FACTSET 〉 **SEE THE ADVANTAGE**

VAULT API - VERSION 3.0
Developer's Manual and Reference
April 2023

Vault API – Version 3.0

Contents

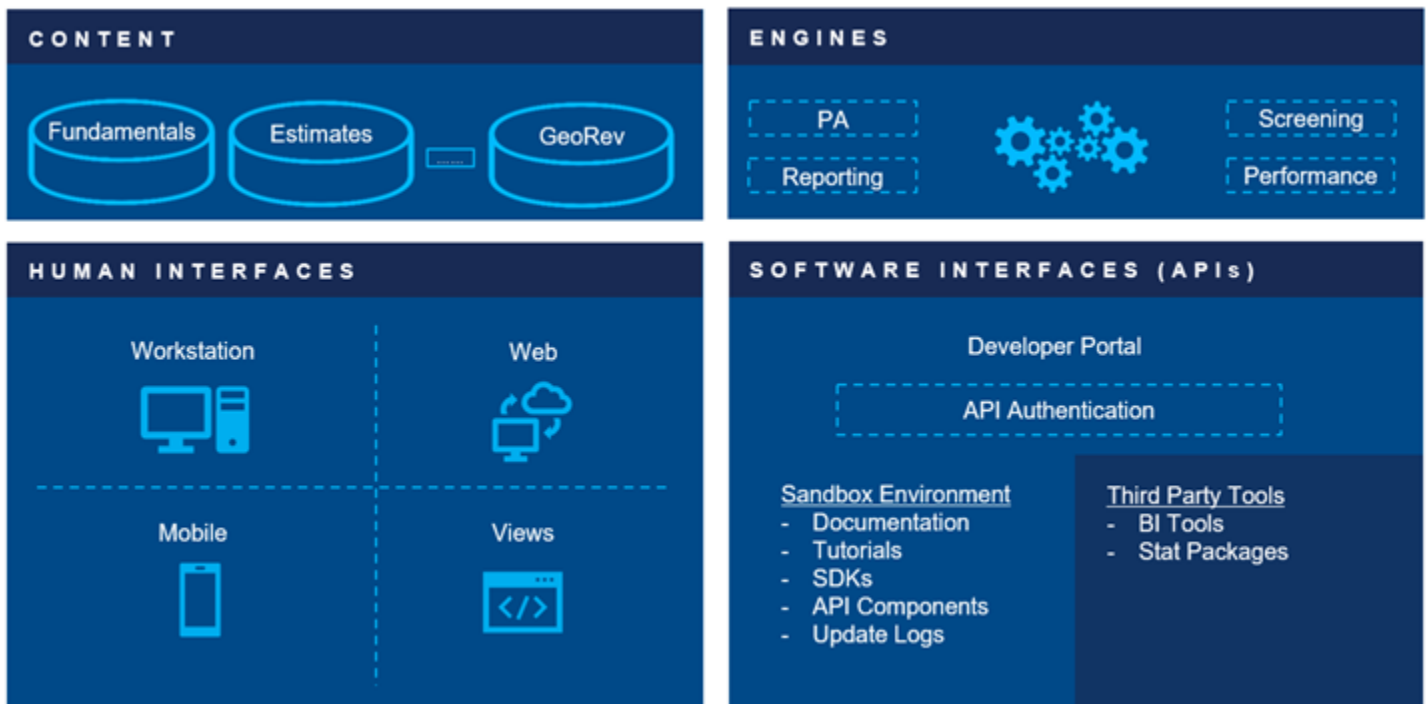FactSet Research Systems Inc. | www.factset.com

1. Motivation

In 1997, FactSet launched Portfolio Analysis 1.0, which set the foundation for Analytics. Soon after, Portfolio Analysis 2.0 integrated risk analytics from third-party vendors, and then expanded to include Fixed Income in 2004. FactSet now offers a robust suite of multi-asset portfolio analytics products that leads the market in flexibility, analytics, and breadth. Today, clients rely on FactSet for interactive analytics through various products, such as Portfolio Analysis (PA), SPAR, Alpha Testing, Optimizers, and Portfolio Dashboard, as well as the distribution of analytics through Portfolio Batcher, Publisher Flat Files, and Publisher documents.

2. API Program

2.1 Overview

Clients have been moving towards building a custom solution, driven by the need to increase productivity by consolidating information into a single user experience. By exposing analytics, performance, and risk through APIs, it provides you with a sophisticated channel to interact with FactSet's leading multi-asset analytics. As the market continues to demand more transparency and data, FactSet will provide flexible options to meet those demands. APIs complement the current analytics suite offerings and facilitate partnerships by allowing you to build private experiences, integrate with third-party BI tools like Tableau, third-party stat packages like RStudio, and increase control over internal consumption of analytics from FactSet.

The first stage of exposing APIs will focus on the analytics engines. Later, the program will expand to include other analytics products, and APIs from other business units.

The program will provide the following:

- Developer toolkit to build proof of concept
- Uniform feel across all FactSet's Enterprise scale APIs
- Adherence to industry standards
- Versioned APIs
- Extensive documentation and tutorials on the developer portal

3. Vault APIs

Through the Vault API, request validated pre-calculated returns and attribution data archived in Portfolio Vault to streamline your official performance and reporting workflows.

All APIs are hosted under https://api.factset.com. Authentication is handled using API Keys and authorization is handled using FactSet's in-house subscriptions product. You can find more information about using API Keys at https://developer.factset.com/authentication.

HTTP request and response header names should be considered case insensitive as per HTTP Standard. Please do not rely on case sensitive matching of headers in your code.

