Talend User Component tGoogleAnalyticsInput

Purpose

This component addresses the needs of gathering Google Analytics data for a large number of profiles and fine-grained detail data.
The component uses the Google Core Reporting API 3.0 or the new Google Analytics API v4
and the Authentication API OAuth 2.0 final.
To provide the ability to run in multiple iterations the component has special capabilities to avoid multiple logins through iterations. Usually automated processes should not use personal accounts. This requirement is addressed by using a service account, which are the only preferred way to login into Google Analytics for automated processes.
Please in case of problems check the checklist at the end of this document.

Talend-Integration

This component can be found in the palette under Business->Google
This component provides an output flow and several return values.

Parameters

Parameters to connect to Google Analytics (setup client)

Property	Content	Data types
Application Name	Not necessary, but recommended by Google. Simple provide the name of your application gathering data. ***Required***	String
Authentication Method	Choose the method to authenticate: Service Account or Client-ID for native applications	String

Properties to use the authentication method: Service ccount

Property	Content	Data types
Service Account Email	The email address of the service account. Google creates this address within the process of creating a service account. Only for service accounts! ***Required***	String
Key File (p12)	The Service Account Login works with private key file for authentication. In the process of creating a service account you download this file. Only for service accounts ***Required***	String

Properties to use the authentication method: Client-ID for native applications

Property	Content	Data types
User Account Email	Email of the user account or the Client-ID	String
Client secret file (json)	This json file downloaded for the Client-ID	String

The usage of the “Client-ID for native applications” expects on the first run an user interaction with the Google web page and after finishing the form to approve the access right you need to close the browser to let the component continue, otherwise the authentication process will not complete.

Parameters to define the query

Property	Content
View-ID	Set here the View-ID (formally known as Profile-ID). It is a 10-digit number (fast growing number range!) ***Required!***
API Version	Choose here the API Version. Currently v3 and v4 are supported. V4 was introduced in 04/2016. V4 brings a lot of new features but in this component release it is implemented to be compatible with v3, though you can simple change the API version and everything works in the same way. In the next component release all v4 features will be enabled.
Start Date	All queries need always a time range (only date, not time). The value must be a String with the pattern "yyyy-MM-dd". ***Required!*** At the moment the component allows only one date range beside the fact v4 of the API allows 2 date ranges. But for the purpose of fetching the data into a data ware house the second date range currently does not make sense.
End Date	Time range end. If you want gather data for one date, use start date as end date. The value must be a String with the pattern "yyyy-MM-dd". ***Required!***
Use json report request template	The variations of the request parameters in v4 are very high and complex. The Google API explorer can greatly deal with it and builds the request as json document. This json document can be applied in this component and gives the developer the ful flexibility of the Analytics API v4.
Setup report template	Read from input source below as java code: The content of the input field will be interpreted as pure Java code. Read from input source below as plain text: The content of the input field will be interpreted as plain text. This option makes it very easy to setup a json template without hazzling with the java syntax.
Report template	Set here the json formatted report request.
Dimensions	Dimensions are like group clauses. These dimensions will group the metric values. See advise for notations below. Separate multiple dimensions with a comma. ***Not required (since release 1.5)***
Metrics	Things you want to measure. Separate multiple metrics with a comma. See advise for notations below. ***Required!***
Filters	Contains all used filters as concatenated string. See advise for notation below
Sorts	Contains all sort criteria as concatenated string. Separate multiple dimensions/metrics with a comma. See advise for notation below
Segment	Segments are stored filters within Google Analytics. In case of using a service account you have to use dynamic segments because saved segments are always belonging to a personal account. In v4 of the API using segments requires the use of the ga:segment dimension. If this dimension is not present in your current dimensions, the component automatically adds this dimension (to fulfill this requirement of the API v4) and sorted it out in the output. This enables you to use v4 without change your current configuration.
Sampling Level	Google Analytics can collect the result based on sampled data. This attribute tells Google Analytics which kind of sampling should be used (in case of sampling is necessary because of the amount of data). These are the possible values: DEFAULT: It is a balance between Speed and precision FASTER: use more sampled data but the result returns faster HIGHER_PRECISION: use less sampled data and it takes longer to get the result
Deliver Totals Data Set	The API provides a totals record. This can be used to calculate percentage values or check results. This data set will be delivered (as first row) if option is checked or will be omitted if option is not checked. Date values (e.g. ga:date) remains empty (null) in the totals record.
Normalize Output	If true, the component normalizes the otherwise flat record into two normalized output flows

	(dimensions and metrics). For every raw record with its columns for dimensions and metrics this option creates one record per raw-record and dimension / metric. E.g. if the component in the flat mode would create 3 records with 4 dimensions and 2 metrics it will create for the dimensions-flow 3 x 4 records and for the metrics flow 3 x 2 records.
Exclude ga:date dimension and provide value as return value	Set this to exclude the ga:date dimension from the normalized output flow for dimension and instead set the ga:date value in the globalMap as return value (available while the flow runs).

