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# **nisystemlink**

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**National Instruments**

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# CONTENTS

<b>1</b>	<b>User Documentation</b>	<b>3</b>
1.1	Getting Started . . . . .	3
1.2	API Reference . . . . .	11
<b>2</b>	<b>Package Info</b>	<b>167</b>
2.1	About . . . . .	167
2.2	Requirements . . . . .	167
2.3	Installation . . . . .	167
2.4	Usage . . . . .	168
2.5	Support / Feedback . . . . .	168
2.6	Bugs / Feature Requests . . . . .	168
2.7	Documentation . . . . .	168
2.8	Changelog . . . . .	168
2.9	License . . . . .	168
	<b>Python Module Index</b>	<b>169</b>
	<b>Index</b>	<b>171</b>



- *User Documentation*
- *Package Info*
  - *About*
  - *Requirements*
  - *Installation*
  - *Usage*
  - *Support / Feedback*
  - *Bugs / Feature Requests*
  - *Documentation*
  - *Changelog*
  - *License*



## USER DOCUMENTATION

### 1.1 Getting Started

#### 1.1.1 Tag API

##### Overview

The *TagManager* class is the primary entry point of the Tag API.

When constructing a *TagManager*, you can pass an *HttpConfiguration* (like one retrieved from the *HttpConfigurationManager*), or let *TagManager* use the default connection. The default connection depends on your SystemLink Client settings.

With a *TagManager* object, you can:

- Query, create, modify, and delete tags from the server
  - Use *open()* to get a tag's *TagData* from the server when you know the tag's path.
  - Use *query()* to get a *collection* of *TagData* objects based on the tags' paths, keywords, and/or properties.
  - Use *refresh()* to update a list of *TagData* objects with fresh metadata from the server.
  - Use *update()* to modify the server metadata for a list of tags, using either *TagData* objects to overwrite the server's tag data or *TagDataUpdate* objects to selectively update specific fields.
  - Use *delete()* to delete one or more tags from the server.
- Read and write tag values
  - Use *read()* to get a tag's current value. Via method parameters, you can also request the timestamp indicating when that value was last written and/or the aggregate data stored for the tag (if the tag's *collect\_aggregates* attribute is enabled on the server).
  - Use *create\_writer()* to get a *BufferedTagWriter* that will buffer a set of writes, and automatically send the writes when a given *buffer\_size* is reached or when *max\_buffer\_time* has elapsed (or when *send\_buffered\_writes()* is called).
- Get a *TagSelection* that can help perform several of the above operations on several tags at once
  - Use *TagManager.create\_selection()* if you already have a list of *TagData* objects that you want to perform a set of operations on.
  - Use *TagManager.open\_selection()* if you just have a list of paths – optionally including glob-style wildcards! – with which to create the selection.

If you have a *TagSelection*, you can use it to *create* a *TagSubscription* that will trigger a *tag\_changed* event any time one of the tags' values is changed.

## Examples

Read and write individual tags

```
1 from datetime import timedelta
2
3 from nisystemlink.clients.tag import DataType, TagManager
4
5 mgr = TagManager()
6 tag = mgr.open("MyTags.Example Tag", DataType.DOUBLE, create=True)
7
8 with mgr.create_writer(buffer_size=10, max_buffer_time=timedelta(seconds=3)) as writer:
9     writer.write(tag.path, tag.data_type, 3.5)
10 # Note: Exiting the "with" block automatically calls writer.send_buffered_writes()
11
12 read_result = mgr.read(tag.path)
13 assert read_result is not None
14 assert read_result.value == 3.5
```

Subscribe to tag changes

```
1 from contextlib import ExitStack
2 from time import sleep
3
4 from nisystemlink.clients.tag import DataType, TagData, TagManager, TagValueReader
5
6 SIMULATE_EXTERNAL_TAG_CHANGES = True
7
8
9 def on_tag_changed(tag: TagData, reader: TagValueReader) -> None:
10     """Callback for tag_changed events."""
11     path = tag.path
12     data_type = tag.data_type.name
13
14     if reader is not None:
15         read_result = reader.read()
16         # A read_result of None means that the tag has no value, but it *must*
17         # have a value, because we got a tag_changed event!
18         assert read_result is not None
19         value = read_result.value
20     else:
21         value = "???" # tag has unknown data type
22
23     print(f'Tag changed: "{path}" = {value} ({data_type})')
24
25
26 mgr = TagManager()
27 if SIMULATE_EXTERNAL_TAG_CHANGES:
28     mgr.open("MyTags.Example Tag", DataType.DOUBLE, create=True)
29     writer = mgr.create_writer(buffer_size=1)
```

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```

30
31 with ExitStack() as stack:
32     # Notes:
33     # 1. The tags are assumed to already exist before this example is run, but
34     #    setting SIMULATE_EXTERNAL_TAG_CHANGES to True will ensure there is one.
35     # 2. Any tags that get added later will NOT automatically appear in the
36     #    selection just because the path matches the wildcard used below; you
37     #    must call one of the selection's refresh methods to update the tag list
38     #    from the server. But even if you do that:
39     # 3. The subscription will only contain the tags that were in the selection
40     #    when the subscription was created. If you want the subscription to add
41     #    new tags that were added to the selection, you must recreate it.
42     paths = ["MyTags.*"]
43     selection = stack.enter_context(mgr.open_selection(paths))
44     if not selection.metadata:
45         print(f"Found no tags that match {paths}")
46     else:
47         print("Matching tags:")
48         for path in selection.metadata.keys():
49             print(f" - {path}")
50         print()
51
52     subscription = stack.enter_context(selection.create_subscription())
53     subscription.tag_changed += on_tag_changed
54
55     # Wait forever, until a KeyboardInterrupt (Ctrl+C)
56     print("Watching for tag changes; hit Ctrl+C to stop")
57     try:
58         i = 0
59         while True:
60             sleep(1)
61             if SIMULATE_EXTERNAL_TAG_CHANGES:
62                 writer.write("MyTags.Example Tag", DataType.DOUBLE, i)
63                 i += 1
64     except KeyboardInterrupt:
65         pass

```

## 1.1.2 DataFrame API

### Overview

The *DataFrameClient* class is the primary entry point of the DataFrame API.

When constructing a *DataFrameClient*, you can pass an *HttpConfiguration* (like one retrieved from the *HttpConfigurationManager*), or let *DataFrameClient* use the default connection. The default connection depends on your environment.

With a *DataFrameClient* object, you can:

- Create and delete data tables.
- Modify table metadata and query for tables by their metadata.
- Append rows of data to a table, query for rows of data from a table, and decimate table data.

- Export table data in a comma-separated values (CSV) format.

## Examples

Create and write data to a table

```
1 import random
2 from datetime import datetime
3
4 from nisystemlink.clients.dataframe import DataFrameClient
5 from nisystemlink.clients.dataframe.models import (
6     AppendTableDataRequest,
7     Column,
8     ColumnType,
9     CreateTableRequest,
10    DataFrame,
11    DataType,
12 )
13
14 client = DataFrameClient()
15
16 # Create table
17 table_id = client.create_table(
18     CreateTableRequest(
19         name="Example Table",
20         columns=[
21             Column(name="ix", data_type=DataType.Int32, column_type=ColumnType.Index),
22             Column(name="Float_Column", data_type=DataType.Float32),
23             Column(name="Timestamp_Column", data_type=DataType.Timestamp),
24         ],
25     )
26 )
27
28 # Generate example data
29 frame = DataFrame(
30     data=[[i, random.random(), datetime.now().isoformat()] for i in range(100)]
31 )
32
33 # Write example data to table
34 client.append_table_data(
35     table_id, data=AppendTableDataRequest(frame=frame, endOfData=True)
36 )
```

Query and read data from a table

```
1 from nisystemlink.clients.dataframe import DataFrameClient
2 from nisystemlink.clients.dataframe.models import (
3     DecimationMethod,
4     DecimationOptions,
5     QueryDecimatedDataRequest,
6 )
7
8 client = DataFrameClient()
```

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```

9
10 # List a table
11 response = client.list_tables(take=1)
12 table = response.tables[0]
13
14 # Get table metadata by table id
15 client.get_table_metadata(table.id)
16
17 # Query decimated table data
18 request = QueryDecimatedDataRequest(
19     decimation=DecimationOptions(
20         x_column="index",
21         y_columns=["col1"],
22         intervals=1,
23         method=DecimationMethod.MaxMin,
24     )
25 )
26 client.query_decimated_data(table.id, request)

```

Export data from a table

```

1 from shutil import copyfileobj
2
3 from nisystemlink.clients.dataframe import DataFrameClient
4 from nisystemlink.clients.dataframe.models import (
5     ColumnFilter,
6     ColumnOrderBy,
7     ExportFormat,
8     ExportTableDataRequest,
9     FilterOperation,
10 )
11
12 client = DataFrameClient()
13
14 # List a table
15 response = client.list_tables(take=1)
16 table = response.tables[0]
17
18 # Export table data with query options
19 request = ExportTableDataRequest(
20     columns=["col1"],
21     order_by=[ColumnOrderBy(column="col2", descending=True)],
22     filters=[
23         ColumnFilter(column="col1", operation=FilterOperation.NotEquals, value="0")
24     ],
25     response_format=ExportFormat.CSV,
26 )
27
28 data = client.export_table_data(id=table.id, query=request)
29
30 # Write the export data to a file
31 with open(f"{table.name}.csv", "wb") as f:

```

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```

32     copyfileobj(data, f)
33
34     # Alternatively, load the export data into a pandas dataframe
35     # import pandas as pd
36     # df = pd.read_csv(data)

```

### 1.1.3 Spec API

#### Overview

The *SpecClient* class is the primary entry point of the Specification Compliance API.

When constructing a *SpecClient*, you can pass an *HttpConfiguration* (like one retrieved from the *HttpConfigurationManager*), or let *SpecClient* use the default connection. The default connection depends on your environment.

With a *SpecClient* object, you can:

- Create and delete specifications under a product.
- Modify any fields of an existing specification
- Query for specifications on any fields using DynamicLinq syntax.

#### Examples

##### Create and Query Specifications

```

1  from nisystemlink.clients.core import HttpConfiguration
2  from nisystemlink.clients.spec import SpecClient
3  from nisystemlink.clients.spec.models import (
4      Condition,
5      ConditionRange,
6      ConditionType,
7      CreateSpecificationsRequest,
8      NumericConditionValue,
9      QuerySpecificationsRequest,
10     SpecificationDefinition,
11     SpecificationLimit,
12     SpecificationType,
13 )
14
15 # Setup the server configuration to point to your instance of SystemLink Enterprise
16 server_configuration = HttpConfiguration(
17     server_uri="https://yourserver.yourcompany.com",
18     api_key="YourAPIKeyGeneratedFromSystemLink",
19 )
20 client = SpecClient(configuration=server_configuration)
21
22 # Create the spec requests
23 product = "Amplifier"
24 spec_requests = [

```

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```

25 SpecificationDefinition(
26     product_id=product,
27     spec_id="spec1",
28     type=SpecificationType.PARAMETRIC,
29     category="Parametric Specs",
30     name="output voltage",
31     limit=SpecificationLimit(min=1.2, max=1.5),
32     unit="mV",
33 ),
34 SpecificationDefinition(
35     product_id=product,
36     spec_id="spec2",
37     type=SpecificationType.PARAMETRIC,
38     category="Parametric Specs",
39     name="input voltage",
40     limit=SpecificationLimit(min=0.02, max=0.15),
41     unit="mV",
42     conditions=[
43         Condition(
44             name="Temperature",
45             value=NumericConditionValue(
46                 condition_type=ConditionType.NUMERIC,
47                 range=[ConditionRange(min=-25, step=20, max=85)],
48                 unit="C",
49             ),
50         ),
51         Condition(
52             name="Supply Voltage",
53             value=NumericConditionValue(
54                 condition_type=ConditionType.NUMERIC,
55                 discrete=[1.3, 1.5, 1.7],
56                 unit="mV",
57             ),
58         ),
59     ],
60 ),
61 SpecificationDefinition(
62     product_id=product,
63     spec_id="spec3",
64     type=SpecificationType.FUNCTIONAL,
65     category="Noise Thresholds",
66     name="noise",
67 ),
68 ]
69
70 # Create the specs on the server
71 client.create_specs(CreateSpecificationsRequest(specs=spec_requests))
72
73 # You can query specs based on any field using DynamicLinq syntax.
74 # These are just some representative examples.
75
76 response = client.query_specs(QuerySpecificationsRequest(product_ids=[product]))

```

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```

77 all_product_specs = response.specs
78
79 # Query based on spec id
80 response = client.query_specs(
81     QuerySpecificationsRequest(product_ids=[product], filter='specId == "spec2"')
82 )
83 if response.specs:
84     spec2 = response.specs[0]
85
86 # Query based on name
87 response = client.query_specs(
88     QuerySpecificationsRequest(product_ids=[product], filter='name.Contains("voltage")')
89 )
90 voltage_specs = response.specs
91
92 # Query based on Category
93 response = client.query_specs(
94     QuerySpecificationsRequest(
95         product_ids=[product], filter='category == "Noise Thresholds"'
96     )
97 )
98 noise_category = response.specs
99 print(noise_category)

```

## Update and Delete Specifications

```

1  from nisystemlink.clients.core import HttpConfiguration
2  from nisystemlink.clients.spec import SpecClient
3  from nisystemlink.clients.spec.models import (
4      QuerySpecificationsRequest,
5      SpecificationDefinition,
6      SpecificationType,
7      UpdateSpecificationsRequest,
8  )
9
10 # Setup the server configuration to point to your instance of SystemLink Enterprise
11 server_configuration = HttpConfiguration(
12     server_uri="https://yourserver.yourcompany.com",
13     api_key="YourAPIKeyGeneratedFromSystemLink",
14 )
15 client = SpecClient(configuration=server_configuration)
16
17 # The query and delete examples assume you have created the specs from the query_specs_
18 # ↪ example
19 product = "Amplifier"
20
21 # update spec1 to change the block to "modifiedBlock"
22 # query the original spec
23 response = client.query_specs(
24     QuerySpecificationsRequest(product_ids=[product], filter='specId == "spec1"')
25 )
26 if response.specs:

```

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```

26     original_spec1 = response.specs[0]
27     print(f"Original spec1 block: {original_spec1.block}")
28     print(f"Original spec1 version: {original_spec1.version}")
29
30     # make the modifications
31     modified_spec = SpecificationDefinition(
32         id=original_spec1.id,
33         product_id=original_spec1.product_id,
34         spec_id=original_spec1.spec_id,
35         type=SpecificationType.FUNCTIONAL,
36         keywords=["work", "reviewed"],
37         block="modifiedBlock",
38         version=original_spec1.version,
39         workspace=original_spec1.workspace,
40     )
41     update_response = client.update_specs(
42         specs=UpdateSpecificationsRequest(specs=[modified_spec])
43     )
44     if update_response and update_response.updated_specs:
45         print(f"New spec1 version: {update_response.updated_specs[0].version}")
46
47     # query again to see new version
48     response = client.query_specs(
49         QuerySpecificationsRequest(product_ids=[product], filter='specId == "spec1"')
50     )
51     if response.specs:
52         original_spec1 = response.specs[0]
53         print(f"Modified spec1 block: {original_spec1.block}")
54
55     # delete all the specs for the product
56     # query all specs
57     response = client.query_specs(QuerySpecificationsRequest(product_ids=[product]))
58     if response.specs:
59         client.delete_specs(ids=[spec.id for spec in response.specs])

```

## 1.2 API Reference

### 1.2.1 nisystemlink.clients.core

#### pydantic model `nisystemlink.clients.core.ApiError`

Represents the standard error structure for SystemLink API responses.

```

{
    "$ref": "#/definitions/ApiError",
    "definitions": {
        "ApiError": {
            "title": "ApiError",
            "description": "Represents the standard error structure for SystemLink API
↪ responses.",

```

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```

    "type": "object",
    "properties": {
      "name": {
        "title": "Name",
        "type": "string"
      },
      "code": {
        "title": "Code",
        "type": "integer"
      },
      "message": {
        "title": "Message",
        "type": "string"
      },
      "args": {
        "title": "Args",
        "default": [],
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "resourceType": {
        "title": "Resourcetype",
        "type": "string"
      },
      "resourceId": {
        "title": "Resourceid",
        "type": "string"
      },
      "innerErrors": {
        "title": "Innererrors",
        "default": [],
        "type": "array",
        "items": {
          "$ref": "#/definitions/ApiError"
        }
      }
    }
  }
}

```

### Fields

- *args*
- *code*
- *inner\_errors*
- *message*
- *name*



- *resource\_id*
- *resource\_type*

**field args:** List[str] = []

Positional arguments for the error code.

**field code:** Optional[int] = None

Numeric error code.

**field inner\_errors:** List[*ApiError*] = []

Inner errors when the top-level error represents more than one error.

**field message:** Optional[str] = None

Complete error message.

**field name:** Optional[str] = None

String error code.

**field resource\_id:** Optional[str] = None

Identifier of the resource associated with the error.

**field resource\_type:** Optional[str] = None

Type of resource associated with the error.

**\_\_init\_\_**(\*\*data)

Create a new model by parsing and validating input data from keyword arguments.

Raises *ValidationError* if the input data cannot be parsed to form a valid model.

**classmethod construct**(\_fields\_set=None, \*\*values)

Creates a new model setting `__dict__` and `__fields_set__` from trusted or pre-validated data. Default values are respected, but no other validation is performed. Behaves as if *Config.extra* = 'allow' was set since it adds all passed values

**Return type**

Model

**copy**(\*, include=None, exclude=None, update=None, deep=False)

Duplicate a model, optionally choose which fields to include, exclude and change.

**Parameters**

- **include** (Union[AbstractSetIntStr, MappingIntStrAny, None]) – fields to include in new model
- **exclude** (Union[AbstractSetIntStr, MappingIntStrAny, None]) – fields to exclude from new model, as with values this takes precedence over include
- **update** (Optional[DictStrAny]) – values to change/add in the new model. Note: the data is not validated before creating the new model: you should trust this data
- **deep** (bool) – set to *True* to make a deep copy of the model

**Return type**

Model

**Returns**

new model instance

**dict**(\**include=None, exclude=None, by\_alias=False, skip\_defaults=None, exclude\_unset=False, exclude\_defaults=False, exclude\_none=False*)

Generate a dictionary representation of the model, optionally specifying which fields to include or exclude.

**Return type**

DictStrAny

**classmethod from\_orm**(*obj*)

**Return type**

Model

**json**(\**include=None, exclude=None, by\_alias=False, skip\_defaults=None, exclude\_unset=False, exclude\_defaults=False, exclude\_none=False, encoder=None, models\_as\_dict=True, \*\*dumps\_kwargs*)

Generate a JSON representation of the model, *include* and *exclude* arguments as per *dict()*.

*encoder* is an optional function to supply as *default* to *json.dumps()*, other arguments as per *json.dumps()*.

**Return type**

unicode

**classmethod parse\_file**(*path, \*, content\_type=None, encoding='utf8', proto=None, allow\_pickle=False*)

**Return type**

Model

**classmethod parse\_obj**(*obj*)

**Return type**

Model

**classmethod parse\_raw**(*b, \*, content\_type=None, encoding='utf8', proto=None, allow\_pickle=False*)

**Return type**

Model

**classmethod schema**(*by\_alias=True, ref\_template='#/definitions/{model}'*)

**Return type**

DictStrAny

**classmethod schema\_json**(\**by\_alias=True, ref\_template='#/definitions/{model}', \*\*dumps\_kwargs*)

**Return type**

unicode

**classmethod update\_forward\_refs**(\*\**localns*)

Try to update ForwardRefs on fields based on this Model, globalns and localns.

**Return type**

None

**classmethod validate**(*value*)

**Return type**

Model

**exception** `nisystemlink.clients.core.ApiException`(*message=None, error=None, http\_status\_code=None, inner=None*)

Represents errors that occur when calling SystemLink APIs.

**\_\_init\_\_**(*message=None, error=None, http\_status\_code=None, inner=None*)

Initialize an exception.

#### Parameters

- **message** (Optional[str]) – The message describing the error.
- **error** (Optional[nisystemlink.clients.core.ApiError]) – The error returned by the API.
- **http\_status\_code** (Optional[int]) – The HTTP status code, if this exception was the result of an HTTP error.
- **inner** (Optional[Exception]) – The inner exception that caused the error.

**property error:** Optional[ApiError]

The error information returned by the SystemLink API, or None if the API did not return one or the error occurred trying to call the API.

**property http\_status\_code:** Optional[int]

The HTTP status code, if this exception was the result of an HTTP error.

**property inner\_exception:** Optional[Exception]

The exception that caused this failure, if any.

**property message:** Optional[str]

The error message.

**with\_traceback()**

Exception.with\_traceback(tb) – set self.tb to tb and return self.

**class** nisystemlink.clients.core.CloudHttpConfiguration(*api\_key*)

An *HttpConfiguration* specifically for use with SystemLink Cloud.

**DEFAULT\_TIMEOUT\_MILLISECONDS** = 60000

The default value of *timeout\_milliseconds* to use when making API calls.

**\_\_init\_\_**(*api\_key*)

Initialize a configuration for SystemLink Cloud using API key-based authentication.

#### Parameters

**api\_key** (str) – The API key to send with requests.

#### Raises

**ValueError** – if *api\_key* is empty.

**property api\_keys:** Optional[Dict[str, str]]

The available API keys to use for authorization, or None if none were provided.

**property cert\_path:** Optional[Path]

Local path to an SSL certificate file.

**property password:** Optional[str]

The password to use for HTTP authentication, or None if none was provided.

**property server\_uri:** str

The `urllib.parse.urlparse().scheme`, `urllib.parse.urlparse().hostname`, and `urllib.parse.urlparse().port` of the web server hosting the SystemLink service to connect to.

Additional Uri properties such as `urllib.parse.urlparse().path` and `urllib.parse.urlparse().query` are ignored.

**property timeout\_milliseconds: int**

The number of milliseconds before a request times out with an error.

Changing the timeout will not affect APIs that have already read the configuration.

**property user\_agent: Optional[str]**

The string to pass the web server as the product name or names making the request, or None to use a library-specific default.

Changing the user-agent will not affect APIs that have already read the configuration.

**property username: Optional[str]**

The username to use for HTTP authentication, or None if none was provided.

**class nisystemlink.clients.core.HttpConfiguration**(*server\_uri, api\_key=None, username=None, password=None, cert\_path=None*)

Represents the configuration for accessing a SystemLink service over HTTP.

**DEFAULT\_TIMEOUT\_MILLISECONDS = 60000**

The default value of *timeout\_milliseconds* to use when making API calls.

**\_\_init\_\_**(*server\_uri, api\_key=None, username=None, password=None, cert\_path=None*)

Initialize a configuration.

If neither *api\_key* nor *username* and *password* are set, the configuration will use anonymous access, and any API calls that require authorization will fail.

#### Parameters

- **server\_uri** (str) – The scheme, host, and port (if not default) of the web server hosting the SystemLink service to connect to. Additional Uri properties such as `urllib.parse.urlparse().path` and `urllib.parse.urlparse().query` are ignored.
- **api\_key** (Optional[str]) – The API key to send with requests.
- **username** (Optional[str]) – The name of the user to use when authorization is required.
- **password** (Optional[str]) – The user's password to use when authorization is required.
- **cert\_path** (Optional[pathlib.Path]) – Local path to an SSL certificate file.

#### Raises

- **ValueError** – if *server\_uri* is missing scheme or host information.
- **ValueError** – if *username* or *password* is set, but not both.

**property api\_keys: Optional[Dict[str, str]]**

The available API keys to use for authorization, or None if none were provided.

**property cert\_path: Optional[Path]**

Local path to an SSL certificate file.

**property password: Optional[str]**

The password to use for HTTP authentication, or None if none was provided.

**property server\_uri: str**

The `urllib.parse.urlparse().scheme`, `urllib.parse.urlparse().hostname`, and `urllib.parse.urlparse().port` of the web server hosting the SystemLink service to connect to.

Additional Uri properties such as `urllib.parse.urlparse().path` and `urllib.parse.urlparse().query` are ignored.

**property timeout\_milliseconds: int**

The number of milliseconds before a request times out with an error.

Changing the timeout will not affect APIs that have already read the configuration.

**property user\_agent: Optional[str]**

The string to pass the web server as the product name or names making the request, or None to use a library-specific default.

Changing the user-agent will not affect APIs that have already read the configuration.

**property username: Optional[str]**

The username to use for HTTP authentication, or None if none was provided.

**class nisystemlink.clients.core.HttpConfigurationManager**

Factory for *HttpConfiguration* objects.

**HTTP\_LOCALHOST\_CONFIGURATION\_ID = 'SYSTEMLINK\_LOCALHOST'**

The default ID of the SystemLink Server's configuration on the SystemLink Server itself.

**HTTP\_MASTER\_CONFIGURATION\_ID = 'SYSTEMLINK\_MASTER'**

The default ID of the SystemLink Server's configuration on systems registered using SystemLink Client.

**classmethod get\_configuration(id=None, enable\_fallbacks=True)**

Get the requested or default configuration.

#### Parameters

- **id** (Optional[str]) – The ID of the configuration to find.
- **enable\_fallbacks** (Optional[bool]) – Whether or not to fallback to other known configurations, if id is unavailable.

#### Return type

*nisystemlink.clients.core.HttpConfiguration*

#### Returns

The configuration.

#### Raises

- **ValueError** – if id is None and enable\_fallbacks is False.
- **ApiException** – if the specified (or default) configuration is not found.

**class nisystemlink.clients.core.JupyterHttpConfiguration**

An *HttpConfiguration* for Jupyter notebooks running in a SystemLink environment.

**DEFAULT\_TIMEOUT\_MILLISECONDS = 60000**

The default value of *timeout\_milliseconds* to use when making API calls.

**\_\_init\_\_()**

Initialize a configuration for SystemLink using API key-based authentication provided through environment variables.

#### Raises

**KeyError** – if the expected environment variables are not set.

**property api\_keys: Optional[Dict[str, str]]**

The available API keys to use for authorization, or None if none were provided.

**property cert\_path:** Optional[Path]

Local path to an SSL certificate file.

**property password:** Optional[str]

The password to use for HTTP authentication, or None if none was provided.

**property server\_uri:** str

The `urllib.parse.urlparse().scheme`, `urllib.parse.urlparse().hostname`, and `urllib.parse.urlparse().port` of the web server hosting the SystemLink service to connect to.

Additional Uri properties such as `urllib.parse.urlparse().path` and `urllib.parse.urlparse().query` are ignored.

**property timeout\_milliseconds:** int

The number of milliseconds before a request times out with an error.

Changing the timeout will not affect APIs that have already read the configuration.

**property user\_agent:** Optional[str]

The string to pass the web server as the product name or names making the request, or None to use a library-specific default.

Changing the user-agent will not affect APIs that have already read the configuration.

**property username:** Optional[str]

The username to use for HTTP authentication, or None if none was provided.

**class** nisystemlink.clients.core.helpers.IteratorFileLike(iterator)

A file-like object adapter that wraps a python iterator, providing a way to read from the iterator as if it was a file.

**read**(size=-1)

Read at most *size* bytes from the file-like object. If *size* is not specified or is negative, read until the iterator is exhausted and returns all bytes or characters read.

**Return type**

bytes

## 1.2.2 nisystemlink.clients.tag

**class** nisystemlink.clients.tag.AsyncTagQueryResultCollection(first\_page, total\_count, skip)

Represents a paginated list of tags returned by an asynchronous query.

**property current\_page:** Optional[List[TagData]]

The current page of tag results that were last retrieved from the server, or None if there are no more results.

Use `move_next_page_async()` to get the next page of results.

**async** move\_next\_page\_async()

Asynchronously retrieve the next page of query results from the server, returning them and updating `current_page`.

Does nothing if the last page has already been retrieved. Use `reset_async()` to start again from the first page.

**Return type**

Optional[List[nisystemlink.clients.tag.TagData]]

**Returns**

A task representing the asynchronous operation. On success, contains the next page of results, or None if there are no more results.

**Raises**

*ApiException* – if the API call fails.

**async reset\_async()**

Asynchronously query the server for a fresh set of results, returning the first page and updating *current\_page* and *total\_count*.

**Return type**

List[nisystemlink.clients.tag.TagData]

**Returns**

A task representing the asynchronous operation. On success, contains the first page of results, or None if there are no results.

**Raises**

*ApiException* – if the API call fails.

**property total\_count: int**

The total number of tags matched by the query at the time the query was made.

**class nisystemlink.clients.tag.BufferedTagWriter(stamper, buffer\_size, flush\_timer)**

Represents an *ITagWriter* that buffers tag writes instead of sending them immediately.

Writes that utilize automatic timestamps are based on the system time when buffered. Implementations may provide automatic sending of buffered writes based on different conditions. Unsent writes are discarded when the instance is deleted.

Note that *BufferedTagWriter* objects support using the *with* statement (or the *async with* statement), to automatically *send* any remaining buffered writes on exit.

**clear\_buffered\_writes()**

Clear any pending writes from *write()*.

**Raises**

*ReferenceError* – if the writer has been closed.

**Return type**

None

**get\_tag\_writer(path, data\_type)**

Get a *TagValueWriter* for this path.

**Parameters**

- **path** (str) – The path of the tag to write.
- **data\_type** (nisystemlink.clients.tag.DataType) – The data type of the tag to write.

**Return type**

*nisystemlink.clients.tag.TagValueWriter*

**send\_buffered\_writes()**

Write all of the pending writes from *write()* to the server.

Does nothing if there are no pending writes.

**Raises**

- **ReferenceError** – if the writer has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**async send\_buffered\_writes\_async()**

Asynchronously write all of the pending writes from `write()` to the server.

Does nothing if there are no pending writes.

**Raises**

- **ReferenceError** – if the writer has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**write(path, data\_type, value, \*, timestamp=None)**

Write a tag's value.

**Parameters**

- **path** (str) – The path of the tag to write.
- **data\_type** (`nisystemlink.clients.tag.DataType`) – The data type of the value to write.
- **value** (Union[bool, int, float, str, datetime.datetime]) – The tag value to write.
- **timestamp** (Optional[datetime.datetime]) – A custom timestamp to associate with the value, or None to have the server specify the timestamp.

**Raises**

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path or value is None.
- **ValueError** – if data\_type is invalid.
- **ValueError** – if value has the wrong data type.
- **ReferenceError** – if the writer has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**write\_async(path, data\_type, value, \*, timestamp=None)**

Asynchronously write a tag's value.

**Parameters**

- **path** (str) – The path of the tag to write.
- **data\_type** (`nisystemlink.clients.tag.DataType`) – The data type of the value to write.
- **value** (str) – The tag value to write.
- **timestamp** (Optional[datetime.datetime]) – A custom timestamp to associate with the value, or None to have the server specify the timestamp.



**Return type**

Awaitable[None]

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path or value is None.
- **ValueError** – if data\_type is invalid.
- **ValueError** – if value has the wrong data type.
- **ReferenceError** – if the writer has been closed.
- **ApiException** – if the API call fails.