3.1 Multiple Calculations APIs

3.1.1 Run Multiple Calculations

POST /analytics/engines/vault/v3/calculations

Description

This endpoint runs multiple calculations on Vault data based on parameters specified in the POST body. It must be used first, before checking status or cancelling endpoints. A successful response will contain the URL to check the status of the request.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.
Content-Type	Standard HTTP header. Value needs to specify application/JSON (i.e., caller needs to specify that the body is in JSON format).

Request Body

Parameter name	Data type	Required	Description	Format
data	Array	Yes	List of calculations to compute for each component.	Each calculation represented by an object containing calculation inputs. See below for schema and example values.

meta	Object	Yes	Allows users to specify the response format and stachContentOrganization.	Valid contenttype values are 'Json' and 'Binary'. Default is 'Json'. Valid contentorganization values are 'Row', 'Column, 'SimplifiedRow', and 'None'. Default is 'SimplifiedRow'.
				Please refer to the STACH v2 documentation here for more information on STACH v2 format types.

Below are the calculation parameters supported by data section:

Parameter name	Data type	Required	Description	Format
componentid	String	Yes	The Vault component identifier to analyze.	Component ID can be fetched using the Vault Components Lookup API.
account	Object	Yes	User's FactSet account path OR a benchmark.	Account Identifier must have .ACCT or .ACTM extension or BENCH:prefix. Please refer https://my.apps.factset.com/oa/pages/21344#create for creating an account. Vault API runs on accounts stored in Vault repository so, model accounts created through Model Portfolio API are not compatible with Vault API.
dates	Object	No	Date range(s) and frequency to run against. Object takes frequency, startdate and enddate.	Supported Date Formats and Frequency Lookup API.
configid	String	Yes	Vault Configuration identifier.	Vault Configuration identifier can be fetched using the Vault Configurations Lookup API.
componentdetail	String	No	Degree of granularity to return in the Vault component	Valid values are 'groups' and 'totals'.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.
Location	Standard HTTP header. Contains URL to check status of the request.
X-FactSet-Api-RateLimit-Limit	Number of allowed requests for the time window.

| X-FactSet-Api-RateLimit-Remaining | Number of requests left for the time window. |
| X-FactSet-Api-RateLimit-Reset | Number of seconds remaining till rate limit resets. |

Returns

HTTP status code	Description
200	Expected response, if the calculation has one unit and is completed with an error.
201	Expected response if the calculation has one unit and is completed in a short span, returns JSON in the format specified in the Calculation parameters.
202	Expected response, contains the URL in the Location header to check the status of the request.
400	Invalid POST body.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	One or more calculation settings were unavailable.
415	Missing/Invalid Content-Type header. Header needs to be set to application/JSON.
429	Rate limit reached. Cancel older requests using Cancel Calculation endpoint or wait for older requests to finish / expire.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out, Retry the request in sometime.

Remarks

- Maximum 50 POST requests allowed in a 5 second window for each API. The same can be verified using the various Rate-Limit headers available in the API response.

  X-FactSet-Api-RateLimit-Limit   - Number of allowed requests for the time window.

  X-FactSet-Api-RateLimit-Remaining   - Number of requests left for the time window.

  X-FactSet-Api-RateLimit-Reset   - Number of seconds remaining till rate limit resets.

- Maximum 1000 units allowed per request and across all simultaneous requests.

- Any settings in POST body will act as a one-time override over the settings saved in the Vault template.

- Start and end date must be within the configuration's min and max date range. Refer the Vault Configuration Settings Lookup API.

- Multi-horizon frequencies are not supported through this endpoint.

Caching Remarks

- *All results will be cached for 12 hours by default.* This means that by default (without sending any cache-control headers), after the first request successfully completes, all subsequent requests with unchanged request parameters will return the same results for 12 hours.
- Setting the max-stale=<staleness limit in seconds> allows you to fetch pre-calculated results with any subsequent POST requests, as long as they were last calculated within the staleness limit.
  - o Once set, the API will check to see if the stored results are within the staleness limit.
    - ▪ If they are within the limit, then the request will return the cached results, allowing for a quick response and eliminating unnecessary points accrual.
    - ▪ If the results are not within the limit, a brand-new calculation request will be triggered to get the latest results.
- To immediately request the latest results, override the cache by setting "max-stale=0" in the Cache-control header parameter.
- Changes made to the underlying Vault document via the workstation will not trigger a results re-calculation. The cache-control parameter should be set to "max-stale=0" to immediately request the latest results
- The max cache-control value is "max-stale=43200" (12 hours)
- The cached result period is applied to each individual calculation unit after it completes. It is not applied to the entire calculation.

Examples

```
Request:
POST https://api.factset.com/analytics/engines/vault/v3/calculations

Headers:
content-type: application/json
Authorization: Basic RkRTX0RFTU9fVVMt*****************************
Accept-Encoding:  gzip
content-length: 201
content-type: application/json

Body:
{
  "data": {
    "calc1": {
      "componentid": "B0FF076DFF8640B1616462B82BE1F21FBF23E0E9DE62247F4A947B17F81C9A79",
      "account": {
        "id": "CLIENT:/BISAM/REPOSITORY/QA/SMALL_PORT.ACCT"
      },
      "dates": {
        "startdate": "20180101",
```

```
        "enddate": "20180329",
        "frequency": "Monthly"
      },
      "configid": "12ed7b1a-8ac2-4871-a7bf-2d5da5aaa116"
    },
      "calc2": {
      "componentid": "B75D10A84BBD26C9D0C91E78BC5723A4DE70FFE4192070820B9788E382D17E42",
      "account": {
        "id": "CLIENT:/BISAM/REPOSITORY/QA/SMALL_PORT.ACCT"
      },
      "configid": "c1671411-7807-4505-9296-989fe2ffc450"
    }
  },
  "meta": {
    "contentorganization": "SimplifiedRow",
    "contenttype": "Json"
  }
}
```