Explanation for the Normalized Output

The normalized output as made for scenarios in which the job will be configured with metrics and dimensions at runtime. In this use case it is not possible to declare the appropriated schema for the flat output. The normalization creates 2 read only output schemas:

Dimensions

Column	Type	Meaning
ROW_NUM	int	The row number from the original flat result row. It identifies the records, which belongs to together.
DIMENSION_NAME	String	Name of the dimension
DIMENSION_VALUE	String	Value of the dimension

Metrics

Column	Type	Meaning
ROW_NUM	int	The row number from the original flat result row. It identifies the records, which belongs together.
METRIC_NAME	String	Name of the metric
METRIC_VALUE	Double	Value of the metric

Advice for filter and segment notation

For dimensions, metrics, filters and sorts you have to use the notation from the Google Core API:
https://developers.google.com/analytics/devguides/reporting/core/dimsmets

Filters can be concatenated with OR or AND operator.
Separate filter expressions with a comma means OR
Separate filter expressions with a semicolon means AND

Filter comparison operators:

Operator	Meaning
“==”	Exact match to include
“!=”	Exact match to exclude
“=~”	Regex match to include (only for strings)
“!~”	Regex match to exclude (only for strings)
“>=”	Greater or equals than (only for numbers)
“=@”	Contains string
“!@”	Does not contains string
“>”	Greater than (only for numbers)
“<=”	Lower or equals than (only for numbers)
“<”	Lower than (only for numbers)

Building Flat Schema for Component

In the schema you need an amount of columns equals to the sum of the number of dimensions and metrics.
Columns in the schema must start at first with dimensions (if provided) and ends with metrics.
Schema column types must match to the data types of the dimensions and metrics. The schema column names can differ from the names of dimensions and metrics. Only the order and there types are important.
In Talend schema columns must follow the Java naming rules therefore avoid writing ga:xxx instead use the name without the ga: namespace prefix.
Important: For date dimensions (e.g. ga:date) you must specify the date pattern as “yyyyMMdd” if you want it as Date typed value.

Advanced Option Parameters

Property	Content
Timeout in s	How long should the component wait for getting the first result and fetching all result with one internal iteration
Static Time Offset (to past)	Within the process of login, the component requests an access token and use the local time stamp (because these tokens will expire after a couple of seconds) Google rejects all requests to access tokens when the request is in the future compared to the timestamp in Google servers. If you experience such kind of problems, this options let the requests appear to be more in the past (5-10s was recognized as good time shift)
Fetch Size	This is the amount of data the component fetches at once. The value is used to set the max_rows attribute. max_rows means not the absolute amount of data! The component manages setting the start index to get all data. To achieve this, the component iterates as long as the last result set are completely fetched.
Local Number Format	You can get numbers in various formats. Here you can define the locale in which format double or float values are should textual format by the API.
Reuse Client for Iterations	If you use this component in iterations it is strongly recommended to set this option. It saves time to authenticate unnecessary often and avoids problems because of max amount of connects per time range.
Distinct Name Extension	The client will be kept with an automatically created name: Talend-Name-Component name + job name. In case this is not distinct enough, you can specify an additional extension to the name.