```
class nisystemlink.clients.tag.DataType(value)
```

Represents the different data types for a SystemLink tag.

**BOOLEAN = 4**

A boolean tag.

Bool tags support collecting aggregate values for the count.

**DATE\_TIME = 6**

A date and time tag that stores values in UTC ISO 8601 format.

DateTime tags support collecting aggregate values for the count.

**DOUBLE = 1**

A 64-bit floating-point tag following the IEEE standard.

Double tags support collecting aggregate values for the min, max, mean, and count.

**INT32 = 2**

A 32-bit signed integer tag.

Int32 tags support collecting aggregate values for the min, max, mean, and count. The mean is represented as a double.

**STRING = 3**

A string tag for arbitrary values.

String tags support collecting aggregate values for the count.

**UINT64 = 5**

A 64-bit unsigned integer tag.

UInt64 tags support collecting aggregate values for the min, max, mean, and count. The mean is represented as a double value and will truncate large values.

**UNKNOWN = 0**

An unknown or invalid data type.

Not a valid input to API calls, but used to represent tags whose data type isn't recognized.

```
property api_name: str
```

Web API name of the enum value.

**class** `nisystemlink.clients.tag.ITagReader`

Provides an interface for reading the current and aggregate values of a single SystemLink tag.

**get\_tag\_reader**(*path*, *data\_type*)

Get a [\*TagValueReader\*](#) for this path.

**Parameters**

- **path** (str) – The path of the tag to read.
- **data\_type** ([\*nisystemlink.clients.tag.DataType\*](#)) – The data type of the tag to read.

**Return type**

[\*nisystemlink.clients.tag.TagValueReader\*](#)

**read**(*path*, \*, *include\_timestamp=False*, *include\_aggregates=False*)

Retrieve the current value of the tag with the given path from the server.

Optionally retrieves the aggregate values as well. The tag must exist.

**Parameters**

- **path** (str) – The path of the tag to read.
- **include\_timestamp** (bool) – True to include the timestamp associated with the value in the result.
- **include\_aggregates** (bool) – True to include the tag's aggregate values in the result if the tag is set to [\*TagData.collect\\_aggregates\*](#).

**Return type**

Optional[[\*nisystemlink.clients.tag.TagWithAggregates\*](#)]

**Returns**

The value, and the timestamp and/or aggregate values if requested, or None if the tag exists but doesn't have a value.

**Raises**

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path is None.
- **ReferenceError** – if the reader has been closed.
- [\*ApiException\*](#) – if the API call fails.

**async read\_async**(*path*, \*, *include\_timestamp=False*, *include\_aggregates=False*)

Asynchronously retrieve the current value of the tag with the given path from the server.

Optionally retrieves the aggregate values as well. The tag must exist.

**Parameters**

- **path** (str) – The path of the tag to read.
- **include\_timestamp** (bool) – True to include the timestamp associated with the value in the result.
- **include\_aggregates** (bool) – True to include the tag's aggregate values in the result if the tag is set to [\*TagData.collect\\_aggregates\*](#).

**Return type**

Optional[[\*nisystemlink.clients.tag.TagWithAggregates\*](#)]

**Returns**

The value, and the timestamp and/or aggregate values if requested, or None if the tag exists but doesn't have a value.

**Raises**

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path is None.
- **ReferenceError** – if the reader has been closed.
- **ApiException** – if the API call fails.

**class** `nisystemlink.clients.tag.ITagWriter`

Provides an interface for writing the current value of a single SystemLink tag.

**get\_tag\_writer**(*path*, *data\_type*)

Get a *TagValueWriter* for this path.

**Parameters**

- **path** (str) – The path of the tag to write.
- **data\_type** (*nisystemlink.clients.tag.DataType*) – The data type of the tag to write.

**Return type**

*nisystemlink.clients.tag.TagValueWriter*

**write**(*path*, *data\_type*, *value*, \*, *timestamp=None*)

Write a tag's value.

**Parameters**

- **path** (str) – The path of the tag to write.
- **data\_type** (*nisystemlink.clients.tag.DataType*) – The data type of the value to write.
- **value** (Union[bool, int, float, str, datetime.datetime]) – The tag value to write.
- **timestamp** (Optional[datetime.datetime]) – A custom timestamp to associate with the value, or None to have the server specify the timestamp.

**Raises**

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path or value is None.
- **ValueError** – if data\_type is invalid.
- **ValueError** – if value has the wrong data type.
- **ReferenceError** – if the writer has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**write\_async**(*path*, *data\_type*, *value*, \*, *timestamp=None*)

Asynchronously write a tag's value.

**Parameters**

- **path** (str) – The path of the tag to write.
- **data\_type** (*nisystemlink.clients.tag.DataType*) – The data type of the value to write.
- **value** (str) – The tag value to write.
- **timestamp** (Optional[datetime.datetime]) – A custom timestamp to associate with the value, or None to have the server specify the timestamp.

**Return type**

Awaitable[None]

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path or value is None.
- **ValueError** – if data\_type is invalid.
- **ValueError** – if value has the wrong data type.
- **ReferenceError** – if the writer has been closed.
- *ApiException* – if the API call fails.

**class** nisystemlink.clients.tag.RetentionType(value)

Represents the different ways for the SystemLink tag historian to retain the history of tag values.

**COUNT = 3**

A set number of historical values for the tag are retained.

**DURATION = 2**

Historical values for the tag are retained for a set number of days.

**INVALID = 0**

An unknown or invalid tag retention type.

Not a valid input to API calls, but used to represent tags whose retention type isn't recognized.

**NONE = 1**

No history for the tag's value is retained.

**PERMANENT = 4**

All of the tag's values are retained until the tag is deleted.

**class** nisystemlink.clients.tag.TagData(path, data\_type=None, keywords=None, properties=None)

Contains the metadata for a SystemLink tag.

**\_\_init\_\_**(path, data\_type=None, keywords=None, properties=None)

Initialize an instance.

**Parameters**

- **path** (str) – The tag's path, which uses a dot-separated hierarchy to uniquely identify the tag on the server.
- **data\_type** (Optional[*nisystemlink.clients.tag.DataType*]) – The data type for the tag's values.
- **keywords** (Optional[Iterable[str]]) – The tag's keywords.

- **properties** (Optional[Dict[str, str]]) – The tag’s properties.

### **clear\_retention()**

Clear all retention settings, setting it to use a *TagData.retention\_type* of *RetentionType.NONE*.

#### **Parameters**

**tag** – The tag whose retention will be cleared.

#### **Return type**

None

### **property collect\_aggregates: bool**

Whether the server should keep aggregate information for the tag.

The information collected depends on the tag’s *data\_type*.

### **property data\_type: DataType**

The data type for the tag’s values.

Changing the data type of an existing tag requires deleting the tag and creating a new one of a different data type.

### **property keywords: List[str]**

The list of keywords associated with the tag.

### **property path: str**

The tag’s path, which uses a dot-separated hierarchy to uniquely identify the tag on the server.

### **property properties: Dict[str, str]**

The properties associated with the tag.

### **replace\_keywords(keywords)**

Replace all of the tag’s *keywords* with those in *keywords*.

#### **Parameters**

**keywords** (Iterable[str]) – The tag’s new keywords, or None to clear all keywords.

#### **Return type**

None

### **replace\_properties(properties)**

Replace all of the tag’s *properties* with those in *properties*.

#### **Parameters**

**properties** (Dict[str, str]) – The tag’s new properties, or None to clear all properties.

#### **Return type**

None

### **property retention\_count: Optional[int]**

The number of historical values to retain when *retention\_type* is *RetentionType.COUNT*, or None to use the server-specified default of 10000.

### **property retention\_days: Optional[int]**

The number of days to keep a tag’s historical values when *retention\_type* is *RetentionType.DURATION*, or None to use the server-specified default of 30 days.

### **property retention\_type: RetentionType**

How the tag’s historical values are retained by the tag historian, if available.

The *retention\_count* and *retention\_days* properties can further customize when values are removed from the historian.

The tag historian is an optional component for SystemLink Server installations, and is not available in SystemLink Cloud. The tag's historical values are not retained when the tag historian is not available, regardless of the retention type.

**set\_retention\_count**(*count*)

Set the number of historical values to retain.

**Parameters**

**count** (int) – The number of historical values to retain.

**Return type**

None

**set\_retention\_days**(*days*)

Set the historical values to be retained for the specified number of days.

**Parameters**

**days** (int) – The number of days a historical value will be kept.

**Return type**

None

**validate\_path**()

Validate the path as an input and returns it.

Clients do not typically call this method directly.

**Return type**

str

**Returns**

The validated path.

**Raises**

**ValueError** – if the tag's path is invalid.

**validate\_type**(*required\_type*)

Validate that the tag's data type matches *required\_type*.

Clients do not typically call this method directly.

**Parameters**

**required\_type** (*nisystemlink.clients.tag.DataType*) – The data type required by the API.

**Raises**

- **ValueError** – if this is not a tag of the required type with a valid path.
- **ValueError** – if *required\_type* is *DataType.UNKNOWN*.

**Return type**

None

**class** *nisystemlink.clients.tag.TagDataUpdate*(*path*, *data\_type*, *keywords=None*, *properties=None*)

Contains information for updating parts of a tag's metadata on the server when used with the *TagManager.update()* method.

The update can add keywords, add new properties, change the value of existing properties, modify the collect aggregates setting, and modify retention settings. To remove a keyword or property, pass the entire *TagData* to the *TagManager.update()* method instead.

**\_\_init\_\_**(*path*, *data\_type*, *keywords*=None, *properties*=None)

Initialize an update of a tag's keywords and/or properties.

Keywords and properties included in the update that are missing from the tag's metadata on the server are added, and properties that exist with a different value are replaced. At least one of **keywords** or **properties** must be specified.

#### Parameters

- **path** (str) – The path of the tag to update.
- **data\_type** (*nisystemlink.clients.tag.DataType*) – The data type of the tag to update.
- **keywords** (Optional[Iterable[str]]) – The list of keywords that will be added to the tag's metadata on the server, or None to not add any keywords.
- **properties** (Optional[Dict[str, str]]) – The properties that will be added to or replaced in the tag's metadata on the server, or None to not modify any properties.

#### Raises

- **ValueError** – if path is None.
- **ValueError** – if both keywords and properties are None.

**property collect\_aggregates:** Optional[bool]

The *TagData.collect\_aggregates* setting to send with the update, or None to not send a value.

**property data\_type:** *DataType*

The data type for the tag's values.

**classmethod from\_tagdata**(*data*, *fields*)

Create an update by taking one or more fields from a *TagData*.

#### Parameters

- **data** (*nisystemlink.clients.tag.TagData*) – The metadata to send to the server in the update.
- **fields** (*nisystemlink.clients.tag.TagUpdateFields*) – One or more fields to include in the update.

#### Raises

- **ValueError** – if data is None.
- **ValueError** – if fields has no fields or invalid fields.

#### Return type

*nisystemlink.clients.tag.TagDataUpdate*

**property keywords:** Optional[Tuple[str, ...]]

The list of keywords to send with the update, or None to not send any keywords.

**property path:** str

The tag's path, which uses a dot-separated hierarchy to uniquely identify the tag on the server.

**property properties:** Optional[Dict[str, str]]

The properties send with the update, or None to not send any properties.

**class** *nisystemlink.clients.tag.TagManager*(*configuration*=None)

Represents common ways to create, read, and query SystemLink tags for a specific server connection.

**\_\_init\_\_**(*configuration=None*)

Initialize an instance.

**Parameters**

**configuration** (Optional[nisystemlink.clients.core.HttpConfiguration]) – Defines the web server to connect to and information about how to connect.

**Raises**

**ApiException** – if the current system cannot communicate with a SystemLink Server, or if the configuration provided by SystemLink Client cannot be found.

**create\_selection**(*tags*)

Create an *TagSelection* that initially contains the given *tags* without retrieving any additional data from the server.

**Parameters**

**tags** (List[nisystemlink.clients.tag.TagData]) – The tags to include in the selection.

**Return type**

*nisystemlink.clients.tag.TagSelection*

**Returns**

The created selection.

**Raises**

- **ValueError** – if any of the given *tags* is None or has an invalid path.
- **ValueError** – if *tags* is None.

**create\_writer**(*\*, buffer\_size=None, max\_buffer\_time=None*)

Create a tag writer that buffers tag values until *send\_buffered\_writes()* is called on the returned object, *buffer\_size* writes have been buffered, or *max\_buffer\_time* time has past since buffering a value, at which point the writes will be sent automatically.

**Parameters**

- **buffer\_size** (Optional[int]) – The maximum number of tag writes to buffer before automatically sending them to the server.
- **max\_buffer\_time** (Optional[datetime.timedelta]) – The amount of time before writes are sent.

**Return type**

*nisystemlink.clients.tag.BufferedTagWriter*

**Returns**

The created writer. Close the writer to free resources.

**Raises**

- **ValueError** – if *buffer\_size* and *max\_buffer\_time* are both None.
- **ValueError** – if *buffer\_size* is less than one.

**delete**(*tags*)

Delete one or more tags from the server.

**Parameters**

**tags** (Iterable[Union[nisystemlink.clients.tag.TagData, str]]) – The tags (or tag paths) to delete.



**Raises**

- **ValueError** – if `tags` is `None`.
- **ValueError** – if `tags` contains any invalid tags.
- **ApiException** – if the API call fails.

**Return type**

None

**delete\_async**(*tags=None*)

Asynchronously delete one or more tags from the server.

**Parameters**

**tags** (Optional[Iterable[Union[nisystemlink.clients.tag.TagData, str]]]) – The tags (or tag paths) to delete.

**Return type**

Awaitable[None]

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ValueError** – if `tags` is `None`.
- **ValueError** – if `tags` contains any invalid tags.
- **ApiException** – if the API call fails.

**get\_tag\_reader**(*path, data\_type*)Get a *TagValueReader* for this path.**Parameters**

- **path** (str) – The path of the tag to read.
- **data\_type** (nisystemlink.clients.tag.DataType) – The data type of the tag to read.

**Return type**

nisystemlink.clients.tag.TagValueReader

**open**(*path, data\_type=None, \*, create=None*)

Query the server for the metadata of a tag, optionally creating it if it doesn't already exist.

If `data_type` is provided, `create` defaults to `True`. If `data_type` is not provided, `create` cannot be set to `True`.

The call fails if the tag already exists as a different data type than specified or if it doesn't exist and `create` is `False`.

**Parameters**

- **path** (str) – The path of the tag to open.
- **data\_type** (Optional[nisystemlink.clients.tag.DataType]) – The expected data type of the tag.
- **create** (Optional[bool]) – `True` to create the tag if it doesn't already exist, `False` to fail if it doesn't exist.

**Return type**

nisystemlink.clients.tag.TagData

**Returns**

Information about the tag.

**Raises**

- **ValueError** – if path is None or empty.
- **ValueError** – if data\_type is invalid.
- **ValueError** – if create is True, but data\_type is None.
- **ApiException** – if the API call fails.

**async open\_async**(path, data\_type=None, \*, create=None)

Asynchronously query the server for the metadata of a tag, optionally creating it if it doesn't already exist.

The call fails if the tag already exists as a different data type than specified or if it doesn't exist and create is False.

**Parameters**

- **path** (str) – The path of the tag to open.
- **data\_type** (Optional[nisystemlink.clients.tag.DataType]) – The expected data type of the tag.
- **create** (Optional[bool]) – True to create the tag if it doesn't already exist, False to fail if it doesn't exist.

**Return type**

*nisystemlink.clients.tag.TagData*

**Returns**

A task representing the asynchronous operation. On success, contains information about the tag.

**Raises**

- **ValueError** – if path is None or empty.
- **ValueError** – if data\_type is invalid.
- **ValueError** – if create is True, but data\_type is None.
- **ApiException** – if the API call fails.

**open\_selection**(paths)

Query the server for the metadata for the given tag paths and return the results in a *TagSelection*.

**Parameters**

**paths** (List[str]) – The paths of the tags to include in the selection. May include glob-style wildcards.

**Return type**

*nisystemlink.clients.tag.TagSelection*

**Returns**

The created selection with *TagSelection.metadata* containing the metadata.

**Raises**

- **ValueError** – if any of the given paths is None or invalid.
- **ValueError** – if paths contains duplicate paths.
- **ValueError** – if paths is None.

- **ApiException** – if the API call fails.

**open\_selection\_async(paths)**

Asynchronously query the server for the metadata for the given tag paths and return the results in a *TagSelection*.

**Parameters**

**paths** (List[str]) – The paths of the tags to include in the selection. May include glob-style wildcards.

**Return type**

Awaitable[nisystemlink.clients.tag.TagSelection]

**Returns**

A task representing the asynchronous operation. On success, contains the created selection with *TagSelection.metadata* containing the metadata.

**Raises**

- **ValueError** – if any of the given paths is None or invalid.
- **ValueError** – if paths contains duplicate paths.
- **ValueError** – if paths is None.
- **ApiException** – if the API call fails.

**query(paths=None, keywords=None, properties=None, \*, skip=0, take=None)**

Query the server for available tags matching the given criteria.

**Parameters**

- **paths** (Optional[Sequence[str]]) – List of tag paths to include in the result. May include glob-style wildcards.
- **keywords** (Optional[Iterable[str]]) – List of keywords that tags must have, or None.
- **properties** (Optional[Dict[str, str]]) – Mapping of properties and their values that tags must have, or None.
- **skip** (int) – The number of tags to initially skip in the results.
- **take** (Optional[int]) – The number of tags to include in each page of results.

**Return type**

*nisystemlink.clients.tag.TagQueryResultCollection*

**Returns**

A *TagQueryResultCollection* containing the first page of results. Enumerating the collection will retrieve additional pages according to the *take* parameter.

**Raises**

- **ValueError** – if skip or take is negative.
- **ValueError** – if paths is an empty list.
- **ValueError** – if any of paths are None.
- **ApiException** – if the API call fails.

**async query\_async(paths=None, keywords=None, properties=None, \*, skip=0, take=None)**

Asynchronously query the server for available tags matching the given criteria.

**Parameters**

- **paths** (Optional[Sequence[str]]) – List of tag paths to include in the result. May include glob-style wildcards.
- **keywords** (Optional[Iterable[str]]) – List of keywords that tags must have, or None.
- **properties** (Optional[Dict[str, str]]) – Mapping of properties and their values that tags must have, or None.
- **skip** (int) – The number of tags to initially skip in the results.
- **take** (Optional[int]) – The number of tags to include in each page of results.

**Return type**

*[nisystemlink.clients.tag.AsyncTagQueryResultCollection](#)*

**Returns**

A task representing the asynchronous operation. On success, contains a *[TagQueryResultCollection](#)* containing the first page of results. Enumerating the collection will retrieve additional pages according to the `take` parameter.

**Raises**

- **ValueError** – if `skip` is negative.
- **ValueError** – if `take` is negative.
- *[ApiException](#)* – if the API call fails.

**read**(*path*, \*, *include\_timestamp=False*, *include\_aggregates=False*)

Retrieve the current value of the tag with the given `path` from the server.

Optionally retrieves the aggregate values as well. The tag must exist.

**Parameters**

- **path** (str) – The path of the tag to read.
- **include\_timestamp** (bool) – True to include the timestamp associated with the value in the result.
- **include\_aggregates** (bool) – True to include the tag's aggregate values in the result if the tag is set to *[TagData.collect\\_aggregates](#)*.

**Return type**

Optional[*[nisystemlink.clients.tag.TagWithAggregates](#)*]

**Returns**

The value, and the timestamp and/or aggregate values if requested, or None if the tag exists but doesn't have a value.

**Raises**

- **ValueError** – if `path` is empty or invalid.
- **ValueError** – if `path` is None.
- **ReferenceError** – if the reader has been closed.
- *[ApiException](#)* – if the API call fails.

**async read\_async**(*path*, \*, *include\_timestamp=False*, *include\_aggregates=False*)

Asynchronously retrieve the current value of the tag with the given `path` from the server.

Optionally retrieves the aggregate values as well. The tag must exist.

**Parameters**

- **path** (str) – The path of the tag to read.
- **include\_timestamp** (bool) – True to include the timestamp associated with the value in the result.
- **include\_aggregates** (bool) – True to include the tag's aggregate values in the result if the tag is set to *TagData.collect\_aggregates*.

**Return type**Optional[*nisystemlink.clients.tag.TagWithAggregates*]**Returns**

The value, and the timestamp and/or aggregate values if requested, or None if the tag exists but doesn't have a value.

**Raises**

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path is None.
- **ReferenceError** – if the reader has been closed.
- **ApiException** – if the API call fails.

**refresh**(tags)

Populate the given tags with the latest metadata from the server.

Only the *TagData.path* needs to be initialized. Tags that don't exist on the server will have their *TagData.data\_type* set to *DataType.UNKNOWN*.

**Parameters**

**tags** (List[*nisystemlink.clients.tag.TagData*]) – The tags to refresh.

**Raises**

- **ValueError** – if any tags are None or have invalid paths.
- **ValueError** – if tags is None.
- **ApiException** – if the API call fails.

**Return type**

None

**async refresh\_async**(tags)

Asynchronously populate the given tags with the latest metadata from the server.

Only the *TagData.path* needs to be initialized. Tags that don't exist on the server will have their *TagData.data\_type* set to *DataType.UNKNOWN*.

**Parameters**

**tags** (List[*nisystemlink.clients.tag.TagData*]) – The tags to refresh.

**Return type**

None

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ValueError** – if any tags are None or have invalid paths.
- **ValueError** – if tags is None.

- **ApiException** – if the API call fails.

**update**(updates)

Update the metadata of one or more tags on the server, creating tags that don't exist.

If updates contains *TagData* objects, existing metadata will be replaced. If updates contains *TagDataUpdate* objects instead, tags that already exist will have their existing keywords, properties, and settings merged with those specified in the corresponding *TagDataUpdate*.

The call fails if any of the tags already exist as a different data type.

**Parameters**

**updates** (Union[Sequence[nisystemlink.clients.tag.TagData], Sequence[nisystemlink.clients.tag.TagDataUpdate]]) – The tags to update (if *TagData* objects are given), or the tag metadata updates to send (if *TagDataUpdate* objects are given).

**Raises**

- **ValueError** – if updates is None or empty.
- **ValueError** – if updates contains any invalid tags.
- **ValueError** – if updates contains both TagData objects and TagDataUpdate objects.
- **ApiException** – if the API call fails.

**Return type**

None

**async update\_async**(updates)

Asynchronously update the metadata of one or more tags on the server, creating tags that don't exist.

If updates contains *TagData* objects, existing metadata will be replaced. If updates contains *TagDataUpdate* objects instead, tags that already exist will have their existing keywords, properties, and settings merged with those specified in the corresponding *TagDataUpdate*.

**Parameters**

**updates** (Union[Sequence[nisystemlink.clients.tag.TagData], Sequence[nisystemlink.clients.tag.TagDataUpdate]]) – The tags to update (if *TagData* objects are given), or the tag metadata updates to send (if *TagDataUpdate* objects are given).

**Return type**

None

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ValueError** – if updates is None or empty.
- **ValueError** – if updates contains any invalid tags.
- **ValueError** – if updates contains both TagData objects and TagDataUpdate objects.
- **ApiException** – if the API call fails.

**class** nisystemlink.clients.tag.TagPathUtilities

Contains helper methods for interacting with tag paths.

**classmethod validate(*path*)**

Validate *path* as an input tag path.

Clients do not typically need to call this method directly.

**Parameters**

**path** (str) – The tag path to validate.

**Return type**

str

**Returns**

The validated path.

**Raises**

- **ValueError** – if the path is invalid.
- **ValueError** – if path is None.

**classmethod validate\_query(*path*)**

Validate *path* as a tag path query.

Clients do not typically need to call this method directly.

**Parameters**

**path** (str) – The tag path to validate.

**Return type**

str

**Returns**

The validated path.

**Raises**

- **ValueError** – if the path is invalid.
- **ValueError** – if path is None.

**class nisystemlink.clients.tag.TagQueryResultCollection(*first\_page*, *total\_count*, *skip*)**

Represents a paginated list of tags returned by a query.

Iterating over the collection makes additional server requests to retrieve pages after the first.

**property total\_count: int**

The total number of tags matched by the query at the time the query was made.

**class nisystemlink.clients.tag.TagSelection(*tags*, *paths=None*)**

Represents a set of tags that can be read, written, or deleted together.

Tags may be specified using glob-style wildcards to include multiple tags with a common path. Call [`close\(\)`](#) to free resources. Tag reads are buffered, and the latest values are only retrieved on first read or by calling [`refresh\_values\(\)`](#). Reads for tags that aren't in the selection return None, even if the tag exists on the server.

Note that [`TagSelection`](#) objects support using the `with` statement (or the `async with` statement), to [`close\(\)`](#) the selection automatically on exit.

**add\_tags(*tags*)**

Add one or more tags to the selection.

Tags that are already in the selection are ignored. The tags as given are immediately available in the [`metadata`](#) collection. Use [`refresh\_metadata\(\)`](#) to get the latest data for the tags. The tags will be available in the [`values`](#) collection but won't have latest a latest value until [`refresh\_values\(\)`](#) is called.

**Parameters**

**tags** (List[nisystemlink.clients.tag.TagData]) – The tags to add to the selection.

**Raises**

- **ValueError** – if any of the given tags are None or have an invalid path.
- **ValueError** – if tags is None.
- **ReferenceError** – if the selection has been closed.

**Return type**

None

**clear\_tags()**

Remove all tags from the selection.

**Raises**

**ReferenceError** – if the selection has been closed.

**Return type**

None

**close()**

Clean up server resources associated with the selection.

**Return type**

None

**async close\_async()**

Asynchronously clean up server resources associated with the selection.

**Return type**

None

**Returns**

A task representing the asynchronous operation.

**create\_subscription(\*, update\_interval=None)**

Subscribe to receive events when tags in the selection are written to.

Updates will be queried from the server using the specified or default update interval.

The subscription will include any tags that are currently included in the selection when the subscription is created. That list can be seen via the *metadata* property. The subscription will also attempt to include any non-wildcard paths that are in the selection's current list of *paths*. Often, the list of *paths* directly coincides with the *metadata*, but the former may contain paths that did not exist when the selection's metadata was last updated from the server, e.g. via *refresh()*.

Closing, adding tags, or removing tags from the selection will not affect previously created subscriptions.

**Parameters**

**update\_interval** (Optional[datetime.timedelta]) – How often to receive tag updates notifications from the server. Default is `datetime.timedelta(seconds=30)`.

**Return type**

*nisystemlink.clients.tag.TagSubscription*

**Returns**

The created subscription.

**Raises**

- **ValueError** – if update\_interval is negative.



- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**create\_subscription\_async**(\*, *update\_interval=None*)

Asynchronously subscribe to receive events when tags in the selection are written to.

Updates will be queried from the server using the specified or default update interval.

Closing, adding tags, or removing tags from the selection will not affect previously created subscriptions.

**Parameters**

**update\_interval** (Optional[datetime.timedelta]) – How often to receive tag updates notifications from the server. Depending on the *TagManager* implementation in use, this may involve polling the server or have a minimum value.

**Return type**

Awaitable[nisystemlink.clients.tag.TagSubscription]

**Returns**

A task representing the asynchronous operation. On success, contains the created subscription.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**delete\_tags\_from\_server**()

Delete all tags in the selection from the server.

The tags are not removed from the selection but are removed from *metadata* and *values*. If any of the tags are recreated, a call to *refresh\_metadata()* will restore them in the collection of tags.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**async delete\_tags\_from\_server\_async**()

Asynchronously delete all tags in the selection from the server.

The tags are not removed from the selection but are removed from *metadata* and *values*. If any of the tags are recreated, a call to *refresh\_metadata()* will restore them in the collection of tags.

**Return type**

None

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**get\_tag\_reader**(*path*, *data\_type*)

Get a *TagValueReader* for this path.

**Parameters**

- **path** (str) – The path of the tag to read.
- **data\_type** (*nisystemlink.clients.tag.DataType*) – The data type of the tag to read.

**Return type**

*nisystemlink.clients.tag.TagValueReader*

**property metadata: Dict[str, TagData]**

The most recently retrieved metadata for tags in the selection, indexed by *TagData.path*.

Tags in the selection that do not exist on the server will not appear in the collection. Call *refresh\_metadata()* to update the data contained in the collection.

**open\_tags(paths)**

Add one or more tags to the selection by path.

Tags that are already in the selection are ignored. The tags will not be available in the *metadata* collection until *refresh\_metadata()* is called or the *values* collection until *refresh\_values()* is called.

**Parameters**

**paths** (List[str]) – The tag paths to add to the selection. May include glob-style wildcards.

**Raises**

- **ValueError** – if any of the given paths are None or invalid.
- **ValueError** – if *paths* is None.
- **ReferenceError** – if the selection has been closed.

**Return type**

None

**property paths: Tuple[str, ...]**

The paths of all tags in the selection, including those that do not exist on the server.

When using wildcards, the original paths with the wildcards are included in the list, not the paths matched by the wildcards.

**read(path, \*, include\_timestamp=False, include\_aggregates=False)**

Retrieve the current value of the tag with the given *path* from the server.

Optionally retrieves the aggregate values as well. The tag must exist.

**Parameters**

- **path** (str) – The path of the tag to read.
- **include\_timestamp** (bool) – True to include the timestamp associated with the value in the result.
- **include\_aggregates** (bool) – True to include the tag's aggregate values in the result if the tag is set to *TagData.collect\_aggregates*.

**Return type**

Optional[*nisystemlink.clients.tag.TagWithAggregates*]

**Returns**

The value, and the timestamp and/or aggregate values if requested, or None if the tag exists but doesn't have a value.

**Raises**

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path is None.
- **ReferenceError** – if the reader has been closed.
- **ApiException** – if the API call fails.

**async read\_async**(*path*, \*, *include\_timestamp=False*, *include\_aggregates=False*)

Asynchronously retrieve the current value of the tag with the given path from the server.

Optionally retrieves the aggregate values as well. The tag must exist.

#### Parameters

- **path** (str) – The path of the tag to read.
- **include\_timestamp** (bool) – True to include the timestamp associated with the value in the result.
- **include\_aggregates** (bool) – True to include the tag's aggregate values in the result if the tag is set to *TagData.collect\_aggregates*.

#### Return type

Optional[*nisystemlink.clients.tag.TagWithAggregates*]

#### Returns

The value, and the timestamp and/or aggregate values if requested, or None if the tag exists but doesn't have a value.

#### Raises

- **ValueError** – if path is empty or invalid.
- **ValueError** – if path is None.
- **ReferenceError** – if the reader has been closed.
- **ApiException** – if the API call fails.

#### refresh()

Refresh both *TagData* and current values for all tags in the selection, updating *metadata* and *values* accordingly.

Call *refresh\_metadata()* or *refresh\_values()* to only partially refresh.

#### Raises

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

#### Return type

None

#### async refresh\_async()

Asynchronously refresh both the *TagData* and current values for all tags in the selection, updating *metadata* and *values* accordingly.

Call *refresh\_metadata\_async()* or *refresh\_values\_async()* to only partially refresh.

#### Return type

None

#### Returns

A task representing the asynchronous operation.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**refresh\_metadata()**

Refresh the *TagData* for all tags in the selection, updating *metadata* accordingly.

*values* will also be updated with new and removed tags, but those readers will continue to return previously available values until *refresh\_values()* is called.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**async refresh\_metadata\_async()**

Asynchronously refresh the *TagData* for all tags in the selection, updating *metadata* accordingly.

*values* will also be updated with new and removed tags, but those readers will continue to return previously available values until *refresh\_values()* is called.

**Return type**

None

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**refresh\_values()**

Refresh the current value of tags in the selection returned by the readers in the *values* collection.

Readers will return None for tags that no longer exist on the server, or exist but haven't yet been written to. New readers will be added to the collection for tags that have values but have not yet been added to *metadata* by a call to *refresh\_metadata()*.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**async refresh\_values\_async()**

Asynchronously refresh the current value of tags in the selection returned by the readers in the *values* collection.

Readers will return None for tags that no longer exist on the server, or exist but haven't yet been written to. New readers will be added to the collection for tags that have values but have not yet been added to *metadata* by a call to *refresh\_metadata()*.

**Return type**

None

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**remove\_tags(tags)**

Remove one or more tags from the selection.

The tags are not removed from the *metadata* and *values* collections until the next *refresh\_metadata()*.

Tags not in the selection are ignored. Tags that were added to the selection using wildcard paths can only be removed by including the same wildcard paths. Tags matched by multiple wildcard paths remain in the selection until all of the paths are removed.

**Parameters**

**tags** (List[Union[nisystemlink.clients.tag.TagData, str]]) – The tags to remove from the selection. Either strings (paths) or *TagData* objects can be given. For *TagData* objects, only the *TagData.path* is used.

**Raises**

- **ValueError** – if tags is None.
- **ValueError** – if any of the given tags are None or have an invalid path.
- **ReferenceError** – if the selection has been closed.

**Return type**

None

**reset\_aggregates()**

Reset tag value aggregates on the server for all tags in the selection.

Tag historical values are not modified. Has no effect on tags that are not set to *TagData.collect\_aggregates*. Use *refresh\_values()* to retrieve the new aggregates.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**reset\_aggregates\_async()**

Asynchronously reset tag value aggregates on the server for all tags in the selection.

Tag historical values are not modified. Has no effect on tags that are not set to *TagData.collect\_aggregates*. Use *refresh\_values()* to retrieve the new aggregates.

**Return type**

Awaitable[None]

**Returns**

A task representing the asynchronous operation.

**Raises**

- **ReferenceError** – if the selection has been closed.
- **ApiException** – if the API call fails.

**property values:** Dict[str, [TagValueReader](#)]

A [TagValueReader](#) for reading the most recently retrieved value for tags in the selection, indexed by [TagValueReader.path](#).

Tags in the selection that do not exist on the server will not appear in the collection. Readers for tags without values on the server will return None when read. Call [refresh\\_values\(\)](#) to update the values returned by the readers in the dictionary.

**class** `nisystemlink.clients.tag.TagSubscription(paths, heartbeat_timer)`

Represents a subscription for changes to one or more tags' values.

Call [close\(\)](#) to stop receiving events.

Note that [TagSubscription](#) objects support using the with statement (or the async with statement), to [close\(\)](#) the subscription automatically on exit.

**tag\_changed**

An event that is triggered when one of the subscription's tag changes. The callback will receive a [TagData](#) parameter and an Optional [[TagValueReader](#)] parameter.

Example:

