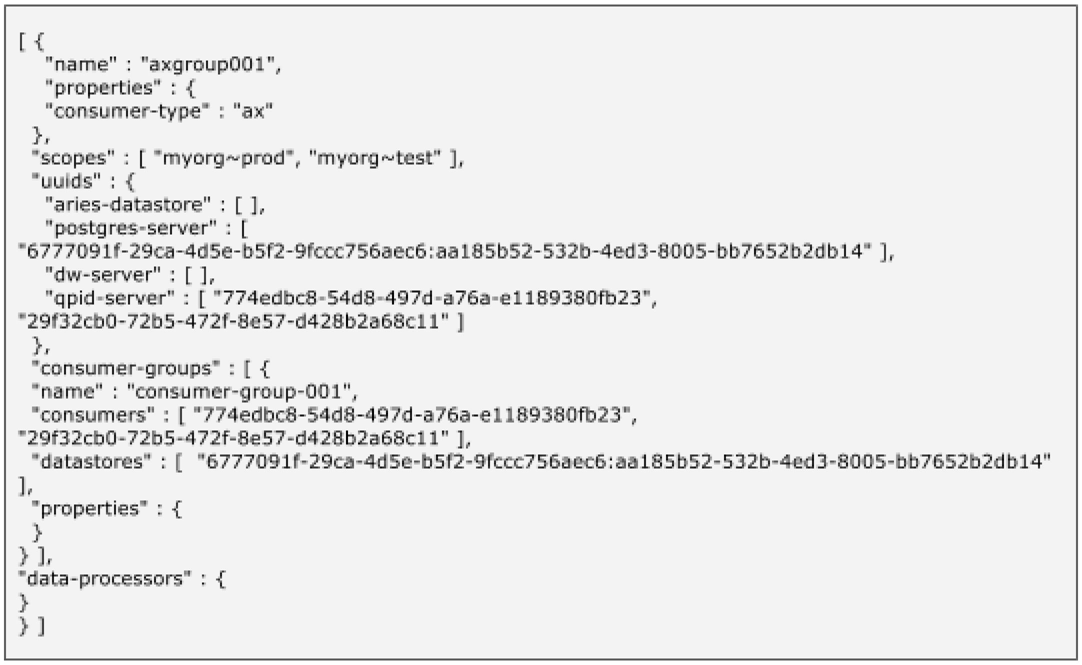
```
/opt/apigee/apigee-service/bin/apigee-service
edge-postgres-server restart
```

Stale Analytics Server UUIDs

1. Get the analytics configuration using the following API call:

```
curl -u <userEmail>:<password>
http://<management-server-host>:<port>/v1/analytics/groups/
ax
```

Here’s a sample output from the above API:



```
[ {
   "name" : "axgroup001",
   "properties" : {
   "consumer-type" : "ax"
  },
  "scopes" : [ "myorg~prod", "myorg~test" ],
  "uuids" : {
   "aries-datastore" : [ ],
   "postgres-server" : [
"6777091f-29ca-4d5e-b5f2-9fccc756aec6:aa185b52-532b-4ed3-8005-bb7652b2db14" ],
   "dw-server" : [ ],
   "qpid-server" : [ "774edbc8-54d8-497d-a76a-e1189380fb23",
"29f32cb0-72b5-472f-8e57-d428b2a68c11" ]
  },
  "consumer-groups" : [ {
  "name" : "consumer-group-001",
  "consumers" : [ "774edbc8-54d8-497d-a76a-e1189380fb23",
"29f32cb0-72b5-472f-8e57-d428b2a68c11" ],
  "datastores" : [  "6777091f-29ca-4d5e-b5f2-9fccc756aec6:aa185b52-532b-4ed3-8005-bb7652b2db14"
],
  "properties" : {
  }
} ],
"data-processors" : {
}
} ]
```

2. Ensure the following information in the output is correct:
    a. org-env names listed in the “scopes” element.
    b. UUIDs of the Postgres servers and Qpid servers.
        - Get the Postgres Server UUIDs by running the following command on each of the Postgres server nodes:

          ```
          curl 0:8084/v1/servers/self/uuid
          ```

        - Get the Qpid Server UUIDs by running the following command on each of the Qpid server nodes:

          ```
          curl 0:8083/v1/servers/self/uuid
          ```

3. If all the information is correct, then proceed to Analytics Data not being pushed to Postgres Database.

4. If the UUIDs of Postgres and/or Qpid servers are incorrect, then it could be possible that the Management Servers are referring to stale UUIDs.

Resolution

To remove the stale UUIDs and add the correct UUIDs of the servers, contact Apigee Support.

Custom variable not visible in analytics custom reports

Description

The custom variable created using the Statistics Collector policy is not visible under Custom Dimensions in the Analytics Custom Reports in the Edge UI.

Error Messages

No Errors are observed.

Causes

The typical causes for this error are:

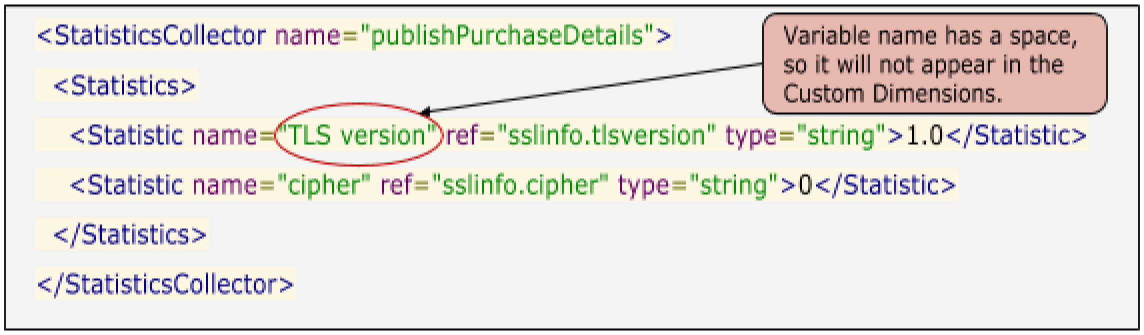
Cause
Custom Variable not adhering to the standard guidelines
No traffic on API Proxy implementing the Statistics Collector policy
Custom Variable not available on Postgres Server

The following sections describe how to diagnose and resolve each issue.

Custom Variable not adhering to the standard guidelines

If the custom variable name used in the Statistics Collector policy does not adhere to the standard guidelines (see below), then it will not appear in the Custom Reports.

The code snippet below shows that the variable name “TLS version” has a space, so it will not appear under the Custom Dimension in the Custom Report.



```
<StatisticsCollector name="publishPurchaseDetails">
 <Statistics>
   <Statistic name="TLS version" ref="sslinfo.tlsversion" type="string">1.0</Statistic>
   <Statistic name="cipher" ref="sslinfo.cipher" type="string">0</Statistic>
 </Statistics>
</StatisticsCollector>
```

Variable name has a space, so it will not appear in the Custom Dimensions.

Guidelines for Custom Variables

Custom variable names used in the Statistics Collector policy within the API proxy should adhere to the following **guidelines**:

- Names can include [a-z][0-9] and '_'.
- Case is ignored.
- Reserved keywords listed in the table at the following link are not permitted. For example, "user" is not permitted.
  https://www.postgresql.org/docs/8.1/static/sql-keywords-appendix.html

Resolution

Use the custom variable as per the above guidelines.

For example, in the code sample shown above, the variable name should be changed to "TLS_version" or "tls_version".

If the problem persists, then proceed to No traffic on API Proxy implementing the Statistics Collector policy**.**

No traffic on API proxy implementing the Statistics Collector policy

If there is no traffic on the API proxy that implements the Statistics Collector policy, then the custom variable will not appear in the Custom Reports.

Resolution

Make some calls to the API proxy that implements the Statistics Collector policy.

If the problem persists, then proceed to Custom Variable not pushed to Postgres Server.

Custom Variable not pushed to Postgres Server

When a custom variable is created in the API proxy and API calls are made, the variable first gets stored in-memory on the Message Processor. The Message Processor then sends the information about the new variable to ZooKeeper, which in turn sends it to the Postgres server to add it as a column in the Postgres database.

At times, the notification from ZooKeeper may not reach Postgres due to network issues. Because of this error, the custom variable might not appear in the Custom Report.

To identify where the custom variable is missing, perform following steps:

1. Generate the ZooKeeper tree using the following command:

   ```
   /opt/apigee/apigee-zookeeper/contrib/zk-tree.sh >
   zktree-output.txt
   ```

2. Search for the custom variable in the ZooKeeper tree output.

3. If the custom variable exists in the ZooKeeper tree, then execute the following commands to check if the custom variable is added to the Postgres database
   a. On the Postgres node, log in to PostgresSQL:

      ```
      psql -h /opt/apigee/var/run/apigee-postgresql -U
      apigee apigee
      ```

   b. Run the following SQL query:

      ```
      select column_name, data_type,
      character_maximum_length from
      INFORMATION_SCHEMA.COLUMNS where table_name =
      analytics"<orgname>.<envname>.fact";
      ```

4. Very likely you will see that custom variable column will be missing in the fact table which is the reason for it not to appear in the Custom Dimensions.

Resolution

Solution #1: Restart the Postgres Server

1. Restart the Postgres Server to force it to read all information relevant to Analytics from Zookeeper.

   ```
   /opt/apigee/bin/apigee-service edge-postgres-server restart
   ```

If the problem persists, apply Solution #2.

Solution #2: Enable the property forceonboard

Enable the **forceonboard** property using the below steps:

1. Create `/opt/apigee/customer/application/postgres-server.properties` file on the Postgres server machine, if it does not already exist.

2. Add the following line to this file:

   ```
   conf_pg-agent_forceonboard=true
   ```

3. Ensure this file is owned by Apigee.

4. Restart the Postgres server:

   ```
   /opt/apigee/apigee-service/bin/apigee-service
   edge-postgres-server restart
   ```

5. If you have more than one Postgres server, repeat the steps above on all the Postgres servers.

6. Undeploy and deploy your API proxy that uses the Statistics Collector policy.

7. Run the API calls.

8. Check if the custom variable(s) appear in the custom dimensions in Custom Report.

If the problem persists, contact Apigee Support.

Postgres Server running out of disk space

Description

The Postgres Server containing the Analytics data has run out of disk space.

In the following example, you can see that the /u01 has filled up 90% (176GB/207GB) of the disk space.

```
/u01/app/apigee/data/apigee-postgresql/pgdata/base/
$df -g

Filesystem Size Used Avail Use% Mounted on
/dev/mapper/sysvg-syslv09 207G 176G 21G 90% /u01
```

Error Messages

You may not observe any error message unless the disk space is completely filled on the Postgres Server.

Causes

The typical causes for this issue are:

Cause
Inadequate disk space
Lack of Analytics Data Pruning

The following sections describe how to diagnose and resolve each issue.

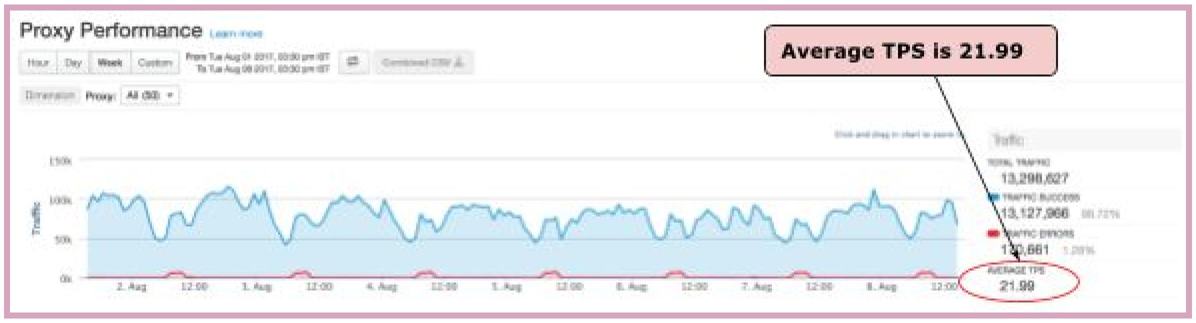
Inadequate disk space

One of the typical causes for disk space errors on Postgres Servers is that you don't have adequate disk space to store the large volumes of analytics data. The steps provided below will help you to determine if you have enough disk space or not and take appropriate action to address the issue.

Steps to Diagnose

1. Determine the rate of incoming API traffic to Edge by referring to the Analytics Proxy Performance Dashboard.

   Sample Proxy Performance showing average TPS



2. Consider the following scenario:
   a. The incoming API traffic for your org is 22 TPS (transactions per second).
      i. This means that the API traffic is 1900800 transactions per day (22 * 60 * 60 * 24).
      ii. Note each transaction/message in Analytics is 1.5K bytes in size.
      iii. Therefore, each day generates 2.7GB of Analytics data (1900800 * 1.5 K).

   b. You have a requirement to retain 30 days worth of Analytics data on your Postgres Servers for reference.
      i. The total data generated for 30 days = 81GB (2.7GB * 30)

   c. Therefore, to store 30 days worth of Analytics data at traffic rate of 22 TPS, you need to have 150 GB of disk space.
      i. 81GB (Analytics data) + 50GB (other data such as logs, etc) + 20GB (additional buffer space) = 150GB.

3. If you have less disk space on the system i.e, less than 150 GB of space (as per the example scenario above), then you don't have adequate disk space to store the Analytics data.

Resolution

Add adequate disk space to the Postgres Server machine.

Lack of Analytics Data Pruning

With the increase in API traffic to Edge, the amount of analytics data getting stored in the Postgres database will also increase. The amount of analytics data that can be stored in Postgres database is limited by the amount of disk space available on the system. Therefore, you cannot continue to keep storing additional analytics data on the Postgres database without taking one of the following actions:

1. Add more disk space.

   This is not a scalable option as we can’t keep adding more disk space as it it limited and expensive.

2. Prune the data beyond the required retention interval.

   This is a preferred solution as you can ensure that the data that is no longer required is being removed at regular intervals of time.

If you don’t prune the data at regular intervals manually or by using a cron job, then the amount of analytics data continually increases and can eventually lead to your running out of disk space on the system.

Resolution

Prune the data that is beyond your required retention interval:

1. Determine the retention interval, that is the duration for which you want to retain the Analytics data in the Postgres Database.

   For example, you want to retain 60 days worth of Analytics data.

2. Run the following command to prune data for a specific organization and environment:

```
/opt/apigee/apigee-service/bin/apigee-service
apigee-postgresql pg-data-purge <Org> <Env>
<NoOfDaysToPurgeBackFromCurrentDate>
```

3. See Pruning Analytics data for more information.

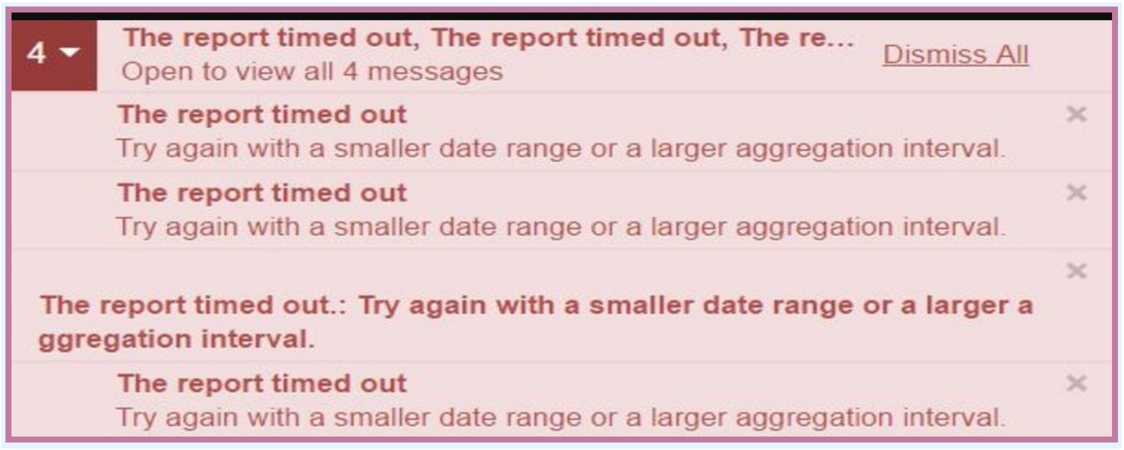
Analytics Reports timing out

Description

The Analytics dashboards (Proxy Performance, Target Performance, Custom Reports, etc.) in the Edge UI timeout.

Error Messages

You see the following error message when the Analytics dashboards timeout:



4 The report timed out, The report timed out, The re...
Open to view all 4 messages
Dismiss All

The report timed out
Try again with a smaller date range or a larger aggregation interval.

The report timed out
Try again with a smaller date range or a larger aggregation interval.

The report timed out.: Try again with a smaller date range or a larger a ggregation interval.

The report timed out
Try again with a smaller date range or a larger aggregation interval.

Causes

The typical causes of this issue are:

Cause
Inadequate Hardware Configuration
Large amount of Analytics data in Postgres Database
Insufficient time to fetch Analytics data

The following sections describe how to diagnose and resolve each issue.

Inadequate Hardware Configuration

If any of the Edge components are under capacity i.e., if they have less CPU, RAM, or IOPS capacity than required, then the Postgres Servers/Qpid Servers may run slowly causing Analytics dashboards to timeout.

Resolution

Ensure that all the Edge components are adhering to the minimum hardware requirements as per the guidance provided in Hardware Requirements.

Large amount of Analytics data in Postgres Database

Steps to Diagnose

1. On the Postgres node, login to PostgresSQL:

   ```
   psql -h /opt/apigee/var/run/apigee-postgresql -U apigee
   apigee
   ```

2. Check the duration for which the data is available in the Postgres Database using the following SQL query:

   ```
   select min(client_received_start_timestamp),
   max(client_received_start_timestamp) from
   analytics."<orgname>.<envname>.fact";
   ```

3. Get the sizes of all the tables in the Postgres Database:

   ```
   SELECT  relname as
   "Table",pg_size_pretty(pg_total_relation_size(relid)) As
   "Size",
   pg_size_pretty(pg_total_relation_size(relid) -
   pg_relation_size(relid)) as "External Size"
     FROM pg_catalog.pg_statio_user_tables ORDER BY
   pg_total_relation_size(relid) DESC;
   ```

Based on the output obtained in step #2 and #3, if you notice that either the duration for which the data has been stored is long (longer than your retention interval) and/or the table sizes are very large, then it indicates that you have large amounts of analytics data in the Postgres database. This could be causing the Analytics dashboards to time out.

Resolution

Prune the data that is beyond your required retention interval.

1. Determine the retention interval, that is the duration for which you want to retain the Analytics data in the Postgres Database.

   For example, you want to retain 60 days worth of Analytics data.

2. Run the following command to prune data for a specific organization and environment:

   ```
   /opt/apigee/apigee-service/bin/apigee-service
   apigee-postgresql pg-data-purge <Org> <Env>
   <NoOfDaysToPurgeBackFromCurrentDate>
   ```

3. See Pruning Analytics data for more information.

If the problem persists, then proceed to Insufficient time to fetch Analytics data**.**

Insufficient time to fetch Analytics data

Steps to diagnose

1. Check if you are able to view the data in the Hour/Day Tab of Analytics dashboard (Proxy Performance/Target Performance).

2. If you are able to view the data in the Hour tab alone or Hour and Day tabs, but are getting report timeout errors only when attempting to view the Week or Custom tabs, then this indicates that the volume of data that needs to be fetched from the Postgres database is very large. This could be causing the Edge UI to time out.

Resolution

The Edge UI has a default timeout of 120 seconds for fetching and displaying the Analytics data. If the volume of Analytics data to be fetched is very large, then 120 seconds may not be sufficient. Increase the Edge UI timeout value to 300 seconds by following the instructions Set the timeout used by the Edge UI for Edge API management calls .

Reload any of the Analytics dashboard and check if you are able to view the data for all the tabs - Hour, Day, Week and Custom.

If the problem persists, contact Apigee Support.

Troubleshooting Deployment Errors

Deployment of API proxies might fail due to various reasons such as network connectivity issues between Edge servers, issues with the Cassandra datastore, ZooKeeper exceptions, and errors in the API proxy bundle. This section provides information and guidance on some specific procedures that can be followed for troubleshooting deployment errors.

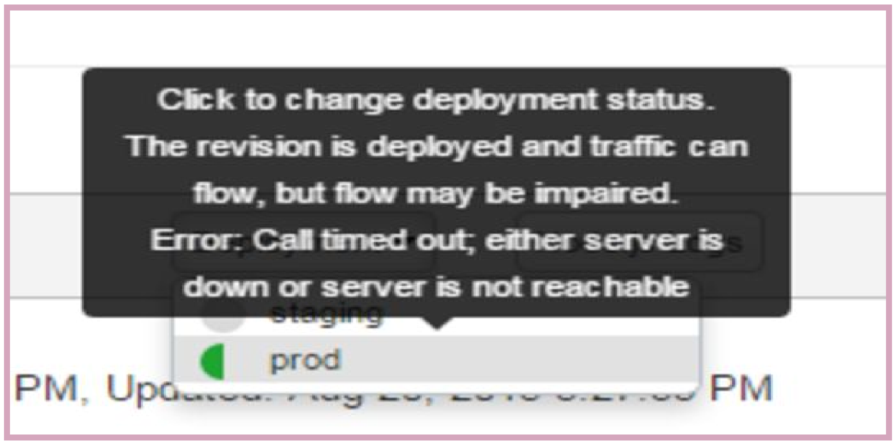
If a deployment failure is encountered that is not described in this doc, contact Apigee Support for assistance.

Deployment Error: "Call timed out; either server is down or server is not reachable"

Description

Deployment of API proxy revisions via the UI or management API calls fails with timeout error.

Error Messages



Click to change deployment status.
The revision is deployed and traffic can flow, but flow may be impaired.
Error: Call timed out; either server is down or server is not reachable

Causes

The typical causes for this issue are:

Cause	Details
Network Connectivity Issue	Communication failure between Management Server and Message Processor due to network connectivity issues or firewall rules.
Large API Proxy Bundle	Message Processor may take a long time to activate if the API proxy bundle is large in size, leading to RPC timeouts.

Network Connectivity Issue

Steps to Diagnose

1. Get the deployment status for the specific API that shows the error by using the following management API call:

```
curl -v
http://<management-server-IPaddress>:<port#>/organizations/
<orgname>/environments/<envname>/apis/<apiname>/deployments
-u <username>
```

   Sample output showing the error:

```
{
"error": "Call timed out; either server is down or server is not reachable",
"status": "error",
"type": [
"message-processor"
],
"uUID": "ebbc1078-cbde-4a00-a7db-66a3c1b2b748"
},
{
"status": "deployed",
"type": [
"message-processor"
],
"uUID": "204e2b7e-52f7-46d9-b458-20f9bfb51e6d"
},
{
"status": "deployed",
"type": [
"router"
],
"uUID": "967e63c6-ee95-47c0-9608-f4a32638fb1e"
},
{
"status": "deployed",
"type": [
"router"
],
"state" : "error"
}
```

The above sample output shows that the error occurred on the Message Processor having the UUID "`ebbc1078-cbde-4a00-a7db-66a3c1b2b748`".

2. Based on the deployment status output for your API proxy, login to each of the Message Processors with the corresponding UUID that showed the error and perform the following steps:

    a. Check if the Message Processor is listening on the port 4528:

    ```
    netstat -an | grep LISTEN | grep 4528
    ```

    If the Message Processor is not listening on port 4528, then restart the Message Processor:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-message-processor restart
```

b. Re-check the deployment status of the API proxy by using the management API call shown in step #1 above. If there no errors, then that indicates the issue is resolved.

3. If the problem persists, test the connectivity from Management Server to the Message Processor on port 4528 using the following steps:

    a. If telnet is available, then use telnet:

    ```
    telnet <MessageProcessor_IP> 4528
    ```

    b. If telnet is not available, use netcat to check the connectivity as follows:

    ```
    nc -vz <MessageProcessor_IP> 4528
    ```

    c. If you get the response "Connection Refused" or "Connection timed out", then engage your network operations team.

4. Test the connectivity from the Message Processor to the Management Server on port 4526 using the following steps:

    a. If telnet is available, then use telnet:

    ```
    telnet <management-server-IP> 4526
    ```

    b. If telnet is not available, use netcat to check the connectivity as follows:

    ```
    nc -vz <management-server-IP> 4526
    ```

    c. If you get the response "Connection Refused" or "Connection timed out", engage your network operations team.

5. Work with your network operations team and do the following:

    a. Ensure RPC protocol is allowed on both the Management Server and Message Processor.

   b. Remove any firewall restrictions or security rules setup between the Management Servers and Message Processors to allow connectivity to port 4526 on the management server, and connectivity from Management Server to Message Processors on port 4528.

6. Re-check the deployment status (refer to step #1 above). If you don't see any errors, then it indicates the error is resolved.

7. If the issue persists, check if there is network issue on the Message Processor. If there's a network issue, restarting the specific Message Processor that shows the timeout error (as per the deployment status output) may fix the issue:

   ```
   /opt/apigee/apigee-service/bin/apigee-service
   edge-message-processor restart
   ```

8. If the problem still persists, then check the Management Server logs at:

   (`/opt/apigee/var/log/edge-management-server/logs/system.log`).

   Sample Call timed out error from Management Server Log

   ```
   2016-05-17 09:29:56,448 org:myorg env:prod qtp281969267-360792 ERROR DISTRIBUTION -
   RemoteServicesConfigEventHandler.configureServers() : exception for server with uuid
   e1381db7-d83b-4752-ae04-2de33f07e555 : cause = RPC Error 504: Call timed out communication
   error = true
   com.apigee.rpc.RPCException: Call timed out
   at com.apigee.rpc.impl.AbstractCallerImpl.handleTimeout(AbstractCallerImpl.java:64) ~[rpc-1.0.0.jar:na]
   at com.apigee.rpc.impl.RPCMachineImpl$OutgoingCall.handleTimeout(RPCMachineImpl.java:483)
   ~[rpc-1.0.0.jar:na]
   at com.apigee.rpc.impl.RPCMachineImpl$OutgoingCall.access$000(RPCMachineImpl.java:402)
   ~[rpc-1.0.0.jar:na]
   at com.apigee.rpc.impl.RPCMachineImpl$OutgoingCall$1.run(RPCMachineImpl.java:437)
   ~[rpc-1.0.0.jar:na]
   at io.netty.util.HashedWheelTimer$HashedWheelTimeout.expire(HashedWheelTimer.java:532)
   ~[netty-all-4.0.0.CR1.jar:na]
   at io.netty.util.HashedWheelTimer$Worker.notifyExpiredTimeouts(HashedWheelTimer.java:430)
   ~[netty-all-4.0.0.CR1.jar:na]
   at io.netty.util.HashedWheelTimer$Worker.run(HashedWheelTimer.java:371) ~[netty-all-4.0.0.CR1.jar:na]
   at java.lang.Thread.run(Thread.java:745) ~[na:1.7.0_79]
   ```

   If you observe a similar error as shown in the above example, then increase the RPC timeout on the Management Server so that if there's any network slowdown then it should give time for Management Server to connect to the Message Processor.

Resolution

1. Perform the following steps to increase the RPC timeout:
    a. Create the file `/opt/apigee/customer/application/management-server.properties` the Management Server machine, if it does not already exist.

    b. Add the following line into this file:

    ```
    conf_cluster_rpc.connect.timeout=<time in seconds>
    ```

    The default RPC timeout value is 10 and it is recommended to increase it to 40 seconds. Set it as follows:

    ```
    conf_cluster_rpc.connect.timeout=40
    ```

    c. Ensure this file is owned by apigee:

    ```
    chown apigee:apigee
    /opt/apigee/customer/application/management-server.pro
    perties
    ```

    d. Restart the Management Server:

    ```
    /opt/apigee/apigee-service/bin/apigee-service
    edge-management-server restart
    ```

    e. If you have more than one Management Server, repeat the above steps on all the Management Servers.

    f. Deploy the API proxy in the Edge UI or by using the Edge management API call. If the API proxy gets deployed without any issues, then that indicates the issue is resolved.

2. If the problem persists, then collect tcpdump command from the Management Server and Message Processor. Enable the tcpdump command on each of the servers and then initiate the deployment of the API Proxy from the UI or using the

management API:

a. Run the below tcpdump command from the Management Server:

```
tcpdump -i any -s 0 host <message-processor-IP
address> -w <File name>
```

b. Run the below tcpdump command from the Message Processor:

```
tcpdump -i any -s 0 host <management-server-IP
address> -w <File name>
```

3. Contact Apigee Support to get assistance on analyzing the tcpdumps and to troubleshoot the problem further.

Large API Proxy Bundle

Steps to Diagnose

1. Check the size of the API proxy bundle for which the deployment error is being observed.

2. If the size is reasonably large (10MB or higher), then it's very likely that Message Processor may need more time to activate the API proxy.

3. If the API Proxy bundle size is greater than 15 MB, then proceed to API Proxy Bundle larger than 15MB.

Resolution

Increase the RPC timeout on the Management Server so that Message Processor has enough time to activate large API proxy bundles. Perform the following steps to increase the RPC timeout value:

1. Create the `/opt/apigee/customer/application/management-server.properties` file on the Management Server machine, if it does not already exist.

2. Add the following line to this file:

   ```
   conf_cluster_rpc.connect.timeout=<time in seconds>
   ```

   The default RPC timeout value is 10 and it is recommended to increase it to 40 seconds. Set it as follows:

   ```
   conf_cluster_rpc.connect.timeout=40
   ```

3. Ensure this file is owned by apigee:

   ```
   chown apigee:apigee
   /opt/apigee/customer/application/management-server.properties
   ```

4. Restart the Management Server:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-management-server restart
```

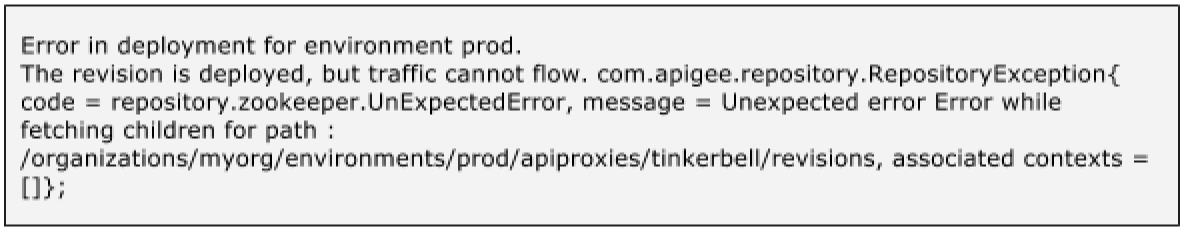
5. If you have more than one Management Server, repeat the above steps on all the Management Servers.