Response:
HTTP 202 Accepted

Headers:
location:https://api.factset.com/analytics/engines/vault/v3/calculations/9cf4e224aae64f4983ea5e
           a505b0da42/status
x-datadirect-request-key: 60d19db906e6a3cc
x-factset-api-request-key: 60d19db9139ac00b

3.1.2   Create and Update Vault calculation

PUT /analytics/engines/vault/v3/calculations/{id}

Description

This endpoint can be used to either:

- Create a new Vault calculation(s) with a custom id specified in the id path parameter
- Update calculation parameters and run a pre-existing Vault calculation

Like the POST endpoint, the PUT endpoint must be used first, before checking status or cancelling endpoints. A successful response will contain the URL to check the status of the request. If the **X-FactSet-Api-Long-Running-**Deadline header is passed, then this endpoint will return calculation results in the response if the calculation completes within the specified amount of time.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.
Content-Type	Standard HTTP header. Value needs to specify application/JSON (i.e., caller needs to specify that the body is in JSON format).
X-FactSet-Api-Long-Running-Deadline	Long running deadline in seconds when only one unit is passed in the POST body. The endpoint will return calculation results in the response if it completes within the specified amount of time (rather than return the status polling URL) Max value is 20 seconds.
Cache-Control	Standard HTTP header that holds caching instructions. max-stale is the only supported directive. It indicates that the client will accept a stale response, the value (in seconds) denotes the upper time limit for the stale response. Note that all results are cached for 12 hours, to override the default cache and trigger a new request, set max-stale=0.Max value is 43200 seconds (12 hours). For more information on caching, see the Caching Remarks section.

Request Body

Like the POST endpoint, the request body is made up of the following 2 objects, "data" which holds calculation parameters, and "meta" which specifies the response's content type and formatting.

Object name	Required	Description	Format
data	Yes	Parent object for the request body	List of calculation parameters
meta	No	Allows users to specify the response format and StachContentOrganization.	Valid contenttype values are 'Json' and 'Binary'. Default is 'Json'. Valid contentorganization values are 'Row', 'Column, 'SimplifiedRow', and 'None'. Default is 'SimplifiedRow'. Please refer to the STACH v2 documentation here for more information on STACH v2 format types.

The calculation parameters within the "data" object are outlined below:

Parameter name	Data type	Required	Description	Format
componentid	String	Yes	The Vault component identifier to analyze.	Component ID can be fetched using the Vault Components Lookup API.

account	Object	Yes	User's FactSet account path OR a benchmark.	Account Identifier must have .ACCT or .ACTM extension or BENCH:prefix. Please refer https://my.apps.factset.com/oa/pages/21344#create for creating an account. Vault API runs on accounts stored in Vault repository so, model accounts created through Model Portfolio API are not compatible with Vault API.
dates	Object	No	Date range(s) and frequency to run against. Object takes frequency, startdate and enddate.	Supported Date Formats and Frequency Lookup API.
configid	String	Yes	Vault Configuration identifier.	Vault Configuration identifier can be fetched using the Vault Configurations Lookup API.
componentdetail	String	No	Degree of granularity to return in the Vault component	Valid values are 'groups' and 'totals'.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.
Location	Standard HTTP header. Contains URL to check status of the request.
X-FactSet-Api-RateLimit-Limit	Number of allowed requests for the time window.
X-FactSet-Api-RateLimit-Remaining	Number of requests left for the time window.
X-FactSet-Api-RateLimit-Reset	Number of seconds remaining till rate limit resets.

Returns

HTTP status code	Description
200	Expected response if the calculation has one unit and is completed with an error
201	Expected response if the calculation has one unit and is completed in a short span, returns JSON in the format specified in the Calculation parameters.
202	Expected response, contains the poll URL in the Location header.

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400	Invalid calculation parameters.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	One or more calculation settings were unavailable.
409	Duplicate calculation exists with same parameters.
415	Missing/Invalid Content-Type header. Header needs to be set to application/json.
429	Rate limit reached. Cancel older requests using Cancel Calculation endpoint or wait for older requests to finish / expire.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in some time.

Examples

Request:

PUT https://api.factset.com/analytics/engines/vault/v3/calculations/custom-id

Request Headers:

content-type: application/json

Authorization: Basic RkRTX0RFTU9fVVMt*****************************

Accept-Encoding: gzip

Body:
```
{
  "data": {
    "calc1": {
      "componentid": "B0FF076DFF8640B1616462B82BE1F21FBF23E0E9DE62247F4A947B17F81C9A79",
      "account": {
        "id": "CLIENT:/BISAM/REPOSITORY/QA/SMALL_PORT.ACCT"
      },
      "dates": {
        "startdate": "20180101",
        "enddate": "20180429",
        "frequency": "Monthly"
      },
      "configid": "12ed7b1a-8ac2-4871-a7bf-2d5da5aaa116"
    },
     "calc2": {
      "componentid": "B75D10A84BBD26C9D0C91E78BC5723A4DE70FFE4192070820B9788E382D17E42",
      "account": {
        "id": "CLIENT:/BISAM/REPOSITORY/QA/SMALL_PORT.ACCT"
```

```
      },
      "configid": "c1671411-7807-4505-9296-989fe2ffc450"
    }
  },
  "meta": {
    "contentorganization": "SimplifiedRow",
    "contenttype": "Json"
  }
}
```

Response:
```
HTTP 202 Accepted
{
  "data": {
    "calculationid": "cu",
    "status": "Queued",
    "units": {
      "calc1": {
        "status": "Executing"
      },
      "calc2": {
        "status": "Queued"
      }
    }
  }
}
```

Response Headers:
```
location: https://api.factset.com/analytics/engines/vault/v3/calculations/custom-id/status
x-datadirect-request-key: 60d1a45639425f1d
x-factset-api-request-key: 60d1a456362cd0ab
```

3.1.3   Get Vault Calculation Status By ID

GET /analytics/engines/vault/v3/calculations//{id}/status

Description

This is the endpoint to check on the progress of a previous request that was submitted using Run Multiple Calculations endpoint. The response body contains status information of the entire request and each individual calculation. If an individual calculation has finished computing, the result parameter in the response body will contain the result URL. Otherwise, the calculation is still running, and the **X-FactSet-Api-PickUp-Progress** header will contain a progress percentage.