```
def my_callback(tag: TagData, reader: Optional[TagValueReader]):
    print("{} changed".format(tag.path))
    if reader is None:
        print(" - unknown data type")
    else:
        value = reader.read()
        assert value is not None
        print(" - new value: {}".format(value.value))

subscription.tag_changed += my_callback
```

**close()**

Close server resources associated with the subscription.

Further tag writes will not trigger new events.

**Return type**

None

**async close\_async()**

Asynchronously close server resources associated with the subscription.

Further tag writes will not trigger new events.

**Return type**

None

**Returns**

A task representing the asynchronous operation.

**class** `nisystemlink.clients.tag.TagUpdateFields(value)`

Represents the various [TagData](#) fields that may be included in a [TagDataUpdate](#).

Fields that aren't included are left unmodified when updates are sent to the server.

**ALL = 15**

Specify that all fields in the [TagData](#) should be included in the update.

Keywords and properties that already exist on the server will not be removed, even if they are missing from the update.

**COLLECT\_AGGREGATES = 4**

Specify that the tag's *TagData.collect\_aggregates* setting will be modified on the server.

**KEYWORDS = 1**

Specify that entries in the *TagData.keywords* that are missing from the tag's metadata on the server will be added.

**PROPERTIES = 2**

Specify that entries in the *TagData.properties* that are missing from or different in the tag's metadata on the server will be added or replaced.

**RETENTION = 8**

Specify that the tag's *TagData.retention\_type*, *TagData.retention\_count*, and *TagData.retention\_days* settings will be modified on the server.

**class** `nisystemlink.clients.tag.TagValueReader(reader, tag)`

Represents the ability to read a single tag's value using an *ITagReader*.

**\_\_init\_\_**(reader, tag)

Initialize an instance.

#### Parameters

- **reader** (*nisystemlink.clients.tag.ITagReader*) – The *ITagReader* to use when reading values.
- **tag** (*nisystemlink.clients.tag.TagData*) – The tag whose values will be read.
- **path** – The path of the tag whose values will be read.

#### Raises

**ValueError** – if tag is not a tag of a valid data type and with a valid path.

**property** `data_type: DataType`

The data type of the tag associated with the value.

**property** `path: str`

The path of the tag associated with the value.

**read**(\*, include\_timestamp=False, include\_aggregates=False)

Read the current value of the tag.

#### Parameters

- **include\_timestamp** (bool) – True to include the timestamp associated with the value in the result.
- **include\_aggregates** (bool) – True to include the tag's aggregate values in the result if the tag is set to *TagData.collect\_aggregates*.

#### Return type

Optional[*nisystemlink.clients.tag.TagWithAggregates*[TypeVar(typing.Any)]]

#### Returns

The value, and the timestamp and/or aggregate values if requested, or None if the tag exists but doesn't have a value.

#### Raises

- **ReferenceError** – if the underlying reader has been closed.
- **ApiException** – if the API call fails.

**async read\_async**(\**, include\_timestamp=False, include\_aggregates=False*)

Read the current value of the tag.

**Parameters**

- **include\_timestamp** (bool) – True to include the timestamp associated with the value in the result.
- **include\_aggregates** (bool) – True to include the tag’s aggregate values in the result if the tag is set to *TagData.collect\_aggregates*.

**Return type**

Optional[nisystemlink.clients.tag.TagWithAggregates[TypeVar(typing.Any)]]

**Returns**

The value, and the timestamp and/or aggregate values if requested, or None if the tag exists but doesn’t have a value.

**Raises**

- **ReferenceError** – if the underlying reader has been closed.
- **ApiException** – if the API call fails.

**class** nisystemlink.clients.tag.TagValueWriter(writer, tag)

Represents the ability to write a single tag’s value using an *ITagWriter*.

**\_\_init\_\_**(writer, tag)

Initialize an instance.

**Parameters**

- **writer** (nisystemlink.clients.tag.ITagWriter) – The *ITagWriter* to use when writing values.
- **tag** (nisystemlink.clients.tag.TagData) – The tag whose values will be written.
- **path** – The path of the tag whose values will be written.

**Raises**

**ValueError** – if tag is not a tag of a valid type and with a valid path.

**property data\_type:** *DataType*

The data type of the tag associated with the value.

**property path:** str

The path of the tag associated with the value.

**write**(value, \*, timestamp=None)

Write the tag’s value.

**Parameters**

- **value** (TypeVar(typing.Any)) – The tag value to write.
- **timestamp** (Optional[datetime.datetime]) – A custom timestamp to associate with the value, or None to have the server specify the timestamp.

**Raises**



- **ReferenceError** – if the underlying writer has been closed.
- **ApiException** – if the API call fails.

**Return type**

None

**write\_async**(*value*, \*, *timestamp=None*)

Write the tag's value.

**Parameters**

- **value** (TypeVar(typing.Any)) – The tag value to write.
- **timestamp** (Optional[datetime.datetime]) – A custom timestamp to associate with the value, or None to have the server specify the timestamp.

**Raises**

- **ReferenceError** – if the underlying writer has been closed.
- **ApiException** – if the API call fails.

**Return type**

Awaitable[None]

```
class nisystemlink.clients.tag.TagWithAggregates(path, data_type, value, timestamp=None,
                                              count=None, min=None, max=None, mean=None)
```

Represents a generic tag value with optional timestamp and optional aggregate values.

**property count:** Optional[int]

The number of times the tag has been written, or None if the tag is not collecting aggregates.

**property data\_type:** *DataType*

The data type of the value.

**property max:** Optional[Union[int, float]]

The maximum value of the tag, or None if the tag is not collecting aggregates or the data type of the tag does not track a maximum value.

**property mean:** Optional[float]

The mean value of the tag, or None if the tag is not collecting aggregates or the data type of the tag does not track a mean value.

**property min:** Optional[Union[int, float]]

The minimum value of the tag, or None if the tag is not collecting aggregates or the data type of the tag does not track a minimum value.

**property path:** str

The path of the tag associated with the value.

**property timestamp:** Optional[datetime]

The timestamp associated with the value, if available.

**property value:** *\_Any*

The value of the tag.

### 1.2.3 nisystemlink.clients.testmonitor

`class nisystemlink.clients.testmonitor.TestMonitorClient(configuration)`

`__init__(configuration)`

Initialize an instance.

#### Parameters

- **configuration** (Optional[nisystemlink.clients.core.HttpConfiguration])  
– Defines the web server to connect to and information about how to connect.
- **base\_path** – The base path for all API calls.

`pydantic model nisystemlink.clients.testmonitor.models.ApiInfo`

Information about the available API operations.

```
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  "description": "Information about the available API operations.",
  "type": "object",
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      "$ref": "#/definitions/V2Operations"
    }
  },
  "required": [
    "operations"
  ],
  "definitions": {
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      "description": "Represents an operation that can be performed on a data_
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      "type": "object",
      "properties": {
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          "type": "boolean"
        },
        "version": {
          "title": "Version",
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      },
      "required": [
        "available",
        "version"
      ]
    },
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      "title": "V2Operations",
      "description": "The operations available in the routes provided by the v2_
↪HTTP API.",
      "type": "object",
```

(continues on next page)

(continued from previous page)

```

"properties": {
  "getProducts": {
    "$ref": "#/definitions/Operation"
  },
  "queryProducts": {
    "$ref": "#/definitions/Operation"
  },
  "createProducts": {
    "$ref": "#/definitions/Operation"
  },
  "updateProducts": {
    "$ref": "#/definitions/Operation"
  },
  "deleteProducts": {
    "$ref": "#/definitions/Operation"
  },
  "deleteManyProducts": {
    "$ref": "#/definitions/Operation"
  },
  "getResults": {
    "$ref": "#/definitions/Operation"
  },
  "getResultsPropertyKeys": {
    "$ref": "#/definitions/Operation"
  },
  "queryResults": {
    "$ref": "#/definitions/Operation"
  },
  "createResults": {
    "$ref": "#/definitions/Operation"
  },
  "updateResults": {
    "$ref": "#/definitions/Operation"
  },
  "deleteResult": {
    "$ref": "#/definitions/Operation"
  },
  "deleteManyResults": {
    "$ref": "#/definitions/Operation"
  },
  "getSteps": {
    "$ref": "#/definitions/Operation"
  },
  "querySteps": {
    "$ref": "#/definitions/Operation"
  },
  "createSteps": {
    "$ref": "#/definitions/Operation"
  },
  "updateSteps": {
    "$ref": "#/definitions/Operation"
  },
}

```

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```

        "deleteStep": {
            "$ref": "#/definitions/Operation"
        },
        "deleteManySteps": {
            "$ref": "#/definitions/Operation"
        },
        "queryPaths": {
            "$ref": "#/definitions/Operation"
        }
    },
    "required": [
        "getProducts",
        "queryProducts",
        "createProducts",
        "updateProducts",
        "deleteProducts",
        "deleteManyProducts",
        "getResults",
        "getResultsPropertyKeys",
        "queryResults",
        "createResults",
        "updateResults",
        "deleteResult",
        "deleteManyResults",
        "getSteps",
        "querySteps",
        "createSteps",
        "updateSteps",
        "deleteStep",
        "deleteManySteps",
        "queryPaths"
    ]
}
}
}

```

**Fields**

- *operations*

**field operations:** *V2Operations* [Required]

**pydantic model** `nisystemlink.clients.testmonitor.models.Operation`

Represents an operation that can be performed on a data frame.

```

{
    "title": "Operation",
    "description": "Represents an operation that can be performed on a data frame.",
    "type": "object",
    "properties": {
        "available": {
            "title": "Available",

```

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```

        "type": "boolean"
    },
    "version": {
        "title": "Version",
        "type": "integer"
    }
},
"required": [
    "available",
    "version"
]
}

```

**Fields**

- *available*
- *version*

**field available: bool [Required]**

Whether or not the operation is available to the caller (e.g. due to permissions).

**field version: int [Required]**

The version of the available operation.

**pydantic model** `nisystemlink.clients.testmonitor.models.V2Operations`

The operations available in the routes provided by the v2 HTTP API.

