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SPAR ENGINE API - VERSION 2.0
Developer's Manual and Reference
Jan 2020

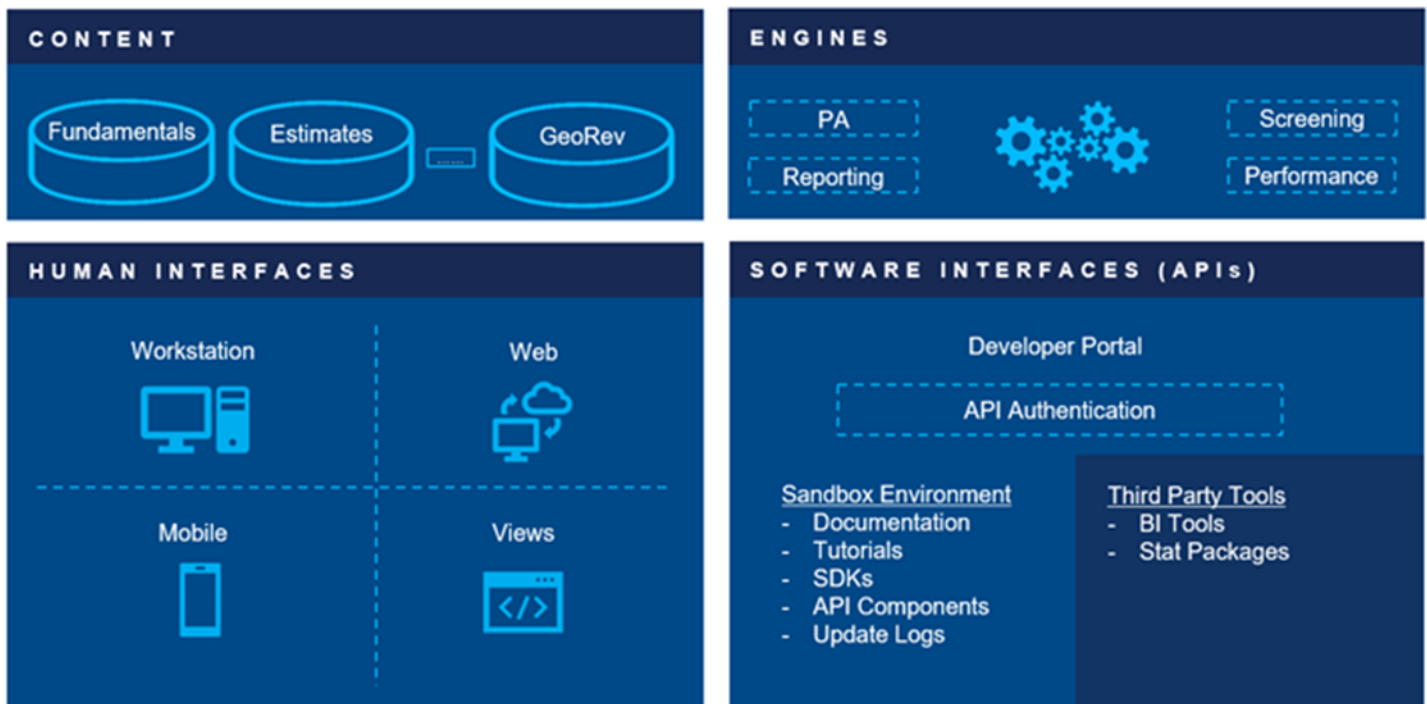# SPAR Engine API – Version 2.0

Contents

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 Engine, 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. SPAR Engine APIs

Leverage the SPAR Engine API (Style, Performance, and Risk) to monitor your portfolios' returns against equity and fixed income benchmarks, with more than 70 Modern Portfolio Theory risk statistics such as beta, standard deviation, r-squared, alpha, and tracking error.

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/v2/calculations

Description

This endpoint runs multiple calculations on SPAR Engine 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

The request body accepts a collection of calculation parameters. The parameters are outlined below:

Parameter name	Data type	Required	Description	Format
componentid	String	Yes	The SPAR Engine component identifier to analyze.	Component ID can be fetched using the SPAR Engine Components Lookup API.
accounts	Array	Yes	List of user's FactSet account paths OR benchmarks.	Account Identifier must have .ACCT or .ACTM extension or BENCH: prefix. Please refer https://my.apps.factset.com/oa/pages/21344#create for creating accounts that can be uploaded through nightly parsers or https://developer.factset.com/api-catalog/model-portfolio-api for creating prospective accounts with model holdings.
benchmark	Object	No	User's FactSet account path OR a benchmark.	Account Identifier must have .ACCT or .ACTM extension or BENCH: prefix.
dates	Object	No	Date range(s) and frequency to run against. Object takes frequency, startdate and enddate.	Supported Date Formats and Frequency Lookup API.

