

**FACTSET** › SEE THE ADVANTAGE

# STACH FORMAT DOCUMENTATION - VERSION 1.0 DEVELOPER'S MANUAL AND REFERENCE SEPT 2019

Document Version 1.2



## STACH Format Documentation – Version 1.0

### Contents

1.	Introduction .....	2
2.	Format Features .....	2
2.1	Primary tables .....	2
2.2	Tables .....	3
2.3	Table Schema .....	3
2.4	Column Schema.....	4
2.5	Table Data .....	6
2.6	Row Data .....	6
2.7	Column Data .....	7
2.8	Metadata .....	8
2.9	Column Headers .....	10
2.10	Version.....	11
3.	Appendix: An example of the json stach format .....	12

## 1. Introduction

Given the lack of industry standard, FactSet’s engineering team developed the STACH format as the JSON standard for representing tabular data. As this is a new standard, there will be ongoing changes to the format. To simplify integration around this standard, FactSet will provide language classes to represent the format for the commonly used languages.

Please refer to Appendix of the API documentation for an example of STACH format.

## 2. Format Features

### 2.1 Primary tables

STACH aims to represent complex Portfolio Analysis (PA) workflows using tabular representation with the following characteristics:

- Tables store derived data and its associated metadata.
- Package houses all associated tables in each response.
- Primary data tables within a package are included in the “primaryTableIds” property of the JSON.

```
...
"primaryTableIds": [
  "main"
],
...
```

## 2.2 Tables

This property details all tables in the response. It is a dictionary mapping the table identifiers to its contents.

```
...
"primaryTableIds": [
  "main"
],
"tables": {
  "main": {
    "definition": {...},
    "data": {...}
  },
  "headers": {
    "definition": {...},
    "data": {...}
  }
}
...
```

In the above example, primary table can be found in the “primaryTableIds” property. The contents of the primary table can be found in the “tables” object. Tables “main” and “headers” are shown for illustration and should not be hardcoded.

## 2.3 Table Schema

This property defines the table schema including header table location and its columns.

```
...
"definition": {
  "headerTableId": "headers",
  "columns": [...]
}
...
```

## 2.4 Column Schema

This property defines the column schema. A column can either be a dimension column or a simple data column. A dimension column contains additional information about another peer column.

```

...
"definition": {
  "headerTableId": "headers",
  "columns": [{
    "id": "c_continent1",
    "name": "continent1",
    "description": "Continent 1",
    "type": "STRING",
    "isDimension": true,
    "parentId": "c_region"
  },{
    "id": "c_continent2",
    "name": "continent2",
    "description": "Continent 2",
    "type": "DOUBLE",
    "format": {
      "format": "{0:0.00;-0.00;--}",
      "nullFormat": "--",
      "halign": "RIGHT"
    }
  },
  {...}
]
},
"data": {...}
...

```

## Hidden Columns

A column of data can represent metadata which can be used for interactive rendering (e.g., for a tooltip or hyperlink). In this case, you can hide a column is set to hidden by setting the “isHidden” property to true.

## Data Types

Table 1 lists the supported data types.

**Table 1**

Type	Null Value Placeholder
double	“NaN”
Duration	“3652500.00:00:00.9999999”
float	“NaN”
int32	2147483647
int64	9223372036854775807
string	“null”
Timestamp	“12/31/9999 11:59:59 PM”

## Column Format

The “nullFormat” property denotes the null value for a data item. The null value placeholder for each data type is tabulated in Table 1.

The “format” property is used to render a raw value into a human readable string. Refer [Microsoft’s Formatting Types for what strings can be used.](#)

The “halign” and “valign” properties are used to specify how the data should be aligned within the table cell.