```

{
    "title": "V2Operations",
    "description": "The operations available in the routes provided by the v2 HTTP ↵
↵API.",
    "type": "object",
    "properties": {
        "getProducts": {
            "$ref": "#/definitions/Operation"
        },
        "queryProducts": {
            "$ref": "#/definitions/Operation"
        },
        "createProducts": {
            "$ref": "#/definitions/Operation"
        },
        "updateProducts": {
            "$ref": "#/definitions/Operation"
        },
        "deleteProducts": {
            "$ref": "#/definitions/Operation"
        },
        "deleteManyProducts": {
            "$ref": "#/definitions/Operation"
        },
        "getResults": {

```

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```

    "$ref": "#/definitions/Operation"
  },
  "getResultsPropertyKeys": {
    "$ref": "#/definitions/Operation"
  },
  "queryResults": {
    "$ref": "#/definitions/Operation"
  },
  "createResults": {
    "$ref": "#/definitions/Operation"
  },
  "updateResults": {
    "$ref": "#/definitions/Operation"
  },
  "deleteResult": {
    "$ref": "#/definitions/Operation"
  },
  "deleteManyResults": {
    "$ref": "#/definitions/Operation"
  },
  "getSteps": {
    "$ref": "#/definitions/Operation"
  },
  "querySteps": {
    "$ref": "#/definitions/Operation"
  },
  "createSteps": {
    "$ref": "#/definitions/Operation"
  },
  "updateSteps": {
    "$ref": "#/definitions/Operation"
  },
  "deleteStep": {
    "$ref": "#/definitions/Operation"
  },
  "deleteManySteps": {
    "$ref": "#/definitions/Operation"
  },
  "queryPaths": {
    "$ref": "#/definitions/Operation"
  }
},
"required": [
  "getProducts",
  "queryProducts",
  "createProducts",
  "updateProducts",
  "deleteProducts",
  "deleteManyProducts",
  "getResults",
  "getResultsPropertyKeys",
  "queryResults",

```

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```

    "createResults",
    "updateResults",
    "deleteResult",
    "deleteManyResults",
    "getSteps",
    "querySteps",
    "createSteps",
    "updateSteps",
    "deleteStep",
    "deleteManySteps",
    "queryPaths"
  ],
  "definitions": {
    "Operation": {
      "title": "Operation",
      "description": "Represents an operation that can be performed on a data_
↪frame.",
      "type": "object",
      "properties": {
        "available": {
          "title": "Available",
          "type": "boolean"
        },
        "version": {
          "title": "Version",
          "type": "integer"
        }
      },
      "required": [
        "available",
        "version"
      ]
    }
  }
}

```

### Fields

- *create\_products*
- *create\_results*
- *create\_steps*
- *delete\_many\_products*
- *delete\_many\_results*
- *delete\_many\_steps*
- *delete\_products*
- *delete\_result*
- *delete\_step*
- *get\_products*

- *get\_results*
- *get\_results\_property\_keys*
- *get\_steps*
- *query\_paths*
- *query\_products*
- *query\_results*
- *query\_steps*
- *update\_products*
- *update\_results*
- *update\_steps*

**field create\_products:** *Operation* [Required]

The ability to create one or more products.

**field create\_results:** *Operation* [Required]

The ability to create results.

**field create\_steps:** *Operation* [Required]

The ability to create steps.

**field delete\_many\_products:** *Operation* [Required]

The ability to delete a list of products.

**field delete\_many\_results:** *Operation* [Required]

The ability to delete multiple results.

**field delete\_many\_steps:** *Operation* [Required]

The ability to delete multiple steps.

**field delete\_products:** *Operation* [Required]

The ability to delete a single products.

**field delete\_result:** *Operation* [Required]

The ability to delete a single results.

**field delete\_step:** *Operation* [Required]

The ability to delete a single step.

**field get\_products:** *Operation* [Required]

The ability to get a list of products.

**field get\_results:** *Operation* [Required]

The ability to get a list of results.

**field get\_results\_property\_keys:** *Operation* [Required]

The ability to get custom property keys.

**field get\_steps:** *Operation* [Required]

The ability to get a list of steps.

**field query\_paths:** *Operation* [Required]

The ability to query step paths.



**field query\_products:** *Operation* [Required]

The ability to query products based on their properties.

**field query\_results:** *Operation* [Required]

“The ability to to query results based on their properties.

**field query\_steps:** *Operation* [Required]

The ability to query steps based on their properties.

**field update\_products:** *Operation* [Required]

The ability to update the properties of one or more products.

**field update\_results:** *Operation* [Required]

The ability to update results.

**field update\_steps:** *Operation* [Required]

The ability to update steps.

## 1.2.4 nisystemlink.clients.dataframe

**class** `nisystemlink.clients.dataframe.DataFrameClient`(*configuration=None*)

**\_\_init\_\_**(*configuration=None*)

Initialize an instance.

### Parameters

**configuration** (Optional[*nisystemlink.clients.core.HttpConfiguration*]) – Defines the web server to connect to and information about how to connect. If not provided, an instance of *JupyterHttpConfiguration* is used.

### Raises

*ApiException* – if unable to communicate with the DataFrame Service.

**api\_info**()

Get information about available API operations.

### Return type

*nisystemlink.clients.dataframe.models.ApiInfo*

### Returns

Information about available API operations.

### Raises

*ApiException* – if unable to communicate with the DataFrame Service.

**list\_tables**(*take=None, id=None, order\_by=None, order\_by\_descending=None, continuation\_token=None, workspace=None*)

Lists available tables on the SystemLink DataFrame service.

### Parameters

- **take** (Optional[int]) – Limits the returned list to the specified number of results. Defaults to 1000.
- **id** (Optional[List[str]]) – List of table IDs to filter by.
- **order\_by** (Optional[Literal['CREATED\_AT', 'METADATA\_MODIFIED\_AT', 'NAME', 'NUMBER\_OF\_ROWS', 'ROWS\_MODIFIED\_AT']]) – The sort order of the returned list of tables.

- **order\_by\_descending** (Optional[bool]) – Whether to sort descending instead of ascending. Defaults to false.
- **continuation\_token** (Optional[str]) – The token used to paginate results.
- **workspace** (Optional[List[str]]) – List of workspace IDs to filter by.

**Return type**

*nisystemlink.clients.dataframe.models.PagedTables*

**Returns**

The list of tables with a continuation token.

**Raises**

*ApiException* – if unable to communicate with the DataFrame Service or provided an invalid argument.

**create\_table(table)**

Create a new table with the provided metadata and column definitions.

**Parameters**

**table** (*nisystemlink.clients.dataframe.models.CreateTableRequest*) – The request to create the table.

**Return type**

str

**Returns**

The ID of the newly created table.

**Raises**

*ApiException* – if unable to communicate with the DataFrame Service or provided an invalid argument.

**query\_tables(query)**

Queries available tables on the SystemLink DataFrame service and returns their metadata.

**Parameters**

**query** (*nisystemlink.clients.dataframe.models.QueryTablesRequest*) – The request to query tables.

**Return type**

*nisystemlink.clients.dataframe.models.PagedTables*

**Returns**

The list of tables with a continuation token.

**Raises**

*ApiException* – if unable to communicate with the DataFrame Service or provided an invalid argument.

**get\_table\_metadata(id)**

Retrieves the metadata and column information for a single table identified by its ID.

**Parameters**

**id** (str) – Unique ID of a data table.

**Return type**

*nisystemlink.clients.dataframe.models.TableMetadata*

**Returns**

The metadata for the table.

**Raises**

***ApiException*** – if unable to communicate with the DataFrame Service or provided an invalid argument.

**modify\_table**(*id*, *update*)

Modify properties of a table or its columns.

**Parameters**

- **id** (*str*) – Unique ID of a data table.
- **update** (*nisystemlink.clients.dataframe.models.ModifyTableRequest*) – The metadata to update.

**Raises**

***ApiException*** – if unable to communicate with the DataFrame Service or provided an invalid argument.

**Return type**

None

**delete\_table**(*id*)

Deletes a table.

**Parameters**

**id** (*str*) – Unique ID of a data table.

**Raises**

***ApiException*** – if unable to communicate with the DataFrame Service or provided an invalid argument.

**Return type**

None

**delete\_tables**(*ids*)

Deletes multiple tables.

**Parameters**

**ids** (*List[str]*) – List of unique IDs of data tables.

**Return type**

Optional[*nisystemlink.clients.dataframe.models.DeleteTablesPartialSuccess*]

**Returns**

A partial success if any tables failed to delete, or None if all tables were deleted successfully.

**Raises**

***ApiException*** – if unable to communicate with the DataFrame Service or provided an invalid argument.

**modify\_tables**(*updates*)

Modify the properties associated with the tables identified by their IDs.

**Parameters**

**updates** (*nisystemlink.clients.dataframe.models.ModifyTablesRequest*) – The table modifications to apply.

**Return type**

Optional[*nisystemlink.clients.dataframe.models.ModifyTablesPartialSuccess*]

**Returns**

A partial success if any tables failed to be modified, or None if all tables were modified successfully.

**Raises**

**ApiException** – if unable to communicate with the DataFrame Service or provided an invalid argument.

**get\_table\_data**(*id*, *columns=None*, *order\_by=None*, *order\_by\_descending=None*, *take=None*, *continuation\_token=None*)

Reads raw data from the table identified by its ID.

**Parameters**

- **id** (str) – Unique ID of a data table.
- **columns** (Optional[List[str]]) – Columns to include in the response. Data will be returned in the same order as the columns. If not specified, all columns are returned.
- **order\_by** (Optional[List[str]]) – List of columns to sort by. Multiple columns may be specified to order rows that have the same value for prior columns. The columns used for ordering do not need to be included in the columns list, in which case they are not returned. If not specified, then the order in which results are returned is undefined.
- **order\_by\_descending** (Optional[bool]) – Whether to sort descending instead of ascending. Defaults to false.
- **take** (Optional[int]) – Limits the returned list to the specified number of results. Defaults to 500.
- **continuation\_token** (Optional[str]) – The token used to paginate results.

**Return type**

*nisystemlink.clients.dataframe.models.PagedTableRows*

**Returns**

The table data and total number of rows with a continuation token.

**Raises**

**ApiException** – if unable to communicate with the DataFrame Service or provided an invalid argument.

**append\_table\_data**(*id*, *data*)

Appends one or more rows of data to the table identified by its ID.

**Parameters**

- **id** (str) – Unique ID of a data table.
- **data** (*nisystemlink.clients.dataframe.models.AppendTableDataRequest*) – The rows of data to append and any additional options.

**Raises**

**ApiException** – if unable to communicate with the DataFrame Service or provided an invalid argument.

**Return type**

None

**query\_table\_data**(*id*, *query*)

Reads rows of data that match a filter from the table identified by its ID.

**Parameters**

- **id** (str) – Unique ID of a data table.
- **query** (*nisystemlink.clients.dataframe.models.QueryTableDataRequest*) – The filtering and sorting to apply when reading data.

**Return type***nisystemlink.clients.dataframe.models.PagedTableRows***Returns**

The table data and total number of rows with a continuation token.

**Raises***ApiException* – if unable to communicate with the DataFrame Service or provided an invalid argument.**export\_table\_data(id, query)**

Exports rows of data that match a filter from the table identified by its ID.

**Parameters**

- **id** (str) – Unique ID of a data table.
- **query** (*nisystemlink.clients.dataframe.models.ExportTableDataRequest*) – The filtering, sorting, and export format to apply when exporting data.

**Return type***nisystemlink.clients.core.helpers.IteratorFileLike***Returns**

A file-like object for reading the exported data.

**Raises***ApiException* – if unable to communicate with the DataFrame Service or provided an invalid argument.**query\_decimated\_data(id, query)**

Reads decimated rows of data from the table identified by its ID.

**Parameters**

- **id** (str) – Unique ID of a data table.
- **query** (*nisystemlink.clients.dataframe.models.QueryDecimatedDataRequest*) – The filtering and decimation options to apply when reading data.

**Return type***nisystemlink.clients.dataframe.models.TableRows***Returns**

The decimated table data.

**Raises***ApiException* – if unable to communicate with the DataFrame Service or provided an invalid argument.**pydantic model** *nisystemlink.clients.dataframe.models.ApiInfo*

Information about the available API operations.

```
{
  "title": "ApiInfo",
  "description": "Information about the available API operations.",
```

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```

    "type": "object",
    "properties": {
      "operations": {
        "$ref": "#/definitions/OperationsV1"
      }
    },
    "required": [
      "operations"
    ],
    "definitions": {
      "Operation": {
        "title": "Operation",
        "description": "Represents an operation that can be performed on a data_
↪frame.",
        "type": "object",
        "properties": {
          "available": {
            "title": "Available",
            "type": "boolean"
          },
          "version": {
            "title": "Version",
            "type": "integer"
          }
        },
        "required": [
          "available",
          "version"
        ]
      },
      "OperationsV1": {
        "title": "OperationsV1",
        "description": "The operations available in the routes provided by the v1_
↪HTTP API.",
        "type": "object",
        "properties": {
          "createTables": {
            "$ref": "#/definitions/Operation"
          },
          "deleteTables": {
            "$ref": "#/definitions/Operation"
          },
          "modifyMetadata": {
            "$ref": "#/definitions/Operation"
          },
          "listTables": {
            "$ref": "#/definitions/Operation"
          },
          "readData": {
            "$ref": "#/definitions/Operation"
          },
          "writeData": {

```

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```

        "$ref": "#/definitions/Operation"
    },
    "required": [
        "createTables",
        "deleteTables",
        "modifyMetadata",
        "listTables",
        "readData",
        "writeData"
    ]
}
}
}

```

**Fields**

- *operations*

**field operations:** *OperationsV1* [Required]

**pydantic model** `nisystemlink.clients.dataframe.models.AppendTableDataRequest`

Contains the rows to append and optional flags. The `frame` field is required unless `endOfData` is true.

```

{
    "title": "AppendTableDataRequest",
    "description": "Contains the rows to append and optional flags. The ``frame``
    ↳field is\nrequired unless ``endOfData`` is true.",
    "type": "object",
    "properties": {
        "frame": {
            "$ref": "#/definitions/DataFrame"
        },
        "endOfData": {
            "title": "Endofdata",
            "type": "boolean"
        }
    },
    "definitions": {
        "DataFrame": {
            "title": "DataFrame",
            "description": "Data read from or to be written to a table.\n\nValues may
            ↳be ``None`` (if the column is of type ``NULLABLE``) or encoded as\na string in a
            ↳format according to each column's datatype:\n\n* BOOL: One of ``"true"`` or ``
            ↳"false"`` , case-insensitive.\n* INT32: Any integer number in the range [-
            ↳2147483648, 2147483647],\n surrounded by quotes.\n* INT64: Any integer number in
            ↳the range [-9223372036854775808,\n 9223372036854775807], surrounded by quotes.\n
            ↳* FLOAT32: A decimal number using a period for the decimal point, optionally\n
            ↳in scientific notation, in the range [-3.40282347E+38, 3.40282347E+38],\n
            ↳surrounded by quotes. Not all values within the range can be represented\n with
            ↳32 bits. To preserve the exact binary encoding of the value when\n converting to
            ↳a string, clients should serialize 9 digits after the\n decimal. Instead of a

```

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```

→number, the value may be ``"NaN"`` (not a number),\n ``"Infinity"``
→(positive infinity), or ``"-Infinity"`` (negative\n infinity), case-sensitive.\n
→n* FLOAT64: A decimal number using a period for the decimal point, optionally\n
→in scientific notation, in the range [-1.7976931348623157E+308,\n 1.
→7976931348623157E+308], surrounded by quotes. Not all values within the\n range
→can be represented with 64 bits. To preserve the exact binary\n encoding of the
→value when converting to a string, clients should\n serialize 17 digits after
→the decimal. Instead of a number, the value may\n be ``"NaN"`` (not a number),
→``"Infinity"`` (positive infinity), or\n ``"-Infinity"`` (negative infinity),
→ case-sensitive.\n* STRING: Any quoted string.\n* TIMESTAMP: A date and time with
→millisecond precision in ISO-8601 format\n and time zone. For example: ``"2022-
→08-19T16:17:30.123Z"``. If a time zone\n is not provided, UTC is assumed. If a
→time zone other than UTC is\n provided, the value will be converted to UTC. If
→more than three digits of\n fractional seconds are provided, the time will be
→truncated to three\n digits (i.e. milliseconds).\n\nThe format is the same as a
→serialized Pandas DataFrame with orient="split"\nand index=False. See\nhttps://
→pandas.pydata.org/docs/reference/api/pandas.DataFrame.to_json.html.\n\nWhen
→providing a DataFrame for appending rows, any of the table's columns\nnot
→specified will receive a value of ``None``. If any such columns aren't\nnullable,
→an error will be returned. If the entire columns property is left\nout, each row
→is assumed to contain all columns in the order specified when\nthe table was
→created.",
    "type": "object",
    "properties": {
      "columns": {
        "title": "Columns",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "data": {
        "title": "Data",
        "type": "array",
        "items": {
          "type": "array",
          "items": {
            "type": "string"
          }
        }
      }
    },
    "required": [
      "data"
    ]
  }
}

```

## Fields

- *end\_of\_data*



- *frame*

**field end\_of\_data:** `Optional[bool] = None`

Whether the table should expect any additional rows to be appended in future requests.

**field frame:** `Optional[DataFrame] = None`

The data frame containing the rows to append.

**pydantic model** `nisystemlink.clients.dataframe.models.Column`

Defines a single column in a table.

```
{
  "title": "Column",
  "description": "Defines a single column in a table.",
  "type": "object",
  "properties": {
    "name": {
      "title": "Name",
      "type": "string"
    },
    "dataType": {
      "$ref": "#/definitions/DataType"
    },
    "columnType": {
      "default": "NORMAL",
      "allOf": [
        {
          "$ref": "#/definitions/ColumnType"
        }
      ]
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    }
  },
  "required": [
    "name",
    "dataType"
  ],
  "definitions": {
    "DataType": {
      "title": "DataType",
      "description": "Represents the different data types for a table column.",
      "enum": [
        "BOOL",
        "FLOAT32",
        "FLOAT64",
        "INT32",
        "INT64",
        "STRING",

```

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```

        "TIMESTAMP"
    ],
    "type": "string"
},
"ColumnType": {
    "title": "ColumnType",
    "description": "Represents the different column types for a table column.",
    "enum": [
        "NORMAL",
        "INDEX",
        "NULLABLE"
    ],
    "type": "string"
}
}
}

```

### Fields

- *column\_type*
- *data\_type*
- *name*
- *properties*

**field column\_type:** *ColumnType* = *ColumnType.Normal*

The column type. Defaults to *ColumnType.Normal*.

**field data\_type:** *DataType* [Required]

The data type of the column.

**field name:** *str* [Required]

The column name, which must be unique across all columns in the table.

**field properties:** *Optional[Dict[str, str]]* = *None*

User-defined properties associated with the column.

**pydantic model** *nisystemlink.clients.dataframe.models.ColumnFilter*

A filter to apply to the table data.

```

{
    "title": "ColumnFilter",
    "description": "A filter to apply to the table data.",
    "type": "object",
    "properties": {
        "column": {
            "title": "Column",
            "type": "string"
        },
        "operation": {
            "$ref": "#/definitions/FilterOperation"
        }
    }
}

```

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```

    "value": {
      "title": "Value",
      "type": "string"
    },
    "required": [
      "column",
      "operation"
    ],
    "definitions": {
      "FilterOperation": {
        "title": "FilterOperation",
        "description": "Represents the different operations that can be used in a ↵
↵filter.",
        "enum": [
          "EQUALS",
          "NOT_EQUALS",
          "LESS_THAN",
          "LESS_THAN_EQUALS",
          "GREATER_THAN",
          "GREATER_THAN_EQUALS",
          "CONTAINS",
          "NOT_CONTAINS"
        ],
        "type": "string"
      }
    }
  }
}

```

### Fields

- *column*
- *operation*
- *value*

**field column:** `str` [Required]

The name of the column to use for filtering.

**field operation:** `FilterOperation` [Required]

How to compare the column's value with the specified value.

An error is returned if the column's data type does not support the specified operation: \* String columns only support EQUALS, NOT\_EQUALS, CONTAINS, and NOT\_CONTAINS. \* Non-string columns do not support CONTAINS or NOT\_CONTAINS. \* When value is None, the operation must be EQUALS or NOT\_EQUALS. \* When value is NaN for a floating-point column, the operation must be NOT\_EQUALS.

**field value:** `Optional[str]` = None

The comparison value to use for filtering. An error will be returned if the value cannot be converted to the column's data type.

**pydantic model** `nisystemlink.clients.dataframe.models.ColumnMetadataPatch`

Specifies column properties to add, modify, or delete when editing table metadata.

```
{
  "title": "ColumnMetadataPatch",
  "description": "Specifies column properties to add, modify, or delete when
↪ editing table metadata.",
  "type": "object",
  "properties": {
    "name": {
      "title": "Name",
      "type": "string"
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    }
  },
  "required": [
    "name",
    "properties"
  ]
}
```

#### Fields

- *name*
- *properties*

**field name:** `str` [Required]

The name of the column to modify.

**field properties:** `Dict[str, Optional[str]]` [Required]

The properties to modify. A map of key value properties containing the metadata to be added or modified. Setting a property value to `None` will delete the property.

**pydantic model** `nisystemlink.clients.dataframe.models.ColumnOrderBy`

Specifies a column to order by and the ordering direction.

```
{
  "title": "ColumnOrderBy",
  "description": "Specifies a column to order by and the ordering direction.",
  "type": "object",
  "properties": {
    "column": {
      "title": "Column",
      "type": "string"
    },
    "descending": {
      "title": "Descending",
      "type": "boolean"
    }
  }
},
```

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```

    "required": [
        "column"
    ]
}

```

**Fields**

- *column*
- *descending*

**field column:** str [Required]

The name of the column to order by.

**field descending:** Optional[bool] = None

Whether the ordering should be in descending order.

**class** nisystemlink.clients.dataframe.models.ColumnType(*value*)

Represents the different column types for a table column.

**Index** = 'INDEX'

The column provides a unique value per row. Each table must provide exactly one INDEX column. The column's *DataType* must be INT32, INT64, or TIMESTAMP.

**Normal** = 'NORMAL'

The column has no special properties. This is the default.

**Nullable** = 'NULLABLE'

Rows may contain null values for this column. When appending rows, NULLABLE columns may be left out entirely, in which case all rows being appended will use null values for that column.

**pydantic model** nisystemlink.clients.dataframe.models.CreateTableRequest

Contains information needed to create a table, including its properties and column definitions.

```

{
  "title": "CreateTableRequest",
  "description": "Contains information needed to create a table, including its
  ↳ properties and column definitions.",
  "type": "object",
  "properties": {
    "columns": {
      "title": "Columns",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Column"
      }
    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "properties": {
      "title": "Properties",
      "type": "object",

```

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```

        "additionalProperties": {
            "type": "string"
        }
    },
    "workspace": {
        "title": "Workspace",
        "type": "string"
    }
},
"required": [
    "columns"
],
"definitions": {
    "DataType": {
        "title": "DataType",
        "description": "Represents the different data types for a table column.",
        "enum": [
            "BOOL",
            "FLOAT32",
            "FLOAT64",
            "INT32",
            "INT64",
            "STRING",
            "TIMESTAMP"
        ],
        "type": "string"
    },
    "ColumnType": {
        "title": "ColumnType",
        "description": "Represents the different column types for a table column.",
        "enum": [
            "NORMAL",
            "INDEX",
            "NULLABLE"
        ],
        "type": "string"
    },
    "Column": {
        "title": "Column",
        "description": "Defines a single column in a table.",
        "type": "object",
        "properties": {
            "name": {
                "title": "Name",
                "type": "string"
            },
            "dataType": {
                "$ref": "#/definitions/DataType"
            },
            "columnType": {
                "default": "NORMAL",
                "allOf": [

```

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```

        {
            "$ref": "#/definitions/ColumnType"
        }
    ],
    "properties": {
        "title": "Properties",
        "type": "object",
        "additionalProperties": {
            "type": "string"
        }
    },
    "required": [
        "name",
        "dataType"
    ]
}

```

**Fields**

- *columns*
- *name*
- *properties*
- *workspace*

**field columns:** List[[Column](#)] [Required]

The list of columns in the table. Exactly one column must have a [ColumnType](#) of INDEX.

**field name:** Optional[str] = None

The name to associate with the table. When not specified, a name will be assigned from the table's ID.

**field properties:** Optional[Dict[str, str]] = None

User-defined properties to associate with the table.

**field workspace:** Optional[str] = None

The workspace to create the table in. Uses the default workspace when not specified.

**pydantic model** `nisystemlink.clients.dataframe.models.DataFrame`

Data read from or to be written to a table.

Values may be None (if the column is of type NULLABLE) or encoded as a string in a format according to each column's datatype:

- **BOOL:** One of "true" or "false", case-insensitive.
- **INT32:** Any integer number in the range [-2147483648, 2147483647], surrounded by quotes.
- **INT64:** Any integer number in the range [-9223372036854775808, 9223372036854775807], surrounded by quotes.

- **FLOAT32:** A decimal number using a period for the decimal point, optionally in scientific notation, in the range [-3.40282347E+38, 3.40282347E+38], surrounded by quotes. Not all values within the range can be represented with 32 bits. To preserve the exact binary encoding of the value when converting to a string, clients should serialize 9 digits after the decimal. Instead of a number, the value may be "NaN" (not a number), "Infinity" (positive infinity), or "-Infinity" (negative infinity), case-sensitive.
- **FLOAT64:** A decimal number using a period for the decimal point, optionally in scientific notation, in the range [-1.7976931348623157E+308, 1.7976931348623157E+308], surrounded by quotes. Not all values within the range can be represented with 64 bits. To preserve the exact binary encoding of the value when converting to a string, clients should serialize 17 digits after the decimal. Instead of a number, the value may be "NaN" (not a number), "Infinity" (positive infinity), or "-Infinity" (negative infinity), case-sensitive.
- **STRING:** Any quoted string.
- **TIMESTAMP:** A date and time with millisecond precision in ISO-8601 format and time zone. For example: "2022-08-19T16:17:30.123Z". If a time zone is not provided, UTC is assumed. If a time zone other than UTC is provided, the value will be converted to UTC. If more than three digits of fractional seconds are provided, the time will be truncated to three digits (i.e. milliseconds).

The format is the same as a serialized Pandas DataFrame with orient="split" and index=False. See [https://pandas.pydata.org/docs/reference/api/pandas.DataFrame.to\\_json.html](https://pandas.pydata.org/docs/reference/api/pandas.DataFrame.to_json.html).

When providing a DataFrame for appending rows, any of the table's columns not specified will receive a value of None. If any such columns aren't nullable, an error will be returned. If the entire columns property is left out, each row is assumed to contain all columns in the order specified when the table was created.

```
{
  "title": "DataFrame",
  "description": "Data read from or to be written to a table.\n\nValues may be
  ↳ ``None`` (if the column is of type ``NULLABLE``) or encoded as a string in a
  ↳ format according to each column's datatype:\n\n* BOOL: One of ``"true"`` or ``
  ↳ "false"`` , case-insensitive.\n* INT32: Any integer number in the range [-
  ↳ 2147483648, 2147483647],\n surrounded by quotes.\n* INT64: Any integer number in
  ↳ the range [-9223372036854775808,\n 9223372036854775807], surrounded by quotes.\n
  ↳ * FLOAT32: A decimal number using a period for the decimal point, optionally\n
  ↳ in scientific notation, in the range [-3.40282347E+38, 3.40282347E+38],\n
  ↳ surrounded by quotes. Not all values within the range can be represented\n with
  ↳ 32 bits. To preserve the exact binary encoding of the value when\n converting to
  ↳ a string, clients should serialize 9 digits after the\n decimal. Instead of a
  ↳ number, the value may be ``"NaN"`` (not a number),\n ``"Infinity"``
  ↳ (positive infinity), or ``"-Infinity"`` (negative\n infinity), case-sensitive.\n
  ↳ * FLOAT64: A decimal number using a period for the decimal point, optionally\n
  ↳ in scientific notation, in the range [-1.7976931348623157E+308,\n 1.
  ↳ 7976931348623157E+308], surrounded by quotes. Not all values within the\n range
  ↳ can be represented with 64 bits. To preserve the exact binary\n encoding of the
  ↳ value when converting to a string, clients should\n serialize 17 digits after
  ↳ the decimal. Instead of a number, the value may\n be ``"NaN"`` (not a number),
  ↳ ``"Infinity"`` (positive infinity), or\n ``"-Infinity"`` (negative infinity),
  ↳ case-sensitive.\n* STRING: Any quoted string.\n* TIMESTAMP: A date and time with
  ↳ millisecond precision in ISO-8601 format\n and time zone. For example: ``"2022-
  ↳ 08-19T16:17:30.123Z"``. If a time zone\n is not provided, UTC is assumed. If a
  ↳ time zone other than UTC is\n provided, the value will be converted to UTC. If
  ↳ more than three digits of\n fractional seconds are provided, the time will be
  ↳ truncated to three\n digits (i.e. milliseconds).\n\nThe format is the same as a
  ↳ serialized Pandas DataFrame with orient="split"\nand index=False. See\nhttps://
```

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```

→pandas.pydata.org/docs/reference/api/pandas.DataFrame.to_json.html.\n\nWhen
→providing a DataFrame for appending rows, any of the table's columns\nnot
→specified will receive a value of ``None``. If any such columns aren't\nnullable,
→an error will be returned. If the entire columns property is left\nout, each row
→is assumed to contain all columns in the order specified when\nthe table was
→created.",
    "type": "object",
    "properties": {
        "columns": {
            "title": "Columns",
            "type": "array",
            "items": {
                "type": "string"
            }
        },
        "data": {
            "title": "Data",
            "type": "array",
            "items": {
                "type": "array",
                "items": {
                    "type": "string"
                }
            }
        }
    },
    "required": [
        "data"
    ]
}

```

**Fields**

- *columns*
- *data*

**field columns:** Optional[List[str]] = None

The names and order of the columns included in the data frame.