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Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.

Path Parameters

Name	Required	Description
id	Yes	From url, provided from the location header in the Create and Run Vault calculation endpoint

Response Headers

Header name	Description
Content-Encoding	Standard HTTP header. Header value based on Accept-Encoding Request header.
Content-Type	Standard HTTP header.
Transfer-Encoding	Standard HTTP header. Header value will be set to Chunked if Accept-Encoding header is specified.
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.
Cache-Control	Standard HTTP header. Header will specify max-age in seconds. Polling can be adjusted based on the max-age value.
X-FactSet-Api-RateLimit-Limit	Number of allowed requests for the time window.
X-FactSet-Api-RateLimit-Remaining	Number of requests left for the time window.
X-FactSet-Api-RateLimit-Reset	Number of seconds remaining till rate limit resets.

Returns

HTTP status code	Description
200	Expected response once the calculation is completed. The response body contains status information of the entire request and each individual calculation.
202	Expected response returned if the calculation is not yet completed. Contains X-FactSet-Api-PickUp-Progress header with a percentage of progress completed

400	Invalid identifier parameter provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Calculation was already returned, provided id was not a requested calculation, or the calculation was cancelled.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in sometime.

Examples

```
Request:
GET
https://api.factset.com/analytics/engines/vault/v3/calculations/f204d270049c49f1b0f307c602a4058
3/status

Request Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************

Response:
HTTP 200 Success

Response Headers:
x-datadirect-request-key: 60d1df1c32679ac9
x-factset-api-request-key: 60d1df1cf955d7f1

Body:
{
  "data": {
    "calculationid": "f204d270049c49f1b0f307c602a40583",
    "status": "Completed",
    "units": {
      "calc1": {
        "status": "Success",
        "result":
"https://api.factset.com/analytics/engines/vault/v3/calculations/f204d270049c49f1b0f307c602a405
83/units/calc1/result",
        "progress": "100"
      },
```

```
      "calc2": {
        "status": "Success",
        "result":
"https://api.factset.com/analytics/engines/vault/v3/calculations/f204d270049c49f1b0f307c602a405
83/units/calc2/result",
        "progress": "100"
      }
    }
  }
}
```

3.1.4 Get Vault Calculations Result By ID

GET /analytics/engines/vault/v3/calculations/{id}/units/{unitId}/result

Description

This is the endpoint to get the result of a previously requested calculation. If the calculation has finished computing, the body of the response will contain the requested document in JSON.

Request Headers

Header name	Description
Accept	(Optional) Standard HTTP header. Value can be gzip, compress, deflate, br, identity and/or

Path Parameters

Name	Required	Description
id	Yes	Calculation id. From url, provided from the location header in the Create and Run Vault calculation endpoint
unitId	Yes	Unit id. from url, provided from the location header in the Get Vault calculation status by id endpoint

Response Headers

Header name	Description
Content-Encoding	Standard HTTP header. Header value based on Accept-Encoding Request header.
Content-Type	Standard HTTP header.

Transfer-Encoding	Standard HTTP header. Header value will be set to Chunked if Accept-Encoding header is specified.
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.
X-FactSet-Api-RateLimit-Limit	Number of allowed requests for the time window.
X-FactSet-Api-RateLimit-Remaining	Number of requests left for the time window.
X-FactSet-Api-RateLimit-Reset	Number of seconds remaining till rate limit resets.

Returns

HTTP status code	Description
200	Expected response once calculation is completed, returns JSON in the format specified in the Calculation parameters.
400	Invalid identifier provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Calculation was already returned, provided id was not a requested calculation, or the calculation was cancelled
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in sometime.

Examples

```
Request:
GET
https://api.factset.com/analytics/engines/vault/v3/calculations/f204d270049c49f1b0f307c602a4058
3/units/calc1/result

Request Headers:
Authorization: Basic RkRTX0RFTU9fVVMt****************************

Response:
HTTP 200 Success

Response Headers:
```

```
x-datadirect-request-key: 60d1e110225c7638
x-factset-api-request-key: 60d1e11074a1ed9d


Body:
See a sample SimplifiedRow formatted response here
```

3.1.5   Get All Calculations

GET /analytics/engines/vault/v3/calculations

Description

This endpoint returns all calculation requests. The data is sorted in descending order by request time and by default one page will fetch 20 calculations.

Request Headers

Header name	Description
Accept	(Optional) Standard HTTP header. Value can be gzip, compress, deflate, br, identity and/or *

Query Parameters

Name	Required	Type	Description
pageNumber	Yes	Integer	Page number

Response Headers

Header name	Description
Content-Encoding	Standard HTTP header. Header value based on Accept-Encoding Request header.
Content-Type	Standard HTTP header.
Transfer-Encoding	Standard HTTP header. Header value will be set to Chunked if Accept-Encoding header is specified.
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.
X-FactSet-Api-RateLimit-Limit	Number of allowed requests for the time window.
X-FactSet-Api-RateLimit-Remaining	Number of requests left for the time window.
X-FactSet-Api-RateLimit-Reset	Number of seconds remaining till rate limit resets.

Response Body Parameters

Header name	Description
data	Parent object of the response body.
meta	Contains pagination details.

Data object includes following parameters -

Header name	Description
status	Status of the calculation id . E.g. completed, failed, queued, executing etc.
units	Number of units for a calculation request.
requestTime	Time at which the calculation request was made.
lastPollTime	Time at which the calculation was last polled.