## 2.5 Table Data

This property defines the table contents.

```
...  
"definition": {...},  
"data": {  
  "rows": [...],  
  "columns": {...},  
  "metadata": {...}  
}  
...
```

## 2.6 Row Data

This property defines the row contents.

```
...  
"data": {  
  "rows": [{  
    "id": "r_0"  
  },  
  {...},  
  ...  
],  
  "columns": {...},  
  "metadata": {...}  
}  
...
```

## 2.7 Column Data

This property defines the column data.

```

...
"data": {
  "rows": [...],
  "columns": {
    "c_region": {...},
    "c_continent1": {
      "stringArray": {
        "values": [
          "null",
          "null",
          "null",
          "Americas",
          "Asia Pacific",
          "Europe",
          "Middle East and Africa",
          "null",
          "null",
          "null",
          "null",
          "null",
          "null",
          "null",
          "null",
          "null"
        ]
      }
    },
    "c_continent2": {...},
    "c_f0": {...},
    "c_b0": {...},
    ...
  },
  "metadata": {...}
}
...

```

## 2.8 Metadata

Metadata helps in providing the information beyond the raw data, e.g. accounts, benchmarks, dates etc. values used while creating the calculation. It can be attributed to the entire table, or to a particular column, row or a cell.

The locations object specifies to what level the metadata is applicable. The items object defines the actual metadata item whose reference is present in location object. Each item key can either be a value in itself or a reference to another table in the JSON.

```

...
"data": {
  "rows": [...],
  "columns": {...},
  "metadata": {
    "items": {
      "m_h1": {
        "name": "Currency",
        "stringValue": "USD"
      },
      "m_h2": {
        "name": "Benchmark",
        "stringValue": "BENCH:SP50"
      },
      "m_fundUrl": {
        "name": "fundUrl",
        "refValue": {
          "tableId": "main",
          "columnId": "c_fundUrl"
        }
      },
      "m_regionUrl": {...},
      "m_rm": {...}
    },
    "locations": {
      "table": [
        "m_h1",
        "m_h2"
      ],
      "columns": {
        "c_f0": {
          "ids": [
            "m_format",
            "m_fundUrl"
          ]
        }
      }
    }
  }
}

```



```
    ]  
  },  
  "c_b0": {  
    "ids": [  
      "m_format"  
    ]  
  },  
  "c_region": {  
    "ids": [  
      "m_regionUrl",  
      "m_rm"  
    ]  
  }  
}  
}  
}  
}  
...  
}
```

## 2.9 Column Headers

Column Header tables contain additional information about columns in the primary tables. Every row in a column header table links to a column in the primary table.

```
...
"tables": {
  "main": {
    "definition": {
      "headerTableId": "headers",
      "columns": [...]
    },
    "data": {...}
  },
  "headers": {
    "definition": {
      "columns": [...]
    },
    "data": {
      "rows": [...],
      "columns": {...},
      "metadata": {...}
    }
  }
}
...
```

**Example**

	2017					
	Exposure		Total Risk		Contribution to Risk	
	Fund	Bench	Fund	Bench	Fund	Bench
Max	88.3	89.62	17.17	15.67	86.07	89.18
Total	100	100	8.6	8.38	100	100
Developed Markets	88.3	89.62	8.51	8.39	86.07	89.18
Americas	46.03	54.98	10.21	9.63	50.74	61.23
Asia Pacific	9.09	12.48	11.94	10.06	7.37	9.77
Europe	33.15	21.95	8.71	8.28	27.96	17.93
Middle East and Africa		0.21		13.58		0.24
Emerging Markets	8.71	7.76	14.12	10.65	10.48	8.17
Americas	0.3	1.12	22.7	15.44	0.36	1.41
Asia Pacific	8.41	5.41	14.22	11.02	10.12	5.47
Europe		0.33		12.78		0.25
Middle East and Africa		0.89		14.92		1.03
Frontier Markets	0.36		17.17		0.19	
Other		0.53		15.67		0.59
[Cash]	0.15		8.45		0.06	

The above table can have its own column header table rotated 90° as shown below:

Year	Category	Portfolio Type
2017	Exposure	Fund
2017	Exposure	Bench
2017	Total Risk	Fund
2017	Total Risk	Bench
2017	Contribution to Risk	Fund
2017	Contribution to Risk	Bench

2.10 Version

This property defines the version of STACH format.

```
...
"version": "1.0"
...
```