**field data:** List[List[Optional[str]]] [Required]

The data for each row with the order specified in the columns property. Must contain a value for each column in the columns property.

**class** nisystemlink.clients.dataframe.models.DataType(*value*)

Represents the different data types for a table column.

**Bool** = 'BOOL'

32-bit IEEE 754 floating-point number.

**Float32** = 'FLOAT32'

32-bit IEEE 754 floating-point number.

**Float64** = 'FLOAT64'

64-bit IEEE 754 floating-point number.

**Int32** = 'INT32'

32-bit signed integers.

**Int64** = 'INT64'

64-bit signed integers.

**String** = 'STRING'

Arbitrary string data.

**Timestamp** = 'TIMESTAMP'

Date and time represented in UTC with millisecond precision.

**class** nisystemlink.clients.dataframe.models.**DecimationMethod**(*value*)

Represents the different methods that can be used to decimate data.

**EntryExit** = 'ENTRY\_EXIT'

Creates an `x_column` ordered set which will be divided in the number of `intervals` specified. For each of the intervals, the first and last row within the interval will be returned in addition to the maximum and minimum values for all the columns specified in `y_columns`.

**Lossy** = 'LOSSY'

Creates an `x_column` ordered set and returns an uniformly distributed sample of rows with as many rows as the number specified as `intervals`.

**MaxMin** = 'MAX\_MIN'

Creates an `x_column` ordered set which will be divided in the number of `intervals` specified. For each of the intervals, the maximum and minimum values for all the columns specified in `y_columns` will be returned.

**pydantic model** nisystemlink.clients.dataframe.models.**DecimationOptions**

Contains the parameters to use for data decimation.

```
{
  "title": "DecimationOptions",
  "description": "Contains the parameters to use for data decimation.",
  "type": "object",
  "properties": {
    "xColumn": {
      "title": "Xcolumn",
      "type": "string"
    },
    "yColumns": {
      "title": "Ycolumns",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "intervals": {
      "title": "Intervals",
      "type": "integer"
    }
  }
}
```

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```

    "method": {
      "$ref": "#/definitions/DecimationMethod"
    },
    "definitions": {
      "DecimationMethod": {
        "title": "DecimationMethod",
        "description": "Represents the different methods that can be used to_
↪decimate data.",
        "enum": [
          "LOSSY",
          "MAX_MIN",
          "ENTRY_EXIT"
        ],
        "type": "string"
      }
    }
  }
}

```

**Fields**

- *intervals*
- *method*
- *x\_column*
- *y\_columns*

**field intervals:** `Optional[int] = None`

Number of intervals to use for decimation. Defaults to 1000.

**field method:** `Optional[DecimationMethod] = None`

Specifies the method used to decimate the data. Defaults to *DecimationMethod.Lossy*

**field x\_column:** `Optional[str] = None`

The name of the column that will be used as the x-axis for decimating the data. The column in the table that was specified as Index will be used if this field is excluded. Only numeric columns are supported. i.e. INT32, INT64, FLOAT32, FLOAT64 and TIMESTAMP.

**field y\_columns:** `Optional[List[str]] = None`

A list of columns to decimate by. This property is only needed when the specified method is MAX\_MIN or ENTRY\_EXIT. Only numeric columns are supported. i.e. INT32, INT64, FLOAT32, FLOAT64 and TIMESTAMP.

**pydantic model** `nisystemlink.clients.dataframe.models.DeleteTablesPartialSuccess`

The result of deleting multiple tables when one or more tables could not be deleted.

```

{
  "title": "DeleteTablesPartialSuccess",
  "description": "The result of deleting multiple tables when one or more tables_
↪could not be deleted.",
  "type": "object",
  "properties": {

```

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```

    "deletedTableIds": {
      "title": "Deletedtableids",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "failedTableIds": {
      "title": "Failedtableids",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "error": {
      "$ref": "#/definitions/ApiError"
    }
  },
  "required": [
    "deletedTableIds",
    "failedTableIds",
    "error"
  ],
  "definitions": {
    "ApiError": {
      "title": "ApiError",
      "description": "Represents the standard error structure for SystemLink API_
↪responses.",
      "type": "object",
      "properties": {
        "name": {
          "title": "Name",
          "type": "string"
        },
        "code": {
          "title": "Code",
          "type": "integer"
        },
        "message": {
          "title": "Message",
          "type": "string"
        },
        "args": {
          "title": "Args",
          "default": [],
          "type": "array",
          "items": {
            "type": "string"
          }
        }
      },
      "resourceType": {
        "title": "Resourcetype",

```

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```

        "type": "string"
    },
    "resourceId": {
        "title": "Resourceid",
        "type": "string"
    },
    "innerErrors": {
        "title": "Innererrors",
        "default": [],
        "type": "array",
        "items": {
            "$ref": "#/definitions/ApiError"
        }
    }
}
}
}
}
}

```

**Fields**

- *deleted\_table\_ids*
- *error*
- *failed\_table\_ids*

**field** `deleted_table_ids`: `List[str]` [Required]

The IDs of the tables that were successfully deleted.

**field** `error`: `ApiError` [Required]

The error that occurred when deleting the tables.

**field** `failed_table_ids`: `List[str]` [Required]

The IDs of the tables that could not be deleted.

**class** `nisystemlink.clients.dataframe.models.ExportFormat`(*value*)

The format of the exported data.

**CSV** = 'CSV'

Comma-separated values.

**pydantic model** `nisystemlink.clients.dataframe.models.ExportTableDataRequest`

Specifies the parameters for a data export with ordering and filtering.

```

{
    "title": "ExportTableDataRequest",
    "description": "Specifies the parameters for a data export with ordering and_
↪filtering.",
    "type": "object",
    "properties": {
        "columns": {
            "title": "Columns",
            "type": "array",

```

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```

        "items": {
            "type": "string"
        }
    },
    "orderBy": {
        "title": "Orderby",
        "type": "array",
        "items": {
            "$ref": "#/definitions/ColumnOrderBy"
        }
    },
    "filters": {
        "title": "Filters",
        "type": "array",
        "items": {
            "$ref": "#/definitions/ColumnFilter"
        }
    },
    "responseFormat": {
        "$ref": "#/definitions/ExportFormat"
    }
},
"required": [
    "responseFormat"
],
"definitions": {
    "ColumnOrderBy": {
        "title": "ColumnOrderBy",
        "description": "Specifies a column to order by and the ordering direction.",
        ↪ "type": "object",
        "properties": {
            "column": {
                "title": "Column",
                "type": "string"
            },
            "descending": {
                "title": "Descending",
                "type": "boolean"
            }
        },
        "required": [
            "column"
        ]
    },
    "FilterOperation": {
        "title": "FilterOperation",
        "description": "Represents the different operations that can be used in a ↪
        ↪ filter.",
        "enum": [
            "EQUALS",
            "NOT_EQUALS",

```

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```

        "LESS_THAN",
        "LESS_THAN_EQUALS",
        "GREATER_THAN",
        "GREATER_THAN_EQUALS",
        "CONTAINS",
        "NOT_CONTAINS"
    ],
    "type": "string"
},
"ColumnFilter": {
    "title": "ColumnFilter",
    "description": "A filter to apply to the table data.",
    "type": "object",
    "properties": {
        "column": {
            "title": "Column",
            "type": "string"
        },
        "operation": {
            "$ref": "#/definitions/FilterOperation"
        },
        "value": {
            "title": "Value",
            "type": "string"
        }
    },
    "required": [
        "column",
        "operation"
    ]
},
"ExportFormat": {
    "title": "ExportFormat",
    "description": "The format of the exported data.",
    "enum": [
        "CSV"
    ],
    "type": "string"
}
}
}

```

**Fields**

- *columns*
- *filters*
- *order\_by*
- *response\_format*

**field columns:** Optional[List[str]] = None

The names of columns to include in the export. The export will include the columns in the same order

specified in this parameter. All columns are included in the order specified at table creation if this property is excluded.

**field filters:** `Optional[List[ColumnFilter]] = None`

A list of columns to filter by. Only rows whose columns contain values matching all of the specified filters are returned. The columns used for filtering do not need to be included in the columns list, in which case they are not included in the export.

**field order\_by:** `Optional[List[ColumnOrderBy]] = None`

A list of columns to order the results by. Multiple columns may be specified to order rows that have the same value for prior columns. The columns used for sorting do not need to be included in the columns list, in which case they are not included in the export.

**field response\_format:** `ExportFormat [Required]`

The format of the exported data. The only response format currently supported is CSV.

**class** `nisystemlink.clients.dataframe.models.FilterOperation(value)`

Represents the different operations that can be used in a filter.

**pydantic model** `nisystemlink.clients.dataframe.models.ModifyTableRequest`

Contains the metadata properties to modify. Values not included will remain unchanged.

```
{
  "title": "ModifyTableRequest",
  "description": "Contains the metadata properties to modify. Values not included_
↪will remain unchanged.",
  "type": "object",
  "properties": {
    "metadataRevision": {
      "title": "Metadatarevision",
      "type": "integer"
    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    },
    "columns": {
      "title": "Columns",
      "type": "array",
      "items": {
        "$ref": "#/definitions/ColumnMetadataPatch"
      }
    }
  }
},
```

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```

    "definitions": {
      "ColumnMetadataPatch": {
        "title": "ColumnMetadataPatch",
        "description": "Specifies column properties to add, modify, or delete when
↪editing table metadata.",
        "type": "object",
        "properties": {
          "name": {
            "title": "Name",
            "type": "string"
          },
          "properties": {
            "title": "Properties",
            "type": "object",
            "additionalProperties": {
              "type": "string"
            }
          }
        },
        "required": [
          "name",
          "properties"
        ]
      }
    }
  }
}

```

### Fields

- *columns*
- *metadata\_revision*
- *name*
- *properties*
- *workspace*

**field columns:** `Optional[List[ColumnMetadataPatch]] = None`

Updates to the column properties. Cannot add or remove columns, or change the name of a column.

**field metadata\_revision:** `Optional[int] = None`

When specified, this is an integer that must match the last known revision number of the table, incremented by one. If it doesn't match the current `metadataRevision` incremented by one at the time of execution, the modify request will be rejected with a 409 Conflict. This is used to ensure that changes to this table's metadata are based on a known, previous state.

**field name:** `Optional[str] = None`

The new name of the table. Setting to `None` will reset the name to the table's ID.

**field properties:** `Optional[Dict[str, Optional[str]]] = None`

The properties to modify. A map of key value properties containing the metadata to be added or modified. Setting a property value to `None` will delete the property.

**field workspace:** Optional[str] = None

The new workspace for the table. Setting to None will reset to the default workspace. Changing the workspace requires permission to delete the table in its current workspace and permission to create the table in its new workspace.

**pydantic model** nisystemlink.clients.dataframe.models.ModifyTablesPartialSuccess

The result of modifying multiple tables when one or more tables could not be modified.

```
{
  "title": "ModifyTablesPartialSuccess",
  "description": "The result of modifying multiple tables when one or more tables_
↳could not be modified.",
  "type": "object",
  "properties": {
    "modifiedTableIds": {
      "title": "Modifiedtableids",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "failedModifications": {
      "title": "Failedmodifications",
      "type": "array",
      "items": {
        "$ref": "#/definitions/TableMetadataModification"
      }
    },
    "error": {
      "$ref": "#/definitions/ApiError"
    }
  },
  "required": [
    "modifiedTableIds",
    "failedModifications",
    "error"
  ],
  "definitions": {
    "TableMetadataModification": {
      "title": "TableMetadataModification",
      "description": "Contains the metadata properties to modify. Values not_
↳included in the\nrequest or included with a ``None`` value will remain unchanged.
↳",
      "type": "object",
      "properties": {
        "id": {
          "title": "Id",
          "type": "string"
        },
        "metadataRevision": {
          "title": "Metadatarevision",
          "type": "integer"
        }
      }
    }
  }
}
```

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```

        "name": {
            "title": "Name",
            "type": "string"
        },
        "workspace": {
            "title": "Workspace",
            "type": "string"
        },
        "properties": {
            "title": "Properties",
            "type": "object",
            "additionalProperties": {
                "type": "string"
            }
        },
        "required": [
            "id"
        ],
    },
    "ApiError": {
        "title": "ApiError",
        "description": "Represents the standard error structure for SystemLink API",
        ↪responses.",
        "type": "object",
        "properties": {
            "name": {
                "title": "Name",
                "type": "string"
            },
            "code": {
                "title": "Code",
                "type": "integer"
            },
            "message": {
                "title": "Message",
                "type": "string"
            },
            "args": {
                "title": "Args",
                "default": [],
                "type": "array",
                "items": {
                    "type": "string"
                }
            },
            "resourceType": {
                "title": "Resourcetype",
                "type": "string"
            },
            "resourceId": {
                "title": "Resourceid",

```

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```

        "type": "string"
    },
    "innerErrors": {
        "title": "Innererrors",
        "default": [],
        "type": "array",
        "items": {
            "$ref": "#/definitions/ApiError"
        }
    }
}
}
}
}
}

```

**Fields**

- *error*
- *failed\_modifications*
- *modified\_table\_ids*

**field error:** *ApiError* [Required]

The error that occurred when modifying the tables.

**field failed\_modifications:** List[*TableMetadataModification*] [Required]

The requested modifications that could not be applied.

**field modified\_table\_ids:** List[str] [Required]

The IDs of the tables that were successfully modified.

**pydantic model** `nisystemlink.clients.dataframe.models.ModifyTablesRequest`

Contains one or more table modifications to apply.

```

{
    "title": "ModifyTablesRequest",
    "description": "Contains one or more table modifications to apply.",
    "type": "object",
    "properties": {
        "tables": {
            "title": "Tables",
            "type": "array",
            "items": {
                "$ref": "#/definitions/TableMetadataModification"
            }
        },
        "replace": {
            "title": "Replace",
            "type": "boolean"
        }
    },
    "required": [
        "tables"
    ]
}

```

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```

],
"definitions": {
  "TableMetadataModification": {
    "title": "TableMetadataModification",
    "description": "Contains the metadata properties to modify. Values not_
→ included in the request or included with a ``None`` value will remain unchanged.
→",
    "type": "object",
    "properties": {
      "id": {
        "title": "Id",
        "type": "string"
      },
      "metadataRevision": {
        "title": "Metadatarevision",
        "type": "integer"
      },
      "name": {
        "title": "Name",
        "type": "string"
      },
      "workspace": {
        "title": "Workspace",
        "type": "string"
      },
      "properties": {
        "title": "Properties",
        "type": "object",
        "additionalProperties": {
          "type": "string"
        }
      }
    },
    "required": [
      "id"
    ]
  }
}

```

**Fields**

- *replace*
- *tables*

**field replace:** Optional[bool] = None

When true, existing properties are replaced instead of merged.

**field tables:** List[TableMetadataModification] [Required]

The table modifications to apply. Each table may only appear once in the list.

**pydantic model** nisystemlink.clients.dataframe.models.Operation

Represents an operation that can be performed on a data frame.

```
{
  "title": "Operation",
  "description": "Represents an operation that can be performed on a data frame.",
  "type": "object",
  "properties": {
    "available": {
      "title": "Available",
      "type": "boolean"
    },
    "version": {
      "title": "Version",
      "type": "integer"
    }
  },
  "required": [
    "available",
    "version"
  ]
}
```

#### Fields

- *available*
- *version*

**field available: bool [Required]**

Whether or not the operation is available to the caller (e.g. due to permissions).

**field version: int [Required]**

The version of the available operation.

**pydantic model** `nisystemlink.clients.dataframe.models.OperationsV1`

The operations available in the routes provided by the v1 HTTP API.

```
{
  "title": "OperationsV1",
  "description": "The operations available in the routes provided by the v1 HTTP ↪API.",
  "type": "object",
  "properties": {
    "createTables": {
      "$ref": "#/definitions/Operation"
    },
    "deleteTables": {
      "$ref": "#/definitions/Operation"
    },
    "modifyMetadata": {
      "$ref": "#/definitions/Operation"
    },
    "listTables": {
      "$ref": "#/definitions/Operation"
    },
    "readData": {
```

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```

    "$ref": "#/definitions/Operation"
  },
  "writeData": {
    "$ref": "#/definitions/Operation"
  }
},
"required": [
  "createTables",
  "deleteTables",
  "modifyMetadata",
  "listTables",
  "readData",
  "writeData"
],
"definitions": {
  "Operation": {
    "title": "Operation",
    "description": "Represents an operation that can be performed on a data_
↪frame.",
    "type": "object",
    "properties": {
      "available": {
        "title": "Available",
        "type": "boolean"
      },
      "version": {
        "title": "Version",
        "type": "integer"
      }
    },
    "required": [
      "available",
      "version"
    ]
  }
}
}

```

### Fields

- *create\_tables*
- *delete\_tables*
- *list\_tables*
- *modify\_metadata*
- *read\_data*
- *write\_data*

**field create\_tables:** *Operation* [Required]

The ability to create new data tables.

**field delete\_tables:** *Operation* [Required]

The ability to delete tables and all of their data.

**field list\_tables:** *Operation* [Required]

The ability to locate and read metadata for tables.

**field modify\_metadata:** *Operation* [Required]

The ability to modify metadata for tables.

**field read\_data:** *Operation* [Required]

The ability to query and read data from tables.

**field write\_data:** *Operation* [Required]

The ability to append rows of data to tables.

**pydantic model** `nisystemlink.clients.dataframe.models.PagedTableRows`

Contains the result of a query for rows of data.

```
{
  "title": "PagedTableRows",
  "description": "Contains the result of a query for rows of data.",
  "type": "object",
  "properties": {
    "continuationToken": {
      "title": "Continuationtoken",
      "type": "string"
    },
    "frame": {
      "$ref": "#/definitions/DataFrame"
    },
    "totalRowCount": {
      "title": "Totalrowcount",
      "type": "integer"
    }
  },
  "required": [
    "frame",
    "totalRowCount"
  ],
  "definitions": {
    "DataFrame": {
      "title": "DataFrame",
      "description": "Data read from or to be written to a table.\n\nValues may be `None` (if the column is of type `NULLABLE`) or encoded as a string in a format according to each column's datatype:\n\n* BOOL: One of `\"true\"` or `\"false\"`, case-insensitive.\n* INT32: Any integer number in the range [-2147483648, 2147483647], surrounded by quotes.\n* INT64: Any integer number in the range [-9223372036854775808, 9223372036854775807], surrounded by quotes.\n* FLOAT32: A decimal number using a period for the decimal point, optionally in scientific notation, in the range [-3.40282347E+38, 3.40282347E+38], surrounded by quotes. Not all values within the range can be represented with 32 bits. To preserve the exact binary encoding of the value when converting to a string, clients should serialize 9 digits after the decimal. Instead of a number, the value may be `\"NaN\"` (not a number), `\"Infinity\"` (positive infinity), or `\"-Infinity\"` (negative infinity), case-sensitive.\n\n(continues on next page)
```



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```

→n* FLOAT64: A decimal number using a period for the decimal point, optionally\n
→in scientific notation, in the range [-1.7976931348623157E+308,\n 1.\n
→7976931348623157E+308], surrounded by quotes. Not all values within the\n range\n
→can be represented with 64 bits. To preserve the exact binary\n encoding of the\n
→value when converting to a string, clients should\n serialize 17 digits after\n
→the decimal. Instead of a number, the value may\n be ``"NaN"`` (not a number),\n
→``"Infinity"`` (positive infinity), or\n ``"-Infinity"`` (negative infinity),\n
→ case-sensitive.\n* STRING: Any quoted string.\n* TIMESTAMP: A date and time with\n
→millisecond precision in ISO-8601 format\n and time zone. For example: ``"2022-\n
→08-19T16:17:30.123Z"``. If a time zone\n is not provided, UTC is assumed. If a\n
→time zone other than UTC is\n provided, the value will be converted to UTC. If\n
→more than three digits of\n fractional seconds are provided, the time will be\n
→truncated to three\n digits (i.e. milliseconds).\n\nThe format is the same as a\n
→serialized Pandas DataFrame with orient="split"\nand index=False. See\nhttps://\n
→pandas.pydata.org/docs/reference/api/pandas.DataFrame.to_json.html.\n\nWhen\n
→providing a DataFrame for appending rows, any of the table's columns\nnot\n
→specified will receive a value of ``None``. If any such columns aren't\nnullable,\n
→an error will be returned. If the entire columns property is left\nout, each row\n
→is assumed to contain all columns in the order specified when\nthe table was\n
→created.",
    "type": "object",
    "properties": {
      "columns": {
        "title": "Columns",
        "type": "array",
        "items": {
          "type": "string"
        }
      },
      "data": {
        "title": "Data",
        "type": "array",
        "items": {
          "type": "array",
          "items": {
            "type": "string"
          }
        }
      }
    },
    "required": [
      "data"
    ]
  }
}

```

### Fields

- *frame*
- *total\_row\_count*

**field frame:** *DataFrame* [Required]

The data frame containing the rows of data.

**field total\_row\_count:** *int* [Required]

The total number of rows matched by the query across all pages of results.

**pydantic model** *nisystemlink.clients.dataframe.models.PagedTables*

The response for a table query containing the matched tables.

```
{
  "title": "PagedTables",
  "description": "The response for a table query containing the matched tables.",
  "type": "object",
  "properties": {
    "continuationToken": {
      "title": "Continuationtoken",
      "type": "string"
    },
    "tables": {
      "title": "Tables",
      "type": "array",
      "items": {
        "$ref": "#/definitions/TableMetadata"
      }
    }
  },
  "required": [
    "tables"
  ],
  "definitions": {
    "DataType": {
      "title": "DataType",
      "description": "Represents the different data types for a table column.",
      "enum": [
        "BOOL",
        "FLOAT32",
        "FLOAT64",
        "INT32",
        "INT64",
        "STRING",
        "TIMESTAMP"
      ],
      "type": "string"
    },
    "ColumnType": {
      "title": "ColumnType",
      "description": "Represents the different column types for a table column.",
      "enum": [
        "NORMAL",
        "INDEX",
        "NULLABLE"
      ],
      "type": "string"
    }
  }
}
```

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```

"Column": {
  "title": "Column",
  "description": "Defines a single column in a table.",
  "type": "object",
  "properties": {
    "name": {
      "title": "Name",
      "type": "string"
    },
    "dataType": {
      "$ref": "#/definitions/DataType"
    },
    "columnType": {
      "default": "NORMAL",
      "allOf": [
        {
          "$ref": "#/definitions/ColumnType"
        }
      ]
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    }
  },
  "required": [
    "name",
    "dataType"
  ]
},
"TableMetadata": {
  "title": "TableMetadata",
  "description": "Contains information about a table, including its
↪ properties and column definitions.",
  "type": "object",
  "properties": {
    "columns": {
      "title": "Columns",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Column"
      }
    },
    "createdAt": {
      "title": "Createdat",
      "type": "string",
      "format": "date-time"
    }
  },
  "id": {

```

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```

        "title": "Id",
        "type": "string"
    },
    "metadataModifiedAt": {
        "title": "Metadatamodifiedat",
        "type": "string",
        "format": "date-time"
    },
    "metadataRevision": {
        "title": "Metadatarevision",
        "type": "integer"
    },
    "name": {
        "title": "Name",
        "type": "string"
    },
    "properties": {
        "title": "Properties",
        "type": "object",
        "additionalProperties": {
            "type": "string"
        }
    },
    "rowCount": {
        "title": "Rowcount",
        "type": "integer"
    },
    "rowsModifiedAt": {
        "title": "Rowsmodifiedat",
        "type": "string",
        "format": "date-time"
    },
    "supportsAppend": {
        "title": "Supportsappend",
        "type": "boolean"
    },
    "workspace": {
        "title": "Workspace",
        "type": "string"
    }
},
"required": [
    "columns",
    "createdAt",
    "id",
    "metadataModifiedAt",
    "metadataRevision",
    "name",
    "properties",
    "rowCount",
    "rowsModifiedAt",
    "supportsAppend",

```

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```

        "workspace"
    ]
}
}
}

```

**Fields**

- *tables*

**field tables:** List[TableMetadata] [Required]

The list of tables returned by the query.

**pydantic model** nisystemlink.clients.dataframe.models.QueryDecimatedDataRequest

Specifies the columns, filters and decimation parameters for a query.

```

{
  "title": "QueryDecimatedDataRequest",
  "description": "Specifies the columns, filters and decimation parameters for a
↪query.",
  "type": "object",
  "properties": {
    "columns": {
      "title": "Columns",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "filters": {
      "title": "Filters",
      "type": "array",
      "items": {
        "$ref": "#/definitions/ColumnFilter"
      }
    },
    "decimation": {
      "$ref": "#/definitions/DecimationOptions"
    }
  },
  "definitions": {
    "FilterOperation": {
      "title": "FilterOperation",
      "description": "Represents the different operations that can be used in a
↪filter.",
      "enum": [
        "EQUALS",
        "NOT_EQUALS",
        "LESS_THAN",
        "LESS_THAN_EQUALS",
        "GREATER_THAN",
        "GREATER_THAN_EQUALS",

```

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```

        "CONTAINS",
        "NOT_CONTAINS"
    ],
    "type": "string"
},
"ColumnFilter": {
    "title": "ColumnFilter",
    "description": "A filter to apply to the table data.",
    "type": "object",
    "properties": {
        "column": {
            "title": "Column",
            "type": "string"
        },
        "operation": {
            "$ref": "#/definitions/FilterOperation"
        },
        "value": {
            "title": "Value",
            "type": "string"
        }
    },
    "required": [
        "column",
        "operation"
    ]
},
"DecimationMethod": {
    "title": "DecimationMethod",
    "description": "Represents the different methods that can be used to
↳decimate data.",
    "enum": [
        "LOSSY",
        "MAX_MIN",
        "ENTRY_EXIT"
    ],
    "type": "string"
},
"DecimationOptions": {
    "title": "DecimationOptions",
    "description": "Contains the parameters to use for data decimation.",
    "type": "object",
    "properties": {
        "xColumn": {
            "title": "Xcolumn",
            "type": "string"
        },
        "yColumns": {
            "title": "Ycolumns",
            "type": "array",
            "items": {
                "type": "string"
            }
        }
    }
}

```

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```

    },
    "intervals": {
      "title": "Intervals",
      "type": "integer"
    },
    "method": {
      "$ref": "#/definitions/DecimationMethod"
    }
  }
}
}

```

**Fields**

- *decimation*

**field** *decimation*: Optional[*DecimationOptions*] = None

The decimation options to use when querying data. If not specified, the default is to use *DecimationMethod.Lossy* with 1000 intervals over the table's index column.