Deployment Error: “Error while fetching children for path”

Description

Deployment of API proxy revisions via the Edge UI or Edge management API call fails with ZooKeeper error “Error while fetching children for path”.

Error Messages



```
Error in deployment for environment prod.
The revision is deployed, but traffic cannot flow. com.apigee.repository.RepositoryException{
code = repository.zookeeper.UnExpectedError, message = Unexpected error Error while
fetching children for path :
/organizations/myorg/environments/prod/apiproxies/tinkerbell/revisions, associated contexts =
[]};
```

Causes

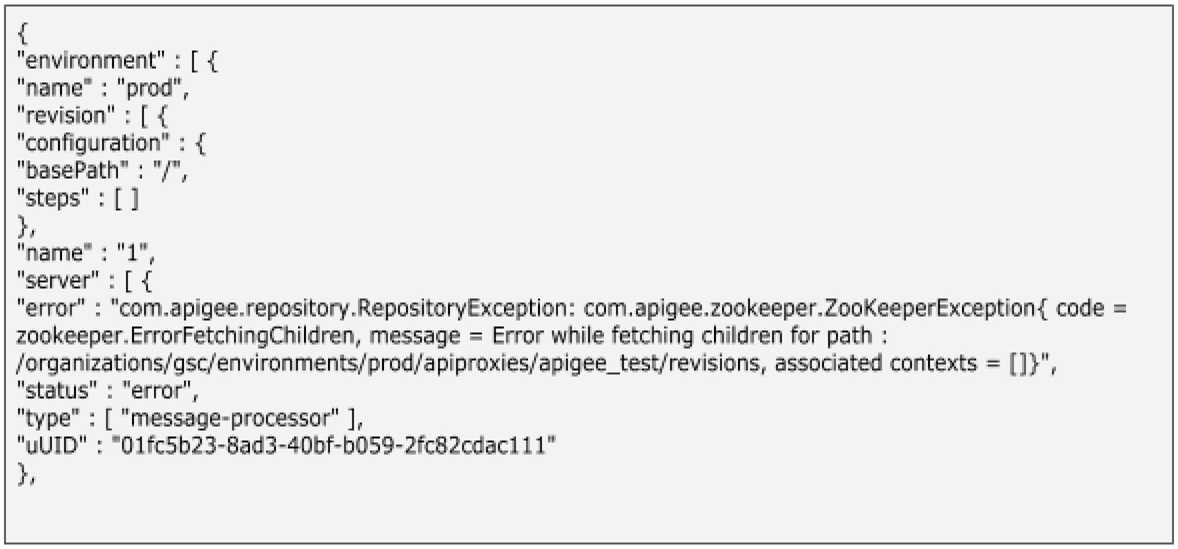
The typical cause for this error is network connectivity issue between the Message Processor and ZooKeeper.

Steps to Diagnose

1. Get the deployment status output for the specific API that shows the error using the following management API call:

   ```
   curl -v
   http://<management-server-IPaddress>:<port#>/organizations/
   <orgname>/environments/<envname>/apis/<apiname>/deployments
   -u <username>
   ```

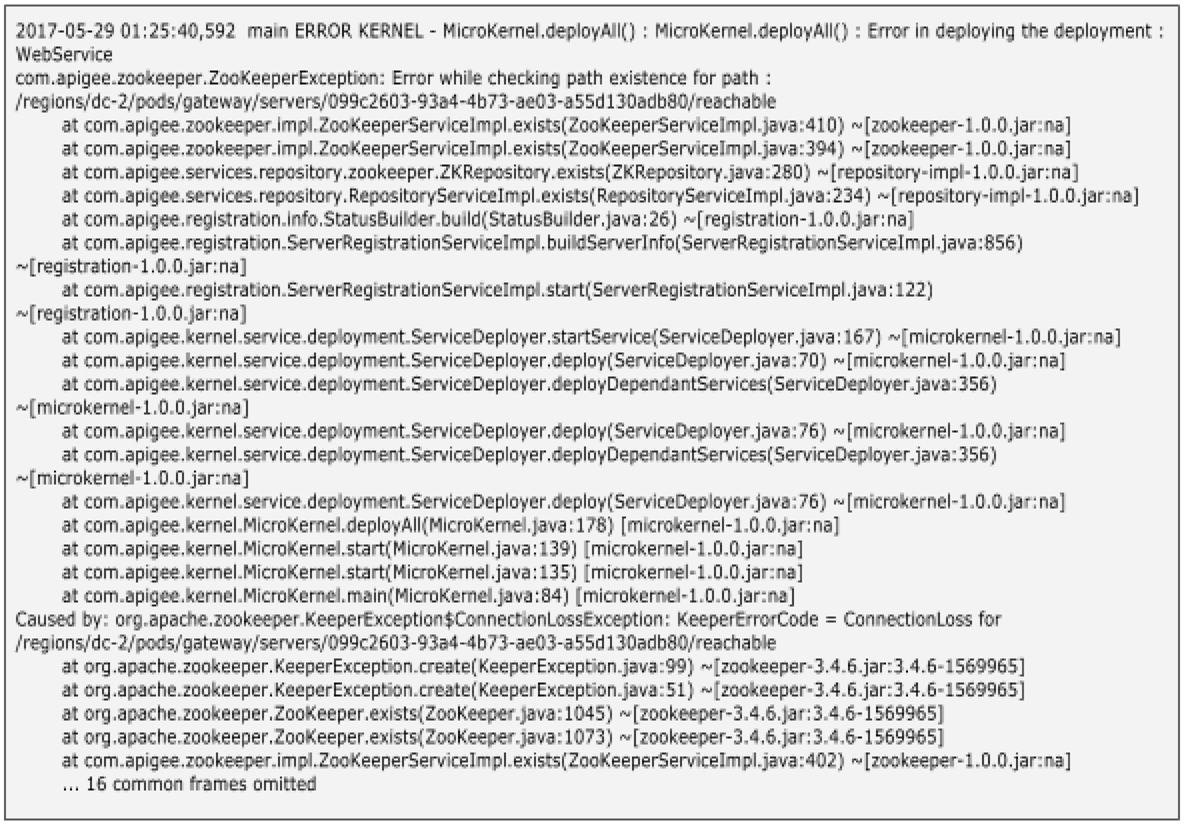
   Sample deployment status output showing the error:



```
{
"environment" : [ {
"name" : "prod",
"revision" : [ {
"configuration" : {
"basePath" : "/",
"steps" : [ ]
},
"name" : "1",
"server" : [ {
"error" : "com.apigee.repository.RepositoryException: com.apigee.zookeeper.ZooKeeperException{ code =
zookeeper.ErrorFetchingChildren, message = Error while fetching children for path :
/organizations/gsc/environments/prod/apiproxies/apigee_test/revisions, associated contexts = []}",
"status" : "error",
"type" : [ "message-processor" ],
"uUID" : "01fc5b23-8ad3-40bf-b059-2fc82cdac111"
},
```

2. Check the Message Processor
   (`/opt/apigee/var/log/edge-message-processor/system.log`).

   Sample error from Message Processor log



```
2017-05-29 01:25:40,592  main ERROR KERNEL - MicroKernel.deployAll() : MicroKernel.deployAll() : Error in deploying the deployment :
WebService
com.apigee.zookeeper.ZooKeeperException: Error while checking path existence for path :
/regions/dc-2/pods/gateway/servers/099c2603-93a4-4b73-ae03-a55d130adb80/reachable
	at com.apigee.zookeeper.impl.ZooKeeperServiceImpl.exists(ZooKeeperServiceImpl.java:410) ~[zookeeper-1.0.0.jar:na]
	at com.apigee.zookeeper.impl.ZooKeeperServiceImpl.exists(ZooKeeperServiceImpl.java:394) ~[zookeeper-1.0.0.jar:na]
	at com.apigee.services.repository.zookeeper.ZKRepository.exists(ZKRepository.java:280) ~[repository-impl-1.0.0.jar:na]
	at com.apigee.services.repository.RepositoryServiceImpl.exists(RepositoryServiceImpl.java:234) ~[repository-impl-1.0.0.jar:na]
	at com.apigee.registration.info.StatusBuilder.build(StatusBuilder.java:26) ~[registration-1.0.0.jar:na]
	at com.apigee.registration.ServerRegistrationServiceImpl.buildServerInfo(ServerRegistrationServiceImpl.java:856)
~[registration-1.0.0.jar:na]
	at com.apigee.registration.ServerRegistrationServiceImpl.start(ServerRegistrationServiceImpl.java:122)
~[registration-1.0.0.jar:na]
	at com.apigee.kernel.service.deployment.ServiceDeployer.startService(ServiceDeployer.java:167) ~[microkernel-1.0.0.jar:na]
	at com.apigee.kernel.service.deployment.ServiceDeployer.deploy(ServiceDeployer.java:70) ~[microkernel-1.0.0.jar:na]
	at com.apigee.kernel.service.deployment.ServiceDeployer.deployDependantServices(ServiceDeployer.java:356)
~[microkernel-1.0.0.jar:na]
	at com.apigee.kernel.service.deployment.ServiceDeployer.deploy(ServiceDeployer.java:76) ~[microkernel-1.0.0.jar:na]
	at com.apigee.kernel.service.deployment.ServiceDeployer.deployDependantServices(ServiceDeployer.java:356)
~[microkernel-1.0.0.jar:na]
	at com.apigee.kernel.service.deployment.ServiceDeployer.deploy(ServiceDeployer.java:76) ~[microkernel-1.0.0.jar:na]
	at com.apigee.kernel.MicroKernel.deployAll(MicroKernel.java:178) [microkernel-1.0.0.jar:na]
	at com.apigee.kernel.MicroKernel.start(MicroKernel.java:139) [microkernel-1.0.0.jar:na]
	at com.apigee.kernel.MicroKernel.start(MicroKernel.java:135) [microkernel-1.0.0.jar:na]
	at com.apigee.kernel.MicroKernel.main(MicroKernel.java:84) [microkernel-1.0.0.jar:na]
Caused by: org.apache.zookeeper.KeeperException$ConnectionLossException: KeeperErrorCode = ConnectionLoss for
/regions/dc-2/pods/gateway/servers/099c2603-93a4-4b73-ae03-a55d130adb80/reachable
	at org.apache.zookeeper.KeeperException.create(KeeperException.java:99) ~[zookeeper-3.4.6.jar:3.4.6-1569965]
	at org.apache.zookeeper.KeeperException.create(KeeperException.java:51) ~[zookeeper-3.4.6.jar:3.4.6-1569965]
	at org.apache.zookeeper.ZooKeeper.exists(ZooKeeper.java:1045) ~[zookeeper-3.4.6.jar:3.4.6-1569965]
	at org.apache.zookeeper.ZooKeeper.exists(ZooKeeper.java:1073) ~[zookeeper-3.4.6.jar:3.4.6-1569965]
	at com.apigee.zookeeper.impl.ZooKeeperServiceImpl.exists(ZooKeeperServiceImpl.java:402) ~[zookeeper-1.0.0.jar:na]
	... 16 common frames omitted
```

3. If you observe a similar error as shown in the above example, then perform the following steps:
   a. Test the connectivity from the Message Processor to ZooKeeper servers on port 2181 using the following steps:

      i. If telnet is available, then use telnet:

      ```
      telnet <ZooKeeper-IP> 2181
      ```

      ii. If telnet is not available, use netcat to check the connectivity as follows:

      ```
      nc -vz <ZooKeeper-IP> 2181
      ```

      iii. If you get the response “Connection Refused” or “Connection timed out”, engage your network operations team. Go to **Resolution** section below.

4. If you observe any other, then contact Apigee Support.

Resolution

1. Work with your network team to:
    a. Ensure connectivity is allowed between the Message Processor and all ZooKeeper nodes on port 2181.
    b. Remove any firewall restrictions or security rules setup from Message Processors to allow connectivity to port 2181 on the ZooKeeper servers.

2. If there is network issue on the Message Processor, then restarting the specific Message Processor that shows the error (as per the deployment status output) might fix the issue. Restart the specific Message Processor:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-message-processor restart
```

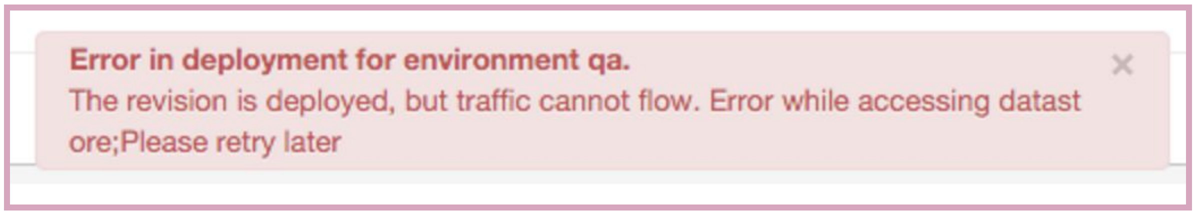
If the problem persists, contact Apigee Support.

Deployment Error: "Error while accessing datastore"

Description

Deployment of API proxy revisions via the Edge UI or Edge management API call fail with the error "`Error while accessing datastore`".

Error Messages



Error in deployment for environment qa.
The revision is deployed, but traffic cannot flow. Error while accessing datast
ore;Please retry later

Causes

The typical causes for this issue are:

Cause	Details
Network Connectivity Issue between Message Processor and Cassandra	Communication failure between the Message Processor and Cassandra due to network connectivity issues or firewall rules.
Deployment errors due to Cassandra restarts	Cassandra node(s) was unavailable because it was restarted as part of routine maintenance.
Spike in read request latency on Cassandra	If the Cassandra node(s) is performing a large number of concurrent reads, then it may respond slowly due to spike in read request latency.
API Proxy Bundle larger than 15MB	Cassandra has been configured to not allow API proxy bundles larger than 15MB in size.

Network Connectivity Issue between Message Processor and Cassandra

Steps to Diagnose

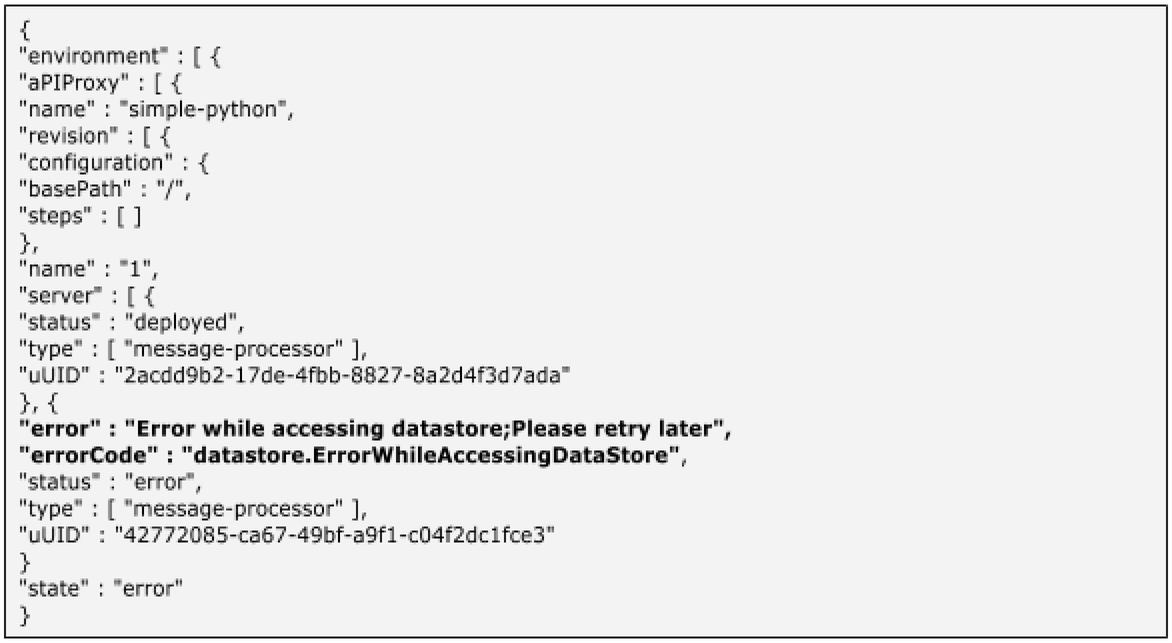
1. Undeploy and redeploy the API proxy. If there was a temporary connectivity issue between the Message Processor and Cassandra, then the error might go away.

   WARNING: Don’t undeploy if the errors are seen in the Production environment.

2. If the problem persists, then execute the below management AP call to check the deployment status and check if there are any errors on any components:

   ```
   curl -u sysadmin@email.com
   https://management:8080/v1/o/<org>/apis/<api>/deployments
   ```

   Sample deployment status output showing Error while accessing datastore on one of the Message Processors



```
{
"environment" : [ {
"aPIProxy" : [ {
"name" : "simple-python",
"revision" : [ {
"configuration" : {
"basePath" : "/",
"steps" : [ ]
},
"name" : "1",
"server" : [ {
"status" : "deployed",
"type" : [ "message-processor" ],
"uUID" : "2acdd9b2-17de-4fbb-8827-8a2d4f3d7ada"
}, {
"error" : "Error while accessing datastore;Please retry later",
"errorCode" : "datastore.ErrorWhileAccessingDataStore",
"status" : "error",
"type" : [ "message-processor" ],
"uUID" : "42772085-ca67-49bf-a9f1-c04f2dc1fce3"
}
"state" : "error"
}
```

3. Restart the Message Processor(s) that show the deployment error. If there was a temporary network issue, then the error should go away:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-message-processor restart
```

4. Repeat step #2 to see if the deployment succeeds on the Message Processor that was restarted. If no errors found, then that indicates the issue is resolved.

5. Check if the message processor is able to connect to each Cassandra node on port 9042 and 9160:

    a. If telnet is available, then use telnet:

    ```
    telnet <Cassandra_IP> 9042
    telnet <Cassandra_IP> 9160
    ```

    b. If telnet is not available, use netcat to check the connectivity as follows:

    ```
    nc -vz <Cassandra_IP> 9042
    nc -vz <Cassandra_IP> 9160
    ```

    c. If you get the response “Connection Refused” or “Connection timed out”, then engage your network operations team.

6. If the problem persists, then check if each of the Cassandra nodes are listening on the port 9042 and port 9160:

```
netstat -an | grep LISTEN | grep 9042
netstat -an | grep LISTEN | grep 9160
```

7. If the Cassandra nodes are not listening on port 9042 or 9160, then restart the specific Cassandra node(s):

```
/opt/apigee/apigee-service/bin/apigee-service
apigee-cassandra restart
```

8. If the problem persists, then engage your network operations team.

Resolution

Work with your network operations team and get the network connectivity issue fixed between Message Processor and Cassandra.

Deployment errors due to Cassandra restarts

Cassandra nodes are usually restarted periodically as part of routine maintenance. If API proxies are deployed during the Cassandra maintenance work, then the deployments fail due to inaccessibility to the Cassandra datastore.

Steps to Diagnose

1. Check if the Cassandra nodes were restarted during the time of the deployment.This can be done by checking the Cassandra log or most recent startup time logs of the Cassandra node:

   ```
   grep "shutdown"
   /opt/apigee/var/log/apigee-cassandra/system.log
   ```

Resolution

1. Ensure Cassandra is up and running.

2. Check if Message Processors are able to connect to Cassandra datastore on port 9042 and 9160.

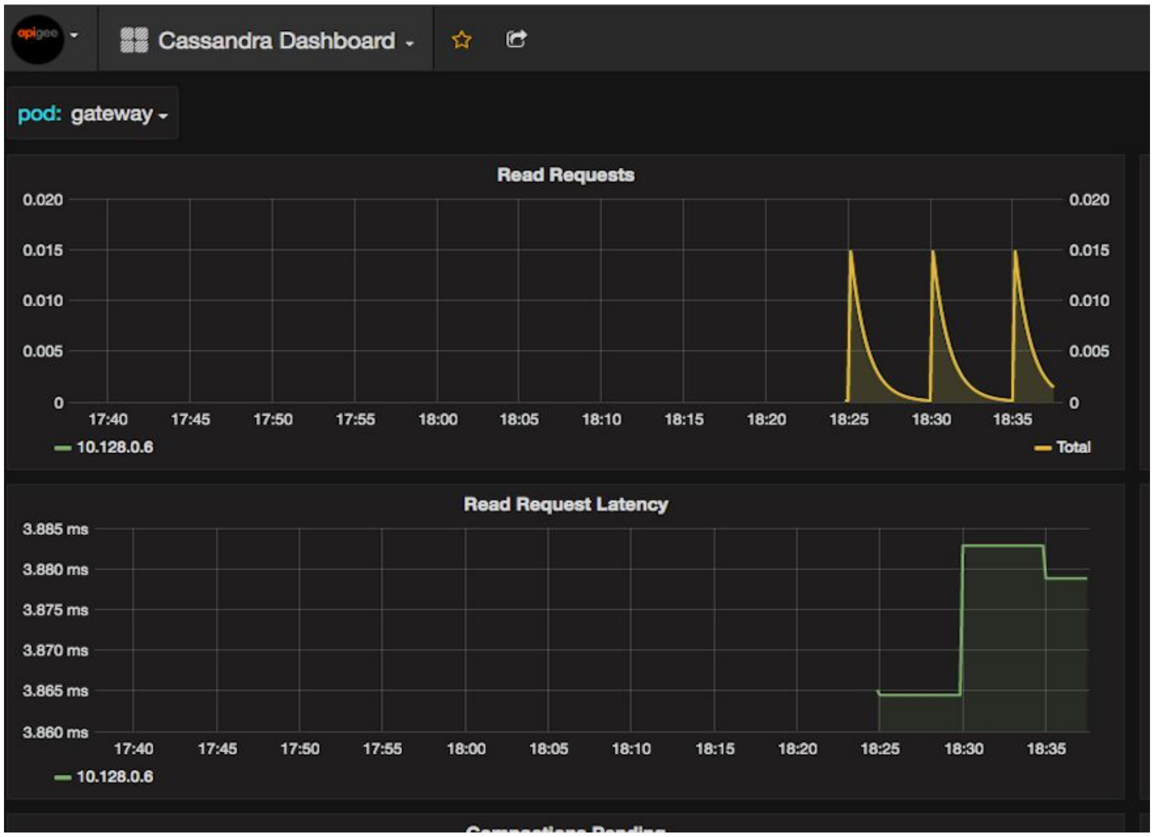
Spike in read request latency on Cassandra

A high number of reads on Cassandra is dependant on individual use cases and traffic patterns on the proxies that contain policies that require read access from Cassandra.

For example, if a GET call to refresh_token grant type is called for OAuth policies, and the refresh token is associated with many access tokens, then this may result in high amounts of reads from Cassandra. This can cause increase in the read request latency on Cassandra.

Steps to Diagnose

1. If you have installed the Beta Monitoring dashboard, look at the Cassandra dashboard, and review the “Read Requests” chart for the period of the problem. Also review the chart for “Read Request Latencies”.



2. Alternate tool to check the read requests and read latencies is the `nodetool cfstats` command. See [Cassandra documentation]() to get more details to use this command.

Resolution

1. Try the deployment again once Cassandra performance is back to normal. Make sure the entire Cassandra ring is normal.

2. (Optional) Do a rolling restart on Message Processors to be sure connectivity is established.

3. For a long term solution, review the API traffic patterns that would possibly contribute to higher reads in the Cassandra datastore. Contact Apigee Support for assistance in troubleshooting this issue.

4. If the existing Cassandra node(s) are not adequate to handle the incoming traffic, then either increase the hardware capacity or the number of the Cassandra datastore nodes appropriately.