## 3. Appendix: An example of the json stach format

```

{
  "version": "1.0",
  "primaryTableIds": [
    "e15e51d2-1e75-43c7-a354-d0cee6ea3550"
  ],
  "tables": {
    "e15e51d2-1e75-43c7-a354-d0cee6ea3550": {
      "definition": {
        "headerTableId": "c59b707f-6f37-45f1-9408-64d0155afbbc",
        "columns": [
          {
            "id": "ea15e0a1-6462-4fd6-94fb-dd7d39891e07",
            "name": "total0",
            "type": "STRING",
            "isDimension": true
          },
          {
            "id": "ab21a27e-dfe6-49a3-9761-5ddff09cafe2",
            "name": "EndingWeight:FACTSET099:5",
            "description": "Port.+Weight",
            "type": "DOUBLE",
            "headerId": "90d347a1-4657-45e8-9a93-61037cbfe75f",
            "format": {
              "format": "{0:0.00;-0.00;--}",
              "nullFormat": "--"
            }
          },
          {
            "id": "22fdd939-d901-4d9d-a653-ade74781ac9d",
            "name": "EndingMarketValue:FACTSET0102:0",
            "description": "Port.+Ending+Market+Value",
            "type": "DOUBLE",
            "headerId": "f14c1a47-e36a-42fd-99fe-d2f97eb6aa37",
            "format": {
              "format": "{0:0.00;-0.00;--}",
              "nullFormat": "--"
            }
          }
        ]
      }
    }
  }
}

```

```

    }
  ]
},
"data": {
  "rows": [
    {
      "id": "68d50331-fb7d-4799-a37d-f6cee69be59e"
    },
    {
      "id": "d74cf026-9081-4dd1-8a44-98834d2824ac"
    },
    {
      "id": "4e04aa27-c8d8-4e41-9cf2-2aced1759d12"
    },
    {
      "id": "008bb9e5-6105-4fc1-bc37-07a4825d733d"
    },
    {
      "id": "05362a8f-5eac-4e6d-9512-34b34e7f3fb7"
    },
    {
      "id": "a582e499-2335-4a7f-8c93-f9b5e91772fb"
    },
    {
      "id": "d4a3da49-64a3-43e4-aed3-d8a8e88a5bdc"
    },
    {
      "id": "20408876-a9b7-4523-b590-7d296e6be13f"
    },
    {
      "id": "99e57c2c-aa8b-4cc8-a3a5-241d03df80e5"
    },
    {
      "id": "3599d49f-d517-47df-88cb-234fbb42a487"
    },
    {
      "id": "0d19dff3-e8c3-4835-abfc-dce49ab59766"
    },
    {
      "id": "e72ec3ba-646d-4a3d-820a-dc5ce1e0c475"
    },
    {

```

```
"id": "219326a0-d545-48b4-9d60-3c44233dfd4d"  
},  
{  
  "id": "c20f2df3-5101-405c-bc7f-a1ab48f33661"  
},  
{  
  "id": "94aa87c6-2173-4aa9-a199-7e271be70f8d"  
},  
{  
  "id": "01000ad7-0ee6-497e-a5d0-cd78a9e9453d"  
},  
{  
  "id": "5ec585b4-1d43-4e9a-8d44-56b401753e10"  
},  
{  
  "id": "3c7c3ed9-e55d-49f5-acba-989f861f0320"  
},  
{  
  "id": "c185b104-7c08-4fe7-b654-cf1e31a07b19"  
},  
{  
  "id": "daa77e16-8d4f-4d5d-be0a-809d3746a1ea"  
},  
{  
  "id": "707f04e6-6ffd-47ef-941d-8b0885bd9f2e"  
},  
{  
  "id": "3fcc4824-cd2a-4b91-8668-4027d579cc59"  
},  
{  
  "id": "027c6995-5009-4232-8cc3-584d695c6950"  
},  
{  
  "id": "eb90a0d1-1b84-4723-afc9-c3feced1a897"  
},  
{  
  "id": "de951b83-eec5-4a1c-9abc-f7c9ea94c132"  
},  
{  
  "id": "63db540f-2a4c-4b2e-91b7-4ec8b9b26c53"  
},  
{
```

```

    "id": "ab6e13bb-89e7-4080-bf11-d45ae855d69b"
  },
  {
    "id": "ebd2a781-cc9d-4d65-a165-1e2569844f94"
  },
  {
    "id": "2b214b16-349e-48fe-98c8-fc6c40374231"
  },
  {
    "id": "eb1b03f6-9639-4084-bd4d-bf42192e1eec"
  },
  {
    "id": "102361d7-4a45-4137-bc52-070c35eb4323"
  }
],
"columns": {
  "ea15e0a1-6462-4fd6-94fb-dd7d39891e07": {
    "stringArray": {
      "values": [
        "Total",
        "Asian Paints Ltd.",
        "Axis Bank Limited",
        "Bajaj Auto Limited.",
        "Bajaj Finance Limited",
        "Bajaj Finserv Limited",
        "Bharti Airtel Limited",
        "HCL Technologies Limited",
        "HDFC Bank Limited",
        "Hindustan Unilever Limited",
        "Housing Development Finance Corporation Limited",
        "ICICI Bank Limited",
        "IndusInd Bank Ltd.",
        "Infosys Limited",
        "ITC Limited",
        "Kotak Mahindra Bank Limited",
        "Larsen & Toubro Ltd.",
        "Mahindra & Mahindra Ltd.",
        "Maruti Suzuki India Limited",
        "Nestle India Ltd.",
        "NTPC Limited",
        "Oil & Natural Gas Corp. Ltd.",
        "Power Grid Corporation of India Limited",