**pydantic model** *nisystemlink.clients.dataframe.models.QueryTableDataRequest*

Contains the filtering and sorting options to use when querying table data.

```

{
  "title": "QueryTableDataRequest",
  "description": "Contains the filtering and sorting options to use when querying_
↪table data.",
  "type": "object",
  "properties": {
    "continuationToken": {
      "title": "Continuationtoken",
      "type": "string"
    },
    "columns": {
      "title": "Columns",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "filters": {
      "title": "Filters",
      "type": "array",
      "items": {
        "$ref": "#/definitions/ColumnFilter"
      }
    },
    "orderBy": {
      "title": "Orderby",
      "type": "array",

```

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```

        "items": {
            "$ref": "#/definitions/ColumnOrderBy"
        }
    },
    "take": {
        "title": "Take",
        "type": "integer"
    }
},
"definitions": {
    "FilterOperation": {
        "title": "FilterOperation",
        "description": "Represents the different operations that can be used in a
↪ filter.",
        "enum": [
            "EQUALS",
            "NOT_EQUALS",
            "LESS_THAN",
            "LESS_THAN_EQUALS",
            "GREATER_THAN",
            "GREATER_THAN_EQUALS",
            "CONTAINS",
            "NOT_CONTAINS"
        ],
        "type": "string"
    },
    "ColumnFilter": {
        "title": "ColumnFilter",
        "description": "A filter to apply to the table data.",
        "type": "object",
        "properties": {
            "column": {
                "title": "Column",
                "type": "string"
            },
            "operation": {
                "$ref": "#/definitions/FilterOperation"
            },
            "value": {
                "title": "Value",
                "type": "string"
            }
        },
        "required": [
            "column",
            "operation"
        ]
    },
    "ColumnOrderBy": {
        "title": "ColumnOrderBy",
        "description": "Specifies a column to order by and the ordering direction.
↪ ",

```

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```

    "type": "object",
    "properties": {
      "column": {
        "title": "Column",
        "type": "string"
      },
      "descending": {
        "title": "Descending",
        "type": "boolean"
      }
    },
    "required": [
      "column"
    ]
  }
}

```

**Fields**

- *order\_by*
- *take*

**field order\_by:** Optional[List[ColumnOrderBy]] = None

A list of columns to order the results by. Multiple columns may be specified to order rows that have the same value for prior columns. The columns used for sorting do not need to be included in the columns list, in which case they are not returned. If *order\_by* is not specified, then the order in which results are returned is undefined.

**field take:** Optional[int] = None

Limits the returned list to the specified number of results.

**pydantic model** `nisystemlink.clients.dataframe.models.QueryTablesRequest`

Request parameters for querying tables.

```

{
  "title": "QueryTablesRequest",
  "description": "Request parameters for querying tables.",
  "type": "object",
  "properties": {
    "continuationToken": {
      "title": "Continuationtoken",
      "type": "string"
    },
    "filter": {
      "title": "Filter",
      "type": "string"
    },
    "substitutions": {
      "title": "Substitutions",
      "type": "array",
      "items": {

```

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```

        "anyOf": [
            {
                "type": "integer"
            },
            {
                "type": "boolean"
            },
            {
                "type": "string"
            }
        ]
    },
    "referenceTime": {
        "title": "Referencetime",
        "type": "string",
        "format": "date-time"
    },
    "take": {
        "title": "Take",
        "type": "integer"
    },
    "orderBy": {
        "title": "Orderby",
        "enum": [
            "CREATED_AT",
            "METADATA_MODIFIED_AT",
            "NAME",
            "NUMBER_OF_ROWS",
            "ROWS_MODIFIED_AT"
        ],
        "type": "string"
    },
    "orderByDescending": {
        "title": "Orderbydescending",
        "type": "boolean"
    }
},
"required": [
    "filter"
]
}

```

### Fields

- *filter*
- *order\_by*
- *order\_by\_descending*
- *reference\_time*
- *substitutions*

- *take*

**field filter:** `str` [Required]

The table query filter in [Dynamic LINQ](#) format.

Allowed properties in the filter are:

- `createdAt`: `DateTime` the table was created
- `createdWithin`: `TimeSpan` in which the table was created
- `id`: String value uniquely identifying the table
- `name`: String name for the table
- `metadataModifiedAt`: `DateTime` the table's metadata was last modified
- `metadataModifiedWithin`: `TimeSpan` in which the table's metadata was last modified
- `properties`: Dictionary with string keys and values representing table metadata
- `rowsModifiedAt`: `DateTime` rows were last appended to the table
- `rowsModifiedWithin`: `TimeSpan` within rows were last appended to the table
- `rowCount`: `Int32` number of rows in the table
- `supportsAppend`: Boolean indicating whether or not the table supports appending additional rows of data
- `workspace`: String value ID of the workspace the table belongs to
- `workspaceName`: String value name of the workspace the table belongs to

Allowed constants in the filter are:

- `RelativeTime.CurrentDay`: `TimeSpan` representing the elapsed time between now and the start of the current day
- `RelativeTime.CurrentWeek`: `TimeSpan` representing the elapsed time between now and the start of the current week
- `RelativeTime.CurrentMonth`: `TimeSpan` representing the elapsed time between now and the start of the current month
- `RelativeTime.CurrentYear`: `TimeSpan` representing the elapsed time between now and the start of the current year

**field order\_by:** `Optional[Literal['CREATED_AT', 'METADATA_MODIFIED_AT', 'NAME', 'NUMBER_OF_ROWS', 'ROWS_MODIFIED_AT']] = None`

The sort order of the returned list of tables.

**field order\_by\_descending:** `Optional[bool] = None`

Whether to sort descending instead of ascending.

The elements in the list are sorted ascending by default. If the `orderByDescending` parameter is specified, the elements in the list are sorted based on it's value. The `orderByDescending` value must be a boolean string. The elements in the list are sorted ascending if false and descending if true.

**field reference\_time:** `Optional[datetime] = None`

The date and time to use as the reference point for *RelativeTime* filters, including time zone information. Defaults to the time on the server in UTC.

**field substitutions:** `Optional[List[Union[StrictInt, StrictBool, str, None]]] = None`

Make substitutions in the query filter expression.

Substitutions for the query expression are indicated by non-negative integers that are prefixed with the @ symbol. Each substitution in the given expression will be replaced by the element at the corresponding index (zero-based) in this list. For example, @0 in the filter expression will be replaced with the element at the zeroth index of the substitutions list.

**field take:** `Optional[int] = None`

Limits the returned list to the specified number of results.

**pydantic model** `nisystemlink.clients.dataframe.models.TableMetadata`

Contains information about a table, including its properties and column definitions.

```
{
  "title": "TableMetadata",
  "description": "Contains information about a table, including its properties and
  ↪column definitions.",
  "type": "object",
  "properties": {
    "columns": {
      "title": "Columns",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Column"
      }
    },
    "createdAt": {
      "title": "Createdat",
      "type": "string",
      "format": "date-time"
    },
    "id": {
      "title": "Id",
      "type": "string"
    },
    "metadataModifiedAt": {
      "title": "Metadatamodifiedat",
      "type": "string",
      "format": "date-time"
    },
    "metadataRevision": {
      "title": "Metadatarevision",
      "type": "integer"
    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    }
  }
}
```

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```

    }
  },
  "rowCount": {
    "title": "Rowcount",
    "type": "integer"
  },
  "rowsModifiedAt": {
    "title": "Rowsmodifiedat",
    "type": "string",
    "format": "date-time"
  },
  "supportsAppend": {
    "title": "Supportsappend",
    "type": "boolean"
  },
  "workspace": {
    "title": "Workspace",
    "type": "string"
  }
},
"required": [
  "columns",
  "createdAt",
  "id",
  "metadataModifiedAt",
  "metadataRevision",
  "name",
  "properties",
  "rowCount",
  "rowsModifiedAt",
  "supportsAppend",
  "workspace"
],
"definitions": {
  "DataType": {
    "title": "DataType",
    "description": "Represents the different data types for a table column.",
    "enum": [
      "BOOL",
      "FLOAT32",
      "FLOAT64",
      "INT32",
      "INT64",
      "STRING",
      "TIMESTAMP"
    ],
    "type": "string"
  },
  "ColumnType": {
    "title": "ColumnType",
    "description": "Represents the different column types for a table column.",
    "enum": [

```

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```

        "NORMAL",
        "INDEX",
        "NULLABLE"
    ],
    "type": "string"
  },
  "Column": {
    "title": "Column",
    "description": "Defines a single column in a table.",
    "type": "object",
    "properties": {
      "name": {
        "title": "Name",
        "type": "string"
      },
      "dataType": {
        "$ref": "#/definitions/DataType"
      },
      "columnType": {
        "default": "NORMAL",
        "allOf": [
          {
            "$ref": "#/definitions/ColumnType"
          }
        ]
      },
      "properties": {
        "title": "Properties",
        "type": "object",
        "additionalProperties": {
          "type": "string"
        }
      }
    }
  },
  "required": [
    "name",
    "dataType"
  ]
}

```

### Fields

- *columns*
- *created\_at*
- *id*
- *metadata\_modified\_at*
- *metadata\_revision*
- *name*

- *properties*
- *row\_count*
- *rows\_modified\_at*
- *supports\_append*
- *workspace*

**field columns:** List[Column] [Required]

The list of columns in the table.

**field created\_at:** datetime [Required]

The date and time the table was created.

**field id:** str [Required]

The table's unique identifier.

**field metadata\_modified\_at:** datetime [Required]

The date and time the table's metadata was last modified.

**field metadata\_revision:** int [Required]

The table's metadata revision number, incremented each time the metadata is modified.

**field name:** str [Required]

The name associated with the table.

**field properties:** Dict[str, str] [Required]

User-defined properties associated with the table.

**field row\_count:** int [Required]

The number of rows in the table.

**field rows\_modified\_at:** datetime [Required]

The date and time the table's data was last modified.

**field supports\_append:** bool [Required]

Whether the table supports appending additional rows of data.

**field workspace:** str [Required]

The workspace the table belongs to.

**pydantic model** `nisystemlink.clients.dataframe.models.TableMetadataModification`

Contains the metadata properties to modify. Values not included in the request or included with a None value will remain unchanged.

```
{
  "title": "TableMetadataModification",
  "description": "Contains the metadata properties to modify. Values not included_
↪in the\nrequest or included with a ``None`` value will remain unchanged.",
  "type": "object",
  "properties": {
    "id": {
      "title": "Id",
      "type": "string"
    },
    "metadataRevision": {
```

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```

        "title": "Metadatarevision",
        "type": "integer"
    },
    "name": {
        "title": "Name",
        "type": "string"
    },
    "workspace": {
        "title": "Workspace",
        "type": "string"
    },
    "properties": {
        "title": "Properties",
        "type": "object",
        "additionalProperties": {
            "type": "string"
        }
    }
},
"required": [
    "id"
]
}

```

**Fields**

- *id*
- *metadata\_revision*
- *name*
- *properties*
- *workspace*

**field id:** `str` [Required]

The ID of the table to modify.

**field metadata\_revision:** `Optional[int]` = None

When specified, this is an integer that must match the last known revision number of the table, incremented by one. If it doesn't match the current `metadataRevision` incremented by one at the time of execution, the modify request will be rejected with a conflict error. This is used to ensure that changes to this table's metadata are based on a known, previous state.

**field name:** `Optional[str]` = None

The new name of the table.

**field properties:** `Optional[Dict[str, Optional[str]]]` = None

The properties to modify. A map of key value properties containing the metadata to be added or modified. Setting a property value to None will delete the property. Existing properties not included in the map are unaffected unless `replace` is true in the top-level request object.

**field workspace:** `Optional[str]` = None

The new workspace for the table. Changing the workspace requires permission to delete the table in its current workspace and permission to create the table in its new workspace.



`nisystemlink.clients.dataframe.models.TableMetdataModification`

alias of `TableMetadataModification`

**pydantic model** `nisystemlink.clients.dataframe.models.TableRows`

Contains the result of a query for rows of decimated data.

```
{
  "title": "TableRows",
  "description": "Contains the result of a query for rows of decimated data.",
  "type": "object",
  "properties": {
    "frame": {
      "$ref": "#/definitions/DataFrame"
    }
  },
  "required": [
    "frame"
  ],
  "definitions": {
    "DataFrame": {
      "title": "DataFrame",
      "description": "Data read from or to be written to a table.\n\nValues may
→ be ``None`` (if the column is of type ``NULLABLE``) or encoded as a string in a
→ format according to each column's datatype:\n\n* BOOL: One of ``"true"`` or ``
→ "false"`` , case-insensitive.\n* INT32: Any integer number in the range [-
→ 2147483648, 2147483647],\n surrounded by quotes.\n* INT64: Any integer number in
→ the range [-9223372036854775808,\n 9223372036854775807], surrounded by quotes.\n
→ * FLOAT32: A decimal number using a period for the decimal point, optionally\n
→ in scientific notation, in the range [-3.40282347E+38, 3.40282347E+38],\n
→ surrounded by quotes. Not all values within the range can be represented\n with
→ 32 bits. To preserve the exact binary encoding of the value when\n converting to
→ a string, clients should serialize 9 digits after the\n decimal. Instead of a
→ number, the value may be ``"NaN"`` (not a number),\n ``"Infinity"``
→ (positive infinity), or ``"-Infinity"`` (negative\n infinity), case-sensitive.\n
→ * FLOAT64: A decimal number using a period for the decimal point, optionally\n
→ in scientific notation, in the range [-1.7976931348623157E+308,\n 1.
→ 7976931348623157E+308], surrounded by quotes. Not all values within the\n range
→ can be represented with 64 bits. To preserve the exact binary\n encoding of the
→ value when converting to a string, clients should\n serialize 17 digits after
→ the decimal. Instead of a number, the value may\n be ``"NaN"`` (not a number),
→ ``"Infinity"`` (positive infinity), or\n ``"-Infinity"`` (negative infinity),
→ case-sensitive.\n* STRING: Any quoted string.\n* TIMESTAMP: A date and time with
→ millisecond precision in ISO-8601 format\n and time zone. For example: ``"2022-
→ 08-19T16:17:30.123Z"``. If a time zone\n is not provided, UTC is assumed. If a
→ time zone other than UTC is\n provided, the value will be converted to UTC. If
→ more than three digits of\n fractional seconds are provided, the time will be
→ truncated to three\n digits (i.e. milliseconds).\n\nThe format is the same as a
→ serialized Pandas DataFrame with orient="split"\nand index=False. See\nhttps://
→ pandas.pydata.org/docs/reference/api/pandas.DataFrame.to_json.html.\n\nWhen
→ providing a DataFrame for appending rows, any of the table's columns\nnot
→ specified will receive a value of ``None``. If any such columns aren't\nnullable,
→ an error will be returned. If the entire columns property is left\nout, each row
→ is assumed to contain all columns in the order specified when\nthe table was
```

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```

↪created.",
  "type": "object",
  "properties": {
    "columns": {
      "title": "Columns",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "data": {
      "title": "Data",
      "type": "array",
      "items": {
        "type": "array",
        "items": {
          "type": "string"
        }
      }
    }
  },
  "required": [
    "data"
  ]
}
}
}

```

**Fields**

- *frame*

**field frame:** *DataFrame* [Required]

The data frame containing the rows of data.

## 1.2.5 nisystemlink.clients.spec

**class** `nisystemlink.clients.spec.SpecClient(configuration)`

**\_\_init\_\_**(*configuration*)

Initialize an instance.

**Parameters**

- **configuration** (Optional[*nisystemlink.clients.core.HttpConfiguration*])  
– Defines the web server to connect to and information about how to connect.
- **base\_path** – The base path for all API calls.

**api\_info**()

Get information about available API operations.

**Return type**

*nisystemlink.clients.spec.models.V1Operations*

**Returns**

Information about available API operations.

**Raises**

[\*ApiException\*](#) – if unable to communicate with the DataFrame Service.

**create\_specs(specs)**

Creates one or more specifications.

**Parameters**

**specs** ([\*nisystemlink.clients.spec.models.CreateSpecificationsRequest\*](#)) – A list of specifications to create.

**Return type**

[\*nisystemlink.clients.spec.models.CreateSpecificationsPartialSuccess\*](#)

**Returns**

A list of specs that were successfully created and ones that failed to be created.

**Raises**

- [\*ApiException\*](#) – if unable to communicate with the */nispec* service or if there are
- **invalid arguments.** –

**delete\_specs(ids)**

Deletes one or more specifications by global id.

**Parameters**

- **ids** (List[str]) – a list of specification ids. Note that these are the global ids and not the
- **workspace.** (*specId that is local to a product and*) –

**Return type**

Optional[[\*nisystemlink.clients.spec.models.DeleteSpecificationsPartialSuccess\*](#)]

**Returns**

None if all deletes succeed otherwise a list of which ids failed and which succeeded.

**Raises**

- [\*ApiException\*](#) – if unable to communicate with the *nispec* service or if there are invalid
- **arguments.** –

**query\_specs(query)**

Queries for specs that match the filters.

**Parameters**

**query** ([\*nisystemlink.clients.spec.models.QuerySpecificationsRequest\*](#)) – The query contains a product id as well as a filter for specs under that product.

**Return type**

[\*nisystemlink.clients.spec.models.QuerySpecifications\*](#)

**Returns**

A list of specifications that match the filter.

**update\_specs(specs)**

Updates one or more specifications.

Update requires that the version field matches the version being updated from.

**Parameters**

- **specs** (*nisystemlink.clients.spec.models.UpdateSpecificationsRequest*) – a list of specifications that are to be updated. Must include the global id and
- **server.** (each spec being updated must match the version currently on the) –

**Return type**Optional[*nisystemlink.clients.spec.models.UpdateSpecificationsPartialSuccess*]**Returns**

A list of specs that were successfully updated and a list of ones that were not along with error messages for updates that failed.

**pydantic model** *nisystemlink.clients.spec.models.Condition*

A single condition.

```
{
  "title": "Condition",
  "description": "A single condition.",
  "type": "object",
  "properties": {
    "name": {
      "title": "Name",
      "type": "string"
    },
    "value": {
      "title": "Value",
      "anyOf": [
        {
          "$ref": "#/definitions/NumericConditionValue"
        },
        {
          "$ref": "#/definitions/StringConditionValue"
        }
      ]
    }
  ],
  "definitions": {
    "ConditionType": {
      "title": "ConditionType",
      "description": "Conditions are either numeric or string type.",
      "enum": [
        "NUMERIC",
        "STRING"
      ]
    },
    "ConditionRange": {
      "title": "ConditionRange",
      "description": "Specifies the range of values that the condition must
↪ cover.",
      "type": "object",
      "properties": {
        "min": {
          "title": "Min",
```

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```

        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      },
      "step": {
        "title": "Step",
        "type": "number"
      }
    }
  },
  "NumericConditionValue": {
    "title": "NumericConditionValue",
    "description": "A numeric condition.\n\nNumeric conditions can contain a
↪combination of ranges and discrete lists.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      },
      "range": {
        "title": "Range",
        "type": "array",
        "items": {
          "$ref": "#/definitions/ConditionRange"
        }
      },
      "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "unit": {
        "title": "Unit",
        "type": "string"
      }
    },
    "required": [
      "conditionType"
    ]
  },
  "StringConditionValue": {
    "title": "StringConditionValue",
    "description": "A string condition.\n\nString conditions may only contain
↪discrete lists of values.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      }
    }
  }
}

```

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```

    },
    "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
            "type": "string"
        }
    },
    },
    "required": [
        "conditionType"
    ]
}
}
}

```

**Fields**

- *name*
- *value*

**field name:** `Optional[str] = None`

Name of the condition.

**field value:** `Union[NumericConditionValue, StringConditionValue, None] = None`

Value of the condition.

**pydantic model** `nisystemlink.clients.spec.models.ConditionRange`

Specifies the range of values that the condition must cover.

```

{
    "title": "ConditionRange",
    "description": "Specifies the range of values that the condition must cover.",
    "type": "object",
    "properties": {
        "min": {
            "title": "Min",
            "type": "number"
        },
        "max": {
            "title": "Max",
            "type": "number"
        },
        "step": {
            "title": "Step",
            "type": "number"
        }
    }
}

```

**Fields**

- *max*

- *min*
- *step*

**field max:** Optional[float] = None

Maximum value of the condition range.

**field min:** Optional[float] = None

Minimum value of the condition range.

**field step:** Optional[float] = None

Step value of the condition range.

**class** nisystemlink.clients.spec.models.**ConditionType**(value)

Conditions are either numeric or string type.

**NUMERIC** = 'NUMERIC'

Numeric condition.

**STRING** = 'STRING'

String condition.

**pydantic model** nisystemlink.clients.spec.models.**CreateSpecificationsPartialSuccess**

When some specs can not be created, this contains the list that was and was not created.

```
{
  "title": "CreateSpecificationsPartialSuccess",
  "description": "When some specs can not be created, this contains the list that
↳ was and was not created.",
  "type": "object",
  "properties": {
    "createdSpecs": {
      "title": "Createdspecs",
      "type": "array",
      "items": {
        "$ref": "#/definitions/CreatedSpecification"
      }
    },
    "failedSpecs": {
      "title": "Failedspecs",
      "type": "array",
      "items": {
        "$ref": "#/definitions/SpecificationDefinition"
      }
    }
  },
  "error": {
    "$ref": "#/definitions/ApiError"
  }
},
"definitions": {
  "CreatedSpecification": {
    "title": "CreatedSpecification",
    "description": "A specification successfully created on the server.",
    "type": "object",
    "properties": {
```

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```

        "createdAt": {
            "title": "Createdat",
            "type": "string",
            "format": "date-time"
        },
        "createdBy": {
            "title": "Createdby",
            "type": "string"
        },
        "productId": {
            "title": "Productid",
            "type": "string"
        },
        "specId": {
            "title": "Specid",
            "type": "string"
        },
        "workspace": {
            "title": "Workspace",
            "type": "string"
        },
        "id": {
            "title": "Id",
            "type": "string"
        },
        "version": {
            "title": "Version",
            "type": "integer"
        }
    },
    "required": [
        "productId",
        "specId",
        "id",
        "version"
    ]
},
"SpecificationType": {
    "title": "SpecificationType",
    "description": "The overall type of the specification.",
    "enum": [
        "PARAMETRIC",
        "FUNCTIONAL"
    ]
},
"SpecificationLimit": {
    "title": "SpecificationLimit",
    "description": "A limit for a specification.\n\nThe limit is the value_
↳that a measurement should be compared against during analysis to\ndetermine the_
↳health or pass/fail status of that measurement.",
    "type": "object",
    "properties": {

```

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```

        "min": {
            "title": "Min",
            "type": "number"
        },
        "typical": {
            "title": "Typical",
            "type": "number"
        },
        "max": {
            "title": "Max",
            "type": "number"
        }
    },
    "ConditionType": {
        "title": "ConditionType",
        "description": "Conditions are either numeric or string type.",
        "enum": [
            "NUMERIC",
            "STRING"
        ]
    },
    "ConditionRange": {
        "title": "ConditionRange",
        "description": "Specifies the range of values that the condition must
↪ cover.",
        "type": "object",
        "properties": {
            "min": {
                "title": "Min",
                "type": "number"
            },
            "max": {
                "title": "Max",
                "type": "number"
            },
            "step": {
                "title": "Step",
                "type": "number"
            }
        }
    },
    "NumericConditionValue": {
        "title": "NumericConditionValue",
        "description": "A numeric condition.\n\nNumeric conditions can contain a
↪ combination of ranges and discrete lists.",
        "type": "object",
        "properties": {
            "conditionType": {
                "$ref": "#/definitions/ConditionType"
            },
            "range": {

```

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```

        "title": "Range",
        "type": "array",
        "items": {
            "$ref": "#/definitions/ConditionRange"
        }
    },
    "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
            "type": "number"
        }
    },
    "unit": {
        "title": "Unit",
        "type": "string"
    }
},
"required": [
    "conditionType"
]
},
"StringConditionValue": {
    "title": "StringConditionValue",
    "description": "A string condition.\n\nString conditions may only contain
↳discrete lists of values.",
    "type": "object",
    "properties": {
        "conditionType": {
            "$ref": "#/definitions/ConditionType"
        },
        "discrete": {
            "title": "Discrete",
            "type": "array",
            "items": {
                "type": "string"
            }
        }
    }
},
"required": [
    "conditionType"
]
},
"Condition": {
    "title": "Condition",
    "description": "A single condition.",
    "type": "object",
    "properties": {
        "name": {
            "title": "Name",
            "type": "string"
        }
    }
},

```

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```

        "value": {
          "title": "Value",
          "anyOf": [
            {
              "$ref": "#/definitions/NumericConditionValue"
            },
            {
              "$ref": "#/definitions/StringConditionValue"
            }
          ]
        }
      },
    },
    "SpecificationDefinition": {
      "title": "SpecificationDefinition",
      "description": "Base class for models that are serialized to and from JSON.",
      "type": "object",
      "properties": {
        "productId": {
          "title": "Productid",
          "type": "string"
        },
        "specId": {
          "title": "Specid",
          "type": "string"
        },
        "workspace": {
          "title": "Workspace",
          "type": "string"
        },
        "name": {
          "title": "Name",
          "type": "string"
        },
        "category": {
          "title": "Category",
          "type": "string"
        },
        "type": {
          "$ref": "#/definitions/SpecificationType"
        },
        "symbol": {
          "title": "Symbol",
          "type": "string"
        },
        "block": {
          "title": "Block",
          "type": "string"
        },
        "limit": {
          "$ref": "#/definitions/SpecificationLimit"
        }
      }
    }
  },
  "type": "object",
  "properties": {
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "category": {
      "title": "Category",
      "type": "string"
    },
    "type": {
      "$ref": "#/definitions/SpecificationType"
    },
    "symbol": {
      "title": "Symbol",
      "type": "string"
    },
    "block": {
      "title": "Block",
      "type": "string"
    },
    "limit": {
      "$ref": "#/definitions/SpecificationLimit"
    }
  }
}

```

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```

    },
    "unit": {
      "title": "Unit",
      "type": "string"
    },
    "conditions": {
      "title": "Conditions",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Condition"
      }
    },
    "keywords": {
      "title": "Keywords",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    }
  },
  "required": [
    "productId",
    "specId",
    "type"
  ],
  "ApiError": {
    "title": "ApiError",
    "description": "Represents the standard error structure for SystemLink API",
    ↪ responses: "type": "object",
    "properties": {
      "name": {
        "title": "Name",
        "type": "string"
      },
      "code": {
        "title": "Code",
        "type": "integer"
      },
      "message": {
        "title": "Message",
        "type": "string"
      },
      "args": {

```

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```

        "title": "Args",
        "default": [],
        "type": "array",
        "items": {
            "type": "string"
        }
    },
    "resourceType": {
        "title": "Resourcetype",
        "type": "string"
    },
    "resourceId": {
        "title": "Resourceid",
        "type": "string"
    },
    "innerErrors": {
        "title": "Innererrors",
        "default": [],
        "type": "array",
        "items": {
            "$ref": "#/definitions/ApiError"
        }
    }
}
}
}
}
}

```

**Fields**

- *created\_specs*
- *error*
- *failed\_specs*

**field created\_specs:** Optional[List[*CreatedSpecification*]] = None

Information about the created specification(s)

**field error:** Optional[*ApiError*] = None

**field failed\_specs:** Optional[List[*SpecificationDefinition*]] = None

List of specification requests that failed during creation.

**pydantic model** `nisystemlink.clients.spec.models.CreateSpecificationsRequest`

Create multiple specifications.