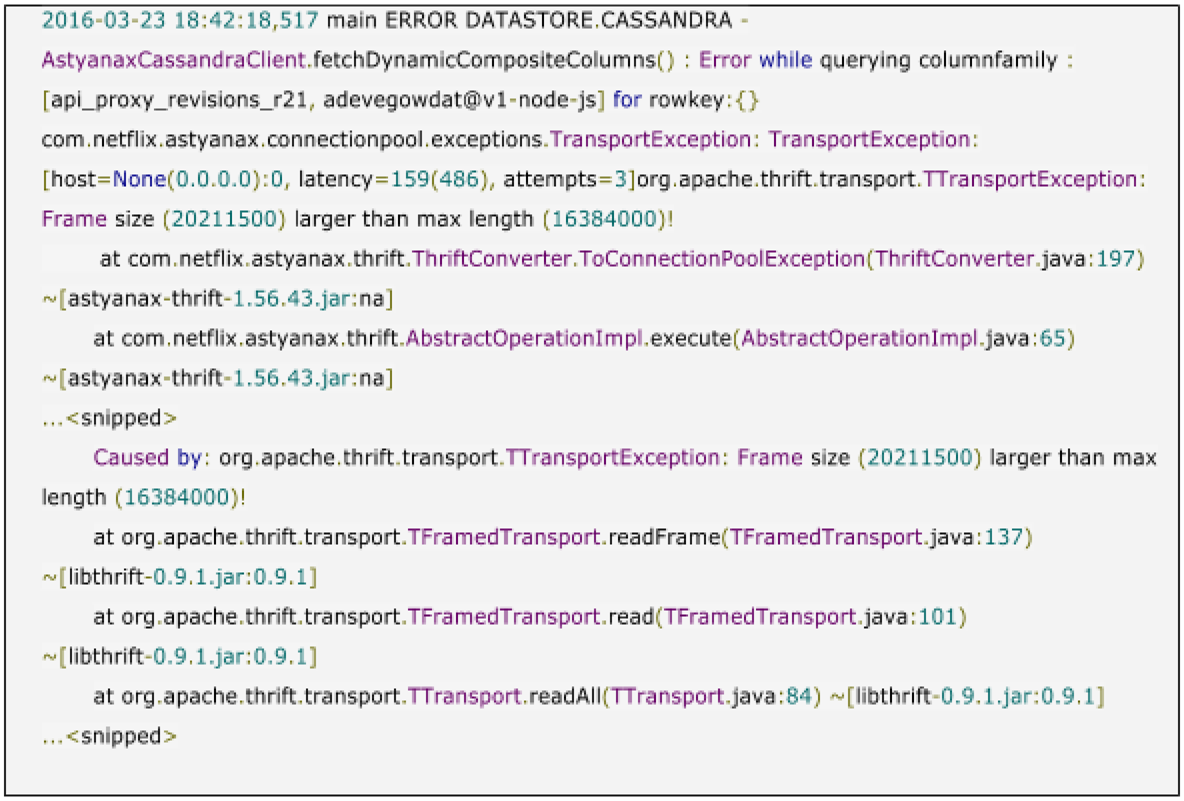
API Proxy Bundle larger than 15MB

The size of API proxy bundles are restricted to 15MB on Cassandra. If the size of the API proxy bundle is greater than 15 MB, then you will see “Error while accessing datastore" when you attempt to deploy the API proxy.

Steps to Diagnose

1. Check the Message Processor logs (`/opt/apigee/var/log/edge-message-processor/logs/system.log`) and see if there are any errors occurred during deployment of the specific API Proxy.

2. If you see an error similar to the one shown in the figure below, then the deployment error is because the API proxy bundle size is > 15 MB.



```
2016-03-23 18:42:18,517 main ERROR DATASTORE.CASSANDRA -
AstyanaxCassandraClient.fetchDynamicCompositeColumns() : Error while querying columnfamily :
[api_proxy_revisions_r21, adevegowdat@v1-node-js] for rowkey:{}
com.netflix.astyanax.connectionpool.exceptions.TransportException: TransportException:
[host=None(0.0.0.0):0, latency=159(486), attempts=3]org.apache.thrift.transport.TTransportException:
Frame size (20211500) larger than max length (16384000)!
        at com.netflix.astyanax.thrift.ThriftConverter.ToConnectionPoolException(ThriftConverter.java:197)
~[astyanax-thrift-1.56.43.jar:na]
        at com.netflix.astyanax.thrift.AbstractOperationImpl.execute(AbstractOperationImpl.java:65)
~[astyanax-thrift-1.56.43.jar:na]
...<snipped>
        Caused by: org.apache.thrift.transport.TTransportException: Frame size (20211500) larger than max
length (16384000)!
        at org.apache.thrift.transport.TFramedTransport.readFrame(TFramedTransport.java:137)
~[libthrift-0.9.1.jar:0.9.1]
        at org.apache.thrift.transport.TFramedTransport.read(TFramedTransport.java:101)
~[libthrift-0.9.1.jar:0.9.1]
        at org.apache.thrift.transport.TTransport.readAll(TTransport.java:84) ~[libthrift-0.9.1.jar:0.9.1]
...<snipped>
```

Resolution

The API proxy bundle will be large if there are too many resource files. Use the following solutions to address this issue:

Solution #1: Move resource files to the Environment or Organization level

1. Move any of the resource files, such as NodeJS Script files and modules, JavaScript files, JAR files to the environment or organization level. For more information on resource files, see the Edge documentation.

2. Deploy the API proxy and see if the error goes away.

If the problem persists or you cannot move the resource files to environment or organization level for some reason, then apply solution #2.

Solution #2: Increase the API proxy bundle size on Cassandra

Follow these steps to increase the size of the Cassandra property **thrift frame transport size**, that controls the maximum size of the API proxy bundle allowed in Edge:

1. Create the following file, if it does not exist:

   ```
   /opt/apigee/customer/application/cassandra.properties
   ```

2. Add the following line to the file, replacing <size> with the size setting needed for the large bundle:

   ```
   conf_cassandra_thrift_framed_transport_size_in_mb=<size>
   ```

3. Restart Cassandra:

   ```
   /opt/apigee/apigee-service/bin/apigee-service
   edge-management-server restart
   ```

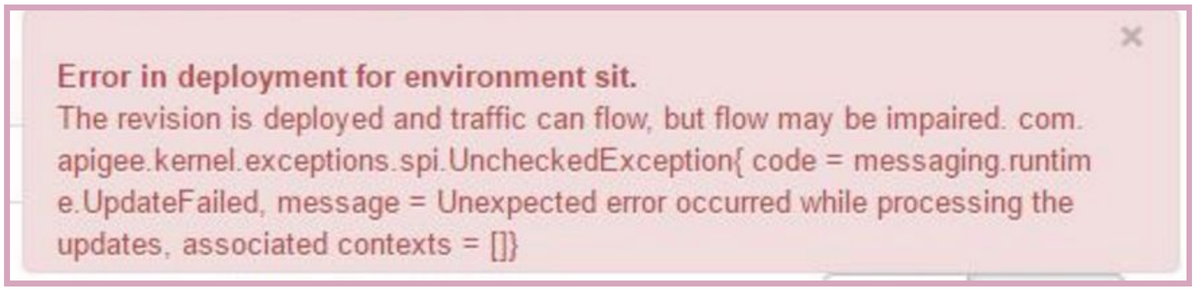
4. Repeat the steps #1 through #3 on all Cassandra nodes in the cluster.

Deployment Error: "Unexpected error occurred while processing the updates"

Description

Deployment of API proxy revisions via the Edge UI or Edge management API calls fails with the error "`Unexpected error occurred while processing the updates`".

Error Messages



```
Error in deployment for environment sit.
The revision is deployed and traffic can flow, but flow may be impaired. com.
apigee.kernel.exceptions.spi.UncheckedException{ code = messaging.runtim
e.UpdateFailed, message = Unexpected error occurred while processing the
updates, associated contexts = []}
```

Causes

There could be many different causes for this error. Here are a few sample causes:

Cause	Details
Out Of Memory	Message Processor ran out of Java heap space resulting in API proxy deployment failure.
Error in API Proxy Bundle	API Proxy bundle has errors that can lead to API proxy deployment failure.

Common Steps to Diagnose

1. Check if there are any deployment errors or exception stack trace in the Message Processor log

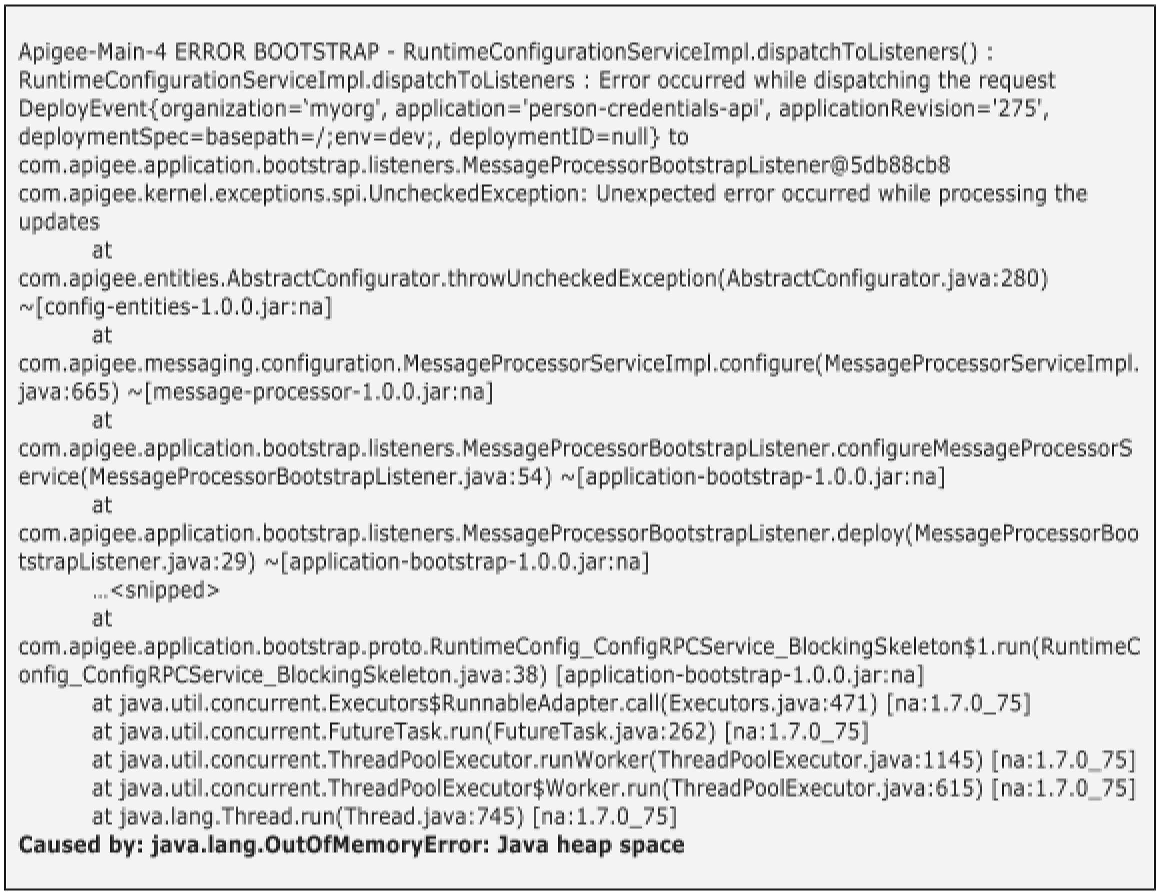
`/opt/apigee/var/log/apigee/edge-message-processor/logs/system.log`

2. You usually see a stack trace that provides information on the cause for the deployment error. Please read the stack trace thoroughly to understand the cause.

Out Of Memory

Steps to Diagnose

1. You may see exception similar to the one in the Message Processor log `/opt/apigee/var/log/apigee/edge-message-processor/logs/system.log` as shown in the figure below:



```
Apigee-Main-4 ERROR BOOTSTRAP - RuntimeConfigurationServiceImpl.dispatchToListeners() :
RuntimeConfigurationServiceImpl.dispatchToListeners : Error occurred while dispatching the request
DeployEvent{organization='myorg', application='person-credentials-api', applicationRevision='275',
deploymentSpec=basepath=/;env=dev;, deploymentID=null} to
com.apigee.application.bootstrap.listeners.MessageProcessorBootstrapListener@5db88cb8
com.apigee.kernel.exceptions.spi.UncheckedException: Unexpected error occurred while processing the
updates
        at
com.apigee.entities.AbstractConfigurator.throwUncheckedException(AbstractConfigurator.java:280)
~[config-entities-1.0.0.jar:na]
        at
com.apigee.messaging.configuration.MessageProcessorServiceImpl.configure(MessageProcessorServiceImpl.
java:665) ~[message-processor-1.0.0.jar:na]
        at
com.apigee.application.bootstrap.listeners.MessageProcessorBootstrapListener.configureMessageProcessorS
ervice(MessageProcessorBootstrapListener.java:54) ~[application-bootstrap-1.0.0.jar:na]
        at
com.apigee.application.bootstrap.listeners.MessageProcessorBootstrapListener.deploy(MessageProcessorBoo
tstrapListener.java:29) ~[application-bootstrap-1.0.0.jar:na]
        ...<snipped>
        at
com.apigee.application.bootstrap.proto.RuntimeConfig_ConfigRPCService_BlockingSkeleton$1.run(RuntimeC
onfig_ConfigRPCService_BlockingSkeleton.java:38) [application-bootstrap-1.0.0.jar:na]
        at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:471) [na:1.7.0_75]
        at java.util.concurrent.FutureTask.run(FutureTask.java:262) [na:1.7.0_75]
        at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1145) [na:1.7.0_75]
        at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:615) [na:1.7.0_75]
        at java.lang.Thread.run(Thread.java:745) [na:1.7.0_75]
Caused by: java.lang.OutOfMemoryError: Java heap space
```

2. The message **Caused by: java.lang.OutofMemoryError: Java Heap space** indicates that the Message Processor has run out of Java Heap space.

Resolution

Increase the maximum Java Heap space on the Message Processors.

The maximum Java Heap space is controlled by the JVM property -Xmx. Here are the steps to increase the Java Heap space on the Message Processors:

1. Determine the amount of memory by which the Java heap space can be increased:

    a. Check the current value set for max heap space, max_mem, in the file `/opt/apigee/edge-message-processor/bin/setenv.sh`

    b. Get **MemTotal** (Total amount of usable RAM), **MemFree** (amount of physical RAM left unused on the system) using /proc/meminfo command on the system.

        i. Ensure the above information includes the memory consumed by any other processes such as Edge Router etc that exist on the same system.

    c. Based on the above information, determine by how much the Java heap space can be increased for Message Processor.

    d. For example, the current max heap space on the Message Processor is 1024MB, MemTotal is 8GB (8192MB), MemFree is 5GB (5120MB), then you can increase the max Java heap space to 3GB (3072MB).

    e. If assistance is needed in determining how much to increase the Java heap space, contact Apigee Support.

2. Create the following file, if it does not exist already:

```
/opt/apigee/customer/application/message-processor.properti
es
```

3. Add the following line in the file, with the increased heap setting (for example, 3072M):

   ```
   bin_setenv_max_mem=3072m
   ```

4. Save the file.

5. Restart the Message Processor:

   ```
   /opt/apigee/apigee-service/bin/apigee-service
   edge-message-processor restart
   ```

6. If you have more than one Message Processor, repeat the steps 3 through 6 on all the Message Processors.

If the problem persists, contact Apigee Support.

Error in API proxy bundle

If there are any errors in any of the policies used in the API proxy, then the deployment will fail with the error "`Unexpected error occurred while processing the updates`".
For example, see this community post.

Steps to Diagnose

1. Check the Message Processor logs for exceptions or errors related to the API proxy deployment. The error should give you information on what should be changed in the API proxy bundle to address the problem.

2. If no error messages show up on the Message Processor logs, check the diffs in the revision history of the API proxy. If older revisions deploy without a problem then review what code changes were made.

Resolution

1. Make the necessary changes in the API proxy bundle to address the issue.

2. Revert any code changes to the API proxy that was problematic for the deployment.

If the problem persists, contact Apigee Support for further assistance.

Troubleshooting Developer Portal Problems

This section provides guidance on troubleshooting common issues encountered when using the developer portal.

Before we begin looking at troubleshooting developer portal issues, let's get a quick overview of Apigee Developer Portal and how it works.

Overview of Apigee Developer Portal (Drupal)

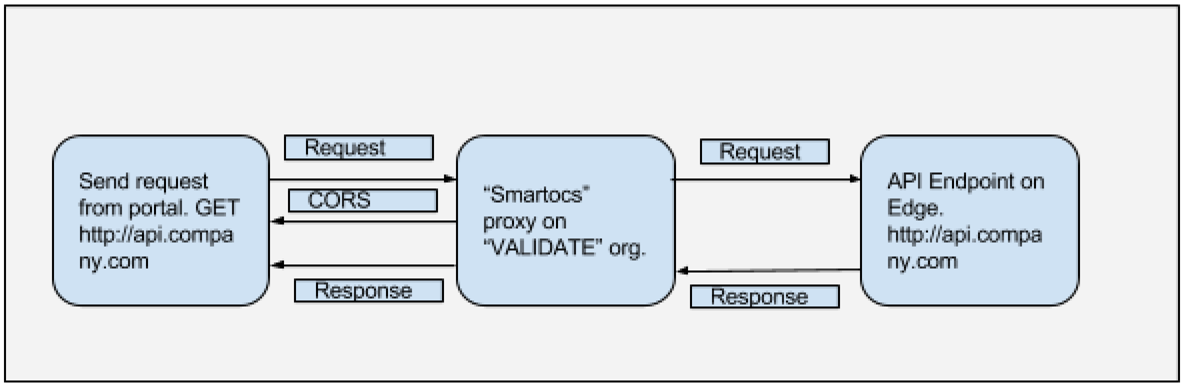
As an API provider, you need a way to expose your APIs, educate developers about your APIs, sign up developers, and let developers register apps. Apigee Edge provides you with a Developer Services portal that you can use to build and launch your own customized website to provide these services to your development community. To learn more about developer portal, see http://docs.apigee.com/developer-services/content/what-developer-portal

The following sections describe key concepts that you should understand before troubleshooting issues with your developer portal.

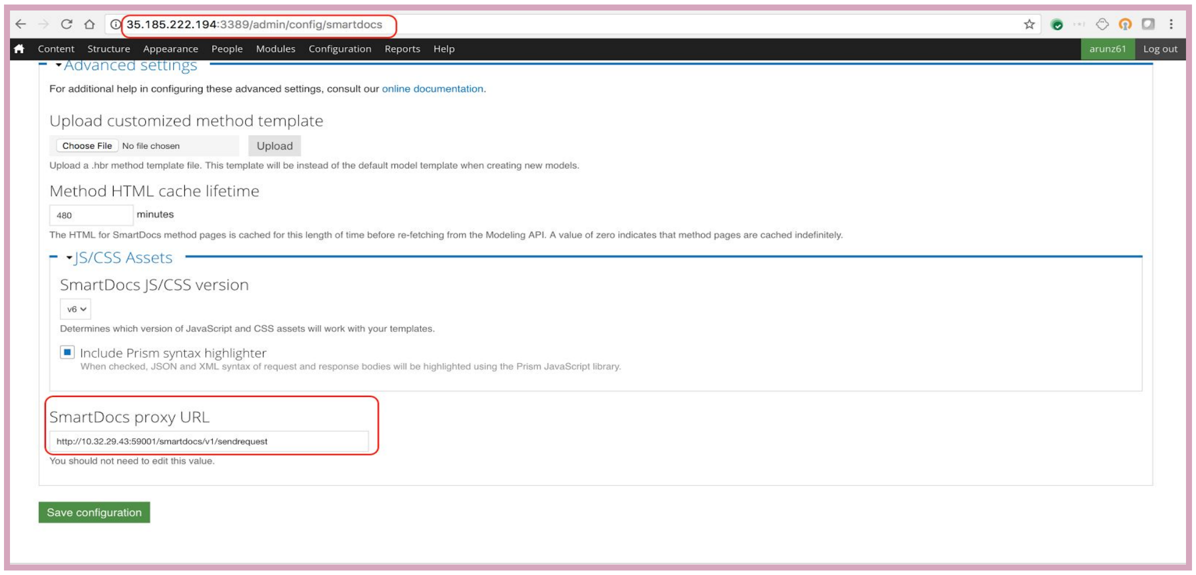
How SmartDocs works

An OpenAPI (JSON or YAML) or WADL specification describing your API can be imported into SmartDocs and used to publish API reference documentation to your portal. The API reference documentation appears under the APIs tab on your portal automatically. Developers discover the API documentation through the portal and can make live API requests. As the API requests originate from a browser, CORS (Cross-Origin Resource Sharing) support is needed to allow them to succeed. CORS support is provided by the "smartdocs" proxy on Edge (in the "VALIDATE" org) that acts as the proxy for all SmartDocs requests to the intended endpoint. The "smartdocs" proxy is created when you install SmartDocs.

For example:


Send request from portal. GET http://api.company.com
Request
CORS
Response
"Smartocs" proxy on "VALIDATE" org.
Request
Response
API Endpoint on Edge. http://api.company.com

The URL of the smartdocs proxy is exposed as a configurable property at **Configuration -> SmartDocs -> SmartDocs proxy URL**. You may need to modify this URL if your API is on a private network and live API requests using SmartDocs from your portal are failing.



Advanced settings

For additional help in configuring these advanced settings, consult our online documentation.

Upload customized method template

Choose File No file chosen Upload

Upload a .hbr method template file. This template will be instead of the default model template when creating new models.

Method HTML cache lifetime

480 minutes

The HTML for SmartDocs method pages is cached for this length of time before re-fetching from the Modeling API. A value of zero indicates that method pages are cached indefinitely.

JS/CSS Assets

SmartDocs JS/CSS version

v6

Determines which version of JavaScript and CSS assets will work with your templates.

[✓] Include Prism syntax highlighter

When checked, JSON and XML syntax of request and response bodies will be highlighted using the Prism JavaScript library.

SmartDocs proxy URL

http://10.32.29.43:59001/smartdocs/v1/sendrequest

You should not need to edit this value.

Save configuration

How the Developer Portal Communicates with Edge

The developer portal stores and retrieves most of the information it displays from Edge including Smartdocs, developers, products, and developer apps. Edge org information and devadmin credentials are configurable by using the menu command **Configuration -> Devportal**.

For more information, see Communicating between the portal and Edge.

API calls via Developer Portal fail with Internal Error

Description

Error encountered when making a live API request using SmartDocs from the developer portal.

Error Messages

The common error seen on Developer Portal is **"An internal error has occurred. Please retry your request"**.

Causes

This error can occur when Developer Portal fails to get a response from the backend (smartdocs proxy or the actual endpoint).

Steps to Diagnose

Enable "Developer tools" in your browser and check the network tab to identify the actual error.

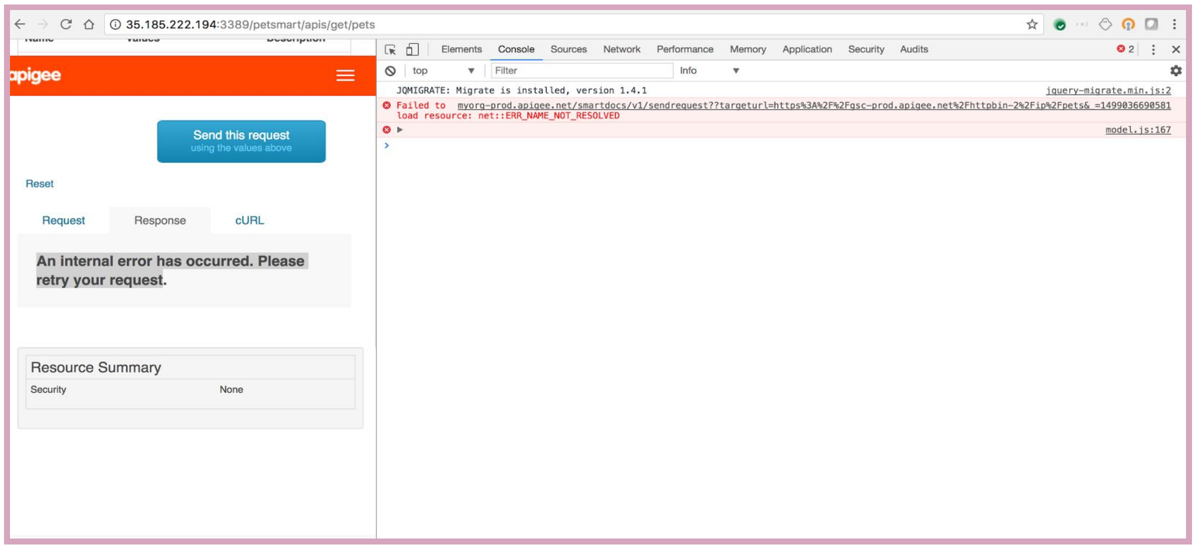
Common errors and their typical causes are listed in the following table:

Error	Typical Cause(s)
`ERR_NAME_NOT_RESOLVED`	SmartDocs proxy misconfigured or network firewall restrictions
`Mixed Content`	Portal configured over HTTPs, SmartDocs request over HTTP
`500 - Internal Server Error`	• SmartDocs proxy returns error • Edge Message Processors unable to call published API endpoint

Let’s go through each of these causes one by one and steps to resolve the issue.

SmartDocs proxy misconfigured or network firewall restrictions

The**“ERR_NAME_NOT_RESOLVED”** message indicates that the smartdocs proxy url is misconfigured or the network from which the portal is being accessed is unable to make a call to the smartdocs proxy URL due to firewall restrictions. The smartdocs proxy must be accessible from the internet or from the internal network (for internal APIs).



An internal error has occurred. Please retry your request.

Resource Summary

Security	None

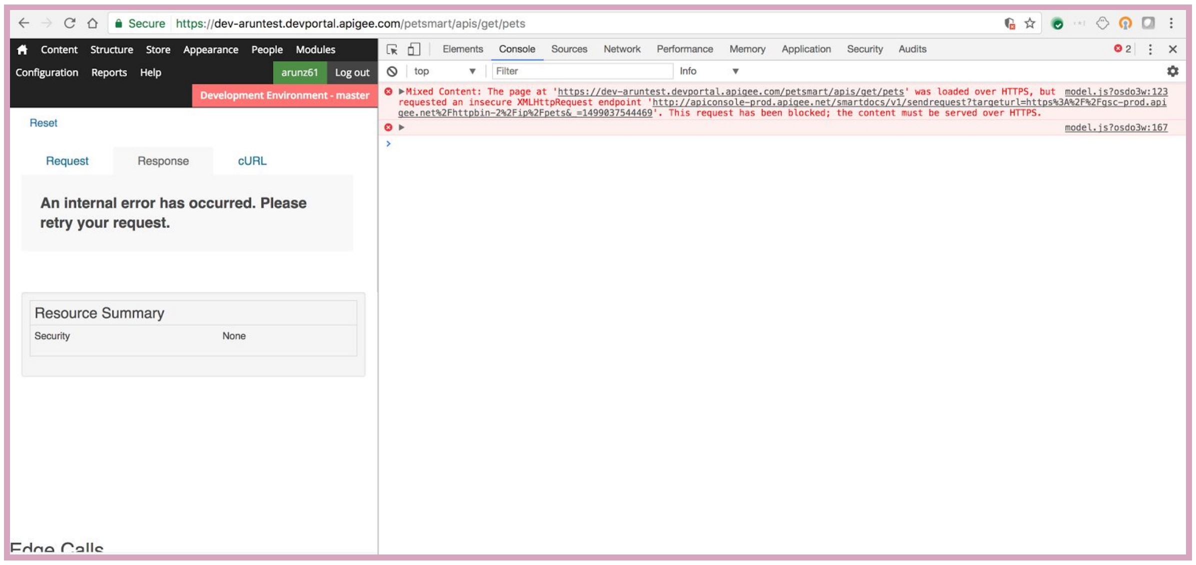
```
JQMIGRATE: Migrate is installed, version 1.4.1                                  jquery-migrate.min.js:2
Failed to  myorg-prod.apigee.net/smartdocs/v1/sendrequest??targeturl=https%3A%2F%2Fgsc-prod.apigee.net%2Fhttpbin-2%2Fip%2Fpets& =1499036690581
load resource: net::ERR_NAME_NOT_RESOLVED
▶                                                                                          model.js:167
```

Resolution

Ensure that the smartdocs proxy can be accessed from all required networks by deploying the smartdocs proxy to a virtual host on Edge with a hostname that is accessible from internet.

Portal configured over HTTPS, SmartDocs request over HTTP

The **“Mixed Content”** error indicates that smartdocs proxy is being called over HTTP from a page loaded over HTTPS.