Meta object includes following parameters -

Header name	Description
pageNumber	Number of the page requested.
pageSize	Number of requests in a page.
totalPages	Total number of pages at a given time
totalCalculation	Total number of calculations at a given time
nextPage	Following page number
lastPage	Previous page number

Returns

HTTP status code	Description
200	List of calculation requests.
400	Invalid page number.
401	Missing or invalid authentication.
403	User is forbidden with current credentials.
404	No calculation found.
406	Unsupported Accept header. Header needs to be set to application/json.

429	Rate limit reached. Wait till the time specified in Retry-After header value to make further requests.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in sometime.

Examples

```
Request:
GET  https://api.factset.com/analytics/engines/vault/v3/calculations?pageNumber=1

Response:
HTTP 200 OK

Response Headers:
x-datadirect-request-key: 62d7ef371709b08a
x-factset-api-request-key: 62d7ef3755f31322

Body:
{
  "data": {
    "389a96cbd59f427191a921a8f01fa455": {
      "status": "Completed",
      "units": 2,
      "requestTime": "2022-07-21T15:26:40.349594Z",
      "lastPollTime": "2022-07-21T15:26:40.539849Z"
    }
  },
  "meta": {
    "pagination": {
      "pageNumber": 1,
      "pageSize": 20,
      "totalPages": 1,
      "totalCalculations": 1,
      "nextPage": null,
      "previousPage": null
    }
  }
}
```

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3.1.6   Get Vault Calculations parameters by ID

GET /analytics/engines/vault/v3/calculations/{id}

Description

This endpoint that returns the calculation parameters passed for a calculation.

Path Parameters

Name	Required	Description
id	Yes	Calculation id. From url, provided from the location header in the Create and Run Vault calculation endpoint

Response Headers

Header name	Description
Content-Encoding	Standard HTTP header. Header value based on Accept-Encoding Request header.
Content-Type	Standard HTTP header.
Transfer-Encoding	Standard HTTP header. Header value will be set to Chunked if Accept-Encoding header is specified.
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.
X-FactSet-Api-RateLimit-Limit	Number of allowed requests for the time window.
X-FactSet-Api-RateLimit-Remaining	Number of requests left for the time window.
X-FactSet-Api-RateLimit-Reset	Number of seconds remaining till rate limit resets.

Returns

HTTP status code	Description
200	Expected response, returns the Vault calculation parameters.
400	Invalid identifier provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.

404	Calculation id not found.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in sometime.

Examples

```
Request:
GEThttps://api.factset.com/analytics/engines/vault/v3/calculations/f204d270049c49f1b0f307c602a4
0583


Response:
HTTP 200 OK


Response Headers:
x-datadirect-request-key: 60d1e3c90332a52d
x-factset-api-request-key: 60d1e3c9daa5b216


Body:
{
  "data": {
    "calc1": {
      "componentid": "b0ff076dff8640b1616462b82be1f21fbf23e0e9de62247f4a947b17f81c9a79",
      "account": {
        "id": "client:/bisam/repository/qa/small_port.acct"
      },
      "dates": {
        "startdate": "20180101",
        "enddate": "20180329",
        "frequency": "monthly"
      },
      "configid": "12ed7b1a-8ac2-4871-a7bf-2d5da5aaa116",
      "componentdetail": null
    },
    "calc2": {
      "componentid": "b75d10a84bbd26c9d0c91e78bc5723a4de70ffe4192070820b9788e382d17e42",
      "account": {
        "id": "client:/bisam/repository/qa/global.acct"
      },
```

```
     "dates": null,
     "configid": "c1671411-7807-4505-9296-989fe2ffc450",
     "componentdetail": null
   }
 },
 "meta": {
   "contentorganization": "simplifiedrow",
   "contenttype": "json"
 }
}
```

3.1.7   Cancel Multiple Calculations

DELETE /analytics/engines/vault/v3/calculations/{id}

Description

This endpoint is used to cancel a previously submitted request. Instead of doing a HTTP GET on the status URL, cancel the request by doing a HTTP DELETE.

Path Parameters

Name	Required	Description
id	Yes	Calculation id. From url, provided from the location header in the Create and Run Vault calculation endpoint

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.

Returns

HTTP status code	Description
204	Expected response, request was canceled successfully.

400	Invalid identifier parameter provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	There was no request for the identifier provided, or the request was already canceled for the provided identifier.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in sometime.

Examples

```
Request:
DELETE https://api.factset.com/analytics/engines/vault/v3/calculations/f204d270049c49f1b0f307c6
       02a40583


Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************


Response:
HTTP 204 No Content


Headers:
x-datadirect-request-key: 60d1e94c1925398b
x-factset-api-request-key: 60d1e94cfe20063e
```

3.2 Lookup APIs

3.2.1   Vault Components Lookup

GET /analytics/engines/vault/v3/components?document={documentname}

Description

This endpoint returns a list of components within a Portfolio Insight document. Run Multiple Calculations API expects component identifiers returned by this endpoint.

Component identifiers are of variable-length and are expected to change. Users should always use this API before calling Run Multiple Calculations API.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.

Accept	(Optional) Standard HTTP header. Value needs to be application/json.

Request Query Parameters

Parameter name	Data type	Description	Format
document	String	Portfolio Insight document name.	FactSet-root:/document-path. Possible values for FactSet-root are client, personal, super_client, or pa_documents. Document name must have .PAR extension

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.

Returns

HTTP status code	Description
200	Expected response.
400	Invalid query parameter/value provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Document not found.
406	Unsupported Accept header. Header needs to be set to application/json.
429	Rate limit reached. Wait till the time specified in Retry-After header value to make further requests.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out, Retry the request in sometime.