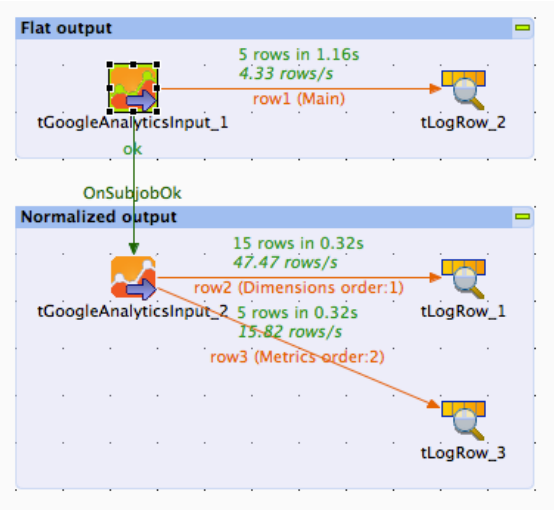
Return values

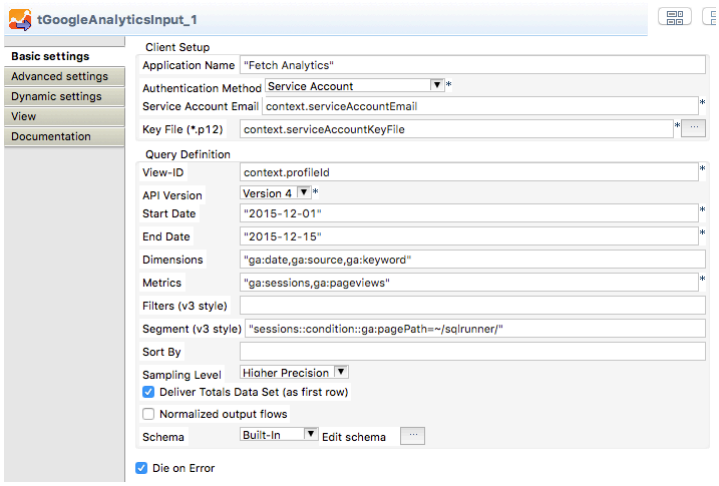
Return value	Content
ERROR_MESSAGE	Last error message
NB_LINE	Number of delivered lines (only set if normalization is not used)
CONTAINS_SAMPLED_DATA	True if data are sampled, means not exactly calculated. This can happen if you query to many details.
SAMPLE_SIZE	The amount of datasets used for the query
SAMPLE_SPACE	The amount of available datasets for this query
TOTAL_AFFECTED_ROWS	Number of rows, which are collected by Google to calculate the result.
NB_LINE_DIMENSIONS	Number of normalized dimension records (only set if normalization is used)
NB_LINE_METRICS	Number of normalized metric records (only set if normalization is used)
CURRENT_DATE	The value of the ga:date dimension (if present in the file) for every row. This value is only available in the “Normalized Flow” mode. Type: java.util.Date
ERROR_CODE	The last error code as Integer. Default value is 0 at start.

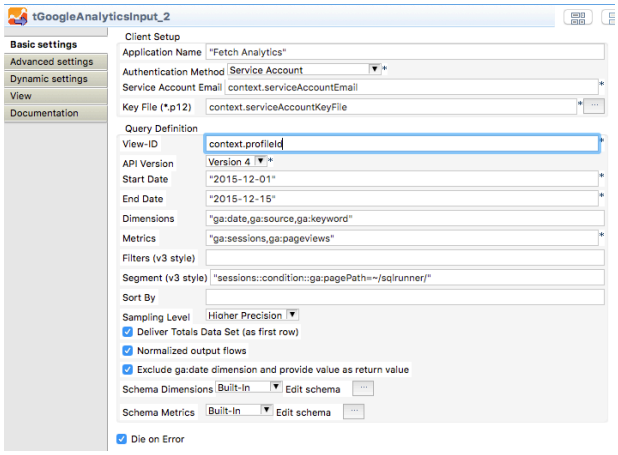
For more information about error codes please check this page:
https://developers.google.com/analytics/devguides/reporting/core/v3/coreErrors

Scenario 1

Using flat and normalized output in a test job.







The dimensions was set to: "ga:date,ga:source,ga:keyword", The metrics was set to: "ga:sessions"
It is not necessary to know this configuration at runtime because the component recognizes the dimensions and metrics from the result set metadata.

The option “Exclude ga:date dimension and provide value as return value” allows you to run a report over a range of dates and save the values nevertheless normalized but treat the date in separate way. The value is in the return value CURRENT_DATE of the component. This works only if you use normalized outputs.
(Off in this example)

Here the outputs of the example test job above:

The output for the plain output

```
.--------+-----------------+--------------+--------.
|                        tLogRow_2                   |
|=-------+-----------------+--------------+-------=|
|date    |source           |keyword       |sessions|
|=-------+-----------------+--------------+-------=|
|total   |total            |total         |11      |
|20141204|(direct)         |(not set)     |5       |
|20141204|google           |(not provided)|2       |
|20141204|semalt.semalt.com|(not set)     |3       |
|20141204|talendforge.org  |(not set)     |1       |
'--------+-----------------+--------------+--------'
```