```

```
"Reliance Industries Limited",
"State Bank of India",
"Sun Pharmaceutical Industries Limited",
"Tata Consultancy Services Limited",
"Tata Steel Limited",
"Tech Mahindra Limited",
"Titan Company Limited",
"UltraTech Cement Limited"
]
}
},
"ab21a27e-dfe6-49a3-9761-5ddff09cafe2": {
  "doubleArray": {
    "values": [
      100,
      1.88704275075372,
      2.48894594594584,
      0.951290009541964,
      1.96226649281912,
      0.927512978779411,
      3.28747887030914,
      1.80676312783847,
      11.602008045367,
      4.82612465165038,
      7.73642822709929,
      5.99235637303858,
      0.770159511740479,
      8.43409371498703,
      4.16408624814052,
      4.05167281666241,
      2.69641967521909,
      1.4009552303312,
      1.95122635035057,
      1.50386801030453,
      0.930031660122387,
      0.623237514634344,
      1.04794039781326,
      16.6261786381696,
      1.75974910469401,
      1.2821102765047,
      5.54452003708269,
      0.639035754277985,
```



```
    0.984922512358245,  
    1.07960745258816,  
    1.04196762087592  
  ]  
}  
},  
"22fdd939-d901-4d9d-a653-ade74781ac9d": {  
  "doubleArray": {  
    "values": [  
      546206.589005788,  
      10307.1518419729,  
      13594.7867535486,  
      5196.008712672,  
      10718.0288776308,  
      5066.137003977,  
      17956.4262018016,  
      9868.6592519808,  
      63370.932400776,  
      26360.610840947,  
      42256.88073012,  
      32730.645346245,  
      4206.6619989813,  
      46067.5755941822,  
      22744.5134592274,  
      22130.5038895665,  
      14728.0219332952,  
      7652.10977709024,  
      10657.726892032,  
      8214.2261622336,  
      5079.89420742839,  
      3404.1643700887,  
      5723.9195017095,  
      90813.283221555,  
      9611.86555980907,  
      7002.970808589,  
      30284.5337712918,  
      3490.45539596919,  
      5379.71165910208,  
      5896.88704143408,  
      5691.29580053112  
    ]  
  }  
}
```

```

    }
  },
  "metadata": {
    "items": {
      "24e7f559-2049-40d0-93f8-52dd0316beec": {
        "name": "Portfolio Holdings As Of Date",
        "stringValue": "S&P BSE Sensex 24-JUL-2020"
      },
      "a184cd11-2087-4402-b1ca-b5a1da21bd8a": {
        "name": "Portfolio Pricing Sources",
        "stringValue": "FactSet - Equity|Client Portfolio|FactSet - Options"
      },
      "664152f9-829e-4648-887a-a32536fede84": {
        "name": "Benchmark Pricing Sources",
        "stringValue": "FactSet - Equity|Client Portfolio|FactSet - Options"
      },
      "020b3270-1b46-432a-9387-318a3e9d8c63": {
        "name": "Portfolio Analytics Sources",
        "stringValue": "FactSet - Equity|Client Portfolio|FactSet - Options"
      },
      "99689463-8e0c-4314-8e95-da80ea0a465c": {
        "name": "Benchmark Analytics Sources",
        "stringValue": "FactSet - Equity|Client Portfolio|FactSet - Options"
      },
      "b624eeef-9925-4554-9a2f-8aebc73eba34": {
        "name": "Additional Pricing Options",
        "stringValue": "Calculate Returns with Missing Accrued Interest"
      },
      "fbb0f903-65ca-44ab-92c7-47a1140e11b6": {
        "name": "Composite Assets",
        "stringValue": "None"
      },
      "3e8545a1-e246-4058-86bd-1c080c8eb925": {
        "name": "Currency ISO Code",
        "stringValue": "USD"
      },
      "7cab1f6a-174b-49b1-a51b-d6856478fc20": {
        "name": "Absolute Start Date",
        "stringValue": "20200724"
      },
      "d4889a4a-3c38-4267-895c-902ca38e8dde": {
        "name": "Absolute End Date",