Examples

```
Request:
GET https://api.factset.com/analytics/engines/vault/v3/components?document=Client%3A%2Faapi%2FV
    AULT_QA_PI_DEFAULT_LOCKED


Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************
```

```
Response:
HTTP 200 Success

Headers:
x-datadirect-request-key: 60d2c4661d490582
x-factset-api-request-key: 60d2c466a6e71b04

Body:
{
  "B75D10A84BBD26C9D0C91E78BC5723A4DE70FFE4192070820B9788E382D17E42": {
    "name": "Performance Attribution",
    "category": "Performance / Fixed Income Attribution"
  },
  "B9F0CA1A272C4F1E0998BFADB53B7D7C046D4EA28D872B3D2533919A263D720D": {
    "name": "Attribution Over Time Chart",
    "category": "Performance / Fixed Income Attribution"
  }
}
```

3.2.2   Vault Component Settings Lookup

GET /analytics/engines/vault/v3/components/{id}

Description

This endpoint returns settings for a given vault component.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.
Accept	(Optional) Standard HTTP header. Value needs to be application/json.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.

Returns

HTTP status code	Description
200	Expected response.
400	Invalid component identifier.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Component not found.
406	Unsupported Accept header. Header needs to be set to application/json.
429	Rate limit reached. Wait till the time specified in Retry-After header value to make further requests.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out, Retry the request in sometime.

Examples

```
Request:
GET
https://api.factset.com/analytics/engines/vault/v3/components/B75D10A84BBD26C9D0C91E78BC5723A4D
E70FFE4192070820B9788E382D17E42


Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************

Response:
HTTP 200 Success

Headers:
x-datadirect-request-key: 60d2c5e035576ee2
x-factset-api-request-key: 60d2c5e053b6b592

Body:
{
  "id": "B75D10A84BBD26C9D0C91E78BC5723A4DE70FFE4192070820B9788E382D17E42",
  "account": {
    "id": "CLIENT:/BISAM/REPOSITORY/QA/GLOBAL.ACCT"
  },
  "benchmark": {
    "id": "MSCI_EM:AC_WORLD_FREE"
```

```
  },
  "currencyisocode": "EUR",
  "dates": {
    "startdate": "20171229",
    "enddate": "20180214",
    "frequency": "Single"
  },
  "snapshot": false,
  "name": "Performance Attribution",
  "category": "Performance / Fixed Income Attribution"
}
```

3.2.3 Vault Configurations Lookup

GET /analytics/engines/vault/v3/configurations?account={accountname}

Description

This endpoint returns a list of Vault configurations for an account. Run Multiple Calculations API expects configuration identifiers returned by this endpoint.

Users should always use this API before calling Run Multiple Calculations API.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.
Accept	(Optional) Standard HTTP header. Value needs to be application/json.

Request Query Parameters

Parameter name	Data type	Description	Format
account	String	User's FactSet account path.	Account must have .ACCT or .ACTM extension.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.

Returns

HTTP status code	Description
200	Expected response.
400	Invalid query parameter/value provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Account not found.
406	Unsupported Accept header. Header needs to be set to application/json.
429	Rate limit reached. Wait till the time specified in Retry-After header value to make further requests.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out, Retry the request in sometime.

Examples

Request:

GET   https://api.factset.com/analytics/engines/vault/v3/configurations?account=CLIENT%3A%2FBISAM%2F
       REPOSITORY%2FQA%2FSMALL_PORT.ACCT

Headers:
Authorization: Basic RkRTX0RFTU9fVVMt****************************

Response:
HTTP 200 Success

Headers:
x-datadirect-request-key: 60d2c7401e28c2ec
x-factset-api-request-key: 60d2c74095195100

Body:
```
{
  "12ed7b1a-8ac2-4871-a7bf-2d5da5aaa116": {
    "name": "Asset Type Brinson 3F without Currency"
  },
  "5c551841-5e6c-496e-8c82-c3487ca0c65f": {
    "name": "Market Cap Brinson 3F without Currency"
  }
}
```

3.2.4 Vault Configuration Settings Lookup

GET /analytics/engines/vault/v3/configurations/{id}

Description

This endpoint returns settings for a given vault configuration.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.
Accept	(Optional) Standard HTTP header. Value needs to be application/json.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.

Returns

HTTP status code	Description
200	Expected response.
400	Invalid component identifier.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Component not found.
406	Unsupported Accept header. Header needs to be set to application/json.
429	Rate limit reached. Wait till the time specified in Retry-After header value to make further requests
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out, Retry the request in sometime.

Examples

```
Request:
GET   https://api.factset.com/analytics/engines/vault/v3/configurations/E522DF7D-C286-4EF1-AE34-
      0AA104AF602F
```

```
Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************

Response:
HTTP 200 Success

Headers:
x-datadirect-request-key: 60d2c7b037bf7ba5
x-factset-api-request-key: 60d2c7b0abe6b172

Body:
{
  "name": "Sector 2F Brinson Without Currency",
  "accounts": {
    "client:/mac/demo/demo_ps_eq_em_country_alpha.acct": {
      "benchmarkCode": "MSCI_EM:EMF",
      "benchmarkName": "MSCI Emerging Markets",
      "maxEndDate": "20180611",
      "minStartDate": "20171231",
      "lockingDate": "20180405",
      "name": "Demo Emerging Market Country Alpha Portfolio"
    },
    "client:/mac/demo/demo_eq_eafe_port.acct": {
      "benchmarkCode": "MSCI:EAFE",
      "benchmarkName": "MSCI EAFE",
      "maxEndDate": "20180813",
      "minStartDate": "20180329",
      "lockingDate": "20180731",
      "name": "Demo EAFE Alpha Portfolio"
    },
    "client:/analytics/midwest_im/4303.acct": {
      "benchmarkCode": "RUSSELL:VALUE",
      "benchmarkName": "Russell 1000 Value",
      "maxEndDate": "20180629",
      "minStartDate": "20170629",
      "lockingDate": "20180531",
      "name": "4303"
    }
  }
}
```

3.2.5   Account Lookup

GET /analytics/lookups/v3/accounts/{path}

Description

This endpoint returns a list of account and composite files as well as the directories these files can be found under. Account names from this endpoint can be used in Run Multiple Calculations API. If no path is provided, a list of root level directories is returned, which can then be passed again to this endpoint to retrieve accounts and sub-directories.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.
Accept	(Optional) Standard HTTP header. Value needs to be application/json.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.
Age	Standard HTTP header. Age of cache in seconds.