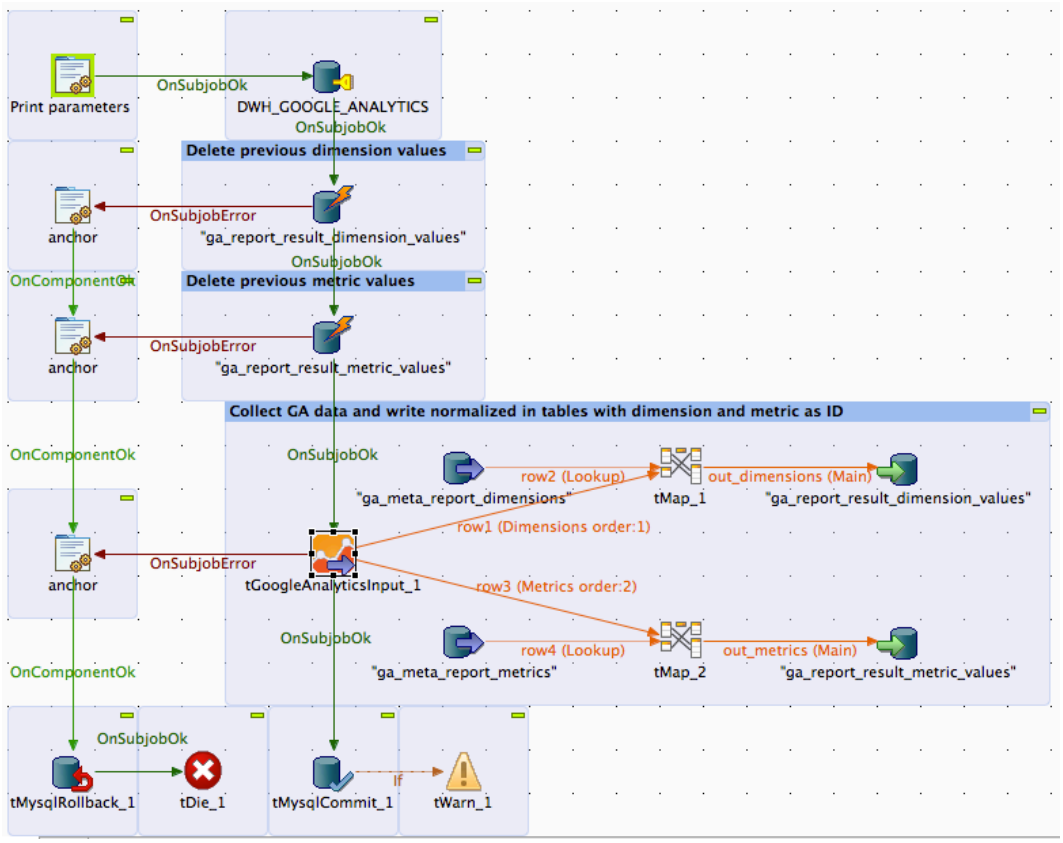
The output for the normalized output

```
.-------+--------------+-----------------.
|              tLogRow_1                  |
|=------+--------------+-----------------=|
|ROW_NUM|DIMENSION_NAME|DIMENSION_VALUE  |
|=------+--------------+-----------------=|
|0      |ga:date       |total            |
|0      |ga:source     |total            |
|0      |ga:keyword    |total            |
|1      |ga:date       |20141204         |
|1      |ga:source     |(direct)         |
|1      |ga:keyword    |(not set)        |
|2      |ga:date       |20141204         |
|2      |ga:source     |google           |
|2      |ga:keyword    |(not provided)   |
|3      |ga:date       |20141204         |
|3      |ga:source     |semalt.semalt.com|
|3      |ga:keyword    |(not set)        |
|4      |ga:date       |20141204         |
|4      |ga:source     |talendforge.org  |
|4      |ga:keyword    |(not set)        |
'-------+--------------+-----------------'
```

```
.-------+-----------+------------.
|           tLogRow_3            |
|=------+-----------+-----------=|
|ROW_NUM|METRIC_NAME|METRIC_VALUE|
|=------+-----------+-----------=|
|0      |ga:sessions|11.0        |
|1      |ga:sessions|5.0         |
|2      |ga:sessions|2.0         |
|3      |ga:sessions|3.0         |
|4      |ga:sessions|1.0         |
'-------+-----------+------------'
```