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.
X-FactSet-Api-Units-Limit	Maximum units limit across all requests.
X-FactSet-Api-Units-Remaining	Number of units remaining till unit limit reached.
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
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.
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	Service unavailable. Retry the request in sometime.

Remarks

- Maximum 500 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 SPAR Engine template.

Examples

```
Request:
POST https://api.factset.com/analytics/engines/v2/calculations
Headers:
content-type: application/json
Authorization: Basic RkRTX0RFTU9fVVVMt*****************************
Accept-Encoding:  gzip
content-length: 201
content-type: application/json
Body:
{
  "spar": {
    "1": {
      "componentid": "8DB4D9629C65705DEC03B0796FCC39DB1ADBBE0BD1F00D3BD46CC7E6BEEF2872",
      "accounts": [
        {
          "id": "R.1000",
          "returntype": "GTR",
          "prefix": "RUSSELL"
```

```
        }
      ],
      "benchmark": {
        "id": "R.2000",
        "returntype": "GTR",
        "prefix": "RUSSELL"
      },
      "dates": {
        "startdate": "-2M",
        "enddate": "0",
        "frequency": "Monthly"
      }
    },
    "2": {
      "componentid": "FB2C22B16A3B85F228B1B13CF83C0AC5721B5C143F511B1F1471A6BB644AF916",
      "accounts": [
        {
          "id": "R.1000",
          "returntype": "GTR",
          "prefix": "RUSSELL"
        },
        {
          "id": "R.2000",
          "returntype": "GTR",
          "prefix": "RUSSELL"
        }
      ],
      "benchmark": {
        "id": "R.2000",
        "returntype": "GTR",
        "prefix": "RUSSELL"
      }
    }
  }
}
```

Response:

```
HTTP 202 Accepted
```

Headers:

location:https://api.factset.com/analytics/engines/v2/calculations/B6FE1F7C85091DEBA2C34AAAB7B3DAD70745A7A2A6AF99E718066EF5ACC5DFC6

```
x-datadirect-request-key: 0v5f3hiw2tag7g91
x-factset-api-request-key: 4wap85dyj7bfec79
```

3.1.2   Get Multiple Calculations Status

GET /analytics/engines/v2/calculations/{id}

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.

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.
Cache-Control	Standard HTTP header. Header will specify max-age in seconds. Polling can be adjusted based on the max-age value.

Returns

HTTP status code	Description
200	Expected response. The response body contains status information of the entire request and each individual calculation.
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.
406	Unsupported Accept header. Header needs to be set to application/json.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Service unavailable. Retry the request in sometime

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Examples

Request:

GET   https://api.factset.com/analytics/engines/v2/calculations/B6FE1F7C85091DEBA2C34AAAB7B3DAD 70745A7A2A6AF99E718066EF5ACC5DFC6

Headers:

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

Response:

HTTP 200 Success

Headers:

x-datadirect-request-key: 3rqwlpmnxuqj6jkx
x-factset-api-request-key: jijlvvdkwion2466

Body:

```
{
  "status": "Executing",
  "units": 3,
  "calculations": {
    "1": {
      "status": "Success",
      "result":
       "https://api.factset.com/analytics/engines/v2/calculations/B6FE1F7C85091DEBA2C34AAAB7B3D
       AD70745A7A2A6AF99E718066EF5ACC5DFC6/results/1"
    },
    "2": {
      "status": "Executing"
    }
  }
}
```

3.1.3   Get All Active Calculations

GET /analytics/engines/v2/calculations/

Description

This is the endpoint to check on the progress of all active requests.

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	List of all active requests.
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.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Service unavailable. Retry the request in sometime.