Secure https://dev-aruntest.devportal.apigee.com/petsmart/apis/get/pets
Content Structure Store Appearance People Modules
Configuration Reports Help
arunz61 Log out
Development Environment - master
Reset
Request
Response
cURL
Resource Summary
Security
None
Edge Calls
Elements Console Sources Network Performance Memory Application Security Audits
top
Filter
Info

An internal error has occurred. Please retry your request.

```
▶Mixed Content: The page at 'https://dev-aruntest.devportal.apigee.com/petsmart/apis/get/pets' was loaded over HTTPS, but  model.js?osdo3w:123
requested an insecure XMLHttpRequest endpoint 'http://apiconsole-prod.apigee.net/smartdocs/v1/sendrequest?targeturl=https%3A%2F%2Fgsc-prod.api
gee.net%2Fhttpbin-2%2Fip%2Fpets&_=1499037544469'. This request has been blocked; the content must be served over HTTPS.
▶                                                                                                                            model.js?osdo3w:167
```

Resolution

Expose smartdocs proxy over https to resolve the issue. You can do so by deploying the smartdocs proxy to include a virtual host configured to use TLS/SSL (typically the “secure” virtual host).

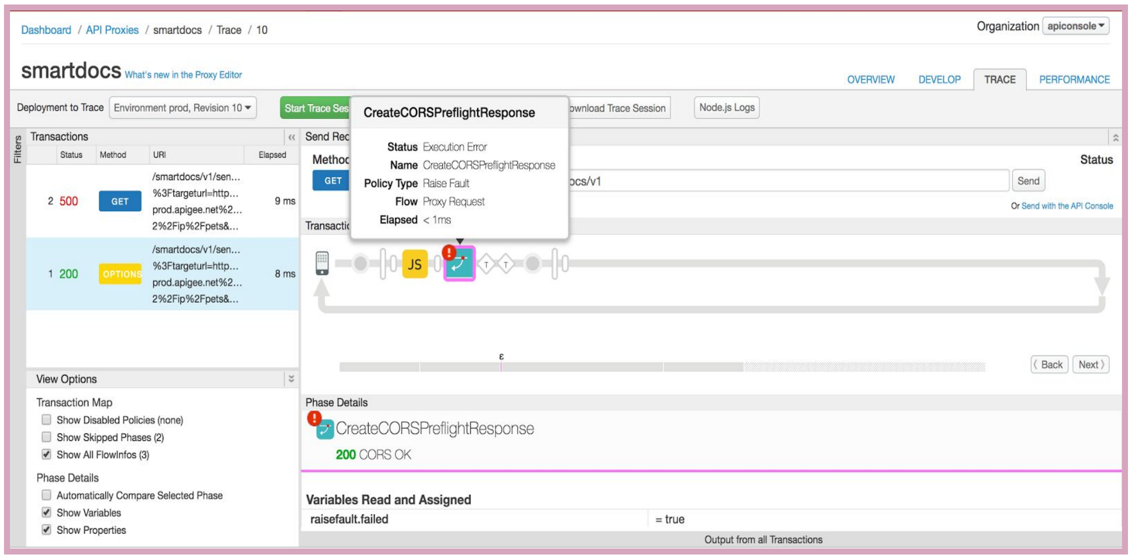
SmartDocs proxy returning an exception

The **500 - Internal Server Error** message can be caused by an issue with the “smartdocs” proxy. In this case, you notice that the smartdocs proxy returns this error.

Steps to Diagnose

Use the Trace tool to diagnose errors with the “smartdocs” proxy, as described below. For more information, see Using the Trace tool.

1. Enable **trace** for the **“smartdocs”** Proxy in the **“VALIDATE”** org to locate the specific policy that is returning the 500 Internal Server Error.



Environment prod, Revision 10

	Status	Method	URI	Elapsed
2	500	GET	/smartdocs/v1/sen... %3Ftargeturl=http... prod.apigee.net%2... 2%2Fip%2Fpets&...	9 ms
1	200	OPTIONS	/smartdocs/v1/sen... %3Ftargeturl=http... prod.apigee.net%2... 2%2Fip%2Fpets&...	8 ms

CreateCORSPreflightResponse

Status	Execution Error
Name	CreateCORSPreflightResponse
Policy Type	Raise Fault
Flow	Proxy Request
Elapsed	< 1ms

Transaction Map
- [ ] Show Disabled Policies (none)
- [ ] Show Skipped Phases (2)
- [✓] Show All FlowInfos (3)

Phase Details
- [ ] Automatically Compare Selected Phase
- [✓] Show Variables
- [✓] Show Properties

Phase Details

CreateCORSPreflightResponse

200 CORS OK

Variables Read and Assigned

raisefault.failed	= true

2. Select the specific policy in the trace to identify the cause of the error.

Resolution

Fix the error identified. If you need assistance, contact Apigee Support.

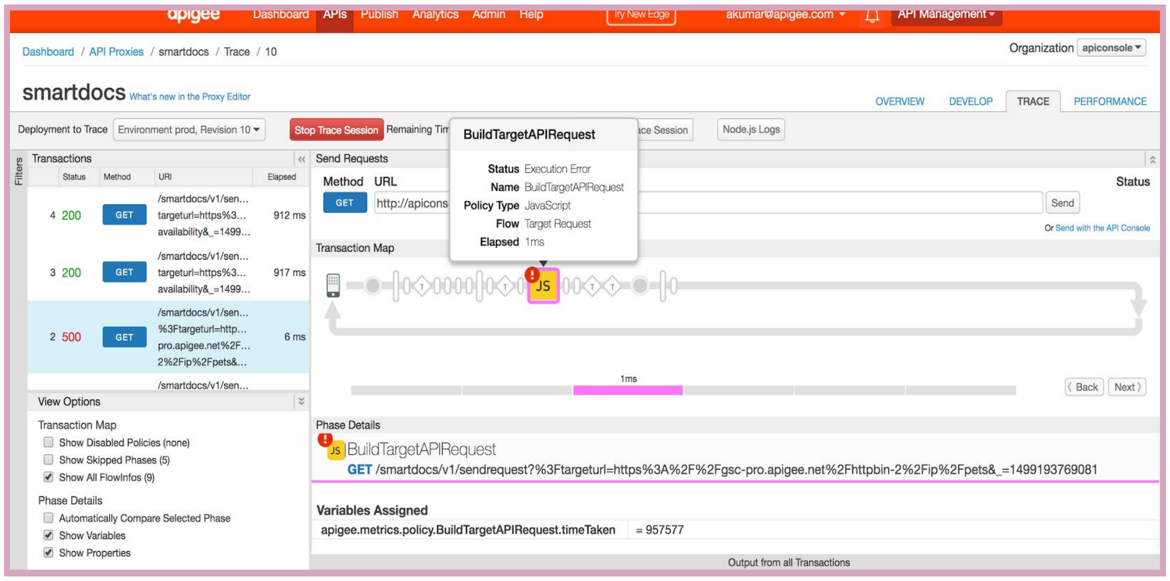
Edge Message Processors unable to call published API endpoint

500 - Internal Server Error can also occur when the Message Processors belonging to the org hosting the Smartdocs proxy are unable to call the API endpoint.

Steps to Diagnose

Use the Trace tool to diagnose errors with the “smartdocs” proxy, as described below. For more information, see [Using the Trace tool](#).

1. Enable **trace** for the **“smartdocs”** proxy in the **“VALIDATE”** org to locate the specific policy that is returning the 500 Internal Server Error.



Deployment to Trace: Environment prod, Revision 10

Status	Method	URI	Elapsed
4 200	GET	/smartdocs/v1/sen... targeturl=https%3... availability&_=1499...	912 ms
3 200	GET	/smartdocs/v1/sen... targeturl=https%3... availability&_=1499...	917 ms
2 500	GET	/smartdocs/v1/sen... %3Ftargeturl=http... pro.apigee.net%2F... 2%2Fip%2Fpets&...	6 ms
		/smartdocs/v1/sen...	

BuildTargetAPIRequest

Status	Execution Error
Name	BuildTargetAPIRequest
Policy Type	JavaScript
Flow	Target Request
Elapsed	1ms

Method URL
GET http://apicons

Transaction Map
- [ ] Show Disabled Policies (none)
- [ ] Show Skipped Phases (5)
- [x] Show All FlowInfos (9)

Phase Details
- [ ] Automatically Compare Selected Phase
- [x] Show Variables
- [x] Show Properties

BuildTargetAPIRequest
GET /smartdocs/v1/sendrequest?%3Ftargeturl=https%3A%2F%2Fgsc-pro.apigee.net%2Fhttpbin-2%2Fip%2Fpets&_=1499193769081

Variables Assigned
apigee.metrics.policy.BuildTargetAPIRequest.timeTaken = 957577

2. In the sample UI trace shown above, it is seen that the JavaScript policy “BuildTargetAPIRequest” is failing to execute the target URL.

3. Obtain the target URL from the JavaScript policy “BuildTargetAPIRequest”.

4. Make a direct call to the URL from the Message Processor nodes associated with **“VALIDATE”** org as shown below:
```
curl -v <target URL>
```

5. Correct any observed error.

Resolution

1. Ensure that APIs published on Developer Portal can be invoked from Message Processors associated with the **“VALIDATE”** org and correct any errors encountered.

2. If you are able to execute the API call directly from the Message Processor, it’s very likely that you should be able to execute the API through SmartDocs as well.

3. Execute the API call through SmartDocs and check if the issue is fixed.

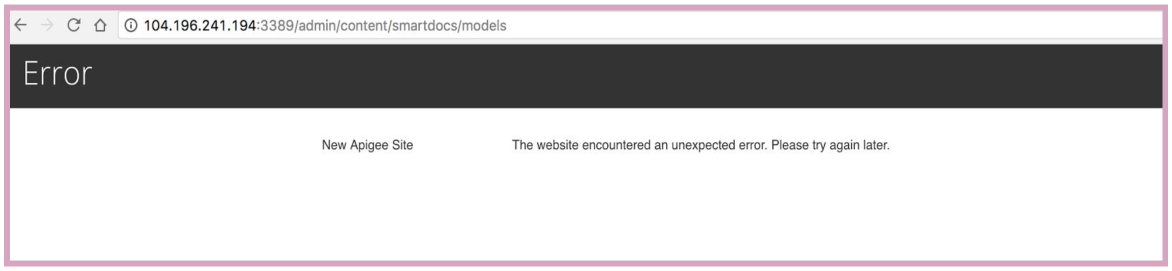
Communication Issues between Developer Portal and Edge

Description

You might encounter one or more of the following issues caused by communication issues between the Developer Portal and Edge:

1. Unable to perform the following tasks:
    a. Create or update SmartDocs.
    b. Register developer apps.
    c. List API products.

2. Error returned when accessing SmartDocs models page on Developer Portal (select **Content > SmartDocs** in the Developer Portal administration menu).



104.196.241.194:3389/admin/content/smartdocs/models

Error

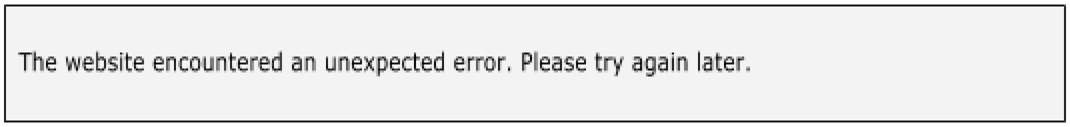
New Apigee Site

The website encountered an unexpected error. Please try again later.

3. Developer app analytics not being generated.

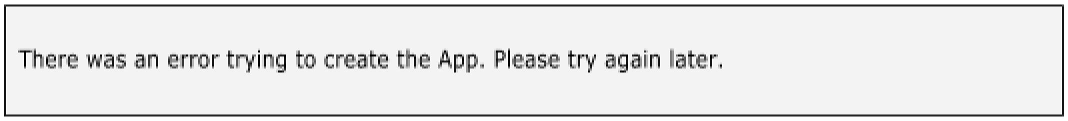
Error Messages

1. Error returned when accessing the “SmartDocs” tab in the developer portal:



The website encountered an unexpected error. Please try again later.

2. Error returned when registering a developer app in the developer portal:



There was an error trying to create the App. Please try again later.

Causes

In most cases, the problem is due to **incorrect devadmin credentials** specified or **insufficient permissions** assigned to the devadmin user role.

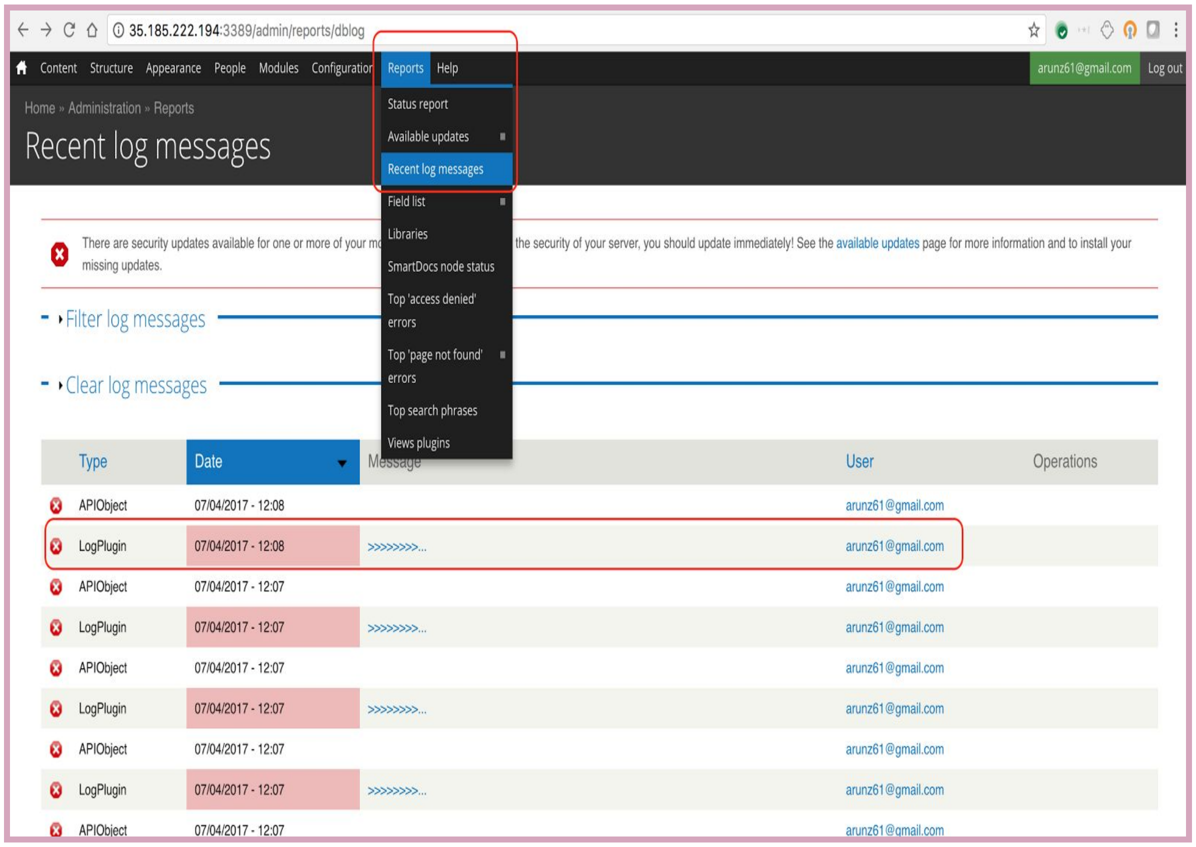
Validate the Edge connection configuration for the dev portal by navigating to **Configuration > Dev Portal** and ensuring the Connection Status field displays Connection Successful. Otherwise, the dev portal is not able to properly connect to the Edge Management server.

Steps to Diagnose

1. Enable "DEBUG" logging on the dev portal by navigating to Configuration > Dev Portal and selecting Debug under Edge logging threshold. By default, Management API calls are not logged.

2. Reproduce the problem.

3. Access the log by navigating to **Reports -> Recent Log Messages**.

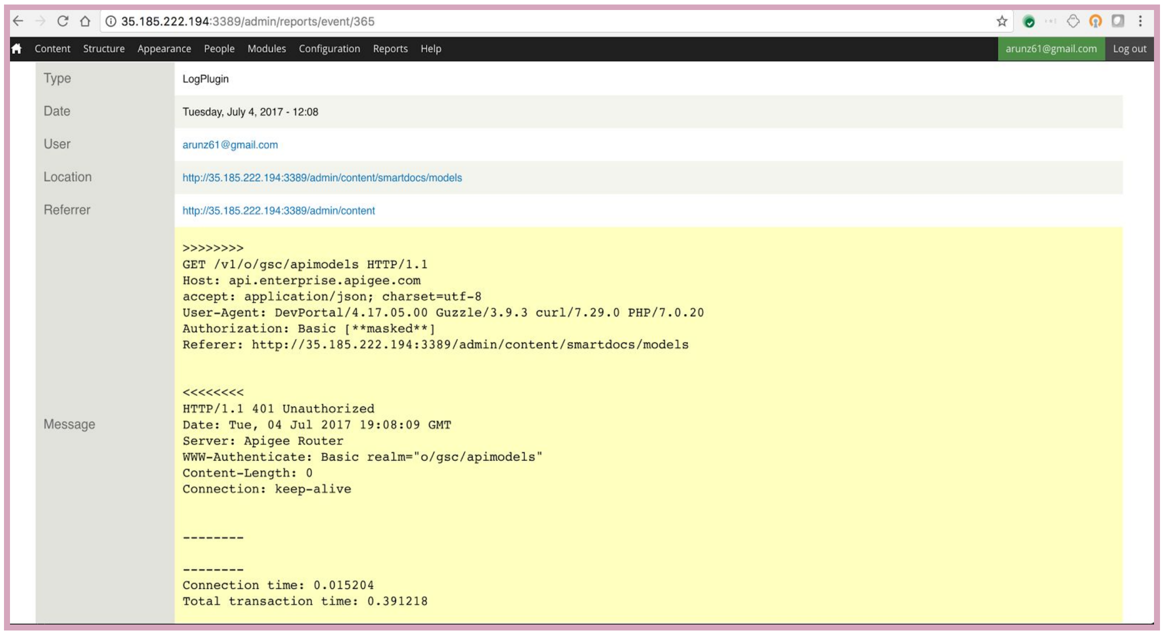


Recent log messages

There are security updates available for one or more of your mo… the security of your server, you should update immediately! See the available updates page for more information and to install your missing updates.

Type	Date	Message	User	Operations
APIObject	07/04/2017 - 12:08		arunz61@gmail.com	
LogPlugin	07/04/2017 - 12:08	>>>>>>>>...	arunz61@gmail.com	
APIObject	07/04/2017 - 12:07		arunz61@gmail.com	
LogPlugin	07/04/2017 - 12:07	>>>>>>>>...	arunz61@gmail.com	
APIObject	07/04/2017 - 12:07		arunz61@gmail.com	
LogPlugin	07/04/2017 - 12:07	>>>>>>>>...	arunz61@gmail.com	
APIObject	07/04/2017 - 12:07		arunz61@gmail.com	
LogPlugin	07/04/2017 - 12:07	>>>>>>>>...	arunz61@gmail.com	
APIObject	07/04/2017 - 12:07		arunz61@gmail.com	

4. Open the “Message” of type “LogPlugin” to learn more about the actual error.
   Sample output showing 401 Unauthorized Error



Type	LogPlugin
Date	Tuesday, July 4, 2017 - 12:08
User	arunz61@gmail.com
Location	http://35.185.222.194:3389/admin/content/smartdocs/models
Referrer	http://35.185.222.194:3389/admin/content

Message

```
>>>>>>>>
GET /v1/o/gsc/apimodels HTTP/1.1
Host: api.enterprise.apigee.com
accept: application/json; charset=utf-8
User-Agent: DevPortal/4.17.05.00 Guzzle/3.9.3 curl/7.29.0 PHP/7.0.20
Authorization: Basic [**masked**]
Referer: http://35.185.222.194:3389/admin/content/smartdocs/models


<<<<<<<<
HTTP/1.1 401 Unauthorized
Date: Tue, 04 Jul 2017 19:08:09 GMT
Server: Apigee Router
WWW-Authenticate: Basic realm="o/gsc/apimodels"
Content-Length: 0
Connection: keep-alive


--------

--------
Connection time: 0.015204
Total transaction time: 0.391218
```

Resolution

Follow the appropriate steps listed in the below table depending on the error encountered:

Error	Steps to Resolve
401 Unauthorized	Update the correct devadmin credentials on Developer Portal and test connectivity again. See Add and manage user accounts.
403 Forbidden	Update the devadmin userrole on Edge organization to have the required permissions for the resource. See Setting user roles and permissions.

Troubleshooting Edge Router Problems

This section provides guidance and instructions to troubleshoot commonly observed problems with Edge Routers.

Bad Config Files

Description

The Edge Router is implemented by using Nginx. During the Edge upgrade process, or when changing the configuration of the Router, you might see Nginx configuration errors. When these errors occur, Edge marks all the Nginx configuration files that caused the issue to `/opt/nginx/conf.d`:

```
-rw-r--r-- 1 apigee apigee 522 Jul 20 08:41 0-default.conf.bad
-rw-r--r-- 1 apigee apigee 577 Jul 20 08:42 0-fallback.conf
-rw-r--r-- 1 apigee apigee 1062 Jul 20 08:18 0-map.conf
-rw-r--r-- 1 apigee apigee 1887 Jul 20 08:42
custorg_test_default.conf.bad
```

Error Messages

You will not see any error messages. However, you might not be able to execute your API proxies because of the bad config files.

Causes

Typically the Nginx config file are marked bad either because incorrect value(s) are set to Nginx property(ies) in the `/opt/apigee/customer/application/router.properties` file or incorrect changes are made to a virtual host.

Steps to Diagnose

1. Remove the .bad suffix from the file names in the `/opt/nginx/conf.d` directory so they end in .conf.

2. Run the Nginx configtest tool to determine the reason for the failure:

   ```
   /opt/nginx/scripts/apigee-nginx configtest
   ```

Resolution

1. If the config test identifies the reason for the bad config files, then fix the issue by making the appropriate changes to the specific property in the `/opt/apigee/customer/application/router.properties` file or virtual host.

2. Remove the `/opt/nginx/conf.d` directory:

   ```
   rm -rf /opt/nginx/conf.d
   ```

3. Restart the Router:

   ```
   /opt/apigee/apigee-service/bin/apigee-service edge-router
   restart
   ```

4. You should no longer see bad config files in the `/opt/nginx/conf.d` directory.

If the problem persists, contact Apigee Support.

Here's an example that shows how to fix the problem based on the information provided by the Nginx config test.

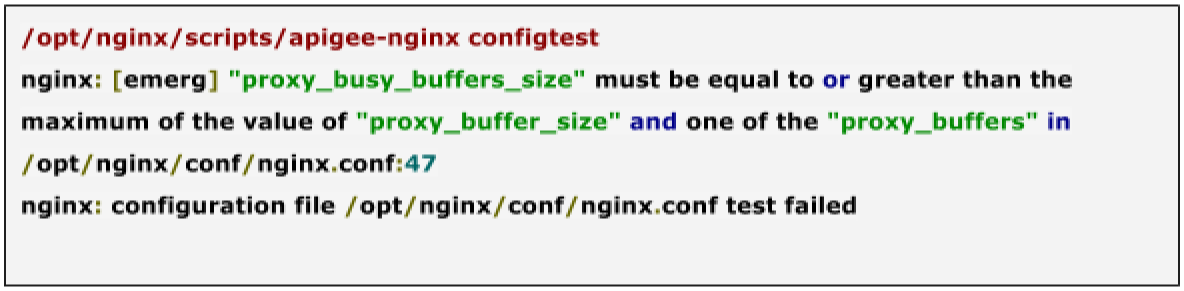
Example: Incorrect Value set for a Nginx property

1. Let's say you updated the property "proxy_busy_buffers_size" to 128K in the `/opt/apigee/customer/application/router.properties` file, as shown below:

`conf_load_balancing_load.balancing.driver.proxy.busy.buffer.size=128k`

This caused the config files to be marked as bad in `/opt/apigee/nginx/conf.d` directory.

2. Run the Nginx configtest command to determine the reason for failure:



```
/opt/nginx/scripts/apigee-nginx configtest
nginx: [emerg] "proxy_busy_buffers_size" must be equal to or greater than the
maximum of the value of "proxy_buffer_size" and one of the "proxy_buffers" in
/opt/nginx/conf/nginx.conf:47
nginx: configuration file /opt/nginx/conf/nginx.conf test failed
```

The configtest results indicates that the value for the property `proxy_busy_buffers_size` should be equal to or greater than `proxy_buffer_size`, but seems to be set with an incorrect value.

3. Check the values set for the properties `proxy_buffer_size` and `proxy_busy_buffers_size` in the `0-default.conf` file:

```
proxy_buffer_size 512k;
proxy_busy_buffers_size 128k;
```

4. Update the value of `proxy_busy_buffers_size` to 512K in the `/opt/apigee/customer/application/router.properties` file:

```
conf_load_balancing_load.balancing.driver.proxy.busy.buffer
.size=512k
```

5. Remove the `/opt/nginx/conf.d` folder:

```
rm -rf /opt/nginx/conf.d
```

6. Restart the router:

```
/opt/apigee/apigee-service/bin/apigee-service edge-router
restart
```

The issue was fixed and the bad config files were removed.

Troubleshooting Monetization Problems

This section provides information and guidance on troubleshooting commonly observed monetization problems.

Developer suspended

Description

Developer is suspended and will not be able to make any additional monetization transactions/API calls.

Note: Developer suspension is enforced by the Monetization Limits Check Policy. If the policy is not attached to the proxy (or it is disabled), calls will go through unchecked, but they will be rated as FAILED. This would enable developers to get unlimited calls "for free".

Error Messages

```
<error>
  <messages>
     <message>Exceeded developer limit configuration -</message>
     <message>Is Developer Suspended - true</message>
  </messages>
</error>
```

Steps to Diagnose

To determine the reason that the developer has been suspended, perform the following steps:

1. Execute the following API call to identify the error code associated with the suspended developer:

```
curl -X GET
"https://api.enterprise.apigee.com/v1/mint/organizations/{o
rg}/suspended-developers/{developer-email}" -u
orgadminEmail:passwrd
```

2. Compare the error code with the following reasons codes to determine why the developer was suspended.

   See also:
   http://docs.apigee.com/monetization/content/unsuspend-developers#suspend-reason-codes

Reason Code	Cause	Details
`INSUFFICIENT_FUNDS`	Developer account balance is depleted	If the prepaid developer account balance does not have enough funds for any additional transactions, then the developer will be suspended. For postpaid developers, this error can occur if they exceed their credit limit or if the credit limit set on the currency used is depleted.
`LIMIT_VIOLATED`	Developer is unable to make any further transactions	Every developer is allowed to make a fixed number of transactions based on the rate plan purchased. If the number of transactions is exceeded, then the developer is suspended and cannot complete additional transactions.
`RATE_PLAN_RATE_BAND_EXCEEDED`		
`NO_CURRENT_PUBLISHABLE_ENTITY`	Developer has not purchased any rate plan	A developer must purchase a rate plan before completing any transactions.

Resolution

Error	Steps to Resolve
`INSUFFICIENT_FUNDS`	The developer needs to make sure that there is a sufficient account balance or available credit in order to complete any additional transactions.