```

{
    "title": "CreateSpecificationsRequest",
    "description": "Create multiple specifications.",
    "type": "object",
    "properties": {
        "specs": {
            "title": "Specs",

```

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```

        "type": "array",
        "items": {
            "$ref": "#/definitions/SpecificationDefinition"
        }
    },
    "definitions": {
        "SpecificationType": {
            "title": "SpecificationType",
            "description": "The overall type of the specification.",
            "enum": [
                "PARAMETRIC",
                "FUNCTIONAL"
            ]
        },
        "SpecificationLimit": {
            "title": "SpecificationLimit",
            "description": "A limit for a specification.\n\nThe limit is the value_
↪that a measurement should be compared against during analysis to\ndetermine the_
↪health or pass/fail status of that measurement.",
            "type": "object",
            "properties": {
                "min": {
                    "title": "Min",
                    "type": "number"
                },
                "typical": {
                    "title": "Typical",
                    "type": "number"
                },
                "max": {
                    "title": "Max",
                    "type": "number"
                }
            }
        },
        "ConditionType": {
            "title": "ConditionType",
            "description": "Conditions are either numeric or string type.",
            "enum": [
                "NUMERIC",
                "STRING"
            ]
        },
        "ConditionRange": {
            "title": "ConditionRange",
            "description": "Specifies the range of values that the condition must_
↪cover.",
            "type": "object",
            "properties": {
                "min": {
                    "title": "Min",

```

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```

        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      },
      "step": {
        "title": "Step",
        "type": "number"
      }
    }
  },
  "NumericConditionValue": {
    "title": "NumericConditionValue",
    "description": "A numeric condition.\n\nNumeric conditions can contain a
↪combination of ranges and discrete lists.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      },
      "range": {
        "title": "Range",
        "type": "array",
        "items": {
          "$ref": "#/definitions/ConditionRange"
        }
      },
      "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "unit": {
        "title": "Unit",
        "type": "string"
      }
    },
    "required": [
      "conditionType"
    ]
  },
  "StringConditionValue": {
    "title": "StringConditionValue",
    "description": "A string condition.\n\nString conditions may only contain
↪discrete lists of values.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      }
    }
  }
}

```

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```

        },
        "discrete": {
            "title": "Discrete",
            "type": "array",
            "items": {
                "type": "string"
            }
        }
    },
    "required": [
        "conditionType"
    ]
},
"Condition": {
    "title": "Condition",
    "description": "A single condition.",
    "type": "object",
    "properties": {
        "name": {
            "title": "Name",
            "type": "string"
        },
        "value": {
            "title": "Value",
            "anyOf": [
                {
                    "$ref": "#/definitions/NumericConditionValue"
                },
                {
                    "$ref": "#/definitions/StringConditionValue"
                }
            ]
        }
    }
},
"SpecificationDefinition": {
    "title": "SpecificationDefinition",
    "description": "Base class for models that are serialized to and from JSON.",
    "type": "object",
    "properties": {
        "productId": {
            "title": "Productid",
            "type": "string"
        },
        "specId": {
            "title": "Specid",
            "type": "string"
        },
        "workspace": {
            "title": "Workspace",
            "type": "string"
        }
    }
},

```

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```

    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "category": {
      "title": "Category",
      "type": "string"
    },
    "type": {
      "$ref": "#/definitions/SpecificationType"
    },
    "symbol": {
      "title": "Symbol",
      "type": "string"
    },
    "block": {
      "title": "Block",
      "type": "string"
    },
    "limit": {
      "$ref": "#/definitions/SpecificationLimit"
    },
    "unit": {
      "title": "Unit",
      "type": "string"
    },
    "conditions": {
      "title": "Conditions",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Condition"
      }
    },
    "keywords": {
      "title": "Keywords",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    }
  },
  "required": [
    "productId",
    "specId",

```

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```

        "type"
    ]
}
}
}

```

**Fields**

- *specs*

**field specs:** Optional[List[*SpecificationDefinition*]] = None

List of specifications to be created.

**pydantic model** nisystemlink.clients.spec.models.CreatedSpecification

A specification successfully created on the server.

```

{
  "title": "CreatedSpecification",
  "description": "A specification successfully created on the server.",
  "type": "object",
  "properties": {
    "createdAt": {
      "title": "Createdat",
      "type": "string",
      "format": "date-time"
    },
    "createdBy": {
      "title": "Createdby",
      "type": "string"
    },
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    },
    "id": {
      "title": "Id",
      "type": "string"
    },
    "version": {
      "title": "Version",
      "type": "integer"
    }
  },
  "required": [

```

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```

    "productId",
    "specId",
    "id",
    "version"
  ]
}
```

**Fields**

- *id*
- *version*

**field id: str [Required]**

The global Id of the specification.

**field version: int [Required]**

Current version of the specification.

When an update is applied, the version is automatically incremented.

**pydantic model** `nisystemlink.clients.spec.models.DeleteSpecificationsPartialSuccess`

The results of deleting multiple specs when one or more of the specs could not be deleted.

```

{
  "title": "DeleteSpecificationsPartialSuccess",
  "description": "The results of deleting multiple specs when one or more of the_
↪ specs could not be deleted.",
  "type": "object",
  "properties": {
    "deletedSpecIds": {
      "title": "Deletedspecsids",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "failedSpecIds": {
      "title": "Failedspecsids",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "error": {
      "$ref": "#/definitions/ApiError"
    }
  },
  "required": [
    "deletedSpecIds",
    "failedSpecIds",
    "error"
  ],
}
```

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```

    "definitions": {
      "ApiError": {
        "title": "ApiError",
        "description": "Represents the standard error structure for SystemLink API.↵
↵responses.",
        "type": "object",
        "properties": {
          "name": {
            "title": "Name",
            "type": "string"
          },
          "code": {
            "title": "Code",
            "type": "integer"
          },
          "message": {
            "title": "Message",
            "type": "string"
          },
          "args": {
            "title": "Args",
            "default": [],
            "type": "array",
            "items": {
              "type": "string"
            }
          },
          "resourceType": {
            "title": "Resourcetype",
            "type": "string"
          },
          "resourceId": {
            "title": "Resourceid",
            "type": "string"
          },
          "innerErrors": {
            "title": "Innererrors",
            "default": [],
            "type": "array",
            "items": {
              "$ref": "#/definitions/ApiError"
            }
          }
        }
      }
    }
  }
}

```

**Fields**

- *deleted\_spec\_ids*
- *error*

- *failed\_spec\_ids*

**field deleted\_spec\_ids:** List[str] [Required]

Global IDs of the deleted specifications.

**field error:** *ApiError* [Required]

**field failed\_spec\_ids:** List[str] [Required]

Global IDs of the specifications that could not be deleted.

**pydantic model** nisystemlink.clients.spec.models.NumericConditionValue

A numeric condition.

Numeric conditions can contain a combination of ranges and discrete lists.

```
{
  "title": "NumericConditionValue",
  "description": "A numeric condition.\n\nNumeric conditions can contain a
↪combination of ranges and discrete lists.",
  "type": "object",
  "properties": {
    "conditionType": {
      "$ref": "#/definitions/ConditionType"
    },
    "range": {
      "title": "Range",
      "type": "array",
      "items": {
        "$ref": "#/definitions/ConditionRange"
      }
    },
    "discrete": {
      "title": "Discrete",
      "type": "array",
      "items": {
        "type": "number"
      }
    },
    "unit": {
      "title": "Unit",
      "type": "string"
    }
  },
  "required": [
    "conditionType"
  ],
  "definitions": {
    "ConditionType": {
      "title": "ConditionType",
      "description": "Conditions are either numeric or string type.",
      "enum": [
        "NUMERIC",
        "STRING"
      ]
    }
  }
}
```

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```

    },
    "ConditionRange": {
        "title": "ConditionRange",
        "description": "Specifies the range of values that the condition must
↪cover.",
        "type": "object",
        "properties": {
            "min": {
                "title": "Min",
                "type": "number"
            },
            "max": {
                "title": "Max",
                "type": "number"
            },
            "step": {
                "title": "Step",
                "type": "number"
            }
        }
    }
}

```

**Fields**

- *discrete*
- *range*
- *unit*

**field discrete:** `Optional[List[float]] = None`

List of condition discrete values.

**field range:** `Optional[List[ConditionRange]] = None`

List of condition range values.

**field unit:** `Optional[str] = None`

Unit of the condition.

**pydantic model** `nisystemlink.clients.spec.models.Operation`

Represents an operation that can be performed on a data frame.

```

{
    "title": "Operation",
    "description": "Represents an operation that can be performed on a data frame.",
    "type": "object",
    "properties": {
        "available": {
            "title": "Available",
            "type": "boolean"
        },
        "version": {

```

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```

        "title": "Version",
        "type": "integer"
    },
    "required": [
        "available",
        "version"
    ]
}

```

**Fields**

- *available*
- *version*

**field available: bool [Required]**

Whether or not the operation is available to the caller (e.g. due to permissions).

**field version: int [Required]**

The version of the available operation.

**pydantic model** `nisystemlink.clients.spec.models.QuerySpecifications`

The list of matching specifications and a continuation token to get the next items.

```

{
    "title": "QuerySpecifications",
    "description": "The list of matching specifications and a continuation token to ↵
↵get the next items.",
    "type": "object",
    "properties": {
        "continuationToken": {
            "title": "Continuationtoken",
            "type": "string"
        },
        "specs": {
            "title": "Specs",
            "type": "array",
            "items": {
                "$ref": "#/definitions/SpecificationWithHistory"
            }
        }
    },
    "definitions": {
        "SpecificationType": {
            "title": "SpecificationType",
            "description": "The overall type of the specification.",
            "enum": [
                "PARAMETRIC",
                "FUNCTIONAL"
            ]
        },
        "SpecificationLimit": {

```

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```

    "title": "SpecificationLimit",
    "description": "A limit for a specification.\n\nThe limit is the value_
↳that a measurement should be compared against during analysis to\ndetermine the_
↳health or pass/fail status of that measurement.",
    "type": "object",
    "properties": {
        "min": {
            "title": "Min",
            "type": "number"
        },
        "typical": {
            "title": "Typical",
            "type": "number"
        },
        "max": {
            "title": "Max",
            "type": "number"
        }
    },
    "ConditionType": {
        "title": "ConditionType",
        "description": "Conditions are either numeric or string type.",
        "enum": [
            "NUMERIC",
            "STRING"
        ]
    },
    "ConditionRange": {
        "title": "ConditionRange",
        "description": "Specifies the range of values that the condition must_
↳cover.",
        "type": "object",
        "properties": {
            "min": {
                "title": "Min",
                "type": "number"
            },
            "max": {
                "title": "Max",
                "type": "number"
            },
            "step": {
                "title": "Step",
                "type": "number"
            }
        }
    },
    "NumericConditionValue": {
        "title": "NumericConditionValue",
        "description": "A numeric condition.\n\nNumeric conditions can contain a_
↳combination of ranges and discrete lists.",

```

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```

    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      },
      "range": {
        "title": "Range",
        "type": "array",
        "items": {
          "$ref": "#/definitions/ConditionRange"
        }
      },
      "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "unit": {
        "title": "Unit",
        "type": "string"
      }
    },
    "required": [
      "conditionType"
    ],
    "StringConditionValue": {
      "title": "StringConditionValue",
      "description": "A string condition.\n\nString conditions may only contain
↳discrete lists of values.",
      "type": "object",
      "properties": {
        "conditionType": {
          "$ref": "#/definitions/ConditionType"
        },
        "discrete": {
          "title": "Discrete",
          "type": "array",
          "items": {
            "type": "string"
          }
        }
      },
      "required": [
        "conditionType"
      ],
      "Condition": {
        "title": "Condition",
        "description": "A single condition.",

```

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```

    "type": "object",
    "properties": {
      "name": {
        "title": "Name",
        "type": "string"
      },
      "value": {
        "title": "Value",
        "anyOf": [
          {
            "$ref": "#/definitions/NumericConditionValue"
          },
          {
            "$ref": "#/definitions/StringConditionValue"
          }
        ]
      }
    }
  },
  "SpecificationWithHistory": {
    "title": "SpecificationWithHistory",
    "description": "A full specification with update and create history.",
    "type": "object",
    "properties": {
      "updatedAt": {
        "title": "Updatedat",
        "type": "string",
        "format": "date-time"
      },
      "updatedBy": {
        "title": "Updatedby",
        "type": "string"
      },
      "createdAt": {
        "title": "Createdat",
        "type": "string",
        "format": "date-time"
      },
      "createdBy": {
        "title": "Createdby",
        "type": "string"
      },
      "id": {
        "title": "Id",
        "type": "string"
      },
      "version": {
        "title": "Version",
        "type": "integer"
      },
      "productId": {
        "title": "Productid",

```

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```

        "type": "string"
    },
    "specId": {
        "title": "Specid",
        "type": "string"
    },
    "workspace": {
        "title": "Workspace",
        "type": "string"
    },
    "name": {
        "title": "Name",
        "type": "string"
    },
    "category": {
        "title": "Category",
        "type": "string"
    },
    "type": {
        "$ref": "#/definitions/SpecificationType"
    },
    "symbol": {
        "title": "Symbol",
        "type": "string"
    },
    "block": {
        "title": "Block",
        "type": "string"
    },
    "limit": {
        "$ref": "#/definitions/SpecificationLimit"
    },
    "unit": {
        "title": "Unit",
        "type": "string"
    },
    "conditions": {
        "title": "Conditions",
        "type": "array",
        "items": {
            "$ref": "#/definitions/Condition"
        }
    },
    "keywords": {
        "title": "Keywords",
        "type": "array",
        "items": {
            "type": "string"
        }
    },
    "properties": {
        "title": "Properties",

```

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```

        "type": "object",
        "additionalProperties": {
            "type": "string"
        }
    },
    "required": [
        "id",
        "version",
        "productId",
        "specId",
        "type"
    ]
}

```

**Fields**

- *specs*

**field specs:** `Optional[List[SpecificationWithHistory]] = None`

List of queried specifications.

An empty list indicates that there are no specifications meeting the criteria provided in the request.

**pydantic model** `nisystemlink.clients.spec.models.QuerySpecificationsRequest`

The request to query specifications.

```

{
    "title": "QuerySpecificationsRequest",
    "description": "The request to query specifications.",
    "type": "object",
    "properties": {
        "productIds": {
            "title": "Productids",
            "type": "array",
            "items": {
                "type": "string"
            }
        },
        "take": {
            "title": "Take",
            "type": "integer"
        },
        "continuationToken": {
            "title": "Continuationtoken",
            "type": "string"
        },
        "filter": {
            "title": "Filter",
            "type": "string"
        }
    },
}

```

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```

    "projection": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/Projection"
      }
    },
    "orderBy": {
      "$ref": "#/definitions/OrderBy"
    },
    "orderByDescending": {
      "title": "Orderbydescending",
      "type": "boolean"
    }
  },
  "required": [
    "productIds"
  ],
  "definitions": {
    "Projection": {
      "title": "Projection",
      "description": "The allowed projections for query.\n\nWhen using ↵
↵projection, only the fields specified by the projection element will be included ↵
↵in\nthe response.",
      "enum": [
        "ID",
        "PRODUCT_ID",
        "SPEC_ID",
        "NAME",
        "CATEGORY",
        "TYPE",
        "SYMBOL",
        "BLOCK",
        "LIMIT",
        "UNIT",
        "CONDITION_NAME",
        "CONDITION_VALUES",
        "CONDITION_UNIT",
        "CONDITION_TYPE",
        "KEYWORDS",
        "PROPERTIES",
        "WORKSPACE",
        "CREATED_AT",
        "CREATED_BY"
      ],
      "type": "string"
    },
    "OrderBy": {
      "title": "OrderBy",
      "description": "The valid ways to order the response to a spec query.",
      "enum": [
        "ID",
        "SPEC_ID"
      ]
    }
  }
}

```

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```

    }
  }
}

```

**Fields**

- *continuation\_token*
- *filter*
- *order\_by*
- *order\_by\_descending*
- *product\_ids*
- *projection*
- *take*

**field continuation\_token: Optional[str] = None**

Allows users to continue the query at the next specification that matches the given criteria.

To retrieve the next batch of specifications, pass the continuation token from the previous batch in the next request. The service responds with the next batch of data and provides a new continuation token. To paginate results, continue sending requests with the newest continuation token provided in each response.

**field filter: Optional[str] = None**

The specification query filter in Dynamic Linq format.

Allowed properties in the filter are: - *specId*: String representing the SpecID of a specification. - *name*: String representing the name of a specification. - *category*: String representing the category of a specification. - *type*: String enumeration representing the type of the specification.

Possible values are : PARAMETRIC, FUNCTIONAL

- *block*: String representing the block of a specification.
- *symbol*: String representing the symbol of a specification.
- *unit*: String representing the unit of a specification.
- *workspace*: String representing the ID of the workspace the specification belongs to.
- *createdBy*: String representing the ID of the user who created the specification.
- *createdAt*: ISO-8601 formatted UTC timestamp indicating when the specification was created.
- *updatedBy*: String representing the ID of the user who updated the specification.
- *updatedAt*: ISO-8601 formatted UTC timestamp indicating when the specification was updated.

See [\[Dynamic Linq\]\(https://github.com/ni/systemlink-OpenAPI-documents/wiki/Dynamic-Linq-Query-Language\)](https://github.com/ni/systemlink-OpenAPI-documents/wiki/Dynamic-Linq-Query-Language) documentation for more details.

**field order\_by: Optional[OrderBy] = None**

Specifies the field to use to sort specifications.

By default, specifications are sorted by *ID*.

**field order\_by\_descending:** `Optional[bool] = None`

Specifies whether to return the specifications in descending order.

By default, this value is *false* and specifications are sorted in ascending order.

**field product\_ids:** `List[str] [Required]`

IDs of the products to query the specifications for.

**field projection:** `Optional[List[Projection]] = None`

Specifies the fields to include in the returned specifications.

Fields you do not specify are excluded. Returns all fields if no value is specified.

**field take:** `Optional[int] = None`

Maximum number of specifications to return in the current API response.

Uses the default if the specified value is negative. The default value is *1000* specs.

**pydantic model** `nisystemlink.clients.spec.models.Specification`

The complete definition of a specification.

```
{
  "title": "Specification",
  "description": "The complete definition of a specification.",
  "type": "object",
  "properties": {
    "id": {
      "title": "Id",
      "type": "string"
    },
    "version": {
      "title": "Version",
      "type": "integer"
    },
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "category": {
      "title": "Category",
      "type": "string"
    },
    "type": {
      "$ref": "#/definitions/SpecificationType"
    }
  }
}
```

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```

    },
    "symbol": {
      "title": "Symbol",
      "type": "string"
    },
    "block": {
      "title": "Block",
      "type": "string"
    },
    "limit": {
      "$ref": "#/definitions/SpecificationLimit"
    },
    "unit": {
      "title": "Unit",
      "type": "string"
    },
    "conditions": {
      "title": "Conditions",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Condition"
      }
    },
    "keywords": {
      "title": "Keywords",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    }
  },
  "required": [
    "id",
    "version",
    "productId",
    "specId",
    "type"
  ],
  "definitions": {
    "SpecificationType": {
      "title": "SpecificationType",
      "description": "The overall type of the specification.",
      "enum": [
        "PARAMETRIC",
        "FUNCTIONAL"
      ]
    }
  }
}

```

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```

    ]
  },
  "SpecificationLimit": {
    "title": "SpecificationLimit",
    "description": "A limit for a specification.\n\nThe limit is the value_
↳that a measurement should be compared against during analysis to\ndetermine the_
↳health or pass/fail status of that measurement.",
    "type": "object",
    "properties": {
      "min": {
        "title": "Min",
        "type": "number"
      },
      "typical": {
        "title": "Typical",
        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      }
    }
  },
  "ConditionType": {
    "title": "ConditionType",
    "description": "Conditions are either numeric or string type.",
    "enum": [
      "NUMERIC",
      "STRING"
    ]
  },
  "ConditionRange": {
    "title": "ConditionRange",
    "description": "Specifies the range of values that the condition must_
↳cover.",
    "type": "object",
    "properties": {
      "min": {
        "title": "Min",
        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      },
      "step": {
        "title": "Step",
        "type": "number"
      }
    }
  },
  "NumericConditionValue": {

```

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```

    "title": "NumericConditionValue",
    "description": "A numeric condition.\n\nNumeric conditions can contain a
↪combination of ranges and discrete lists.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      },
      "range": {
        "title": "Range",
        "type": "array",
        "items": {
          "$ref": "#/definitions/ConditionRange"
        }
      },
      "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "unit": {
        "title": "Unit",
        "type": "string"
      }
    },
    "required": [
      "conditionType"
    ],
  },
  "StringConditionValue": {
    "title": "StringConditionValue",
    "description": "A string condition.\n\nString conditions may only contain
↪discrete lists of values.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      },
      "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
          "type": "string"
        }
      }
    },
    "required": [
      "conditionType"
    ],
  },

```

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```

    "Condition": {
      "title": "Condition",
      "description": "A single condition.",
      "type": "object",
      "properties": {
        "name": {
          "title": "Name",
          "type": "string"
        },
        "value": {
          "title": "Value",
          "anyOf": [
            {
              "$ref": "#/definitions/NumericConditionValue"
            },
            {
              "$ref": "#/definitions/StringConditionValue"
            }
          ]
        }
      }
    }
  }
}

```

### Fields

- *block*
- *category*
- *conditions*
- *keywords*
- *limit*
- *name*
- *properties*
- *symbol*
- *type*
- *unit*

**field block:** `Optional[str] = None`

Block name of the specification.

Typically a block is one of the subsystems of the overall product being specified.

**field category:** `Optional[str] = None`

Category of the specification.

**field conditions:** `Optional[List[Condition]] = None`

Conditions associated with the specification.

**field keywords:** `Optional[List[str]] = None`

Keywords or phrases associated with the specification.

**field limit:** `Optional[SpecificationLimit] = None`

The limits for this spec.

**field name:** `Optional[str] = None`

Name of the specification.

**field properties:** `Optional[Dict[str, str]] = None`

Additional properties associated with the specification.

**field symbol:** `Optional[str] = None`

Short form identifier of the specification.

**field type:** `SpecificationType [Required]`

Type of the specification.

**field unit:** `Optional[str] = None`

Unit of the specification.

**pydantic model** `nisystemlink.clients.spec.models.SpecificationCreation`

When the spec was created and when.

```
{
  "title": "SpecificationCreation",
  "description": "When the spec was created and when.",
  "type": "object",
  "properties": {
    "createdAt": {
      "title": "Createdat",
      "type": "string",
      "format": "date-time"
    },
    "createdBy": {
      "title": "Createdby",
      "type": "string"
    }
  }
}
```

#### Fields

- *created\_at*
- *created\_by*

**field created\_at:** `Optional[datetime] = None`

ISO-8601 formatted timestamp indicating when the specification was created.

**field created\_by:** `Optional[str] = None`

Id of the user who created the specification.

**pydantic model** `nisystemlink.clients.spec.models.SpecificationDefinition`

```

{
  "title": "SpecificationDefinition",
  "description": "Base class for models that are serialized to and from JSON.",
  "type": "object",
  "properties": {
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "category": {
      "title": "Category",
      "type": "string"
    },
    "type": {
      "$ref": "#/definitions/SpecificationType"
    },
    "symbol": {
      "title": "Symbol",
      "type": "string"
    },
    "block": {
      "title": "Block",
      "type": "string"
    },
    "limit": {
      "$ref": "#/definitions/SpecificationLimit"
    },
    "unit": {
      "title": "Unit",
      "type": "string"
    },
    "conditions": {
      "title": "Conditions",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Condition"
      }
    },
    "keywords": {
      "title": "Keywords",
      "type": "array",

```

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```

        "items": {
            "type": "string"
        }
    },
    "properties": {
        "title": "Properties",
        "type": "object",
        "additionalProperties": {
            "type": "string"
        }
    }
},
"required": [
    "productId",
    "specId",
    "type"
],
"definitions": {
    "SpecificationType": {
        "title": "SpecificationType",
        "description": "The overall type of the specification.",
        "enum": [
            "PARAMETRIC",
            "FUNCTIONAL"
        ]
    },
    "SpecificationLimit": {
        "title": "SpecificationLimit",
        "description": "A limit for a specification.\n\nThe limit is the value_
↳that a measurement should be compared against during analysis to\ndetermine the_
↳health or pass/fail status of that measurement.",
        "type": "object",
        "properties": {
            "min": {
                "title": "Min",
                "type": "number"
            },
            "typical": {
                "title": "Typical",
                "type": "number"
            },
            "max": {
                "title": "Max",
                "type": "number"
            }
        }
    },
    "ConditionType": {
        "title": "ConditionType",
        "description": "Conditions are either numeric or string type.",
        "enum": [
            "NUMERIC",

```

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```

        "STRING"
    ]
},
"ConditionRange": {
    "title": "ConditionRange",
    "description": "Specifies the range of values that the condition must
↪cover.",
    "type": "object",
    "properties": {
        "min": {
            "title": "Min",
            "type": "number"
        },
        "max": {
            "title": "Max",
            "type": "number"
        },
        "step": {
            "title": "Step",
            "type": "number"
        }
    }
},
"NumericConditionValue": {
    "title": "NumericConditionValue",
    "description": "A numeric condition.\n\nNumeric conditions can contain a
↪combination of ranges and discrete lists.",
    "type": "object",
    "properties": {
        "conditionType": {
            "$ref": "#/definitions/ConditionType"
        },
        "range": {
            "title": "Range",
            "type": "array",
            "items": {
                "$ref": "#/definitions/ConditionRange"
            }
        },
        "discrete": {
            "title": "Discrete",
            "type": "array",
            "items": {
                "type": "number"
            }
        },
        "unit": {
            "title": "Unit",
            "type": "string"
        }
    }
},
"required": [

```

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```

        "conditionType"
      ]
    },
    "StringConditionValue": {
      "title": "StringConditionValue",
      "description": "A string condition.\n\nString conditions may only contain_
↪discrete lists of values.",
      "type": "object",
      "properties": {
        "conditionType": {
          "$ref": "#/definitions/ConditionType"
        },
        "discrete": {
          "title": "Discrete",
          "type": "array",
          "items": {
            "type": "string"
          }
        }
      }
    },
    "required": [
      "conditionType"
    ]
  },
  "Condition": {
    "title": "Condition",
    "description": "A single condition.",
    "type": "object",
    "properties": {
      "name": {
        "title": "Name",
        "type": "string"
      },
      "value": {
        "title": "Value",
        "anyOf": [
          {
            "$ref": "#/definitions/NumericConditionValue"
          },
          {
            "$ref": "#/definitions/StringConditionValue"
          }
        ]
      }
    }
  }
}

```

**Fields**

- *block*



- *category*
- *conditions*
- *keywords*
- *limit*
- *name*
- *properties*
- *symbol*
- *type*
- *unit*

**field block:** `Optional[str] = None`

Block name of the specification.