Scenario 2

Next a real live scenario for using the normalized output in conjunction with the usage of the meta-data (gathered with the component tGoogleAnalyticsManagement):



This job is designed to gather the data for one day and one report (a combination of a view, dimensions, metrics and filters very much like a custom report in the Google Analytics dashboard).
This job gets the view-ID, dimensions, metrics and filters as context variables and will be called, as much there are queries and dates to process.
The tMaps exchanges the dimension names and metric names with their numeric ids and adds a report-ID and the current date into the output flow for the database.
To get this job restart able everything is done within a transaction and the previous data for the report and the date will be deleted at first.
By the way, take note about the way to handle errors, this is very easy and avoid implementing the error handling multiple times. The anchors are tJava components without any code.

It is supposed to use gather the Analytics metadata to be sure you have access to all necessary data and to be able to build a star schema for the dimensions and metrics. Take a look at the component tGoogleAnalyticsManagement (today I would name it more like metadata but anyway).

Configuration checklist:

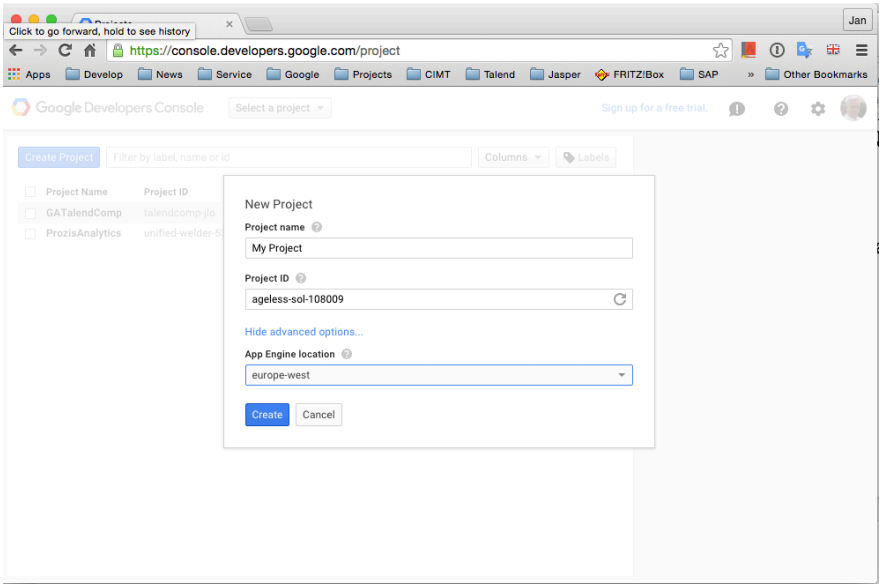
1. Is the email of the service account added to all relevant views (profiles)?
2. Is the system time of the host running the job synchronized with a NTP server?
3. Is the Google Analytics API enabled in the Google API Console?

Tip:
Check your report at first in the Google Analytics API Explorer to get an idea if the data works for you.

How to create a service account

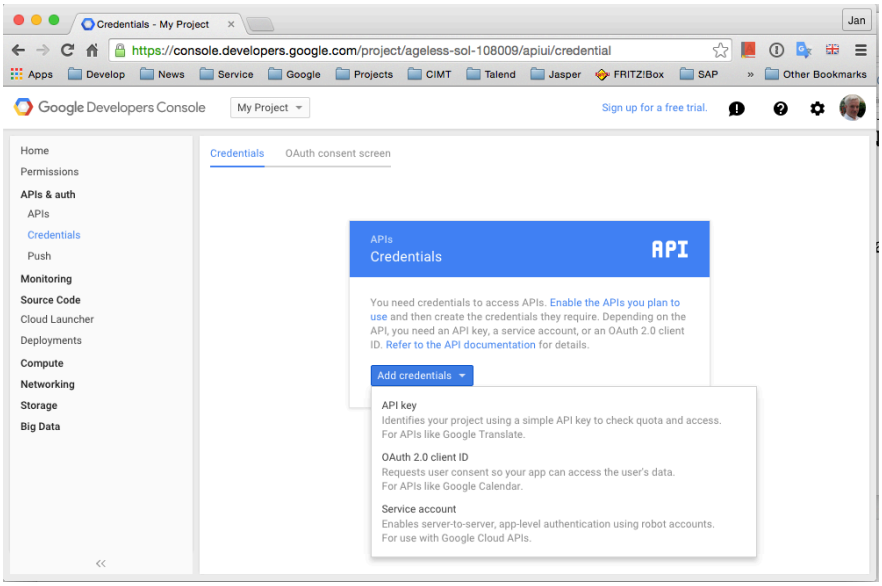
Service accounts have the advantage to not being personal - a big issue in automated processes. The service account use a key file to authorize and therefore do not need a password.