`LIMIT_VIOLATED`	1. Make the following API calls to get the developer rate plan and transaction details, respectively:
	● Run the following API call to get the start and end date of the rate plans that the developer has purchased:
	`http://docs.apigee.com/monetize/apis/get/organizations/%7Borg_name%7D/developers/%7Bdeveloper_id%7D/developer-accepted-rateplans`
	● Run the following API call to get the number of successful transactions made by the developer :
	`http://docs.apigee.com/monetize/apis/get/organizations/%7Borg_name%7D/transactions/developers/%7Bdeveloper_email_or_id%7D`
	2. In Edge UI, you can also check the number of calls a developer is allowed to make by selecting:
	Packages -> *PackageName* -> *RatePlanName* -> Rate Card

`RATE_PLAN_RATE_BAND_EXCEEDED`	

	For example, if the package name is 'Pro Package' and it's a Free Plan, then the path would be: **Packages -> Pro Package -> Free Plan -> Rate Card**
`NO_CURRENT_PUBLISHABLE_ENTITY`	The developer has to purchase a rate plan to be able to make API calls.

Monetization setup issues

Description

The Monetization setup issues can manifest as different symptoms such as:

- Webhooks functionality not working
    - Cannot create webhooks
    - Webhook notifications not being triggered
- Monetization Reports not showing any transactions
    - For example, the Analytics data indicates that the developer has completed many transactions in a specific period of time, but the Monetization reports don't list any of those transactions.
- Transactions not getting recorded

Error Messages

You may not observe any error messages, but you will see issues as explained in the Description section above.

Causes

If you are seeing any of the symptoms listed above in the Description section, then it's very likely the **transactions are not being monetized**.

Steps to Diagnose

1. Use the management API call described in the following section to check if the transactions are being monetized.
   http://docs.apigee.com/monetization/content/transaction-status

2. If you don't see any transactions being listed as 'SUCCESS' within the specified duration, then the transactions are not monetized.

The typical causes for the transactions not being monetized are:

Cause
Monetization Limits Check Policy Not Attached To API Proxy
APIProduct is not Monetized
Transaction Recording Policy incorrectly defined
Developer has not purchased rate plan

The following sections describe how to diagnose and resolve each issue.

Monetization Limits Check Policy not used in API Proxy

Steps To Diagnose

1. Check whether the Monetization Limits Check Policy is attached to the API proxies.

2. If the policy is not attached, then this could be the reason that transactions are listed as ‘FAILED’.

Resolution

Attach the Monetization Limits Check Policy to the required API proxies, as described in the following section: http://docs.apigee.com/monetization/content/enforce-monetization-limits-using-monetization-limits-check-policy

If the problem persists, then check if the API Product is not monetized.

API Product is not monetized

Steps to Diagnose

1. Check if the API product is monetized (only monetized API products are rated and will be listed under transactions). A monetized product is one that has at least one active rate plan available.

2. Use the following management API call to get the list of monetized API products:

   ```
   curl -v
   http://<management-host>:<port#>/v1/mint/organizations/{org
   _id}/products?monetized=true
   ```

3. If the API product associated with your API Proxy is not monetized, then this could be the reason that the transactions are not being monetized.

Resolution

To monetize an API product, perform the following steps:

1. Create a transaction recording policy, as described in the following section: http://docs.apigee.com/monetization/content/create-transaction-recording-policy

2. Check that the API Product has an active rate plan.

If the problem persists, then check if Transaction recording policy incorrectly defined

Transaction recording policy incorrectly defined

Steps to Diagnose

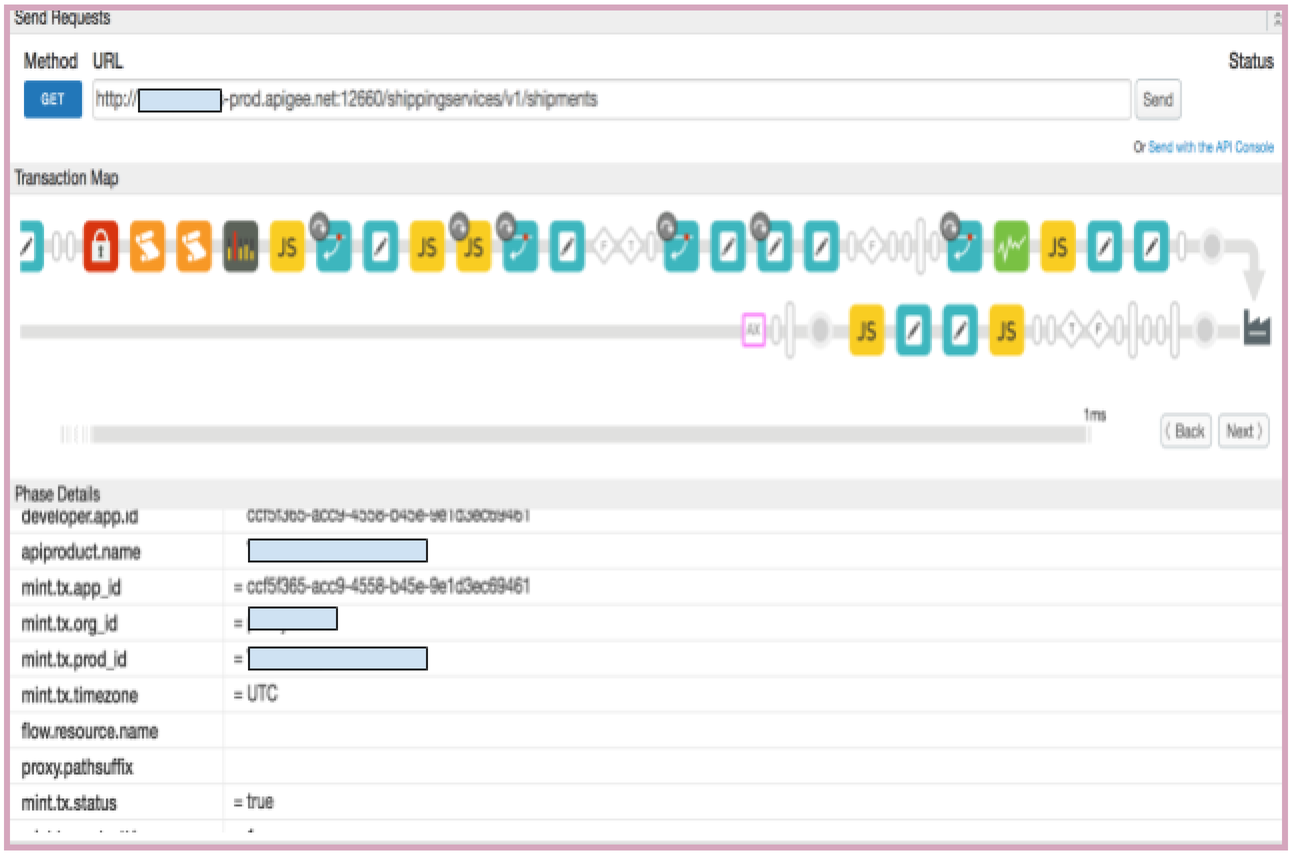
1. Enable the UI trace for the API Proxy that has the Monetization Limits Check Policy attached.

2. Select a particular API request from the UI trace.

3. Select the Analytics ‘AX’ flow and check if the following monetization (mint) flow variables have the proper values:
    a. **mint.tx.status** - Should match the value set up for "success criteria" in the transaction recording policy for the API product being used. When tracing, the txProviderStatus in the transaction recording policy is stored in the variable 'mint.tx.status'.
    b. **mint.tx.app_id** - Application id of API product.
    c. **mint.tx.prod_id** - API product id.

4. Here’s a sample UI trace that shows the mint flow variables setup correctly.

5. If you observe an error in the **mint.tx.status** variable, then it indicates that the transaction recording policy is incorrectly defined.



http://[redacted]-prod.apigee.net:12660/shippingservices/v1/shipments

developer.app.id	ccf5f365-acc9-4558-b45e-9e1d3ec69461
apiproduct.name	[redacted]
mint.tx.app_id	= ccf5f365-acc9-4558-b45e-9e1d3ec69461
mint.tx.org_id	= [redacted]
mint.tx.prod_id	= [redacted]
mint.tx.timezone	= UTC
flow.resource.name	
proxy.pathsuffix	
mint.tx.status	= true

Resolution

1. Ensure that all the steps documented in the following section have been followed correctly while creating the transaction recording policy.
   http://docs.apigee.com/monetization/content/create-transaction-recording-policy

2. The key value is the 'transaction success criteria' set in the transaction recording policy.
   http://docs.apigee.com/monetization/content/create-transaction-recording-policy#success-criteria

Developer has not purchased rate plan

Steps to Diagnose

1. Use the following management API call to verify the rate plans purchased by the developer:
   ```
   curl -v
   http://<management-host>:<port#>/v1/mint/organizations/{org}/developers/{dev_email}/products/{prod}/developer-rateplans
   ```

2. Based on the response from the above call, find the plan that was active at the time that the transaction was completed by the developer.

Resolution

Developer must purchase the rate plan based on their requirements and then execute the transactions/APIs.

Troubleshooting OpenLDAP Problems

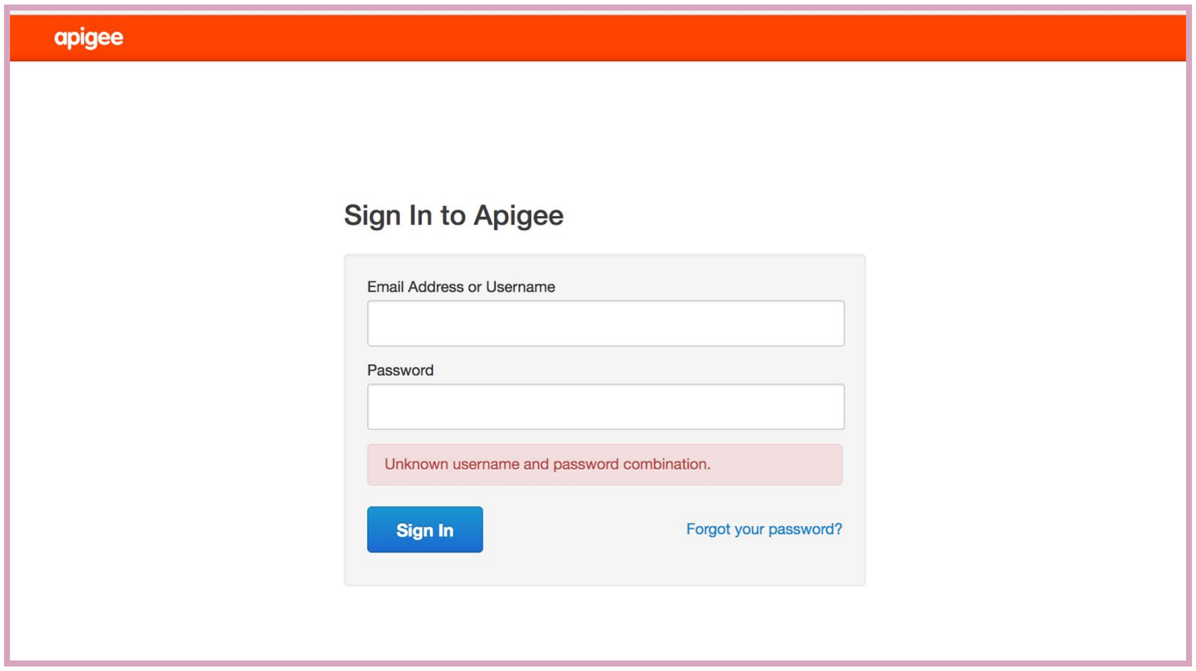
This section provides information and guidance on troubleshooting OpenLDAP problems.

SMTP is disabled and users need to reset password

Description

When SMTP is not set up on the Edge UI, new users added to Edge need a way to set a password.

Error Messages



Unknown username and password combination.

Causes

New users are unable to get an email from the “Forgot your password?” link to set a password because SMTP is not set up.

Resolution

You can address this issue in one of the following ways:

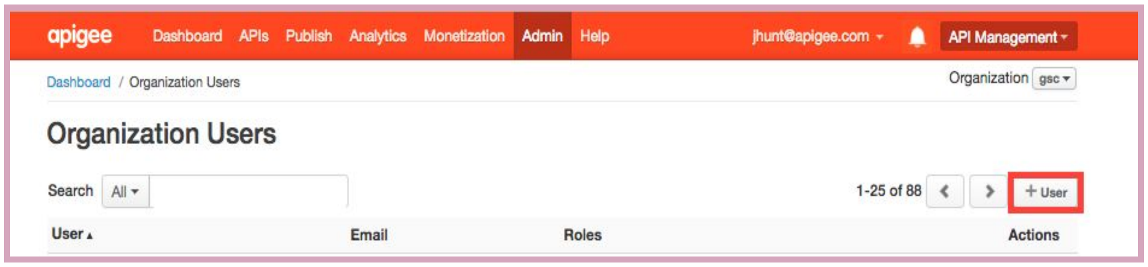
Solution #1: Configure SMTP Server

Configure the SMTP Server to set a new password for the user using the instructions provided in the documentation.

Solution #2: Using LDAP

If you are unable to configure the SMTP server, then use the below LDAP commands to set the new password for a user:

1. An existing org admin needs to add the specific user via the Edge UI as shown below:



2. Use ldapsearch to find the user's distinguished name (dn):

```
ldapsearch -w Secret123 -D "cn=manager,dc=apigee,dc=com" -b
"dc=apigee,dc=com" -LLL -h localhost -p 10389 > ldap.txt
```

Here is an example of a dn entry for a user, along with the attributes for the user:

```
dn:uid=f7a4a4a5-7c43-4168-a47e-6e9a1417cc29,ou=users,ou=global,dc=apigee
,dc=com
mail: apigee_validator@apigee.com
userPassword::
e1NTSEF9b0FrMFFXVmFjbWRxM1BVaFZzMnllWGZMdkNvNjMwNTJlUDZYN3c9PQ=
 =
uid: f7a4a4a5-7c43-4168-a47e-6e9a1417cc29
objectClass: inetOrgPerson
sn: Validator
cn: apigee
```

3. Open the `ldap.txt` and find the dn of the new user that has been added based on the new user's email attribute.

4. Execute the **ldappassword** command to add a password for the new user using its dn. In this example, you are setting the user's password to Apigee123:

```
ldappasswd -h localhost -p 10389 -D
"cn=manager,dc=apigee,dc=com" -W -s Apigee123
"uid=f7a4a4a5-7c43-4168-a47e-6e9a1417cc29,ou=users,ou=globa
l,dc=apigee,dc=com"
```

5. Log in to the Edge UI as the new user with the password defined in the previous step. The user can set a new password once logged into the UI.

LDAP is not Replicating

Description

Many Edge installations have multiple data centers, for example DC-1 and DC-2. When logging into the Edge UI in DC-1 as an org admin you can view the list of users, but that same user list does not appear in the Edge UI in DC-2.

Error Messages

No errors appear, the Edge UI simply does not show the list of users that should have been replicated across all OpenLDAP servers.

Causes

Typically the cause of this issue is a misconfigured OpenLDAP replication configuration, not the installation itself. Also, replication may break if the network between the OpenLDAP servers is not allowing traffic on port 10389.

Steps to Diagnose

Use the following troubleshooting steps to resolve the problem:

1. Check if ldapsearch returns data from each OpenLDAP server:

   ```
   ldapsearch -W -D "cn=manager,dc=apigee,dc=com" -b
   "dc=apigee,dc=com" -LLL -h <host-ip> -p 10389
   ```

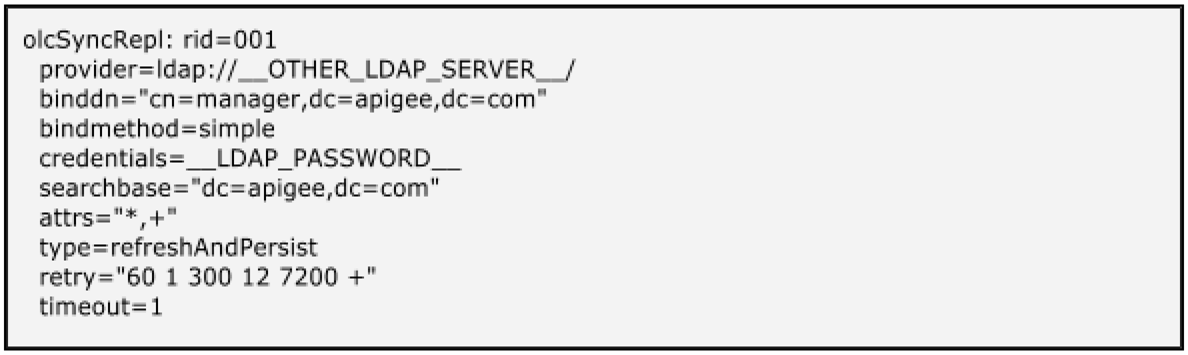
2. Check if you can connect to each OpenLDAP node from the other OpenLDAP nodes on port 10389. If telnet is installed:

   ```
   telnet <OpenLDAP_Peer_IP> 10389
   ```

3. Check the replication configuration in the following file:

```
/opt/apigee/data/apigee-openldap/slapd.d/cn=config/olcDatab
ase={2}bdb.ldif
```

The file should contain configuration like this:



```
olcSyncRepl: rid=001
  provider=ldap://__OTHER_LDAP_SERVER__/
  binddn="cn=manager,dc=apigee,dc=com"
  bindmethod=simple
  credentials=__LDAP_PASSWORD__
  searchbase="dc=apigee,dc=com"
  attrs="*,+"
  type=refreshAndPersist
  retry="60 1 300 12 7200 +"
  timeout=1
```

4. Also check the same file for the value of the **olcMirrorMode** attribute. It should be set to the value TRUE:

   ```
   grep olcMirrorMode
   /opt/apigee/data/apigee-openldap/slapd.d/cn=config/olcDatab
   ase={2}bdb.ldif
   ```

5. Check for iptables and tcp wrapper rules.

6. Make sure the OpenLDAP system password is the same on each OpenLDAP node.

7. Check for hidden characters in the ldif configuration files that are being used to configure N-Way OpenLDAP replication by running dos2unix against the ldif files that have been created to update the configuration. Typically a ldif file that has bad characters would cause the ldapmodify command to fail to run and so replication may not be set up.

Contact [Apigee Support]() for assistance with setting up N-Way OpenLDAP replication.

Unable to start OpenLDAP

Description

OpenLDAP does not start.

Error Messages

```
SLAPD Dead But Pid File Exist
```

Causes

This issue is typically caused by a lock file that is left behind on the file system and needs to be removed.

Steps to Diagnose

Use the following steps to troubleshoot this issue:

1. Check for an OpenLDAP slapd process lock or pid file in the following location:

   ```
   /opt/apigee/var/run/apigee-openldap/apigee-openldap.lock
   ```

   ```
   /opt/apigee/var/run/apigee-openldap/apigee-openldap.pid
   ```

2. Delete the lock and pid file, if found, and try to restart openldap.

   ```
   rm /opt/apigee/var/run/apigee-openldap/apigee-openldap.lock
   Rm /opt/apigee/var/run/apigee-openldap/apigee-openldap.pid
   ```

3. If the OpenLDAP slapd process does not start, try running slapd in debug mode and look for any errors:

   ```
   slapd -h ldap://:10389/ -u apigee -F
   /opt/apigee/data/apigee-openldap/slapd.d -d 255
   ```

4. Errors may point to resource issues. Check memory and CPU utilization.

5. Check the version of OpenLDAP and upgrade if it is old. Check for the supported versions of OpenLDAP in our Supported Software document.

   ```
   slapd -V
   ```

6. Use strace to troubleshoot slapd process, and to provide strace output to Apigee Support:

   ```
   strace -tt -T -f -F -i -v -e read=all -s 8192 -e write=all
   -o /tmp/strace.out -p <pid>
   ```

OpenLDAP Data Corruption

Description

Users are no longer able to run management calls or log in to the Edge UI. Using ldapsearch utility to query the users may indicate the user exists in the LDAP datastore, or may identify possible missing users or roles.

Error Messages

```
Unknown username and password combination.
```

Causes

Typically, OpenLDAP data does not get corrupted. But in the rare case that it does, the corruption could be due to system disk failure or disk space issues.

Steps to Diagnose

1. Check the disk space on the system having OpenLDAP installed using the below command:

   ```
   du -m /opt
   ```

2. If you see the disk space used is very close to 100%, then that would indicate the cause for this issue is your system running out of disk space.

Resolution

If your system has run out of disk space or very near to running out of disk space, then add more disk space to ensure you have sufficient disk space.

Once you have sufficient disk space use one of the below solutions to address the LDAP data corruption issue:

1. Restore the OpenLDAP data from the backup.

2. Clean up the OpenLDAP database.

Solution #1 Restore the LDAP data from the backup

On a working OpenLDAP node make a backup. The backup should be performed regularly. See Apigee Private Cloud Operations Guide for best practices on backups:

```
slapcat -F /opt/apigee/data/apigee-openldap/slapdd -l
/tmp/ldap-backup.ldif
```

The following steps can be used to restore the OpenLDAP data from a good backup.

1. Stop the OpenLDAP node for which the data needs to be restored:

   ```
   /opt/apigee/apigee-service/bin/apigee-service
   apigee-openldap stop
   ```

2. Change directory to the OpenLDAP data directory:

   ```
   cd /opt/apigee/data/apigee-openldap
   ```

3. Back up the existing OpenLDAP data using the move command:

   ```
   mv ldap ldap_orig
   ```

4. Switch to the apigee user:

   ```
   su apigee
   ```

5. From `/opt/apigee/data/apigee-openldap` directory, create a new OpenLDAP data directory with the original name:

   ```
   mkdir ldap
   ```

6. Take the backup of ldap_orig/DB_CONFIG subdirectory from step 3, and copy it to the openldap directory.

```
cp ldap_orig/DB_CONFIG ldap
```

7. To restore data from backup taken with slapcat, use slapadd to import the ldif which contains the good data:

```
slapadd -F /opt/apigee/data/apigee-openldap/slapd.d -l
/tmp/ldap-backup.ldif
```

8. Start the OpenLDAP process:

```
/opt/apigee/apigee-service/bin/apigee-service
apigee-openldap start
```

Solution #2 Cleanup the LDAP database

The following steps wipe out the OpenLDAP database to provide a fresh start. This solution can be used if there is no data backup of the last state where the OpenLDAP data was working.

1. Stop the OpenLDAP service:

```
/opt/apigee/apigee-service/bin/apigee-service
apigee-openldap stop
```

2. Change directory to the OpenLDAP data directory:

```
cd /opt/apigee/data/apigee-openldap
```

3. Back up the existing OpenLDAP data using the move command:

```
mv ldap ldap_orig
```

4. Switch to the apigee user:

```
su apigee
```

5. Create a new OpenLDAP data directory with the original name:

```
mkdir ldap
```

6. Take the backup ldap_orig/DB_CONFIG subdirectory from step 3, and copy it to the openldap directory:

```
cp ldap_orig/DB_CONFIG ldap
```

7. Restart the OpenLDAP process:

```
/opt/apigee/apigee-service/bin/apigee-service
apigee-openldap  start
```

8. Restart the Management Server to force a refresh of the connections to OpenLDAP:

```
/opt/apigee/apigee-service/bin/apigee-service
edge-management-server restart
```

Troubleshooting ZooKeeper Problems

This section provides information and guidance on troubleshooting common ZooKeeper problems.

ZooKeeper Connection Loss Errors

Description

The ZooKeeper connectivity issues can manifest as different symptoms such as:

1. API proxy deployment errors
2. Management API calls fail with 5XX errors
3. Routers or Message Processors fail to start
4. Analytics components report ZooKeeper connection loss in system.logs

Error Messages

The following provides examples of error messages that may be observed when there is connection loss to ZooKeeper node(s).

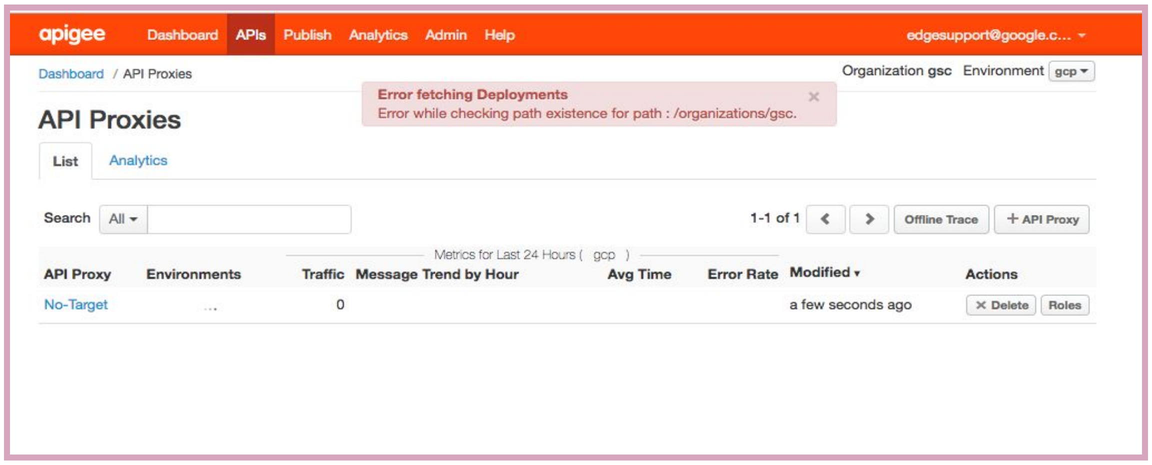
1. The following error is returned in Management Server logs when an API Proxy deployment fails due to ZooKeeper Connection loss:

```
org: env: main INFO ZOOKEEPER - ZooKeeperServiceImpl.exists() : Retry path existence path:
/regions/dc-1/pods/analytics/servers/692afe93-8010-45c6-b37d-e4e05b6b2eb5/reachable,
reason: KeeperErrorCode = ConnectionLoss
org: env: main ERROR ZOOKEEPER - ZooKeeperServiceImpl.exists() : Could not detect existence
of path:
/regions/dc-1/pods/analytics/servers/692afe93-8010-45c6-b37d-e4e05b6b2eb5/reachable ,
reason: KeeperErrorCode = ConnectionLoss
org: env: main ERROR KERNEL.DEPLOYMENT - ServiceDeployer.startService() :
ServiceDeployer.deploy() : Got a life cycle exception while starting service
[ServerRegistrationService, Error while checking path existence for path :
/regions/dc-1/pods/analytics/servers/692afe93-8010-45c6-b37d-e4e05b6b2eb5/reachable] :
com.apigee.zookeeper.ZooKeeperException{ code = zookeeper.ErrorCheckingPathExis tence,
message = Error while checking path existence for path :
/regions/dc-1/pods/analytics/servers/692afe93-8010-45c6-b37d-e4e05b6b2eb5/reachable,
associated contexts = []} 2015-03-25 10:22:39,811 org: env: main ERROR KERNEL -
MicroKernel.deployAll() : MicroKernel.deployAll() : Error in deploying the deployment :
EventService com.apigee.zookeeper.ZooKeeperException: Error while checking path existence for
path : /regions/dc-1/pods/analytics/servers/692afe93-8010-45c6-b37d-e4e05b6b2eb5/reachable
at com.apigee.zookeeper.impl.ZooKeeperServiceImpl.exists(ZooKeeperServiceImpl.java:339)
~[zookeeper-1.0.0.jar:na] at
com.apigee.zookeeper.impl.ZooKeeperServiceImpl.exists(ZooKeeperServiceImpl.java:323)
~[zookeeper-1.0.0.jar:na] at
...<snipped>
```

2. During startup, the Routers and Message Processors connect to ZooKeeper. If there are connectivity issues with ZooKeeper, then these components will fail to start with the following error:

```
2017-08-01 23:20:00,404  CuratorFramework-0 ERROR o.a.c.f.i.CuratorFrameworkImpl -
CuratorFrameworkImpl.logError() : Background operation retry gave up
org.apache.zookeeper.KeeperException$ConnectionLossException: KeeperErrorCode =
ConnectionLoss
        at org.apache.zookeeper.KeeperException.create(KeeperException.java:99)
~[zookeeper-3.4.6.jar:3.4.6-1569965]
        at
org.apache.curator.framework.imps.CuratorFrameworkImpl.checkBackgroundRetry(CuratorFrame
workImpl.java:710) [curator-framework-2.5.0.jar:na]
        at
org.apache.curator.framework.imps.CuratorFrameworkImpl.performBackgroundOperation(Curator
FrameworkImpl.java:827) [curator-framework-2.5.0.jar:na]
        at
org.apache.curator.framework.imps.CuratorFrameworkImpl.backgroundOperationsLoop(CuratorFr
ameworkImpl.java:793) [curator-framework-2.5.0.jar:na]
        at
org.apache.curator.framework.imps.CuratorFrameworkImpl.access$400(CuratorFrameworkImpl.ja
va:57) [curator-framework-2.5.0.jar:na]
        at
org.apache.curator.framework.imps.CuratorFrameworkImpl$4.call(CuratorFrameworkImpl.java:27
5) [curator-framework-2.5.0.jar:na]
        at java.util.concurrent.FutureTask.run(FutureTask.java:266) [na:1.8.0_131]
        at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1142)
[na:1.8.0_131]
        at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:617)
[na:1.8.0_131]
        at java.lang.Thread.run(Thread.java:748) [na:1.8.0_131]
```

3. The Edge UI may display the following error indicating it was unable to check the deployment status of the API Proxies:



Error fetching Deployments
Error while checking path existence for path : /organizations/gsc.