```

```

    "stringValue": "20200724"
  },
  "1581ccad-7239-45ee-bf48-352746094060": {
    "name": "Document Name",
    "stringValue": "client:/analytics_api/new_pa_doc"
  },
  "e72a3191-940d-4445-a374-895987085805": {
    "name": "Calendar",
    "stringValue": "FIVEDAY"
  },
  "7f4257e2-1c0f-4eaa-983d-bff0c303945e": {
    "name": "Report Frequency",
    "stringValue": "Single"
  },
  "5796ce2f-db00-40a9-b8dd-99cb77eec537": {
    "name": "Accounts",
    "stringValue": "BENCH:180353"
  },
  "d568a005-31e1-4520-883f-582b43555ed9": {
    "name": "Benchmark",
    "stringValue": ""
  },
  "604324f4-a93e-4a3f-83bc-dbb21d96543f": {
    "name": "Component Name",
    "stringValue": "Weights"
  }
}
"locations": {
  "table": [
    "24e7f559-2049-40d0-93f8-52dd0316beec",
    "a184cd11-2087-4402-b1ca-b5a1da21bd8a",
    "664152f9-829e-4648-887a-a32536fede84",
    "020b3270-1b46-432a-9387-318a3e9d8c63",
    "99689463-8e0c-4314-8e95-da80ea0a465c",
    "b624eeef-9925-4554-9a2f-8aebc73eba34",
    "fbb0f903-65ca-44ab-92c7-47a1140e11b6",
    "3e8545a1-e246-4058-86bd-1c080c8eb925",
    "7cab1f6a-174b-49b1-a51b-d6856478fc20",
    "d4889a4a-3c38-4267-895c-902ca38e8dde",
    "1581ccad-7239-45ee-bf48-352746094060",
    "e72a3191-940d-4445-a374-895987085805",
    "7f4257e2-1c0f-4eaa-983d-bff0c303945e",

```

```

    "5796ce2f-db00-40a9-b8dd-99cb77eec537",
    "d568a005-31e1-4520-883f-582b43555ed9",
    "604324f4-a93e-4a3f-83bc-dbb21d96543f"
  ]
}
}
},
"c59b707f-6f37-45f1-9408-64d0155afb8c": {
  "definition": {
    "columns": [
      {
        "id": "5b7910c6-0ce9-42f9-abb1-4a069151bbca",
        "name": "EndingWeight:FACTSET099:5",
        "type": "STRING"
      }
    ]
  },
  "data": {
    "rows": [
      {
        "id": "90d347a1-4657-45e8-9a93-61037cbfe75f"
      },
      {
        "id": "f14c1a47-e36a-42fd-99fe-d2f97eb6aa37"
      }
    ],
    "columns": {
      "5b7910c6-0ce9-42f9-abb1-4a069151bbca": {
        "stringArray": {
          "values": [
            "Port.+Weight",
            "Port.+Ending+Market+Value"
          ]
        }
      }
    }
  }
}
}
}
}
}
}
}
}
}
```