If you do not already have one, create a so called project in the Google Developer Console.

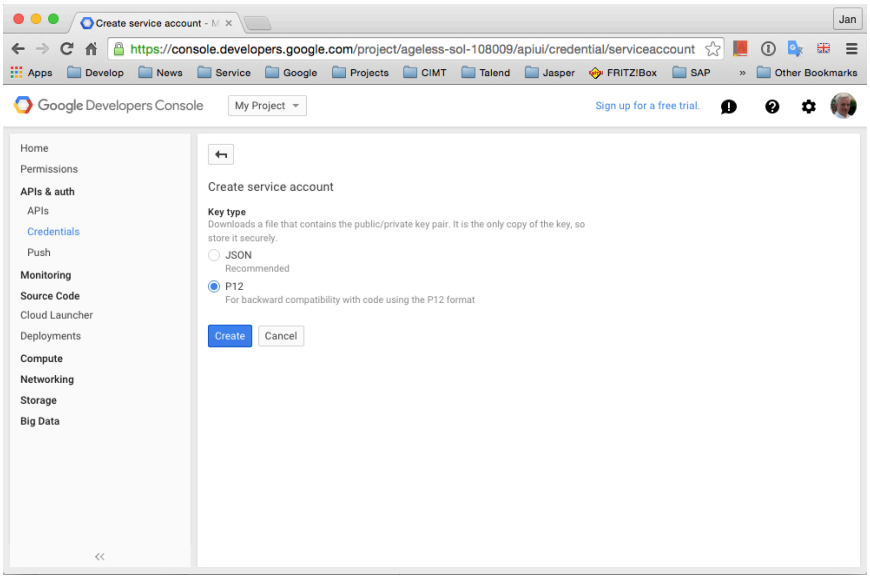


In the first place you do not see this options except the project name. Click at advanced options to expand the dialog.

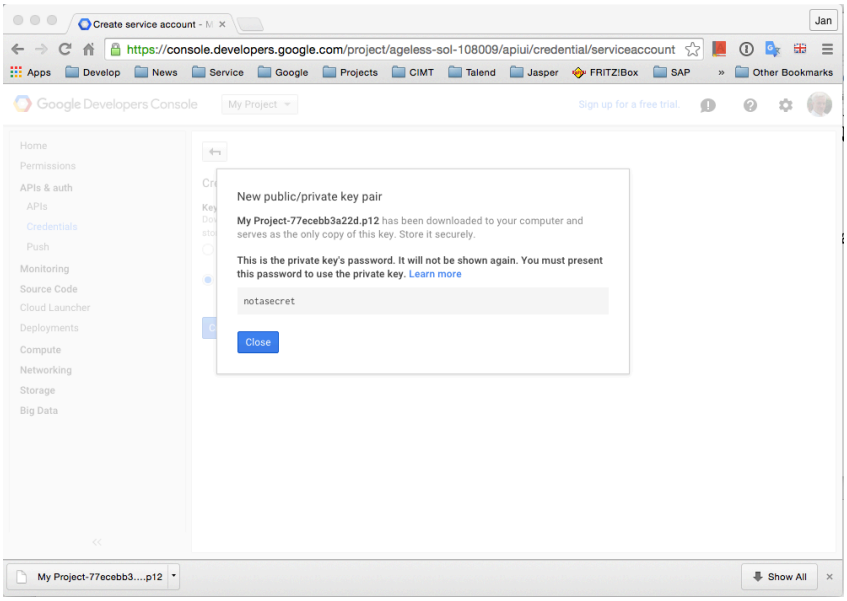
Now create new credentials ... we choose here the last option "Service account".