API Proxy	Environments	Traffic	Message Trend by Hour	Avg Time	Error Rate	Modified	Actions
No-Target	...	0				a few seconds ago	Delete Roles

Causes
The typical causes for this issue are:

Cause
Network connectivity issue across different data centers
ZooKeeper Node not serving requests

Network connectivity issue across different data centers

A ZooKeeper cluster may have nodes that span across multiple regions/data centers, such as DC-1 and DC-2. The typical Apigee Edge 2 DC topology will have:

- ➔ ZooKeeper servers 1, 2, and 3 as voters in DC-1
- ➔ ZooKeeper 4 and 5 as voters and ZooKeeper 6 as an observer in DC-2.

If DC-1 region goes down or network connectivity between DC-1 and DC-2 is broken, then ZooKeeper nodes cannot elect a new leader in DC-2 and they fail to communicate with the leader node. ZooKeeper observers cannot elect a new leader and the two remaining voters in DC-2 do not have a quorum of at least 3 voter nodes to elect a new leader. Thus, the ZooKeepers in DC-2 will not be able to process any requests. The remaining ZooKeeper nodes in DC-2 will continue to loop retrying to connect back to the ZooKeeper voters to find the leader.

Resolution

Apply the following solutions to address this issue in the specified order.

Solution #1

1. Work with your network administrators to repair the network connectivity issue between the data centers.

2. When the ZooKeeper ensemble are able to communicate across the data centers and elect a ZooKeeper leader, the nodes should become healthy and be able to process requests.

Solution #2

1. If the network connectivity will take time to repair, a workaround is to reconfigure ZooKeeper nodes in the region where they are down. For example, reconfigure the ZooKeeper cluster in DC-2 so that the 3 ZooKeeper nodes in this region are all voters and remove the server.# in the zoo.cfg of the ZooKeepers from DC-1 region.
    a. In the following example, zoo.cfg configures nodes for 2 regions where DC-1 uses us-ea hostnames denoting US-East region and DC-2 uses us-wo hostnames denoting US-West region. (NOTE: Only relevant configs are displayed)

    ```
    server.1=zk01ea.us-ea.4.apigee.com:2888:3888
    server.2=zk02ea.us-ea.4.apigee.com:2888:3888
    server.3=zk03ea.us-ea.4.apigee.com:2888:3888
    server.4=zk04wo.us-wo.4.apigee.com:2888:3888
    server.5=zk05wo.us-wo.4.apigee.com:2888:3888
    server.6=zk06wo.us-wo.4.apigee.com:2888:3888:observer
    ```

    In the above example, reconfigure the zoo.cfg as follows:

    ```
    server.1=zk04wo.us-wo.4.apigee.com:2888:3888
    server.2=zk05wo.us-wo.4.apigee.com:2888:3888
    server.3=zk06wo.us-wo.4.apigee.com:2888:3888
    ```

b. Using code with config, create a file /opt/apigee/customer/application/ZooKeeper.properties with the following:

```
conf_zoo_quorum=server.1=zk04wo.us-wo.4.apigee.com:2888:38
88\
        \nserver.2=zk05wo.us-wo.4.apigee.com:2888:3888\
        \nserver.3=zk06wo.us-wo.4.apigee.com:2888:3888\
```

In the above, the nodes from US-East are removed, and the US-West nodes get promoted to voters when the :observer annotation is removed.

2. Back up `/opt/apigee/apigee-ZooKeeper/conf/zoo.cfg` and old `/opt/apigee/customer/application/ZooKeeper.properties`.

   These files will be used to restore the defaults when the network connectivity is back up between data centers.

3. Restart the ZooKeeper nodes in the region where you reconfigured the ZooKeeper cluster.

4. Repeat the above configuration from step #1b through step# 3 on all ZooKeeper nodes in DC-2.

5. Validate the nodes are up with a leader:

```
> echo srvr | nc zk04wo.us-wo.4.apigee.com 2181
> echo srvr | nc zk05wo.us-wo.4.apigee.com 2181
> echo srvr | nc zk06wo.us-wo.4.apigee.com 2181
```

   The output of this command will contain a line that says "mode" followed by "leader" if it is the leader, or "follower" if it is a follower.

   When the network between data centers is reestablished, the ZooKeeper configurations changes can be reverted on the ZooKeeper nodes in DC-2.

Solution #3

1. If ZooKeeper node(s) in the cluster is not started, then restart it.

2. Check ZooKeeper logs to determine why the ZooKeeper node went down.

   ZooKeeper logs are available in the following directory:
   ```
   $ cd /opt/apigee/var/log/apigee-zookeeper
   $ ls -l
   total 188
   -rw-r--r--. 1 apigee apigee   2715 Jul 22 19:51
   apigee-zookeeper.log
   -rw-r--r--. 1 apigee apigee  10434 Jul 17 19:51 config.log
   -rw-r--r--. 1 apigee apigee 169640 Aug  1 19:51
   zookeeper.log
   ```

3. Contact Apigee Support and provide the ZooKeeper logs to troubleshoot the cause of any ZooKeeper node that may have been stopped.

ZooKeeper node not serving requests

A ZooKeeper node in the ensemble may become unhealthy and be unable to respond to client requests. This could be because:

1. The node was stopped without being restarted.

2. The node was rebooted without auto-start enabled.

3. System load on the node caused it to go down or become unhealthy.

Steps to Diagnose

1. Execute the following ZooKeeper health check commands on each of the ZooKeeper nodes and check the output:
   ```
   a. echo "ruok" | nc localhost 2181
   ```
   Note: Response "imok" is a successful response.

   Example output:
   ```
   $ echo "ruok" | nc localhost 2181
   imok
   ```

`b. echo srvr | nc localhost 2181`

Check the mode to determine if the ZooKeeper node is a leader or follower.

Example output for an all in one, single ZooKeeper node:

```
$ echo srvr | nc localhost 2181
ZooKeeper version: 3.4.5-1392090, built on 09/30/2012
17:52 GMT
Latency min/avg/max: 0/0/88
Received: 4206601
Sent: 4206624
Connections: 8
Outstanding: 0
Zxid: 0x745
Mode: standalone
Node count: 282
```

`c. echo mntr | nc localhost 2181`

This command lists the ZooKeeper variables which can be used to check the health of the ZooKeeper cluster.

Example output:

```
$ echo mntr | nc localhost 2181
zk_version 3.4.5-1392090, built on 09/30/2012 17:52
GMT
zk_avg_latency  0
zk_max_latency  88
zk_min_latency  0
zk_packets_received   4206750
zk_packets_sent 4206773
zk_num_alive_connections   8
zk_outstanding_requests    0
zk_server_state standalone
zk_znode_count  282
zk_watch_count  194
zk_ephemerals_count   1
zk_approximate_data_size   22960
```

```
zk_open_file_descriptor_count    34
zk_max_file_descriptor_count     4096
```

Note: Contact Apigee Support for assistance in interpreting the output.

```
d. echo stat | nc localhost 2181
```

This command lists statistics about performance and connected clients.

Example output:

```
$ echo stat | nc localhost 2181
ZooKeeper version: 3.4.5-1392090, built on 09/30/2012
17:52 GMT
Clients:

/10.128.0.8:54152[1](queued=0,recved=753379,sent=75338
5)

/10.128.0.8:53944[1](queued=0,recved=980269,sent=98027
8)

/10.128.0.8:54388[1](queued=0,recved=457094,sent=45709
4)

/10.128.0.8:54622[1](queued=0,recved=972938,sent=97293
8)

/10.128.0.8:54192[1](queued=0,recved=150843,sent=15084
3)

/10.128.0.8:44564[1](queued=0,recved=267332,sent=26733
3)
 /127.0.0.1:40820[0](queued=0,recved=1,sent=0)

/10.128.0.8:53960[1](queued=0,recved=150844,sent=15084
4)

Latency min/avg/max: 0/0/88
Received: 4206995
```

```
Sent: 4207018
Connections: 8
Outstanding: 0
Zxid: 0x745
Mode: standalone
Node count: 282
```

Note: Contact Apigee Support for assistance in interpreting the output.

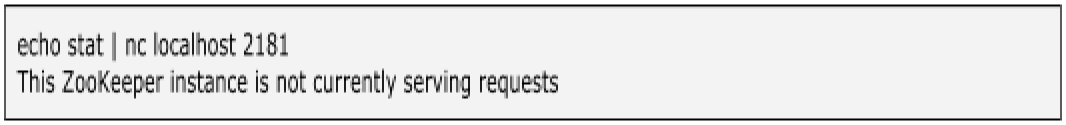
e. `echo cons | nc localhost 2181`
This command gives extended details on ZooKeeper connections.

Example output:

```
$ echo cons | nc localhost 2181
 /127.0.0.1:40864[0](queued=0,recved=1,sent=0)

/10.128.0.8:54152[1](queued=0,recved=753400,sent=75340
6,sid=0x15d521a96d40007,lop=PING,est=1500321588647,to=
40000,lcxid=0x972e9,lzxid=0x745,lresp=1502334173174,ll
at=0,minlat=0,avglat=0,maxlat=26)

/10.128.0.8:53944[1](queued=0,recved=980297,sent=98030
6,sid=0x15d521a96d40005,lop=PING,est=1500321544896,to=
40000,lcxid=0xce92a,lzxid=0x745,lresp=1502334176055,ll
at=0,minlat=0,avglat=0,maxlat=23)

/10.128.0.8:54388[1](queued=0,recved=457110,sent=45711
0,sid=0x15d521a96d4000a,lop=PING,est=1500321673852,to=
40000,lcxid=0x4dbe3,lzxid=0x745,lresp=1502334174245,ll
at=0,minlat=0,avglat=0,maxlat=22)

/10.128.0.8:54622[1](queued=0,recved=972967,sent=97296
7,sid=0x15d521a96d4000b,lop=PING,est=1500321890175,to=
40000,lcxid=0xccc9d,lzxid=0x745,lresp=1502334182417,ll
at=0,minlat=0,avglat=0,maxlat=88)

/10.128.0.8:54192[1](queued=0,recved=150848,sent=15084
8,sid=0x15d521a96d40008,lop=PING,est=1500321591985,to=
40000,lcxid=0x8,lzxid=0x745,lresp=1502334184475,llat=3
,minlat=0,avglat=0,maxlat=19)

/10.128.0.8:44564[1](queued=0,recved=267354,sent=26735
5,sid=0x15d521a96d4000d,lop=PING,est=1501606633426,to=
40000,lcxid=0x356e2,lzxid=0x745,lresp=1502334182315,ll
at=0,minlat=0,avglat=0,maxlat=35)

/10.128.0.8:53960[1](queued=0,recved=150848,sent=15084
8,sid=0x15d521a96d40006,lop=PING,est=1500321547138,to=
40000,lcxid=0x5,lzxid=0x745,lresp=1502334177036,llat=1
,minlat=0,avglat=0,maxlat=20)
```

Note: Contact [Apigee Support](#) for assistance in interpreting the output.

If any of the last 3 health check commands show the following message:



```
echo stat | nc localhost 2181
This ZooKeeper instance is not currently serving requests
```

Then it indicates that specific ZooKeeper node(s) is not serving requests.

2. Check the ZooKeeper logs on the specific node and try to locate any errors causing the ZooKeeper to be down. ZooKeeper logs are available in the following directory:

```
        $ cd /opt/apigee/var/log/apigee-zookeeper
        $ ls -l
        total 188
        -rw-r--r--. 1 apigee apigee   2715 Jul 22 19:51
        apigee-zookeeper.log
        -rw-r--r--. 1 apigee apigee  10434 Jul 17 19:51
config.log
        -rw-r--r--. 1 apigee apigee 169640 Aug  1 19:51
        zookeeper.log
```

Resolution

1. Restart all other ZooKeeper nodes in the cluster one by one.

2. Re-run the ZooKeeper health check commands on each node and see if you get the expected output.

Contact Apigee Support to troubleshoot the cause of system load if it persists or if restarts does not resolve the problem.

Unable to start ZooKeeper

Description

Unable to start the ZooKeeper process.

Error Messages

When you attempt to start the ZooKeeper process, the following error message is returned indicating that ZooKeeper could not be started.

```
+ apigee-service apigee-zookeeper status
apigee-service: apigee-zookeeper: Not running (DEAD)
apigee-all: Error: status failed on [apigee-zookeeper]
```

Causes

Here are the typical causes that can prevent ZooKeeper process from starting:

Cause
Misconfigured ZooKeeper MyId
ZooKeeper Port in Use
Incorrect process id in apigee-ZooKeeper.pid file
ZooKeeper Election Leader Failure

Misconfigured ZooKeeper MyId

The following sections provide an overview of the myid file and describe how to diagnose and resolve misconfiguration issues.

Overview of myid file

On each ZooKeeper node, there are two files:

1. The `/opt/apigee/apigee-zookeeper/conf/zoo.cfg` file which contains a list of IPs for all the ZooKeeper nodes in the cluster.

   For example, if the `/opt/apigee/apigee-zookeeper/conf/zoo.cfg` contains the IPs of 3 ZooKeeper nodes part of the cluster as follows:

   ```
   server.1=11.11.11.11:2888:3888
   server.2=22.22.22.22:2888:3888
   server.2=33.33.33.33:2888:3888
   ```

2. The `/opt/apigee/data/apigee-zookeeper/data/myid` file contains a single line of text which corresponds to the server number of that particular ZooKeeper node. The myid of server 1 would contain the text "1" and nothing else. The id must be unique within the ensemble and should have a value between 1 and 255.

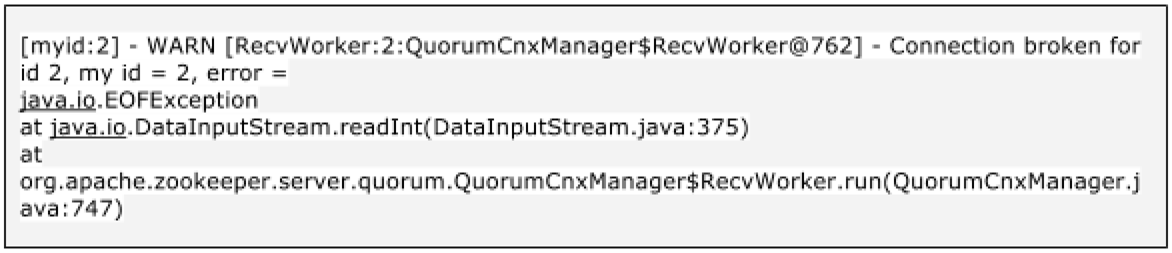
   For example, on ZooKeeper server.1, the `/opt/apigee/data/apigee-zookeeper/data/myid` file should just contain the text 1 as shown below:

   ```
   $ cat myid
   1
   ```

Steps to Diagnose

1. Check the ZooKeeper log `/opt/apigee/var/log/apigee-zookeeper/zookeeper.log` for errors.

2. If you see the WARN message similar to **"Connection broken for id #, my id = #",** as shown in the below figure, then the possible cause for this issue could be that the server # in the myid file is misconfigured or corrupted.



```
[myid:2] - WARN [RecvWorker:2:QuorumCnxManager$RecvWorker@762] - Connection broken for
id 2, my id = 2, error =
java.io.EOFException
at java.io.DataInputStream.readInt(DataInputStream.java:375)
at
org.apache.zookeeper.server.quorum.QuorumCnxManager$RecvWorker.run(QuorumCnxManager.j
ava:747)
```

3. Check the `/opt/apigee/apigee-zookeeper/conf/zoo.cfg` file and note down the server.# for the current ZooKeeper node.

4. Check the `/opt/apigee/data/apigee-zookeeper/data/myid` file and see if the text in this file matches the server.# noted in step #2.

5. If there is a mismatch, then you have identified the cause for ZooKeeper failing to start.

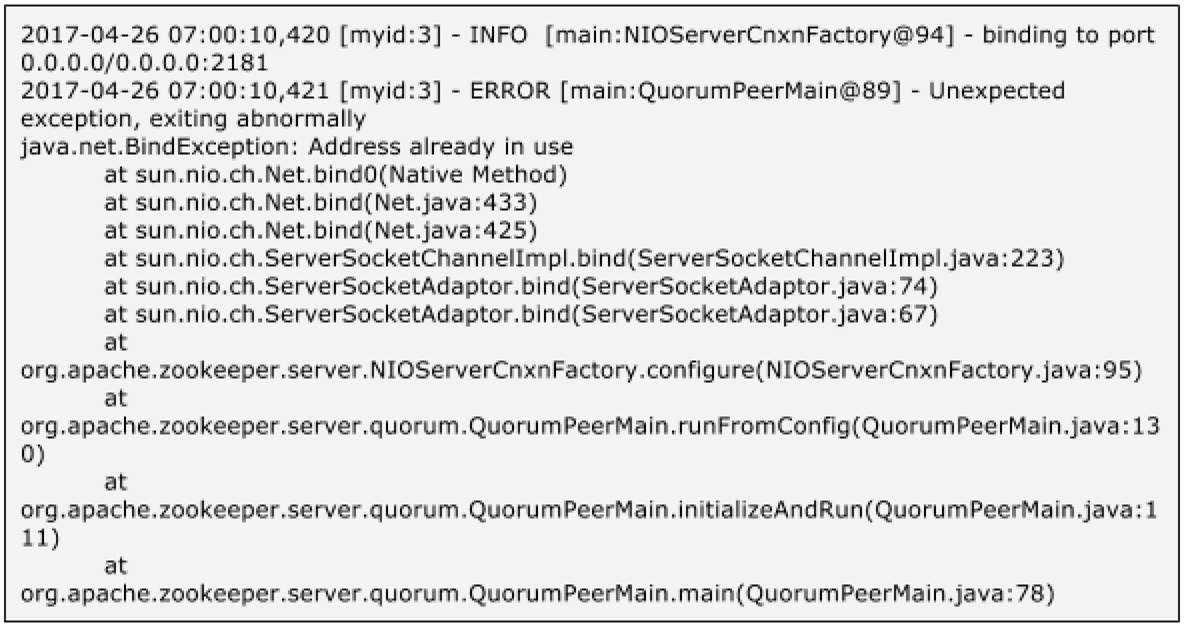
Resolution

If myid file is incorrectly configured, then edit the myid file and replace the value to a correct text representing the server.# parameter in the zoo.cfg.

ZooKeeper port in use

1. Check ZooKeeper log `/opt/apigee/var/log/apigee-zookeeper/zookeeper.log` for errors.

2. If you notice the exception **java.net.BindException: Address already in use** while binding to the port #2181, as shown in the figure below**,** it indicates that the ZooKeeper port 2181 is being used by another process. Hence, the ZooKeeper could not be started.



```
2017-04-26 07:00:10,420 [myid:3] - INFO  [main:NIOServerCnxnFactory@94] - binding to port
0.0.0.0/0.0.0.0:2181
2017-04-26 07:00:10,421 [myid:3] - ERROR [main:QuorumPeerMain@89] - Unexpected
exception, exiting abnormally
java.net.BindException: Address already in use
        at sun.nio.ch.Net.bind0(Native Method)
        at sun.nio.ch.Net.bind(Net.java:433)
        at sun.nio.ch.Net.bind(Net.java:425)
        at sun.nio.ch.ServerSocketChannelImpl.bind(ServerSocketChannelImpl.java:223)
        at sun.nio.ch.ServerSocketAdaptor.bind(ServerSocketAdaptor.java:74)
        at sun.nio.ch.ServerSocketAdaptor.bind(ServerSocketAdaptor.java:67)
        at
org.apache.zookeeper.server.NIOServerCnxnFactory.configure(NIOServerCnxnFactory.java:95)
        at
org.apache.zookeeper.server.quorum.QuorumPeerMain.runFromConfig(QuorumPeerMain.java:13
0)
        at
org.apache.zookeeper.server.quorum.QuorumPeerMain.initializeAndRun(QuorumPeerMain.java:1
11)
        at
org.apache.zookeeper.server.quorum.QuorumPeerMain.main(QuorumPeerMain.java:78)
```

3. Use the below netstat command to confirm that the ZooKeeper port 2181 is indeed being used by another process:

```
netstat -an | grep 2181
```

Resolution

If the ZooKeeper port 2181 is still in use, then follow the below steps to address this issue:

1. Use the netstat command to find the process that is holding onto port 2181. Kill the process that is using the ZooKeeper port 2181:

```
# netstat -antp | grep 2181
tcp         0      0 0.0.0.0:2181           0.0.0.0:*
LISTEN      28016/java <defunct>
# kill -9 28016
```

2. Clean up pid and lock files if they exist:

```
/opt/apigee/var/run/apigee-zookeeper/apigee-zookeeper.pid
```

```
/opt/apigee/var/run/apigee-zookeeper/apigee-zookeeper.lock
```

3. Restart the ZooKeeper:

   ```
   /opt/apigee/apigee-service/bin/apigee-service
   apigee-zookeeper restart
   ```

Incorrect process id in apigee-zookeeper.pid file

When you attempt to stop/restart the ZooKeeper, it may fail because the `apigee-zookeeper.pid` contains older/incorrect pid and not that of the currently running ZooKeeper process. This may happen if the ZooKeeper process terminated unexpectedly or abruptly for some reason and the `apigee-zookeeper.pid` file was not deleted.

Steps to Diagnose

1. Get the process id of the currently running ZooKeeper process by running the ps command:

   ```
   ps -ef | grep zookeeper
   ```

2. Check if the `/opt/apigee/var/run/apigee-ZooKeeper/apigee-zookeeper.pid` file exists. If it exists, then note down the process id written into this file.

3. Compare the process ids taken from step #1 and #2. If they are different, then the cause for this issue is having the incorrect process id in the `apigee-zookeeper.pid` file.

Resolution

1. Edit the `apigee-zookeeper.pid` file and replace the incorrect process id with the correct process id obtained from ps command (step #1 above).

2. Restart the ZooKeeper:

```
/opt/apigee/apigee-service/bin/apigee-service
apigee-zookeeper restart
```

ZooKeeper Leader Election Failure

Steps to Diagnose

1. Check the ZooKeeper log `/opt/apigee/var/log/apigee-zookeeper/zookeeper.log` for errors.

2. Check if there were any configuration changes which may cause ZooKeeper election of the leader to fail.

3. Check the `/opt/apigee/apigee-zookeeper/conf/zoo.cfg` and make sure all ZooKeepers in the cluster have the proper number and IP addresses for the server.# parameter. Also note that for the leader election to succeed there needs to be at least 3 voters minimum and the number of voters should be odd numbered. If there are too little voters, like only 2 voters, it cannot come to a quorum to decide a leader among only 2 voters.

Resolution

Typically, ZooKeeper election failure is caused by misconfigured myid**.** Use the resolution in Misconfigured ZooKeeper MyId to address the election failure.

If the problem persists and further diagnosis is needed, contact Apigee Support.

ZooKeeper Data Issues

Description

Data related issues, commonly referred to as wiring issues, can manifest as one of the following symptoms:

- ➔ Failures during startup of Management servers
- ➔ Deployment failures
- ➔ Datastore errors on the UI
- ➔ Cross data center connectivity issues among Message Processors and Management servers
- ➔ Analytics showing no data

These issues are not related to the ZooKeeper infrastructure, but related to invalid data that is available in the ZooKeeper tree.

Causes

The typical causes for this issue are:

1. Nodes wired to the wrong region or pod name during installation due to mistakes in the silent installation file.

2. A failed installation of a component creates duplicate registrations when you reinstall the component multiple times. In this case, cleanup is required to remove the registration with the wrong UUIDs.

Steps to Diagnose

Gather the following data:

1. Topology diagram, with hostname and ip addresses of each node and what Apigee component exist on the node. A mapping like the following using the profile of the Apigee install would be most helpful

   ```
   DC-1
   DS: ip1 hostname
   DS: ip2 hostname
   DS: ip3 hostname
   ```

```
MS: ip4 hostname
RMP: ip5 hostname
RMP: ip6 hostname
SAX: ip7 hostname

DC-2
DS: ip8 hostname
DS: ip9 hostname
DS: ip10 hostname
MS: ip11 hostname
RMP: ip12 hostname
RMP: ip13 hostname
SAX: ip14 hostname
```

2. Generate ZooKeeper tree output to check the wiring:

```
/opt/apigee/apigee-ZooKeeper/contrib/zk-tree.sh >
zk-tree-output.txt
```

3. For ease of verification of the data in ZooKeeper tree, run the following management API calls to get the list of server UUIDs in each of data centers:

Gateway Servers

```
curl -u sysadmin@email.com
"http://<management-server-host>:8080/v1/servers?pod=gatewa
y&region=<region-name>"
```

Central Servers

```
curl -u sysadmin@email.com
"http://<management-server-host>:8080/v1/servers?pod=centra
l&region=<region-name>"
```

Analytics Servers

```
curl -u sysadmin@email.com
"http://<management-server-host>:8080/v1/servers?pod=analyt
ics&region=<region-name>"
```

4. Check the UUIDs on each component and make sure they match what you see in the ZooKeeper tree:

   Router
   ```
   curl 0:8081/v1/servers/self/uuid
   ```

   Message Processor
   ```
   curl 0:8082/v1/servers/self/uuid
   ```

   Qpid Agent
   ```
   curl 0:8083/v1/servers/self/uuid
   ```

   Postgres Agent
   ```
   curl 0:8084/v1/servers/self/uuid
   ```

5. Use the UUID data to search the ZooKeeper tree output generated in step #2 to validate the components wiring and to remove any duplicate registrations for the component that have the wrong UUIDs.

6. Use the management API calls listed here for correcting datastore registration. The components like Routers, Message Processors, Postgres, and Qpid self register to ZooKeeper during startup time.

Resolution

ZooKeeper data related problems need to be addressed on a case-by-case basis. Data in ZooKeeper is based on Apigee Edge topologies and vary by each use case. If one of the problem symptoms is being experienced, collect the data as explained in the previous section, “Steps to Diagnose,” and contact Apigee Support .