Returns

HTTP status code	Description
200	Expected response.
400	Invalid query parameter or value provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Path not found.
406	Unsupported Accept header. Header needs to be set to application/json.
429	Rate limit reached. Wait till the time specified in Retry-After header value to make further requests.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in sometime.

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Examples

```
Request:
GET https://api.factset.com/analytics/lookups/v3/accounts/


Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************

Response:
HTTP 200 Success

Headers:
x-datadirect-request-key: 564d5a1d49ffluvj
x-factset-api-request-key: 60d2cbd4ffdfa73d

Body:
{
  "directories": [
    "Client:",
    "FactSet:"
  ]
}

Request:
GET https://api.factset.com/analytics/lookups/v3/accounts/Client%3Afolder1/folder2/

Headers:
Authorization: Basic RkRTX0RFTU9fVVMt***************************

Response:
HTTP 200 Success

Headers:
x-datadirect-request-key: 564d5a1d49ffluvj
x-factset-api-request-key: 60d2cbd4ffdfa73d

Body:
{
  "data": {
    "accounts": [
      "TEST.ACCT",
      "COMPOSITE.ACCT",
    ],
```

```
    "directories": [
      "test1",
      "test2"
    ]
  }
}
```

3.2.6   Frequency Lookup

GET /analytics/engines/vault/v3/frequencies

Description

This endpoint returns a list of supported frequencies.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.
Accept	(Optional) Standard HTTP header. Value needs to be application/json.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.

Returns

HTTP status code	Description
200	Expected response.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
406	Unsupported Accept header. Header needs to be set to application/json.
429	Rate limit reached. Wait till the time specified in Retry-After header value to make further requests.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in sometime.

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Examples

```
Request:
GET https://api.factset.com/analytics/engines/vault/v3/frequencies


Headers:
Authorization: Basic RkRTX0RFTU9fVVMt****************************


Response:
HTTP 200 Success


Headers:
x-datadirect-request-key: fns911nz73wv6hb4
x-factset-api-request-key: m2h184putr0jctn4


Body:
{
  "data": {
    "Single": {
      "name": "Single"
    },

    "FiscalYearly": {
      "name": "Fiscal Yearly"
    },
    "Annually": {
      "name": "Annually"
    },
    "SemiAnnually": {
      "name": "Semi Annually"
    },

    "Quarterly": {
      "name": "Quarterly"
    },
    "Monthly": {
      "name": "Monthly"
    },
    "Weekly": {
      "name": "Weekly"
    },

    "Daily": {
      "name": "Daily"
```

```
        }
    }

}
```

3.2.7   Dates Translation

GET

/analytics/engines/vault/v3/dates?startdate={startdate}&enddate={enddate}&componentid={componentid}&account={account}

Description

This endpoint converts part or the whole relative date to its absolute format, i.e., YYYYMMDD format. If the date specified is not a trading day, the API picks the closest trading day prior to the specified date.

Request Headers

Header name	Description
Authorization	Standard HTTP header. Value needs to use 'Basic <base64 encoded value>' format.
Accept	(Optional) Standard HTTP header. Value needs to be application/json.

Request Query Parameters

Parameter name	Data type	Required	Description	Format
startdate	String	No	Relative start date.	Supported Date Formats and Frequency Lookup API.
enddate	String	Yes	Relative end date.	Supported Date Formats and Frequency Lookup API.
componentid	String	Yes	The Vault component identifier to analyze.	Component identifier can be fetched using the Vault Component Lookup API.
account	String	Yes	User's FactSet account path.	Account must have .ACCT or .ACTM extension.

Response Headers

Header name	Description
X-DataDirect-Request-Key	FactSet's request key header.
X-FactSet-Api-Request-Key	Key to uniquely identify an Analytics API request. Only available after successful authentication.

Returns

HTTP status code	Description
200	Expected response.
400	Invalid query parameter/value provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Document or account not found.
406	Unsupported Accept header. Header needs to be set to application/json.
429	Rate limit reached. Wait till the time specified in Retry-After header value to make further requests.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Request timed out. Retry the request in sometime.

Examples

```
Request:
GET https://api.factset.com/analytics/engines/vault/v3/dates?startdate=-
3AY&enddate=1AY&componentid=7CF4BCEB46020A5D3C78344108905FF73A4937F5E37CFF6BD97EC29545341935&ac
count=test.acct


Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************

Response:
HTTP 200 Success

Headers:
x-datadirect-request-key: e43vazt21fr6ln83
x-factset-api-request-key: 0j2zg6lsxcfqx4vy

Body:
{
 "enddate": "20160303"
}
```

```
Request:
```

```
GET https://api.factset.com/analytics/engines/vault/v3/dates?startdate=-3AY&enddate=-
1AY&componentid=7CF4BCEB46020A5D3C78344108905FF73A4937F5E37CFF6BD97EC29545341935&account=test.a
cct


Headers:
Authorization: Basic RkRTX0RFTU9fVVMt****************************


Response:
HTTP 200 Success


Headers:
x-datadirect-request-key: 4cqpdv2nn14ln8gv
x-factset-api-request-key: 6pwnk7iavmt2j434


Body:
{
        "startdate": "20160203",
        "enddate": "20160303"
}
```

Supported Date Formats

Absolute Date Formats

Format	Description	Examples
MM/DD/YYYY	A day.	7/11/2016, 1/1/2015, 3/6/2014.
MM/YYYY	A month end.	6/2016, 4/2015, 11/2014, 5/2013.
YYYY/MMF	A fiscal quarter end.	2016/3F, 2015/2F.
YYYY/MMC	A calendar quarter end.	2016/1C, 2015/3C.
YYYY	A fiscal year end.	2016, 2015.