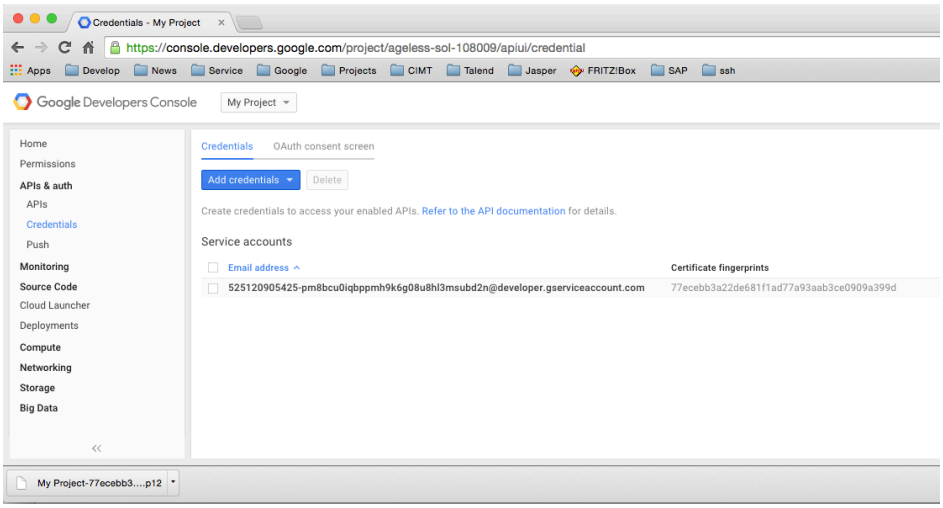
The current releases of the components works with the p12-format for the secured credentials.



After the click on Create you will ask for saving the p12-file. Save it on a clear save place. You can move the file at any place you want. Later the components need to have read access to it.

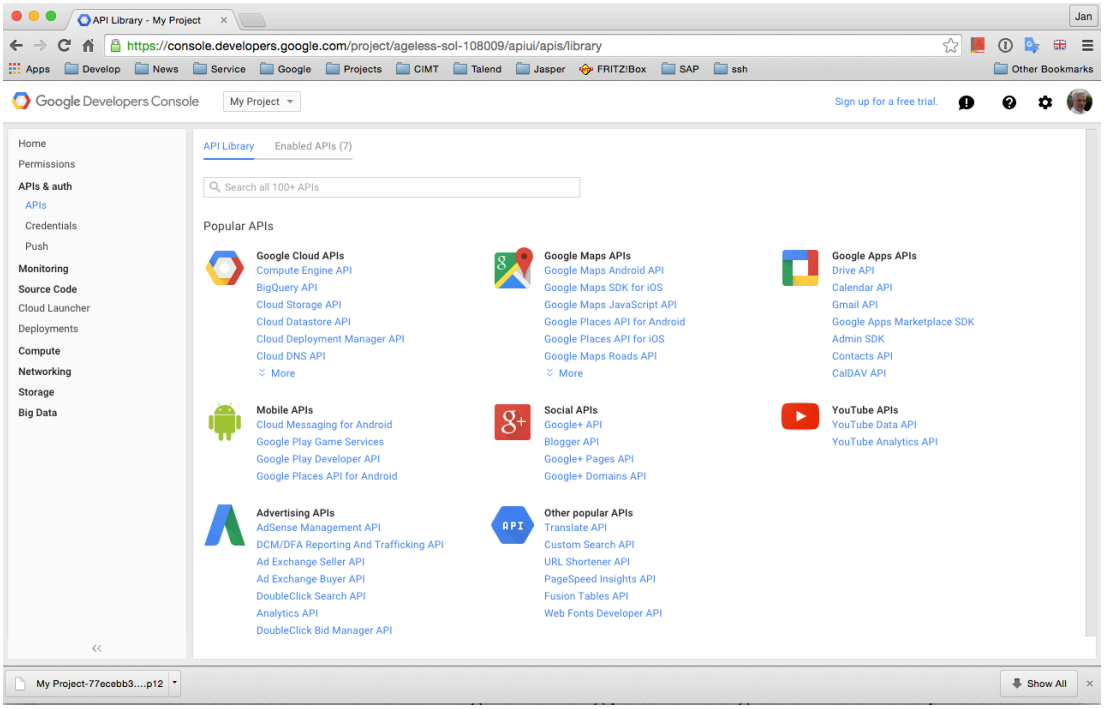


Once you have suceeded downloading the file, you see this sucess message.
Yo do not need the pass phrase because it is always the same and the component code knows this pass phrase and applies it internally.