PART 2 - Commands Quick Reference

Components Command Reference

This section provides a quick reference summarizing the various commands that you can use to start, stop, and restart the components, get the version and status information about the components, and perform a backup of the components.

apigee-all

You can use the **apigee-all** tool to start/stop/restart all the components, get the version and status information of all the components on a system.

```
/opt/apigee/apigee-service/bin/apigee-all <command>
```

Here's the table that lists the various commands that can be used with apigee-tool:

apigee-all command reference table

Command Description	Command
View version of all the components	`/opt/apigee/apigee-service/bin/apigee-all version`
View status of all components in a machine	`/opt/apigee/apigee-service/bin/apigee-all status`
Start all components in a machine	`/opt/apigee/apigee-service/bin/apigee-all start`
Stop all components in a machine	`/opt/apigee/apigee-service/bin/apigee-all stop`
Restart all components in a machine	`/opt/apigee/apigee-service/bin/apigee-all restart`

References

Starting, Stopping, Restarting, and Checking the Status of Apigee Edge

apigee-service

You can use the **apigee-service** tool to start/stop/restart, get the version and status information and perform backup of an individual component.

```
/opt/apigee/apigee-service/bin/apigee-service <component-name>
<command>
```

Here's the table that lists the names of all the Edge components:

component names reference table

Component	Component Name
Management Server	`edge-management-server`
Message Processor	`edge-message-processor`
Router	`edge-router`
UI	`edge-ui`
Cassandra	`apigee-cassandra`
OpenLDAP	`apigee-openldap`
Qpidd	`apigee-qpidd`
Qpid Server	`edge-qpid-server`
PostgreSQL database	`apigee-postgresql`
Postgres Server	`edge-postgres-server`
ZooKeeper	`apigee-zookeeper`

Here's the table that lists the various commands that can be used with apigee-tool:

apigee-service command reference table

Command Description	Command

View status of the specified component	`/opt/apigee/apigee-service/bin/apigee-service <component-name> status`
	
	Example
	To view the status of Message Processor:
	
	`/opt/apigee/apigee-service/bin/apigee-service edge-message-processor status`

Start the specified component	`/opt/apigee/apigee-service/bin/apigee-service <component-name> start`
	
	Example
	To start Message Processor:
	
	`/opt/apigee/apigee-service/bin/apigee-service edge-message-processor start`

Stop the specified component	`/<inst_root>/apigee/apigee-service/bin/apigee-service <component-name> stop`
	
	Example
	To stop Message Processor:
	
	`/opt/apigee/apigee-service/bin/apigee-service edge-message-processor stop`

Restart the specified component	`/opt/apigee/apigee-service/bin/apigee-service <component-name> restart`
	
	Example
	To restart Message Processor:
	
	`/opt/apigee/apigee-service/bin/apigee-service edge-message-processor restart`

Back up the specified component	`/opt/apigee/apigee-service/bin/apigee-service <component-name> backup`
	
	Example
	To backup Cassandra:
	
	`/opt/apigee/apigee-service/bin/apigee-service apigee-cassandra backup`

References

Backup and Restore

Postgres Commands Reference

PostgreSQL (psql) utility

The psql utility is the command-line interface to PostgreSQL. It enables you to query the Postgres database and get the results.

Syntax

```
psql -h <path to apigee-postgresql> -U <user> <database>
```

Example

```
$ psql -h /opt/apigee/var/run/apigee-postgresql -U apigee apigee
psql (9.3.10)
Type "help" for help.
```

Verify existence of your org-env tables

The Describe Table (dt) command can be used to check if your organization and environment level tables exist in the database.

Syntax

```
\dt analytics.*;
```

Example

```
apigee=# \dt analytics.*;
                     List of relations
  Schema   |              Name               | Type  | Owner
-----------+---------------------------------+-------+--------
 analytics | VALIDATE.test.agg_api           | table | apigee
 analytics | VALIDATE.test.agg_app           | table | apigee
 analytics | VALIDATE.test.agg_uri_pattern | table | apigee
 analytics | VALIDATE.test.fact              | table | apigee
 analytics | VALIDATE.test.fact_1            | table | apigee
 analytics | VALIDATE.test.fact_2            | table | apigee
 analytics | _analytics_version              | table | apigee
 analytics | agg_api_rollup_30min          | table | apigee
 analytics | agg_app_rollup_30min          | table | apigee
 analytics | agg_cache                     | table | apigee
 analytics | agg_cache_rollup_30min        | table | apigee
 analytics | agg_geo                       | table | apigee
 analytics | agg_geo_rollup_30min          | table | apigee
 analytics | agg_percentile                | table | apigee
 analytics | agg_target                    | table | apigee
```

List the columns in fact table

Command to describe the fact table. Use this command to check if columns exist and are correct.

Syntax

```
\d analytics."org.env.fact";
```

Note: replace `org` and `env` with the actual organization and environment name.

Example

```
apigee=# \d analytics."gsc.gcp.fact";
                      Table "analytics.gsc.gcp.fact"
             Column               |             Type              |
Modifiers
----------------------------------+-----------------------------+-
----------
 organization                     | text                          |
 environment                      | text                          |
 apiproxy                         | text                          |
 request_uri                      | text                          |
 proxy                            | text                          |
 proxy_basepath                   | text                          |
 request_verb                     | text                          |
 request_size                     | bigint                        |
 response_status_code             | integer                       |
 is_error                         | integer                       |
 client_received_start_timestamp  | timestamp without time zone  |
 client_received_end_timestamp    | timestamp without time zone  |
 target_sent_start_timestamp      | timestamp without time zone  |
 target_sent_end_timestamp       | timestamp without time zone |
 target_received_start_timestamp | timestamp without time zone |
 target_received_end_timestamp   | timestamp without time zone |
 client_sent_start_timestamp     | timestamp without time zone |
 client_sent_end_timestamp       | timestamp without time zone |
 client_ip                       | text                        |
 access_token                    | text                        |
 client_id                       | text                        |
 developer                       | text                        |
 developer_app                   | text                        |
 api_product                     | text                        |
 flow_resource                   | text                        |
 target                          | text                        |
 target_url                      | text                        |
 target_host                     | text                        |
 apiproxy_revision               | text                        |
 proxy_pathsuffix                | text                        |
 proxy_client_ip                 | text                        |
 target_basepath                 | text                        |
 client_host                     | text                        |
 target_ip                       | text                        |
 request_path                    | text                        |
 response_size                   | integer                     |
 developer_email                 | text                        |
 virtual_host                    | text                        |
 gateway_flow_id                 | text                        |
 sla                             | boolean                     |
 message_count                   | integer                     |
 total_response_time             | real                        |
 request_processing_latency      | real                        |
 response_processing_latency     | real                        |
 target_response_time            | real                        |
 cache_hit                       | integer                     |
 x_forwarded_for_ip              | text                        |
 useragent                       | text                        |
 target_response_code            | integer                     |
 groupid                         | integer                     |
 target_error                    | integer                     |
 policy_error                    | integer                     |
 ax_ua_device_category                | text                        |
 ax_ua_agent_type                     | text                        |
 ax_ua_agent_family                   | text                        |
 ax_ua_agent_version                  | text                        |
 ax_ua_os_family                      | text                        |
 ax_ua_os_version                     | text                        |
 ax_geo_city                          | text                        |
 ax_geo_country                       | text                        |
 ax_geo_continent                     | text                        |
 ax_geo_timezone                      | text                        |
 ax_session_id                        | text                        |
 ax_market_id                         | text                        |
 ax_partner_id                        | text                        |
 ax_channel_id                        | text                        |
 ax_business_unit_id                  | text                        |
 ax_traffic_referral_id               | text                        |
 ax_device_id                         | text                        |
 ax_client_org_name                   | text                        |
 ax_client_app_name                   | text                        |
 ax_client_request_id                 | text                        |
 ax_created_time                      | timestamp without time zone |
 ax_hour_of_day                       | text                        |
 ax_day_of_week                       | text                        |
 ax_week_of_month                     | text                        |
 ax_month_of_year                     | text                        |
 gateway_source                       | text                        |
 ax_cache_executed                    | integer                     |
 ax_cache_name                        | text                        |
 ax_cache_key                         | text                        |
 ax_cache_source                      | text                        |
 ax_cache_l1_count                    | bigint                      |
 ax_edge_execution_fault_code         | text                        |
 ax_edge_is_apigee_fault              | integer                     |
 ax_dn_region                         | text                        |
 ax_execution_fault_policy_name       | text                        |
 ax_execution_fault_flow_name         | text                        |
 ax_execution_fault_flow_state        | text                        |
 ax_mp_host                           | text                        |
 ax_router_host                       | text                        |
 ax_geo_region                        | text                        |
 ax_isp                               | text                        |
 ax_true_client_ip                    | text                        |
Indexes:
    "gscgcpfactclrecsts" btree (client_received_start_timestamp)
Number of child tables: 75 (Use \d+ to list them.)
```

Get the Database Table Size

Use the SELECT command to get the size of the database tables. This is typically helpful in troubleshooting disk space issues on Postgres database.

Syntax

```
SELECT  relname as
"Table",pg_size_pretty(pg_total_relation_size(relid)) As "Size",
pg_size_pretty(pg_total_relation_size(relid) -
pg_relation_size(relid)) as "External Size"
  FROM pg_catalog.pg_statio_user_tables ORDER BY
pg_total_relation_size(relid) DESC;
```

Example

```
apigee=# SELECT  relname as
"Table",pg_size_pretty(pg_total_relation_size(relid)) As "Size",
apigee-# pg_size_pretty(pg_total_relation_size(relid) -
pg_relation_size(relid)) as "External Size"
apigee-#   FROM pg_catalog.pg_statio_user_tables ORDER BY
pg_total_relation_size(relid) DESC;
             Table               |    Size    | External Size
---------------------------------+------------+---------------
 VALIDATE.test.agg_app           | 40 kB      | 40 kB
 api_pattern                     | 40 kB      | 40 kB
 gsc.gcp.agg_app                 | 40 kB      | 40 kB
 gsc.gcp.agg_uri_pattern         | 40 kB      | 40 kB
 VALIDATE.test.agg_api           | 40 kB      | 40 kB
 gsc.gcp.agg_api                 | 40 kB      | 40 kB
 VALIDATE.test.agg_uri_pattern | 40 kB      | 40 kB
 VALIDATE.test.fact_1            | 32 kB      | 24 kB
 gsc.gcp.fact_36                 | 16 kB      | 16 kB
 gsc.gcp.fact_52                 | 16 kB      | 16 kB
 gsc.gcp.fact_29                 | 16 kB      | 16 kB
 agg_cache_rollup_30min          | 16 kB      | 16 kB
```

Get Latest Timestamp In Fact Table

Check to see date and time in UTC of the latest analytics data that was inserted into postgres from Qpid. This is useful in checking for problems concerning Qpid latencies. Normal case is the date/time matches as close to current time if there is current traffic being generated.

Run the command a few times back to back after a few seconds to see if the date/timestamp increments, which indicate that data is being pushed to Postgres. The date/time shows how far behind the Qpid server is in pushing the data.

Note: Replace `org` and `env` with the actual organization and environment name.

Syntax

```
SELECT max(client_received_start_timestamp) from
analytics."org.env.fact";
```

Example

```
apigee=# SELECT max(client_received_start_timestamp) from
analytics."gsc.gcp.fact";
 max
-----
2017-07-31 18:39:30.09
(1 row)
```

Get the Oldest and Latest Timestamp in Fact Table

Use this command to determine the duration the analytics data has been stored in the fact table.

Syntax

```
SELECT min(client_received_start_timestamp),
max(client_received_start_timestamp) from
analytics."org.env.fact";
```

Example

```
SELECT min(client_received_start_timestamp),
max(client_received_start_timestamp) from
analytics."myorg.test.fact";
min | max
-------------------------+------------------------
2017-04-18 00:02:38.179 | 2017-07-21 21:57:22.759
(1 row)
```

The above output shows that the analytics data has been stored since Apr 18 till Jul 21.

Get details about SQL queries running in Postgres Database

Get the details about the current activity in Postgres database and display which client is making the query, what query is being run, when the query was started, what state the query is in, if the query is waiting on a lock, and what is the pid of the process. This information is helpful for checking for long running queries and what is taking up the most processing time for postgres for performance tuning activity.

Syntax

```
SELECT client_addr,query,query_start,state,waiting,pid FROM
pg_stat_activity WHERE datname='apigee' AND NOT (state='idle' OR
pid=pg_backend_pid()) ;
```

Example

```
client_addr |  query     | query_start       | state   | waiting |
pid
------------+-----------+-------------------+--------+---------+-
------
 10.16.35.50 | insert into analytics.agg_geo ( org, env,
apiproxy, api_product, ax_geo_city, ax_geo_country,
ax_geo_continent, ax_geo_timezone, timestamp, sum_error_count,
sum_message_count
, sum_total_response_time, max_total_response_time,
min_total_response_time, sum_cache_hit, sum_data_exchange_size,
max_data_exchange_size, min_data_exchange_size,
sum_error_count_3xx, sum_
error_count_4xx, sum_error_count_5xx, sum_target_response_time,
max_target_response_time, min_target_response_time,
sum_request_size, max_request_size, min_request_size,
sum_response_size,
max_response_size, min_response_size, sum_target_error_count_3xx,
sum_target_error_count_4xx, sum_target_error_count_5xx,
sum_request_processing_latency, max_request_processing_latency,
min
_request_processing_latency, sum_response_processing_latency,
max_response_processing_latency, min_response_processing_latency)
Select 'gsc','gcp',apiproxy,api_product,ax_geo_city,ax
_geo_country,ax_geo_continent,ax_geo_timezone,
date_trunc('minute', client_received_start_tim | 2017-07-01
23:54:12.875845+00 | active | f       | 31689
 10.16.35.50 | insert into analytics.agg_percentile ( org, env,
apiproxy, timestamp, tp50_total_response_time,
tp95_total_response_time, tp99_total_response_time,
tp50_target_response_time,
 tp95_target_response_time, tp99_target_response_time,
tp50_request_processing_latency, tp95_request_processing_latency,
tp99_request_processing_latency,
tp50_response_processing_latency, t
p95_response_processing_latency,
tp99_response_processing_latency)select organization,
environment, apiproxy, time_unit, max(tp50) as
tp50_total_resp_time, max(tp95) as tp95_total_response_
time, max(tp99) as tp99_total_response_time ,max(tp50_target) as
tp50_target_resp_time,max(tp95_target) as
tp95_target_resp_time,max(tp99_target) as tp99_target_resp_time
,max(tp50_request_
processing_latency) as
tp50_request_processing_latency,max(tp95_request_processing_laten
cy) as
tp95_request_processing_latency,max(tp99_request_processing_laten
cy) as tp99_request_processin
g_latency , max(tp50_response_processing_latency) as
tp50_response_processing_latency,max(tp9 | 2017-07-01
23:54:13.379458+00 | active | f       | 31690
 10.16.35.50 | insert into analytics.agg_timeofday ( org, env,
apiproxy, api_product, ax_hour_of_day, ax_day_of_week,
ax_week_of_month, ax_month_of_year, timestamp, sum_error_count,
sum_mes
sage_count, sum_total_response_time, max_total_response_time,
min_total_response_time, sum_cache_hit, sum_error_count_3xx,
sum_error_count_4xx, sum_error_count_5xx,
sum_target_error_count_3
xx, sum_target_error_count_4xx, sum_target_error_count_5xx,
sum_target_response_time, max_target_response_time,
min_target_response_time, sum_request_size, max_request_size,
min_request_siz
e, sum_response_size, max_response_size, min_response_size,
sum_target_response_size, max_target_response_size,
min_target_response_size, sum_request_processing_latency,
min_request_process
ing_latency, max_request_processing_latency,
sum_response_processing_latency, min_response_processing_latency,
max_response_processing_latency) Select
'gsc','gcp',apiproxy,api_produc
t,ax_hour_of_day,ax_day_of_week,ax_week_of_month,ax_month_of_year
, date_trunc('minute', clien | 2017-07-01 23:54:13.422099+00 |
active | f        | 31691
(3 rows)
```

The above response shows aggregation jobs that are run on regular intervals triggered from the Apigee Postgres agent.

Get Replication Time Lag on Postgres Standby

Get the lag time for data replication on Postgres standby machine. Ideally the lag time should be zero to a few seconds. In some cases, the lag time may increase to five or ten minutes, but eventually catch up with the Postgres Master. If the lag time continues to increase without catching up to Postgres Master, there is likely an issue with replication.

Syntax

```
SELECT now() - pg_last_xact_replay_timestamp() AS time_lag;
```

Example

```
apigee=# SELECT now() - pg_last_xact_replay_timestamp() AS
time_lag;
time_lag
-------------------------
10 days 22:59:19.852748
(1 row)
```

Interpreting the Output

The output shows the lag time on the Postgres standby is little over 10 days. If this lag continues to increase with time, then we may have to rebuild the Postgres standby.

Cassandra Commands Reference

In the course of normal Apigee troubleshooting, particularly for data-related issues, it might be necessary to look directly at Cassandra. These commands should help.

Cassandra Query Language command-line (cqlsh) utility

The **cqlsh** utility is a python-based command line client that is used for executing Cassandra Query Language (CQL) commands. This utility is part of the Apache Cassandra™ installation. The cqlsh script and batch file can be used to start the cqlsh utility on Linux and Windows operating systems respectively.

See the Cassandra documentation for more information.

Syntax

```
/opt/apigee/apigee-cassandra-client/bin/cqlsh <PRIVATE_IP> 9042
```

You should see the cqlsh> prompt after you connect. Enter the Cassandra commands at that prompt.

Example

```
$ /opt/apigee/apigee-cassandra-client/bin/cqlsh 10.150.0.3 9042
Connected to Apigee at 10.150.0.3:9042.
[cqlsh 5.0.1 | Cassandra 2.1.16 | CQL spec 3.2.1 | Native
protocol v3]
Use HELP for help.
cqlsh>
```

Get information about all keyspaces in Cassandra datastore

Gets the information about all keyspaces in the Cassandra datastore and confirm C* initialization. If you are doing any type of performance analysis, this may aid in diagnosis.

Syntax

```
SELECT * from system.schema_keyspaces ;
```

Example

The preceding query displays information about all keyspaces:

```
keyspace_name            | durable_writes | strategy_class
|
strategy_options-------------------------+----------------+-------
-----------------------------------------------+-----------------
------------------
```

Get Information about OAuth tokens

Gets the information about OAuth Tokens that are stored in the table **“oauth_20_access_tokens”** of **“kms”** keyspace. This may be helpful for diagnosing access issues for a user with a valid token, or for auditing access by a specific token.

Syntax

```
SELECT * FROM kms.oauth_20_access_tokens limit 10;
```

Example

The preceding query fetches all the oauth tokens created during a specific period for an organization.

```
SELECT * FROM kms.oauth_20_access_tokens where
organization_name='<ORG>' and created_at > xxxx and created_at <
yyyy ALLOW FILTERING;

 key | app_end_user | app_id | attributes | client_id |
client_secret | created_at | created_by | developer_id |
expires_at | grant_type | isTokensHashed | issued_at |
lastmodified_at | lastmodified_by | organization_name |
redirect_uri | refresh_count | refresh_token |
refresh_token_expires_at | refresh_token_issued_at |
refresh_token_status | scope | status | token_secret
-----+--------------+--------+------------+-----------+----------
-----+------------+------------+--------------+------------+-----
-------+----------------+-----------+-----------------+----------
-------+-------------------+--------------+---------------+------
---------+--------------------------+-------------------------+--
--------------------+-------+--------+--------------
```

Get Information about Developer Apps

Gets the information about developers and associated Developer Apps that are stored in the table **“developers”** of **“devconnect”** keyspace. This is helpful information if you are looking into missing/orphaned developer apps.

Syntax

```
SELECT apps from devconnect.developers where email =
'<EMAIL_ADDRESS>';
```

Example

The preceding query displays information about all developer apps:

```
 apps
--------------------------
 ["AppName"]
```

Get Information about Apigee Cache

Gets the information about Apigee Cache data that is stored in the table **“cache_entries”** of **“cache”** keyspace. This may be helpful in troubleshooting issues with cache misses or replication among Cassandra nodes.

Syntax

```
SELECT * from cache.cache_entries where cache_name =
'<CACHE_NAME>';
```

Example

The preceding query fetches the details of the given cache.

```
 key | added_at | cache_name | cache_value | expires_in |
is_compressed | uncompressed_size
-----+----------+------------+-------------+------------+--------
-------+-------------------
```

Cassandra nodetool Utility

The nodetool utility is a command-line interface for monitoring Cassandra and performing routine database operations. It provides insights about the overall health of the Cassandra nodes, and is used for cluster management. See About the nodetool utility for more information.

Syntax

```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool [options]
command [args]
```

Example

```
/opt/apigee/apigee-cassandra/bin/nodetool -h0 ring
```

Check Ring Status

Provides node status and information about the Cassandra ring. This command returns information about the load balance and if any Cassandra nodes are down.

Syntax

```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool -h0 ring
```

Example

```
Datacenter: dc-1
==========
Address      Rack          Status State    Load               Owns
Token

127.0.0.1   ra-1          Up      Normal   185.75 KB          ?
0
```

Check compaction status

Provides statistics about a compaction. If there are any performance degradation at the Cassandra layer, this would be good information to know.

Syntax
```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool -h0
compactionstats
```

Example
```
 pending tasks: 5
          compaction type        keyspace         table
completed          total      unit  progress
               Compaction       Keyspace1      Standard1
282310680        302170540     bytes    93.43%
               Compaction       Keyspace1      Standard1
58457931       307520780     bytes    19.01%
Active compaction remaining time :   0h00m16s
```

Check Gossip info

Provides the gossip information for the cluster. Gossip is how Cassandra nodes talk to one another. This information is useful if there are any replication issues.

Syntax
```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool -h0 gossipinfo
```

Example
```
/10.150.0.3
  generation:1496940478
  heartbeat:14924509
  STATUS:18:NORMAL,0
  LOAD:14924353:190207.0
  SCHEMA:1173:6e3380fb-3cc9-3e97-9565-997cdb482e06
  DC:23:dc-1
  RACK:25:ra-1
  RELEASE_VERSION:4:2.1.16
  RPC_ADDRESS:3:10.150.0.3
  SEVERITY:14924511:0.0
  NET_VERSION:1:8
  HOST_ID:2:2b1dd105-3a43-4fb9-adb1-ff32b51d5a18
  TOKENS:17:<hidden>
```

Check reads/writes/drops

Provides usage statistics of thread pools. Cassandra uses thread pools for client-to-server and server-to-server communications. If there are any performance issues, be on the lookout for any Blocked thread pools here.

Syntax

```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool -h0 tpstats
```

Example

```
Pool Name                    Active   Pending      Completed
Blocked  All time blocked
MutationStage                     0         0            579
0                 0
ReadStage                         0         0           2397
0                 0
RequestResponseStage              0         0              0
0                 0
ReadRepairStage                   0         0              0
0                 0
CounterMutationStage              0         0              0
0                 0
MiscStage                         0         0              0
0                 0
HintedHandoff                     0         0              0
0                 0
GossipStage                       0         0              0
0                 0
CacheCleanupExecutor              0         0              0
0                 0
InternalResponseStage             0         0              2
0                 0
CommitLogArchiver                 0         0              0
0                 0
CompactionExecutor                0         0        8040778
0                 0
ValidationExecutor                0         0              0
0                 0
```

```
MigrationStage                                      0          0            114
0                 0
AntiEntropyStage                                    0          0              0
0                 0
PendingRangeCalculator                              0          0              1
0                 0
Sampler                                             0          0              0
0                 0
MemtableFlushWriter                                 0          0           2784
0                 0
MemtablePostFlush                                   0          0          85256
0                 0
MemtableReclaimMemory                               0          0           2784
0                 0
Native-Transport-Requests                           0          0            926
0                 0

Message type           Dropped
READ                         0
RANGE_SLICE                  0
_TRACE                       0
MUTATION                     0
COUNTER_MUTATION             0
BINARY                       0
REQUEST_RESPONSE             0
PAGED_RANGE                  0
READ_REPAIR                  0
```

Display statistics for every keyspace and column family

Provides statistics about column families. If you identify any Cassandra performance issues in a certain columnfamily, this information should be checked.

Syntax

```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool -h0 cfstats
```

Example

```
Keyspace: cache
      Read Count: 2
      Read Latency: 0.1305 ms.
      Write Count: 3
      Write Latency: 0.14733333333333334 ms.
      Pending Flushes: 0
            Table (index):
cache_entries.cache_entries_cache_name_idx
… (this is very verbose output which is too much for this guide)
...
```

Status of the thrift server

Provides the status of the Thrift server. Thrift is the client API used by Apigee. If there are any client-to-server issues like timeouts in connecting, if would be good to ensure this is running.

Syntax

```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool -h0
statusthrift
```

Example

```
running
```

Show Network Statistics

Provides network information about the host. If there are any repairs hanging, this is the utility to check; for example, if a node becomes unresponsive during a repair.

Syntax

```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool -h0 netstats
```

Example

```
 Mode: NORMAL
Not sending any streams.
Read Repair Statistics:
Attempted: 230
Mismatch (Blocking): 0
Mismatch (Background): 0
Pool Name                    Active   Pending      Completed
Dropped
Commands                        n/a         0              2
0
Responses                       n/a         0              2
n/a
```

Repair tables

Repairs one or more tables. Repair might be needed if a compaction was interrupted, or if there are any performance-related issues detected on a single node. Also, the -pr option (recommended by Apigee) only repairs the token range on the single node on which this command is run. So, it must be run individually on all nodes. Note that this process may take some time, so it is ***highly recommended that this should not be done during peak API traffic hours***.

Syntax

```
/<inst_root>/apigee/apigee-cassandra/bin/nodetool -h0 -pr repair
<KEYSPACE>
```

Example

```
Starting repair command #1, repairing 1 ranges for keyspace
system_traces (parallelism=SEQUENTIAL, full=true)
Repair command #1 finished
```

ZooKeeper Utilities

This section provides information about some of the ZooKeeper utilities and various commands that can be used for retrieving, updating, or deleting information or while troubleshooting any problems with ZooKeeper.

ZooKeeper Command Line Interface (zkCli) utility

The ZooKeeper Command Line Interface **zkCli** is used for interacting with the ZooKeeper database. It provides a list of commands that allow you to access and manipulate zNodes in ZooKeeper. It is very useful for debugging any ZooKeeper issues.

To start zkCli.sh commands:

```
/opt/apigee/apigee-zookeeper/bin/zkCli.sh
```

From the zkCli.sh prompt, you can then enter commands to get information about data stored in ZooKeeper.

List Data in a ZooKeeper Node

Lists and displays the data stored in the ZooKeeper node.

Syntax

```
ls /path
```

To list possible paths, get an output from the ZooKeeper Tree Utility.

Example

List the uuids of all the servers in the gateway pod in region DC-1:

```
[zk: localhost:2181(CONNECTED) 1] ls /regions
[dc-1]
[zk: localhost:2181(CONNECTED) 2] ls /regions/dc-1
[pods]
[zk: localhost:2181(CONNECTED) 3] ls /regions/dc-1/pods
[analytics, central, gateway]
```

```
[zk: localhost:2181(CONNECTED) 4] ls /regions/dc-1/pods/gateway
[types, servers, bindings]
[zk: localhost:2181(CONNECTED) 5] ls
/regions/dc-1/pods/gateway/servers
[b76e10cb-ef68-4196-bd47-2d7b724dab8d,
f76f17d9-2e23-47c8-ac04-a318972e3a53,
e386f7eb-47cd-4270-9196-ea185cf07f98]
```

Get Data from a ZooKeeper Node

Gets the data from a ZooKeeper Node.