Relative Date Formats

Format	Examples
D	0D is the most recently completed trading day, -1D is one trading day prior.
AW	0AW is the most recently completed trading day, -1AW is the one actual week (7 days) prior to the most recently completed trading day.

W	0W is the last day of the most recently completed trading week (usually Friday), -1W is the last trading day of the prior week.
AM	0AM is the most recently completed trading day, -1AM is the same day, one actual month prior.
M	0M is the last trading day of the most recent month, -1M is the last trading day of the prior month.
Q	0Q is the last trading day of the company's most recent fiscal quarter, -1Q is the last day of the prior fiscal quarter.
CQ	0CQ is the last trading day of the most recent calendar quarter (March, June, September, or December), -1CQ is the last trading day of the prior calendar quarter.
AY	0AY is the most recently completed trading day, -1AY is one actual year (365 days) prior.
Y	0Y is the last trading day of the company's most recent fiscal year, -1Y is the last trading day of the prior fiscal year.
CY	0CY is the last trading day of the most recent calendar year (the last trading day in December), -1CY is the last trading day of the prior calendar year.
M/D/Y	M, D, and Y can be zero, negative, or a positive number. Examples: 0/0/-1 is the day one year ago, 0/-7/0 is the day one week ago, -1/0/0 is the day one month ago, 12/31/-1 is the day at the end of last year.

Special FactSet Date Identifiers

The user needs to set the following properties in their account (.ACCT/.ACTM file) if they wish to use these identifiers:

Identifier	Definition
INCEPTION	Date the account was created. This typically corresponds to the first day of data in the holdings portfolio.
ALTERINCEPTION	Alternative date option to define when the portfolio was created. This is helpful in cases where the inception date isn't the official day the portfolio was created.
TERMINATION	Date the account is terminated.
END_OF_LAST_FISCAL	End of last fiscal year.

4. Troubleshooting

The following steps are recommended to troubleshoot errors from any of the different APIs:

- Calculation specific endpoints (POST, PUT, GET Status, GET Results, GET All Calculations)
  - Record the below response headers so that FactSet's API support team can analyze your specific request/response:
    - x-factset-api-calculation-instance-id
    - x-factset-api-calculation-id
    - x-datadirect-request-key

- o Record the response body when the response is an error response. All HTTP status codes equal to and greater than 400 are considered error responses.

    o Reach out to your account team with the above information for assistance.

- • Lookups endpoints (GET Components, GET Components by id, GET Accounts, GET Groups etc)

    o Record the x-datadirect-request-key response header so that FactSet's API support team can analyze your specific request/response.

    o Record the response body when the response is an error response. All HTTP status codes equal to and greater than 400 are considered error responses.

    o Reach out to your account team with the above information for assistance.

5. Version Upgrade

FactSet will support old API versions for a limited time. The actual support time will depend on the API and the release stage (i.e., beta or production). All breaking changes, functionality additions, and bug fixes across earlier versions will be documented in the changelog.

FactSet's API engineering team will work with the clients to ensure smooth transition to newer versions.

6. Appendix: Run Multiple Calculations Request Body Scenarios

Below table lists down some multiple calculation scenarios to help understand the points breakdown.

Request Body	Description
| ```json
{
  "data": {
    "calc1": {
      "componentid":
        "7CF4BCEB46020A5D3C78344108905FF73A4937F5E37CFF6BD97EC29545341935",
      "account": {
        "id": "CLIENT:/MAC/DEMO/DEMO_PS_EQ_EM_COUNTRY_ALPHA.ACCT"
      },
      "dates": {
        "startdate": "20180501",
        "enddate": "20180601",
        "frequency": "Monthly"
      },
      "configid": "e95ef921-b4d4-4bb7-93ba-60eca8e3247a"
    }
  },
  "meta": {
    "contentorganization": "SimplifiedRow",
    "contenttype": "Json"
  }
``` | No. of Calculations: 1<br><br>Calculation 1<br>No. of Points: 1<br><br>Total<br>No. of Points: 1 |

```
}
```

```
{
  "data": {
    "calc1": {
      "componentid":
        "B0FF076DFF8640B1616462B82BE1F21FBF23E0E9DE62247F4A947B17F81C9A79",
      "account": {
        "id": "CLIENT:/BISAM/REPOSITORY/QA/SMALL_PORT.ACCT"
      },
      "dates": {
        "startdate": "20180101",
        "enddate": "20180329",
        "frequency": "Monthly"
      },
      "configid": "12ed7b1a-8ac2-4871-a7bf-2d5da5aaa116"
    },
        "calc2": {
      "componentid":
        "B75D10A84BBD26C9D0C91E78BC5723A4DE70FFE4192070820B9788E382D17E42",
      "account": {
        "id": "CLIENT:/BISAM/REPOSITORY/QA/SMALL_PORT.ACCT"
      },
      "configid": "c1671411-7807-4505-9296-989fe2ffc450"
    }
  },
  "meta": {
    "contentorganization": "SimplifiedRow",
    "contenttype": "Json"
  }
}
```

No. of Calculations: 2

Calculation 1
No. of Points: 1

Calculation 2
No. of Points: 1

Total
No. of Points: 2