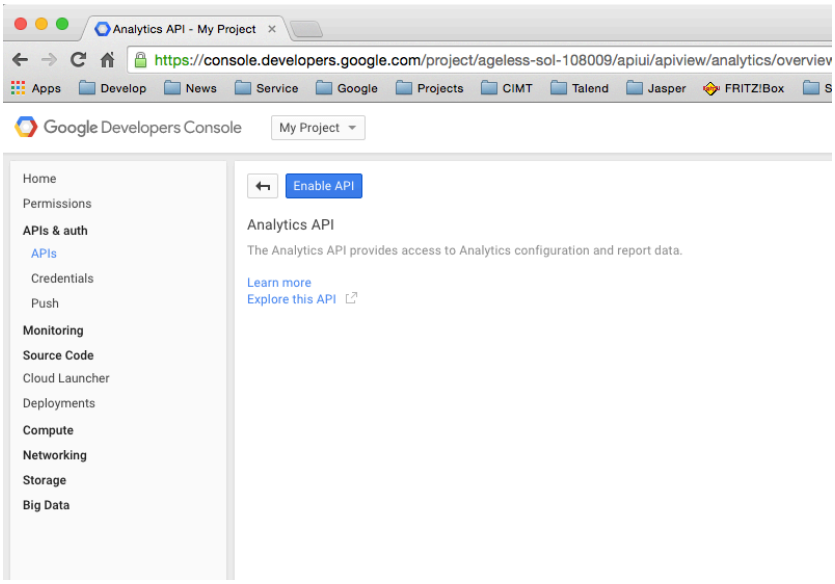


Now you can see the service account email address. This address must be added as user to the views, web properties or accounts (the authorisation will be applied to the lower level elements in the order account->web property->view).

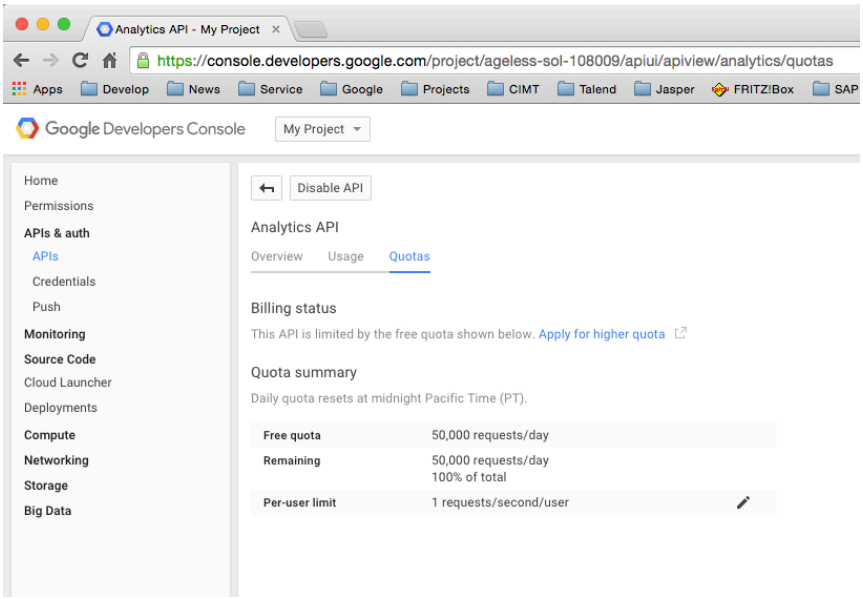
Now we have to enable the necessary APIs for the servive account needed.



It depends on the component what API you have to enable. For tGoogleAnalytics* components you have to anable the Analytics API. In the detail section of an API you can also see the quotas (limitation of usage) you have. Here you can also order an enhancement if necessary.



This way you enable the Analytics API.



Here you can see the quotas.

How to build the json report template and us it in the component

The most convient way to cope with the complexity of the Analytics API v4 is using the Google API explorer.
https://developers.google.com/apis-explorer/#s/analyticsreporting/v4/analyticsreporting.reports.batchGet

Here you can build and test in a convinent way your report.

Request body

If you are ready you have to change to the freeform editor. Not shown here but in the right top corner you will get a drop down menu button.

Request body

Now you will be able to copy the content past it into the Talend studio in the component setting.

This is an example (with a different report) how it looks like to have the report as json template.
The component replaces the dataRanges and viewId attributes with the values from the basic settings.
You can also omit the dataRange and viewId attributes, but if you have both in your copy and paste action here, do not worry about them.
Please not also, in the API explorer you can build more than one report request (as you see here the josn actually starts with a reportRequests as array. This component only takes the first request and runs it because it does not make sense to have more than one report here in one request.