Examples

Request:

GET https://api.factset.com/analytics/engines/v2/calculations/

Headers:

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

Response:

HTTP 200 OK

Headers:

x-datadirect-request-key: 1dn9wrqj9w9juddx
x-factset-api-request-key: 5jwq73yzx5qvni3q

Body:

```
{
  "C59B3879C0BB6A306DD1423A5FF6B92C279FD23C2982C24F79CB56C9E555150B": {
    "status": "Executing",
    "units": 5,
    "requestTime": "2019-06-03T17:52:01.632Z",
    "lastPollTime": "2019-06-03T17:52:01.632Z"
  },
  "B6FE1F7C85091DEBA2C34AAAB7B3DAD70745A7A2A6AF99E718066EF5ACC5DFC6": {
    "status": "Executing",
    "units": 3,
    "requestTime": "2019-06-03T17:52:01.632Z",
    "lastPollTime": "2019-06-03T17:52:01.632Z"
  },
  "0D3FC7C8623352648D743E955A2705FF8E9E3762FDA60DC84D20A20680E1E4E0": {
    "status": "Executing",
    "units": 2,
    "requestTime": "2019-06-03T17:52:01.632Z",
    "lastPollTime": "2019-06-03T17:52:01.632Z"
  }
}
```

3.1.4 Cancel Multiple Calculations

DELETE /analytics/engines/v2/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.

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	Service unavailable. Retry the request in sometime.

Examples

```
Request:
DELETE https://api.factset.com/analytics/engines/v2/calculations/B6FE1F7C85091DEBA2C34AAAB7B3DA
       D70745A7A2A6AF99E718066EF5ACC5DFC6


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


Response:
HTTP 204 No Content


Headers:
x-datadirect-request-key: v6jhud486eq6u6ys
x-factset-api-request-key: 19u73up93ehgyz12
```

3.2 Lookup APIs

3.2.1   Components Lookup

GET /analytics/lookups/v2/engines/spar/components?document={documentname}

Description

This endpoint returns a list of components within a SPAR 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	SPAR document name.	FactSet-root:/document-path. Possible values for FactSet-root are client, personal, super_client, or pa_documents.

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.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Service unavailable. Retry the request in sometime.

Examples

<u>Request</u>:

GET https://api.factset.com/analytics/lookups/v2/engines/spar/components?document=Client%3AFoo

<u>Headers</u>:

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

<u>Response</u>:

HTTP 200 Success

<u>Headers</u>:

x-datadirect-request-key: u5oyzlenrfe1so0b
x-factset-api-request-key: l9k49bj1ra31yuos

<u>Body</u>:

```
{
  "8DB4D9629C65705DEC03B0796FCC39DB1ADBBE0BD1F00D3BD46CC7E6BEEF2872": {
    "name": "Returns Data",
    "category": "Raw Data / Returns"
  },
  "FB2C22B16A3B85F228B1B13CF83C0AC5721B5C143F511B1F1471A6BB644AF916": {
    "name": "Percentile Ranking",
    "category": "Peer Analysis / Universe - Multi-Statistic"
  }
}
```

3.2.2   Account Lookup

GET /analytics/lookups/v2/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.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Service unavailable. Retry the request in sometime.

Examples

```
Request:
GET https://api.factset.com/analytics/lookups/v2/accounts/
Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************
Response:
HTTP 200 Success
Headers:
x-datadirect-request-key: 564d5a1d49ffluvj
x-factset-api-request-key: 1gm8zeczlyj3w6bd

Body:

{
  "directories": [
    "Client:",
    "Factset:"
  ]
}
```

```
Request:
GET https://api.factset.com/analytics/lookups/v2/accounts/Client%3Afolder1/folder2/
Headers:
Authorization: Basic RkRTX0RFTU9fVVMt*****************************
Response:
HTTP 200 Success
Headers:
x-datadirect-request-key: 564d5a1d49ffluvj
x-factset-api-request-key: 1gm8zeczlyj3w6bd

Body:
{
  "accounts": [
    "ACCOUNT1.ACCT",
    "COMPOSITE1.ACTM"
  ],
  "directories": [
    "folder3",
    "folder4"
  ]
}
```

3.2.3   Frequency Lookup

GET /analytics/lookups/v2/engines/spar/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.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Service unavailable. Retry the request in sometime.

Examples

```
Request:
GET https://api.factset.com/analytics/lookups/v2/engines/spar/frequencies

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

Response:
HTTP 200 Success

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

Body:
{
  "Annually": {
    "name": "Annually"
  },
  "Quarterly": {
    "name": "Quarterly"
  },
  "Monthly": {
    "name": "Monthly"
  },
  "Weekly": {
    "name": "Weekly"
  },
  "Daily": {
    "name": "Daily"
  }
}
```

3.2.4 Dates Translation

GET

/analytics/lookups/v2/engines/spar/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 SPAR Engine component identifier to analyze.	Component identifier can be fetched using the SPAR Engine 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.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Service unavailable,Retry the request in sometime.