Syntax

```
get /path
```

To list possible paths, get an output from the ZooKeeper Tree Utility.

Example

Check if the InternalIP has been set:

```
[zk: localhost:2181(CONNECTED) 21] get
/regions/dc-1/pods/gateway/servers/966e107a-d10f-4cc0-8e1e-3077da2
3f8e2/InternalIP
10.28.153.100
cZxid = 0x30000006e
ctime = Mon Apr 27 20:31:03 EDT 2015
mZxid = 0x1200000116
mtime = Fri Mar 11 18:05:15 EST 2016
pZxid = 0x30000006e
cversion = 0
dataVersion = 1
aclVersion = 0
ephemeralOwner = 0x0
dataLength = 13
numChildren = 0
```

ZooKeeper Tree (zkTree) Utility

The ZooKeeper Tree Utility **zkTree** allows you to generate the list of all the nodes and its children recursively in a ZooKeeper. This utility can be run on any ZooKeeper node in the cluster.

Syntax

```
/opt/apigee/apigee-zookeeper/contrib/zk-tree.sh
```

Example

Example of getting the ZooKeeper tree and redirecting the output to a file:

```
/opt/apigee/apigee-zookeeper/contrib/zk-tree.sh > tree.txt
```

The ZooKeeper tree output is raw text of the data stored in ZooKeeper. This data can be used for validation of Apigee Edge wiring and should be replicated across all ZooKeeper nodes in the cluster. Apigee Edge wiring refers details about the IP, hostname, and uuids for component (datastore, message-processor, routers, postgres, qpid, management server) that is deployed into the topology of the installation.

How to check if a ZooKeeper Node is leader?

In a ZooKeeper ensemble, a single ZooKeeper node which handles all writes is the *leader node*. All the write requests from the clients are forwarded to the leader node. The rest of the ZooKeeper servers are called *followers and read data from the ZooKeeper leader.*

Install
To determine if a ZooKeeper node is a leader or a follower, we will need to install the netcat utility. The netcat utility can be installed on the ZooKeeper node using the following command:

```
yum install nc
```

Syntax

```
nc hostname port
```

Example
Run the following command on each of the ZooKeeper nodes in the ZooKeeper ensemble to check if it is a leader or a follower.

```
echo srvr | nc localhost 2181
```

Example output for a leader

```
$ echo srvr | nc localhost 2181
ZooKeeper version: 3.4.5-1392090, built on 09/30/2012 17:52 GMT
Latency min/avg/max: 0/0/0
Received: 1
Sent: 0
Connections: 1
Outstanding: 0
Zxid: 0x50000000a
Mode: leader
Node count: 852
```

Example output for a follower

```
$ echo srvr | nc localhost 2181
ZooKeeper version: 3.4.5-1392090, built on 09/30/2012 17:52 GMT
```

```
Latency min/avg/max: 0/0/14
Received: 1287670
Sent: 1287670
Connections: 8
Outstanding: 0
Zxid: 0x50000000a
Mode: follower
Node count: 852
```

Diagnostic Tools and Logs

This section provides information and guidance about the network and JVM tools and diagnostic logs that can be used for troubleshooting network and JVM related issues in Edge platform.

TCP/IP packet sniffer (tcpdump) utility

The tcpdump tool is a command-line packet sniffer tool that allows you to capture or filter TCP/IP packets that are received or transferred over a network. It is available on Linux/Unix based operating systems. If not, it can be installed easily using yum as follows:

```
yum install tcpdump
```

The tcpdump tool is useful for troubleshooting network or SSL related issues. For example:

- ➔ 502 Bad Gateway Errors (caused due to EOF Exception)
- ➔ 503 Service Unavailable Errors
- ➔ SSL Handshake Failures, etc.

To troubleshoot any of these problems, your first step is to determine the pair of components between which the error occurred. In case of Edge, it can be one of the following pairs:

- ➔ Client app and Router
- ➔ Router and Message Processor
- ➔ Message Processor and Backend server

Once you identify the pair of components, you can capture the network packets using tcpdump on one or both of these components.

Capturing packets sent to/received from a specific host using tcpdump
Use the following tcpdump command to capture all the packets sent to or received from a specified host (IP address) and save the information in the specified file:

```
tcpdump -i any -s 0 host <IP address> -w <File name>
```

Where

- -i - (interface) specifies the interface from which the packets should be captured. Using the value of “any” allows to capture packets from all interfaces.
- -s - (snarf/snaplen) specifies the amount of each packet to capture. Using the value of 0 (zero) allows you to capture the entire packet.
- IP address - is the ip address of the host for which we want to capture the packets
- File Name - is the name of the file to which tcpdump has to be written to

Example
Let’s say you want to capture the packets between the Message Processor and Backend Server:

1. Log in to the Message Processor machine.
2. Determine the IP address of the Backend Server (assume it is 22.22.22.22) for which we want to capture the packets.

Enter the following command to capture the network packets:

```
tcpdump -i any -s 0 host 22.22.22.22 -w rmp-123.pcap
```

If the backend server resolves to multiple IP addresses, then enter the tcpdump command as follows:

```
tcpdump -i any -s 0 host <Hostname> -w rmp-123.pcap
```

If there are multiple backend servers with different IP addresses (22.22.22.22, 33.33.33.33 and 44.44.44.44), then enter the tcpdump command as follows:

```
tcpdump -i any -s 0 host 22.22.22.22 or host 33.33.33.33 or host
44.44.44.44 -w rmp-123.pcap
```

Analysing tcpdumps
The tcpdumps can be viewed or analysed using the tcpdump command or the GUI based tool **Wireshark**.

References

tcpdump man page
TCPdump commands - A Network Sniffer Tool
Wireshark

Heap dumps

Heap dumps are a snapshot of the memory of a Java process. They contain the information about the Java objects and classes in the heap at the moment the heap dump is collected. They are usually pretty large in size ranging anywhere between few 100MBs to few GBs.

Heap dump is very useful when a Java process such as Message Processor shows:

- ➔ High Memory Usage
- ➔ OutofMemoryError

Generating Heap dump for a Java process

Java provides a utility called **jmap,** which allows us to generate the memory statistics or heap dumps of a running Java process.

Use the following jmap command to generate the heap dump of a Java process:

```
sudo -u apigee <JAVA_HOME>/bin/jmap
-dump:live,format=b,file=<filename> <pid>
```

Where

- JAVA_HOME - is the installation directory of Java
- filename - is the file name to which the heap dump will be written
- pid - is the process id of the Java application whose head dump has to be captured

Example

Let's say the Message Processor `mp-east` is showing up high memory usage or is throwing OutOfMemory Errors. Note down the process id of Message Processor, such as 24569.

Run the jmap utility as follows to generate the heap dump:

```
sudo -u apigee <JAVA_HOME>/bin/jmap
-dump:live,format=b,file=mp-east-heapdump.bin 24569
```

Analysing Heap Dumps

Heap Dumps can be analysed using **Eclipse MAT** (Memory Analyzer Tool) to determine the potential memory leaks or which Java objects are leading to high memory usage.

References

How to collect a heap dump
jmap utility
jmap man page
Memory Analyzer Tool (MAT)

Thread dumps

A thread dump is a snapshot of the state of all the threads of a running Java process. The state of each thread is presented with the contents of its stack, referred to as a stack trace. Some of the threads will be part of the Java application that is running, while others will be JVM internal threads.

A thread dump reveals information about each of the application's threads activities. This information can be very useful to:

- ➔ Diagnose problems such as CPU spikes, slow response times, or unresponsive Java applications
- ➔ Optimize application and JVM performance

Generating Thread Dumps

The thread dump for a Java process can be generated using the jstack utility as shown below:

```
<JAVA_HOME>/bin/jstack -l <pid> > <filename>
```

Where

JAVA_HOME	- is the installation directory of Java
pid	- is the process id of the Java application whose thread dump you want to capture
filename	- is the file name to which the thread dump will be written

Example

To generate a thread dump for the process ID 37320 on Message Processor `mp-east`, enter the following command:

```
<JAVA_HOME>/bin/jstack -l 37320 >
/opt/apigee/edge-message-processor/mp-east-threadDump.txt
```

As per the above example, thread dump of the process would be saved to the `/opt/apigee/edge-message-processor/mp-east-threadDump.txt` file.

Analysing Thread Dumps
The thread dumps can be viewed in any text editor such as vi (Linux), notepad (Windows). Refer to Thread Dump for details on different sections of Thread Dump and how to interpret the information.

Use top -h output along with thread dump to troubleshoot high CPU usage issues.

References

jstack utility
Analyzing Thread Dump: CPU High Usage Issue
How to Analyze Java Thread Dumps

PART 3 - APIs Quick Reference

This section provides information about frequently used Edge management APIs to get information about organization, environments, API proxies, deployments, virtual hosts, keystores, analytics, servers, etc.

You can either use management APIs or apigee-adminapi utility to get the information. You need to use your sysadmin username and password for executing the management APIs. See Using the apigee-adminapi.sh utility for information to install and configure the apigee-adminapi, before running the commands using this utility.

Organization APIs

Use the following APIs to get information about your organizations:

Description	API/Command
Get list of organizations	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations`
	adminapi command: `apigee-adminapi.sh orgs list`
Get the details of an organization	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>`
	adminapi command: `apigee-adminapi.sh orgs list -o <orgname>`

Environment APIs

Use the following APIs to get information about environments:

Description	API/Command
List the environments in an organization	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments`
	adminapi command: `apigee-adminapi.sh orgs envs list -o <org>`
Get the environment details of an organization	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>`
	adminapi command: `apigee-adminapi.sh orgs envs list -o <org> -e <env>`

API Proxy APIs

Use the following APIs to get information about and manage the deployment of API proxies:

Description	API/Command
List API Proxies	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apis`
	adminapi command: `apigee-adminapi.sh orgs apis list  -o <org>`
List the revisions of an API Proxy	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apis/<apiname>/revisions`
	adminapi command: `apigee-adminapi.sh orgs apis revisions list -o <org> -a <api>`
Deploy an API Proxy	**API:** `curl -X POST "http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apis/environments/<envname>/<apiname>/revisions/<revnumber>/deployments" -H "Content-Type: application/x-www-form-urlencoded"`
	apigee-adminapi.sh orgs apis deploy -o <org> -e <env> -a <api> -r <revision>
Undeploy an API Proxy	**API:** `curl -X DELETE "http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apis/environments/<envname>/<apiname>/revisions/<revnumber>/deployments?"`

	adminapi command: `apigee-adminapi.sh orgs apis undeploy -o <org> -e <env> -a <api> -r <revision>`

Deployment APIs

Use the following APIs to get information about API proxy deployments:

Description	API/Command
Find where an API proxy is deployed	**API:** `curl "http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apis/<apiname>/deployments"`
	adminapi command: `apigee-adminapi.sh orgs apis deployments -o <org> -a <api>`
List the deployments for all environments in an organization	**API:** `curl "http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apis/<apiname>/deployments"`
	adminapi command: `apigee-adminapi.sh orgs apis deployments -o <org> -a <api>`
List deployments for a specific environment	**API:** `curl "http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/apis/<apiname>/deployments"`
	adminapi command: `apigee-adminapi.sh orgs apis deployments -o <org> -e <env> -a <api>`

Virtual Host APIs

Use the following APIs to create, delete, and get information about virtual hosts:

Description	API/Command
List virtual hosts in an environment	`curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/virtualhosts`
	adminapi command: `apigee-adminapi.sh orgs envs virtual_hosts list -o <org> -e <env>`
Get a specific virtual host detail	`curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/virtualhosts/<virtualhostname>`
	adminapi command: `apigee-adminapi.sh orgs envs virtual_hosts list  -o <org> -e <env> -v <vhname>`
Create a virtual host	`curl -X POST http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/virtualhosts -H "Content-Type: application/xml" -d @new_virtual_host.xml`
	adminapi command: `apigee-adminapi.sh orgs envs virtual_hosts -o <org> -e <env> -f <path to file> -t xml or json`
Delete a virtual host in an environment	`curl -X DELETE http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/virtualhosts/<virtualhostname>`

	adminapi command: `apigee-adminapi.sh orgs envs virtual_hosts delete -o <org> -e <env>-v <virtualhostname>`

Keystore APIs

Use the following APIs create, delete, and get information about keystores and truststores:

Description	API/Command
List keystores and truststores in an environment	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/keystores`
	adminapi command: `apigee-adminapi.sh orgs envs keystores list -o <org> -e <env>`
Get details for a specific keystore or truststore	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/keystores/<keystorename>`
	adminapi command: `apigee-adminapi.sh orgs envs keystores list -o <org> -e <env>`
Create a keystore or truststore	**API:** `curl -X POST http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/keystores -H "content-type: application/xml" -d '<KeyStore name="<KEYSTORE_NAME>"/>' -Q -v`
	adminapi command: `apigee-adminapi.sh orgs envs keystores add-o <org> -e <env> -k <keystore name>`

Upload the certs to a keystore with a JAR file	**API:** `curl -X POST http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/<keystorename>/keys?alias=<keyaliasname> -H "Content-Type: multipart/form-data" -F file="@certs.jar"`
	adminapi command: `apigee-adminapi.sh orgs envs keystores keys add -o <org> -e <env> -k <keystore name> -A <keystore alias> -f <path to the jar file>`
Delete a keystore or truststore in an environment	**API:** `curl -X DELETE http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/keystores/<keystorename>`
	adminapi command: `apigee-adminapi.sh orgs envs keystores delete -o <org> -e <env> -k <keystore name>`

API Product/App/Developer APIs

Use the following APIs to get information about API products, developer apps and developers:

Description	API/Command
List all apps of an organization	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apps`
	adminapi command: `apigee-adminapi.sh orgs apps list -o <org>`
Get a specific app by app ID	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apps/<appid>`
	adminapi command: `apigee-adminapi.sh orgs apps list -o <org> - <app>`
List API products in an org	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apiproducts`
	adminapi command: `apigee-adminapi.sh orgs apiproducts list -o <org>`
Get details for a specific API product	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/apiproducts/<apiproduct name>`
	adminapi command: `apigee-adminapi.sh orgs apiproducts list -o <org> -p <apiproduct name>`

List all the developers in an organization	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/developers`
	adminapi command: `apigee-adminapi.sh orgs developers list -o <org>`
Get details for a specific developer	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/developers/<developer email>`
	adminapi command: `apigee-adminapi.sh orgs developers list -o <org> -d <developer email>`

Analytics APIs

Use the following APIs to determine whether analytics is enabled properly for an environment in an organization and to get information about an analytics config or group:

Description	API/Command
Get the analytics deployment status	**API:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/environments/<envname>/provisioning/axstatus`
	adminapi command: `apigee-adminapi.sh orgs envs analytics status -o <org> -e <env>`
Get the analytics config	**API:** `curl http://<management-server-IP-address>:<port#>/v1/analytics/groups/ax`
	adminapi command: `apigee-adminapi.sh analytics groups list`
Create an analytics group	**API:** `curl http://<management-server-IP-address>:<port#>/v1/analytics/groups/ax/<axgroupname> -H "application/json"`
	adminapi command: `apigee-adminapi.sh analytics groups add -g <axgroupname>`

Server in Pods/Region APIs

Use the following APIs to get information about the pods and servers in a pod and region:

Description	API/Command
Get pods associated with an organization	**API call:** `curl http://<management-server-IP-address>:<port#>/v1/organizations/<orgname>/pods`
	adminapi command: `apigee-adminapi.sh orgs pods list -o <orgname>`
List pods in a region	**API call:** `curl http://<management-server-IP-address>:<port#>/v1/regions/<regionname>/pods`
	adminapi command: `apigee-adminapi.sh regions pods list -r <region>`
List servers in a pod and region	**API:** `curl http://<management-server-IP-address>:<port#>/v1/regions/<regionname>/pods/<podname>/servers`
	adminapi command: `apigee-adminapi.sh regions pods servers list -r <region> -p <pod>`
Get list of servers of a specific type in a pod	**API:** `curl http://<management-server-IP-address>:<port#>/v1/servers?pod=<podname>&type=<servertype>`
	adminapi command:

	`apigee-adminapi.sh servers list -p <pod> -t <servertype>`

Server Info APIs

Use the following APIs to get information about specific servers such as Edge Management Servers, Routers, Message Processor, Qpid Server and Postgres Server, etc.

Note: The port #s for Management Server, Router, Message Processor, Qpid Server and Postgres Server are 8080, 8081, 8082, 8083, and 8083 respectively.

Description	API/Command
View server details	**API:** `curl localhost:<port#>/v1/servers/self`
	adminapi command: `apigee-adminapi.sh servers self list`
Get the server's uuid	**API:** `curl localhost:<port#>/v1/servers/self/uuid`
	adminapi command: `apigee-adminapi.sh servers self uuid`
Get the server reachable status	**API:** `curl localhost:<port#>/v1/servers/self/uuid/reachable`
	adminapi command: `apigee-adminapi.sh servers self reachable`
Verify if server started or not	**API:** `curl localhost:<port#>/v1/servers/self/up`
	adminapi command: `apigee-adminapi.sh servers self is_up --host <host>`

Get application version and build info	**API:** `curl localhost:<port#>/v1/buildinfo`	**adminapi command:** `apigee-adminapi.sh buildinfo  list`

Debug APIs

Use the following APIs to get information that is useful for debugging runtime issues. These APIs should be run on the Edge components, like Message Processors, Routers, or Management Servers. See Enable debug logging for more information also for the port numbers to be used for different components.

Description	API/Command
Create a debug session	**API:** `curl -u sysadmin_user:sysadmin_pass -X POST "http://localhost:<port#>/v1/logsessions?session=logsession_name"`
	adminapi command: `apigee-adminapi.sh logsessions add -s <session name>`
Download debug session information	**API:** `curl -u sysadmin_user:sysadmin_pass -X GET "http://localhost:<port#>/v1/logsessions/<session-name>" -o <file-name>`
	adminapi command: `apigee-adminapi.sh logsessions list -s <session name>` (it will create a file in /tmp/debug.zip)
Delete a debug session	**API:** `curl -u sysadmin_user:sysadmin_pass -X DELETE "http://<MessageProcessor-IPaddress>:<port#>/v1/logsessions/<session-name>"`
	adminapi command: `apigee-adminapi.sh logsessions delete -s <session name>`

PART 4 - Properties

Message Processor Properties

This section provides information and guidance on some of the properties that can be configured on the Edge Message Processor component to get optimized performance and desired results.

The Message Processor properties are categorized based on the functionality and stored in separate property files. All the Message Processor property files are located in `/opt/apigee/edge-message-processor/conf` directory.

Properties Table
The following table lists the different types of Message Processor properties:

Type of Properties	File Name	Details
HTTP properties	http.properties	Contains HTTP protocol properties
Message Logging properties	message-logging.properties	Contains Message Logging policy related properties.
Security properties	security-policy.properties	Contains security based properties.
JVM properties	system.properties	Contains JVM and JSSE related properties.

How to modify Properties
You may have to modify the default values of some of the properties either as part of troubleshooting an issue or to get more optimized performance based on your requirements or application.

The properties cannot be modified directly by editing the properties files listed in the above table. To modify the properties you need to use a technique referred to as “code with config.” Modifying any of the properties requires you to restart the Message Processor. For more details see code with config**.**

http.properties

The following table lists the HTTP Transport, payload, and forward proxy properties:

Property Name	**Description**	**Default Value**
HTTPClient.keepalive.timeout.millis	The maximum number of milliseconds that a keep-alive connection is kept open before closing it. This is for the connections going to the target backend servers. If the connection in the pool is idle beyond the specified limit, then the connection is closed. If the value is set as 0, then it is **turned off**; That is, the connection is kept open forever. If the value set is less than 0, then it uses the value passed to Keep-Alive as part of the API request. **Keep-Alive: timeout=<value>** If the value set is greater than 0, then the value indicates the maximum number of milliseconds that a keep-alive connection is kept open before closing it. **Known implications** None.	-60000 (-60 seconds)
HTTPClient.connect.timeout.millis	The maximum time period within which the connection needs to be established with the target server. If the connection cannot be established, then 503 is returned. Note that if there is a consistent time interval that it takes for API proxies to connect to backend target servers; configure this property with that time interval.	3000 (3 seconds)

	Note: This property can also be configured on the ***HTTPTargetConnection*** XML element in the API proxy. The XML element is as below. ***<Property name="connect.timeout.millis">120000</Property>*** The value specified in the ***HTTPTargetConnection*** overrides the value specified in the Edge Message Processor. **Known implications** None.	
HTTPTransport.io.timeout.millis	The timeout period for HTTP read/write operations in milliseconds. If there is no read or write operation on the HTTP connection within the time period specified by this property, then the transaction will fail with the following error message. ● If the timeout happens while reading HTTP request then *Request Timeout is issued (408).* ● If the timeout happens while reading HTTP response then *Gateway timeout is issued (504)*. **Note:** This property can also be configured on the ***HTTPTargetConnection*** XML element in the API proxy. The value specified on the ***HTTPTargetConnection*** overrides the value specified on the Message Processor(s). If the network infrastructure in which Apigee Private Cloud is installed is known to have consistent read/write latencies, then it is advisable to adjust the value of this property according to the network speeds.	55000 (55 seconds)

	Known implications The value specified should be greater than the time that target servers take to respond. If this value is set to a value less than the expected time required by the target servers, then the Message Processor will time out and you will get a 504 Gateway Timeout Error. You should not set an arbitrarily high number for this value, as it can cause connections to be held for longer than required. Review this community post to learn more about the other associated properties and their values.	
HTTP Payload Header Properties		
HTTPRequest.line.limit	The maximum allowed size of the request line of the HTTP request that is made by the Message Processor to its backend services. The value includes both the HTTP URL and query parameters. If there are a lot of query parameters to be passed as part of the URL, then the value of this property can be modified appropriately to accommodate the URL and the associated query parameters. **Note:** This property is useful in the scenarios where the HTTP request URLs are automatically generated and the length of the URLs is arbitrary. The default value of 7k should suffice most of the situations. Consider increasing the value if the length of the URLs exceed the default value. See the Edge documentation for more information.	7k (7168 bytes)

	Known implications None.	
HTTPRequest.headers.limit	The maximum size allowed for the HTTP headers when Message Processor makes a HTTP request to its backend services. Consider increasing the value if the size of the HTTP headers exceed the default value. See the Edge documentation for more information. **Known implications** None.	25k (25600 bytes)
HTTPResponse.line.limit	The maximum size allowed by the Message Processor component for the response line that it receives from the backend. **Note:** This property is useful in the scenarios where the HTTP request URLs are automatically generated and the length of the URLs is arbitrary. The default value of 2k should suffice in most situations. Consider increasing the value if the length of the URLs exceed the default value. See the Edge documentation for more information. **Known implications** None.	2k (2048 bytes)
HTTPResponse.headers.limit	The maximum size allowed by the Message Processor component for the response headers of the HTTP response that it receives from the backend. Consider increasing the value if the size of the HTTP headers exceed the default value. See the Edge documentation for more information.	(25600 bytes)

	Known implications None.	
HTTP Client connection properties		
HTTPTransport.max.client.count	The maximum number of connections that the Message Processor processes at a given point in time. It indicates the maximum number of connections that are allowed to connect to backend target server. Most of the time the default value of 40000 will suffice. If there is a specific reason to limit the number of connections, this property can be used for that purpose. **Known implications** Setting this value to 0 indicates unlimited number of connections are allowed.	40000
HTTPServer.max.keepalive.clients	The maximum number of keep alive client connections that can be created with Message Processor component. This property applies to the connections made from the router. The default value of -1 indicates that there is no limit for number of keep alive connections coming from router. **Known implications** None.	-1
HTTP Client Properties		
HTTPClient.urlencode.request.line	A flag used to enable (or) disable URL encoding of the requests going to the target servers. Sometimes URL encoding is disabled on the target backend servers. By default, the	true

	Message Processor component encodes the URL and makes HTTP calls to target backend servers. In this case, the URL encoding can be disabled at the Message Processor by setting the value of this property to ***false.*** **Known implications** None.	
HTTPClient.dns.ttl	The application level (Message Processor level) time-to-live value in seconds for DNS cache. The Message Processor uses the DNS values from this property until it expires. If it is expires, then it uses the value specified in ***dns.cache.ttl.sec***, which is specified in the ***security-policy.properties***. This property is related to the DNS entries for the backend servers to which the Message Processor makes calls. Set the value for this property according to frequency with which the DNS entries for the backend servers change. **Known implications** None.	60
HTTP Request Properties		
HTTPRequest.POST.allow.without.Content-Length *(and)* HTTPRequest.PUT.allow.without.Content-Length	Flags used to configure whether POST and PUT requests require a payload. By default, a Message Processor expects POST and PUT requests to have a payload. If the requests do not have payload, then the **HTTP-411 Length Required** error response is sent to clients. If you need to support POST and PUT requests without a payload, then set these properties to **true**.	false

	Note: You can override these system values for a specific API Proxy using the following transport properties: ***<Property name="allow.POST.without.content.length">true</Property>*** ***<Property name="allow.PUT.without.content.length">true</Property>*** **Known implications** None.	
HTTP Forward Proxy properties		
HTTPClient.use.proxy HTTPClient.use.tunneling HTTPClient.proxy.type HTTPClient.proxy.host HTTPClient.proxy.port HTTPClient.proxy.user HTTPClient.proxy.password	These properties enable you to configure an HTTP forward proxy between Edge and the backend target servers. To configure and to learn more about these properties, see the Edge documentation.	
HTTP Payload Properties		
HTTPRequest.body.buffer.limit HTTPResponse.body.buffer.limit	These properties control the message payload size limits on the Message Processor. To configure and to learn more about these properties see the Edge documentation.	

message-logging.properties

The following table lists the Message Logging Policy properties:

Property Name	**Description**	**Default Value**
max.log.message.size.in.kb	The maximum log size allowed by the Message Processor. If you use **Message Logging** policy and see the following message in the Message Processor logs then this property needs to be configured. ***“Log message size exceeded. Increase the max message size setting”*** For more information about this message, see this community post. You can increase the value up to 1024 or 2048 depending on the rate and size of the message payload being logged as part of message logging policy. **Known implications** None.	**128**

security-policy.properties

The following table lists the Security properties:

Property Name	**Description**	**Default Value**
dns.cache.ttl.sec	The JVM level time-to-live value in seconds for DNS entries related to the backend servers. The Message Processor initially uses the application level cache entries to resolve the DNS names. If the application level cache is expired then the JVM level cache is referred. **Note:** Set the value for this property according to frequency with which the DNS entries for the backend servers change. This property along with the property HTTPClient.dns.ttl which is set in **http.properties** are used to resolve DNS names for the backend servers without causing the delay in the resolution process. **Known implications** None.	30
java.security.nssprovider.enabled	A flag that enables the NSSProvider for Message Processor's Java runtime. If the following error is observed while connecting to a target server, then enable NSSProvider by setting the value to *true*. ***SSL Handshake failed javax.net.ssl.SSLHandshakeException: Unsupported curve: 1.2.840.10045.3.1.7*** **Known implications** None.	false

system.properties

The following table lists the Java and JSSE properties:

Property Name	Description	Default Value
jsse.enableSNIExtension	A flag that specifies whether to enable the SNI (server name indication) extension flag in the SSL handshake. Setting the value of this property to *true* enables SNI extension flag in the SSL handshake. When the Message Processor makes TLS connections to the target servers, the *server_name* extension is added to the TLS handshake request. This is required if the target servers are SNI enabled. **Note:** SNI-enabled Message Processors can make TLS connections to both SNI-enabled as well as non-SNI enabled target servers. But non-SNI enabled Message Processors cannot make TLS connections to SNI-enabled target servers. **Known implications** None.	false