Examples

```
Request:
GET      https://api.factset.com/analytics/lookups/v2/engines/spar/dates?enddate=-
         1M&componentid=%20782DA0A0C9CCCA9F80C2F3622FC1373AED30E1B7C1CF58F4677FE8C4C4901A53&accou
         nt=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/lookups/v2/engines/spar/dates?enddate=-1M&startdate=-
         2M&componentid=782DA0A0C9CCCA9F80C2F3622FC1373AED30E1B7C1CF58F4677FE8C4C4901A53&account=
         test.acct


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.

3.2.5   Benchmark Lookup

GET /analytics/lookups/v2/engines/spar/benchmarks?id={benchmarkIdentifier}

Description

This endpoint returns the details of a given SPAR benchmark identifier. Run Multiple Calculations API expects benchmark identifiers returned by this endpoint.

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
id	String	SPAR benchmark identifier.	FactSet's SPAR benchmark identifier 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
200	Expected response.
400	Invalid query parameter/value provided.
401	Missing or invalid authentication.
403	User is forbidden access with current credentials.
404	Benchmark identifier not found.
406	Unsupported Accept header. Header needs to be set to application/json.
500	Server error. Log the X-DataDirect-Request-Key header to assist in troubleshooting.
503	Service unavailable,Retry the request in sometime.

Examples

```
Request:
GET https://api.factset.com/analytics/lookups/v2/engines/spar/benchmarks?id=R.1000


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

Response:
HTTP 200 Success

Headers:
x-datadirect-request-key: xpfalpmac31sqiyc
x-factset-api-request-key: 8rbye9jnec26bkxj

Body:
{
  "id": "R.1000",
  "name": "Russell 1000",
  "identifiers": [
    {
      "id": "R.1000",
      "returntype": "P",
      "prefix": "RUSSELL_P"
    },
    {
      "id": "R.1000",
      "returntype": "GTR",
```

```
      "prefix": "RUSSELL"
    },
    {
      "id": "R.1000",
      "returntype": "NTR",
      "prefix": "RUSSELL_N"
    }
  ]
}
```

4. Troubleshooting

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

- Record the X-DataDirect-Request-Key response header so that FactSet's API engineering team can analyze your specific request/response.

- 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.

- 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
```{ "spar": { "1": { "componentid": "8DB4D9629C65705DEC03B0796FCC39DB1ADBBE0BD1F00D3BD46CC7E6BEEF2872", "accounts": [{ "id": "R.1000", "returntype": "GTR", "prefix": "RUSSELL" }, { "id": "R.2000", "returntype": "GTR", "prefix": "RUSSELL" }], "benchmark": { "id": "R.2000", "returntype": "GTR", "prefix": "RUSSELL" }, "dates": { "startdate": "-2M", "enddate": "0", "frequency": "Monthly" } } } }```	No. of Calculations: 1 <u>Calculation 1</u> No. of Accounts: 2 No. of Points: 2 <u>Total</u> No. of Points: 2
```{ "spar": { "1": { "componentid": "8DB4D9629C65705DEC03B0796FCC39DB1ADBBE0BD1F00D3BD46CC7E6BEEF2872", "accounts": [{ "id": "R.1000", "returntype": "GTR", "prefix": "RUSSELL" }], "benchmark": { "id": "R.2000", "returntype": "GTR", "prefix": "RUSSELL" }, "dates": {```	No. of Calculations: 2 <u>Calculation 1</u> No. of Accounts: 1 No. of Points: 1 <u>Calculation 2</u> No. of Accounts: 2 No. of Points: 2 <u>Total</u> No. of Points: 1 + 2 = 3

```
      "startdate": "-2M",
      "enddate": "0",
      "frequency": "Monthly"
    }
  },
  "2": {
    "componentid":
      "FB2C22B16A3B85F228B1B13CF83C0AC5721B5C143F511B1F1471A6BB644AF916",
    "accounts": [
      {
        "id": "R.1000",
        "returntype": "GTR",
        "prefix": "RUSSELL"
      },
      {
        "id": "R.2000",
        "returntype": "GTR",
        "prefix": "RUSSELL"
      }
    ],
    "benchmark": {
      "id": "R.2000",
      "returntype": "GTR",
      "prefix": "RUSSELL"
    }
  }
 }
}
```