Typically a block is one of the subsystems of the overall product being specified.

**field category:** `Optional[str] = None`

Category of the specification.

**field conditions:** `Optional[List[Condition]] = None`

Conditions associated with the specification.

**field keywords:** `Optional[List[str]] = None`

Keywords or phrases associated with the specification.

**field limit:** `Optional[SpecificationLimit] = None`

The limits for this spec.

**field name:** `Optional[str] = None`

Name of the specification.

**field properties:** `Optional[Dict[str, str]] = None`

Additional properties associated with the specification.

**field symbol:** `Optional[str] = None`

Short form identifier of the specification.

**field type:** `SpecificationType [Required]`

Type of the specification.

**field unit:** `Optional[str] = None`

Unit of the specification.

**pydantic model** `nisystemlink.clients.spec.models.SpecificationLimit`

A limit for a specification.

The limit is the value that a measurement should be compared against during analysis to determine the health or pass/fail status of that measurement.

```
{
  "title": "SpecificationLimit",
  "description": "A limit for a specification.\n\nThe limit is the value that a
↪ measurement should be compared against during analysis to\ndetermine the health
↪ or pass/fail status of that measurement.",
```

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```

    "type": "object",
    "properties": {
      "min": {
        "title": "Min",
        "type": "number"
      },
      "typical": {
        "title": "Typical",
        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      }
    }
  }
}

```

**Fields**

- *max*
- *min*
- *typical*

**field max:** `Optional[float] = None`

Maximum value of the specification.

All measurements that map to this specification should be < this limit.

**field min:** `Optional[float] = None`

Minimum limit of the specification.

All measurements that map to this specification should be > this limit.

**field typical:** `Optional[float] = None`

Typical value of the specification.

**pydantic model** `nisystemlink.clients.spec.models.SpecificationServerManaged`

```

{
  "title": "SpecificationServerManaged",
  "description": "Base class for models that are serialized to and from JSON.",
  "type": "object",
  "properties": {
    "id": {
      "title": "Id",
      "type": "string"
    },
    "version": {
      "title": "Version",
      "type": "integer"
    }
  },
  "required": [

```

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```

    "id",
    "version"
  ]
}

```

**Fields**

- *id*
- *version*

**field id: str [Required]**

The global Id of the specification.

**field version: int [Required]**

Current version of the specification.

When an update is applied, the version is automatically incremented.

**class** nisystemlink.clients.spec.models.**SpecificationType**(*value*)

The overall type of the specification.

**FUNCTIONAL = 'FUNCTIONAL'**

Functional specs only have pass/fail status.

**PARAMETRIC = 'PARAMETRIC'**

Parametric specs have limits.

**pydantic model** nisystemlink.clients.spec.models.**SpecificationUpdated**

When the spec was updated and when.

```

{
  "title": "SpecificationUpdated",
  "description": "When the spec was updated and when.",
  "type": "object",
  "properties": {
    "updatedAt": {
      "title": "Updatedat",
      "type": "string",
      "format": "date-time"
    },
    "updatedBy": {
      "title": "Updatedby",
      "type": "string"
    }
  }
}

```

**Fields**

- *updated\_at*
- *updated\_by*

**field updated\_at:** `Optional[datetime] = None`

ISO-8601 formatted timestamp indicating when the specification was last updated.

**field updated\_by:** `Optional[str] = None`

Id of the user who last updated the specification.

**pydantic model** `nisystemlink.clients.spec.models.SpecificationUserManaged`

```
{
  "title": "SpecificationUserManaged",
  "description": "Base class for models that are serialized to and from JSON.",
  "type": "object",
  "properties": {
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    }
  },
  "required": [
    "productId",
    "specId"
  ]
}
```

#### Fields

- *product\_id*
- *spec\_id*
- *workspace*

**field product\_id:** `str [Required]`

Id of the product to which the specification will be associated.

**field spec\_id:** `str [Required]`

User provided value using which the specification will be identified.

This should be unique for a product and workspace combination.

**field workspace:** `Optional[str] = None`

Id of the workspace to which the specification will be associated.

Default workspace will be taken if the value is not given.

**pydantic model** `nisystemlink.clients.spec.models.SpecificationWithHistory`

A full specification with update and create history.

```

{
  "title": "SpecificationWithHistory",
  "description": "A full specification with update and create history.",
  "type": "object",
  "properties": {
    "updatedAt": {
      "title": "Updatedat",
      "type": "string",
      "format": "date-time"
    },
    "updatedBy": {
      "title": "Updatedby",
      "type": "string"
    },
    "createdAt": {
      "title": "Createdat",
      "type": "string",
      "format": "date-time"
    },
    "createdBy": {
      "title": "Createdby",
      "type": "string"
    },
    "id": {
      "title": "Id",
      "type": "string"
    },
    "version": {
      "title": "Version",
      "type": "integer"
    },
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "category": {
      "title": "Category",
      "type": "string"
    },
    "type": {
      "$ref": "#/definitions/SpecificationType"
    }
  }
}

```

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```

    },
    "symbol": {
      "title": "Symbol",
      "type": "string"
    },
    "block": {
      "title": "Block",
      "type": "string"
    },
    "limit": {
      "$ref": "#/definitions/SpecificationLimit"
    },
    "unit": {
      "title": "Unit",
      "type": "string"
    },
    "conditions": {
      "title": "Conditions",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Condition"
      }
    },
    "keywords": {
      "title": "Keywords",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    }
  },
  "required": [
    "id",
    "version",
    "productId",
    "specId",
    "type"
  ],
  "definitions": {
    "SpecificationType": {
      "title": "SpecificationType",
      "description": "The overall type of the specification.",
      "enum": [
        "PARAMETRIC",
        "FUNCTIONAL"
      ]
    }
  }
}

```

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```

    ]
  },
  "SpecificationLimit": {
    "title": "SpecificationLimit",
    "description": "A limit for a specification.\n\nThe limit is the value_
↳that a measurement should be compared against during analysis to\ndetermine the_
↳health or pass/fail status of that measurement.",
    "type": "object",
    "properties": {
      "min": {
        "title": "Min",
        "type": "number"
      },
      "typical": {
        "title": "Typical",
        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      }
    }
  },
  "ConditionType": {
    "title": "ConditionType",
    "description": "Conditions are either numeric or string type.",
    "enum": [
      "NUMERIC",
      "STRING"
    ]
  },
  "ConditionRange": {
    "title": "ConditionRange",
    "description": "Specifies the range of values that the condition must_
↳cover.",
    "type": "object",
    "properties": {
      "min": {
        "title": "Min",
        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      },
      "step": {
        "title": "Step",
        "type": "number"
      }
    }
  },
  "NumericConditionValue": {

```

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```

    "title": "NumericConditionValue",
    "description": "A numeric condition.\n\nNumeric conditions can contain a
    ↪combination of ranges and discrete lists.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      },
      "range": {
        "title": "Range",
        "type": "array",
        "items": {
          "$ref": "#/definitions/ConditionRange"
        }
      },
      "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "unit": {
        "title": "Unit",
        "type": "string"
      }
    },
    "required": [
      "conditionType"
    ],
    "StringConditionValue": {
      "title": "StringConditionValue",
      "description": "A string condition.\n\nString conditions may only contain
    ↪discrete lists of values.",
      "type": "object",
      "properties": {
        "conditionType": {
          "$ref": "#/definitions/ConditionType"
        },
        "discrete": {
          "title": "Discrete",
          "type": "array",
          "items": {
            "type": "string"
          }
        }
      },
      "required": [
        "conditionType"
      ]
    },
  },

```

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```

    "Condition": {
      "title": "Condition",
      "description": "A single condition.",
      "type": "object",
      "properties": {
        "name": {
          "title": "Name",
          "type": "string"
        },
        "value": {
          "title": "Value",
          "anyOf": [
            {
              "$ref": "#/definitions/NumericConditionValue"
            },
            {
              "$ref": "#/definitions/StringConditionValue"
            }
          ]
        }
      }
    }
  }
}

```

### Fields

- *block*
- *category*
- *conditions*
- *id*
- *keywords*
- *limit*
- *name*
- *product\_id*
- *properties*
- *spec\_id*
- *symbol*
- *type*
- *unit*
- *version*
- *workspace*

**field block:** `Optional[str] = None`

Block name of the specification.

Typically a block is one of the subsystems of the overall product being specified.

**field category:** `Optional[str] = None`

Category of the specification.

**field conditions:** `Optional[List[Condition]] = None`

Conditions associated with the specification.

**field id:** `str [Required]`

The global Id of the specification.

**field keywords:** `Optional[List[str]] = None`

Keywords or phrases associated with the specification.

**field limit:** `Optional[SpecificationLimit] = None`

The limits for this spec.

**field name:** `Optional[str] = None`

Name of the specification.

**field product\_id:** `str [Required]`

Id of the product to which the specification will be associated.

**field properties:** `Optional[Dict[str, str]] = None`

Additional properties associated with the specification.

**field spec\_id:** `str [Required]`

User provided value using which the specification will be identified.

This should be unique for a product and workspace combination.

**field symbol:** `Optional[str] = None`

Short form identifier of the specification.

**field type:** `SpecificationType [Required]`

Type of the specification.

**field unit:** `Optional[str] = None`

Unit of the specification.

**field version:** `int [Required]`

Current version of the specification.

When an update is applied, the version is automatically incremented.

**field workspace:** `Optional[str] = None`

Id of the workspace to which the specification will be associated.

Default workspace will be taken if the value is not given.

**pydantic model** `nisystemlink.clients.spec.models.StringConditionValue`

A string condition.

String conditions may only contain discrete lists of values.

```
{
  "title": "StringConditionValue",
  "description": "A string condition.\n\nString conditions may only contain
↳ discrete lists of values.",
  "type": "object",
  "properties": {
    "conditionType": {
      "$ref": "#/definitions/ConditionType"
    },
    "discrete": {
      "title": "Discrete",
      "type": "array",
      "items": {
        "type": "string"
      }
    }
  },
  "required": [
    "conditionType"
  ],
  "definitions": {
    "ConditionType": {
      "title": "ConditionType",
      "description": "Conditions are either numeric or string type.",
      "enum": [
        "NUMERIC",
        "STRING"
      ]
    }
  }
}
```

### Fields

- *discrete*

**field discrete:** Optional[List[str]] = None

List of condition discrete values.

**pydantic model** nisystemlink.clients.spec.models.UpdateSpecificationsPartialSuccess

```
{
  "title": "UpdateSpecificationsPartialSuccess",
  "description": "Base class for models that are serialized to and from JSON.",
  "type": "object",
  "properties": {
    "updatedSpecs": {
      "title": "Updatedspecs",
      "type": "array",
      "items": {
        "$ref": "#/definitions/UpdatedSpecification"
      }
    }
  },
}
```

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```

    "failedSpecs": {
      "title": "Failedspecs",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Specification"
      }
    },
    "error": {
      "$ref": "#/definitions/ApiError"
    }
  },
  "definitions": {
    "UpdatedSpecification": {
      "title": "UpdatedSpecification",
      "description": "A specification that was updated on the server.",
      "type": "object",
      "properties": {
        "updatedAt": {
          "title": "Updatedat",
          "type": "string",
          "format": "date-time"
        },
        "updatedBy": {
          "title": "Updatedby",
          "type": "string"
        },
        "id": {
          "title": "Id",
          "type": "string"
        },
        "version": {
          "title": "Version",
          "type": "integer"
        },
        "productId": {
          "title": "Productid",
          "type": "string"
        },
        "specId": {
          "title": "Specid",
          "type": "string"
        },
        "workspace": {
          "title": "Workspace",
          "type": "string"
        }
      }
    },
    "required": [
      "id",
      "version",
      "productId",
      "specId"
    ]
  }
}

```

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```

    ]
  },
  "SpecificationType": {
    "title": "SpecificationType",
    "description": "The overall type of the specification.",
    "enum": [
      "PARAMETRIC",
      "FUNCTIONAL"
    ]
  },
  "SpecificationLimit": {
    "title": "SpecificationLimit",
    "description": "A limit for a specification.\n\nThe limit is the value_
↳that a measurement should be compared against during analysis to\ndetermine the_
↳health or pass/fail status of that measurement.",
    "type": "object",
    "properties": {
      "min": {
        "title": "Min",
        "type": "number"
      },
      "typical": {
        "title": "Typical",
        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      }
    }
  },
  "ConditionType": {
    "title": "ConditionType",
    "description": "Conditions are either numeric or string type.",
    "enum": [
      "NUMERIC",
      "STRING"
    ]
  },
  "ConditionRange": {
    "title": "ConditionRange",
    "description": "Specifies the range of values that the condition must_
↳cover.",
    "type": "object",
    "properties": {
      "min": {
        "title": "Min",
        "type": "number"
      },
      "max": {
        "title": "Max",
        "type": "number"
      }
    }
  }
}

```

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```

    },
    "step": {
      "title": "Step",
      "type": "number"
    }
  },
  "NumericConditionValue": {
    "title": "NumericConditionValue",
    "description": "A numeric condition.\n\nNumeric conditions can contain a
↪combination of ranges and discrete lists.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      },
      "range": {
        "title": "Range",
        "type": "array",
        "items": {
          "$ref": "#/definitions/ConditionRange"
        }
      },
      "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {
          "type": "number"
        }
      },
      "unit": {
        "title": "Unit",
        "type": "string"
      }
    },
    "required": [
      "conditionType"
    ]
  },
  "StringConditionValue": {
    "title": "StringConditionValue",
    "description": "A string condition.\n\nString conditions may only contain
↪discrete lists of values.",
    "type": "object",
    "properties": {
      "conditionType": {
        "$ref": "#/definitions/ConditionType"
      },
      "discrete": {
        "title": "Discrete",
        "type": "array",
        "items": {

```

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```

        "type": "string"
      }
    }
  },
  "required": [
    "conditionType"
  ]
},
"Condition": {
  "title": "Condition",
  "description": "A single condition.",
  "type": "object",
  "properties": {
    "name": {
      "title": "Name",
      "type": "string"
    },
    "value": {
      "title": "Value",
      "anyOf": [
        {
          "$ref": "#/definitions/NumericConditionValue"
        },
        {
          "$ref": "#/definitions/StringConditionValue"
        }
      ]
    }
  ]
}
},
"Specification": {
  "title": "Specification",
  "description": "The complete definition of a specification.",
  "type": "object",
  "properties": {
    "id": {
      "title": "Id",
      "type": "string"
    },
    "version": {
      "title": "Version",
      "type": "integer"
    },
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {

```

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```

        "title": "Workspace",
        "type": "string"
    },
    "name": {
        "title": "Name",
        "type": "string"
    },
    "category": {
        "title": "Category",
        "type": "string"
    },
    "type": {
        "$ref": "#/definitions/SpecificationType"
    },
    "symbol": {
        "title": "Symbol",
        "type": "string"
    },
    "block": {
        "title": "Block",
        "type": "string"
    },
    "limit": {
        "$ref": "#/definitions/SpecificationLimit"
    },
    "unit": {
        "title": "Unit",
        "type": "string"
    },
    "conditions": {
        "title": "Conditions",
        "type": "array",
        "items": {
            "$ref": "#/definitions/Condition"
        }
    },
    "keywords": {
        "title": "Keywords",
        "type": "array",
        "items": {
            "type": "string"
        }
    },
    "properties": {
        "title": "Properties",
        "type": "object",
        "additionalProperties": {
            "type": "string"
        }
    }
},
"required": [

```

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```

        "id",
        "version",
        "productId",
        "specId",
        "type"
    ]
},
"ApiError": {
    "title": "ApiError",
    "description": "Represents the standard error structure for SystemLink API",
    ↪responses.",
    "type": "object",
    "properties": {
        "name": {
            "title": "Name",
            "type": "string"
        },
        "code": {
            "title": "Code",
            "type": "integer"
        },
        "message": {
            "title": "Message",
            "type": "string"
        },
        "args": {
            "title": "Args",
            "default": [],
            "type": "array",
            "items": {
                "type": "string"
            }
        },
        "resourceType": {
            "title": "Resourcetype",
            "type": "string"
        },
        "resourceId": {
            "title": "Resourceid",
            "type": "string"
        },
        "innerErrors": {
            "title": "Innererrors",
            "default": [],
            "type": "array",
            "items": {
                "$ref": "#/definitions/ApiError"
            }
        }
    }
}
}
}

```

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}

**Fields**

- *error*
- *failed\_specs*
- *updated\_specs*

**field error:** Optional[[ApiError](#)] = None

Any errors that occurred.

**field failed\_specs:** Optional[List[[Specification](#)]] = None

Information about each of the specification request(s) that failed during the update.

**field updated\_specs:** Optional[List[[UpdatedSpecification](#)]] = None

Information about each of the updated specification(s).

**pydantic model** `nisystemlink.clients.spec.models.UpdateSpecificationsRequest`

```
{
  "title": "UpdateSpecificationsRequest",
  "description": "Base class for models that are serialized to and from JSON.",
  "type": "object",
  "properties": {
    "specs": {
      "title": "Specs",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Specification"
      }
    }
  },
  "definitions": {
    "SpecificationType": {
      "title": "SpecificationType",
      "description": "The overall type of the specification.",
      "enum": [
        "PARAMETRIC",
        "FUNCTIONAL"
      ]
    },
    "SpecificationLimit": {
      "title": "SpecificationLimit",
      "description": "A limit for a specification.\n\nThe limit is the value_
↳ that a measurement should be compared against during analysis to\ndetermine the_
↳ health or pass/fail status of that measurement.",
      "type": "object",
      "properties": {
        "min": {
          "title": "Min",
          "type": "number"
        }
      }
    }
  }
}
```

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```

        "typical": {
            "title": "Typical",
            "type": "number"
        },
        "max": {
            "title": "Max",
            "type": "number"
        }
    },
    "ConditionType": {
        "title": "ConditionType",
        "description": "Conditions are either numeric or string type.",
        "enum": [
            "NUMERIC",
            "STRING"
        ]
    },
    "ConditionRange": {
        "title": "ConditionRange",
        "description": "Specifies the range of values that the condition must
↪cover.",
        "type": "object",
        "properties": {
            "min": {
                "title": "Min",
                "type": "number"
            },
            "max": {
                "title": "Max",
                "type": "number"
            },
            "step": {
                "title": "Step",
                "type": "number"
            }
        }
    },
    "NumericConditionValue": {
        "title": "NumericConditionValue",
        "description": "A numeric condition.\n\nNumeric conditions can contain a
↪combination of ranges and discrete lists.",
        "type": "object",
        "properties": {
            "conditionType": {
                "$ref": "#/definitions/ConditionType"
            },
            "range": {
                "title": "Range",
                "type": "array",
                "items": {
                    "$ref": "#/definitions/ConditionRange"
                }
            }
        }
    }
}

```

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```

    },
    "discrete": {
      "title": "Discrete",
      "type": "array",
      "items": {
        "type": "number"
      }
    },
    "unit": {
      "title": "Unit",
      "type": "string"
    }
  },
  "required": [
    "conditionType"
  ]
},
"StringConditionValue": {
  "title": "StringConditionValue",
  "description": "A string condition.\n\nString conditions may only contain
↳discrete lists of values.",
  "type": "object",
  "properties": {
    "conditionType": {
      "$ref": "#/definitions/ConditionType"
    },
    "discrete": {
      "title": "Discrete",
      "type": "array",
      "items": {
        "type": "string"
      }
    }
  }
},
"required": [
  "conditionType"
]
},
"Condition": {
  "title": "Condition",
  "description": "A single condition.",
  "type": "object",
  "properties": {
    "name": {
      "title": "Name",
      "type": "string"
    },
    "value": {
      "title": "Value",
      "anyOf": [
        {

```

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```

        "$ref": "#/definitions/NumericConditionValue"
      },
      {
        "$ref": "#/definitions/StringConditionValue"
      }
    ]
  }
},
"Specification": {
  "title": "Specification",
  "description": "The complete definition of a specification.",
  "type": "object",
  "properties": {
    "id": {
      "title": "Id",
      "type": "string"
    },
    "version": {
      "title": "Version",
      "type": "integer"
    },
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    },
    "name": {
      "title": "Name",
      "type": "string"
    },
    "category": {
      "title": "Category",
      "type": "string"
    },
    "type": {
      "$ref": "#/definitions/SpecificationType"
    },
    "symbol": {
      "title": "Symbol",
      "type": "string"
    },
    "block": {
      "title": "Block",
      "type": "string"
    }
  }
}

```

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```

    },
    "limit": {
      "$ref": "#/definitions/SpecificationLimit"
    },
    "unit": {
      "title": "Unit",
      "type": "string"
    },
    "conditions": {
      "title": "Conditions",
      "type": "array",
      "items": {
        "$ref": "#/definitions/Condition"
      }
    },
    "keywords": {
      "title": "Keywords",
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "properties": {
      "title": "Properties",
      "type": "object",
      "additionalProperties": {
        "type": "string"
      }
    },
  },
  "required": [
    "id",
    "version",
    "productId",
    "specId",
    "type"
  ]
}

```

### Fields

- *specs*

**field specs:** Optional[List[*Specification*]] = None

List of specifications to be updated.

**pydantic model** nisystemlink.clients.spec.models.UpdatedSpecification

A specification that was updated on the server.

```

{
  "title": "UpdatedSpecification",
  "description": "A specification that was updated on the server.",
  "type": "object",
  "properties": {
    "updatedAt": {
      "title": "Updatedat",
      "type": "string",
      "format": "date-time"
    },
    "updatedBy": {
      "title": "Updatedby",
      "type": "string"
    },
    "id": {
      "title": "Id",
      "type": "string"
    },
    "version": {
      "title": "Version",
      "type": "integer"
    },
    "productId": {
      "title": "Productid",
      "type": "string"
    },
    "specId": {
      "title": "Specid",
      "type": "string"
    },
    "workspace": {
      "title": "Workspace",
      "type": "string"
    }
  },
  "required": [
    "id",
    "version",
    "productId",
    "specId"
  ]
}

```

### Fields

- *product\_id*
- *spec\_id*
- *workspace*

**field product\_id: str [Required]**

Id of the product to which the specification will be associated.

**field spec\_id: str [Required]**

User provided value using which the specification will be identified.

This should be unique for a product and workspace combination.

**field workspace: Optional[str] = None**

Id of the workspace to which the specification will be associated.

Default workspace will be taken if the value is not given.

**pydantic model** `nisystemlink.clients.spec.models.V1Operations`

The operations available in the routes provided by the v1 HTTP API.

```
{
  "title": "V1Operations",
  "description": "The operations available in the routes provided by the v1 HTTP API.",
  "type": "object",
  "properties": {
    "createSpecifications": {
      "$ref": "#/definitions/Operation"
    },
    "querySpecifications": {
      "$ref": "#/definitions/Operation"
    },
    "updateSpecifications": {
      "$ref": "#/definitions/Operation"
    },
    "deleteSpecifications": {
      "$ref": "#/definitions/Operation"
    }
  },
  "required": [
    "createSpecifications",
    "querySpecifications",
    "updateSpecifications",
    "deleteSpecifications"
  ],
  "definitions": {
    "Operation": {
      "title": "Operation",
      "description": "Represents an operation that can be performed on a data frame.",
      "type": "object",
      "properties": {
        "available": {
          "title": "Available",
          "type": "boolean"
        },
        "version": {
          "title": "Version",
          "type": "integer"
        }
      }
    }
  },
  "required": [
```

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```
        "available",  
        "version"  
      ]  
    }  
  }  
}
```

### Fields

- *create\_specifications*
- *delete\_specifications*
- *query\_specifications*
- *update\_specifications*

**field create\_specifications:** *Operation* [Required]

The ability to create new specifications.

**field delete\_specifications:** *Operation* [Required]

The ability to delete specifications.

**field query\_specifications:** *Operation* [Required]

The ability to query specifications.

**field update\_specifications:** *Operation* [Required]

The ability to update specifications.

## 1.2.6 Indices and tables

- genindex
- modindex



## PACKAGE INFO

Info	NI SystemLink API Clients for Python
Author	National Instruments

### 2.1 About

The **nisystemlink-clients** package contains an API (Application Programming Interface) for [SystemLink](#) that uses HTTP to interact with a SystemLink Server. The package is implemented in Python. NI created and supports this package.

### 2.2 Requirements

**nisystemlink-clients** has the following requirements:

- A SystemLink Server installation or a [SystemLink Cloud](#) account to connect to
- CPython 3.8+

### 2.3 Installation

To install **nisystemlink-clients**, use one of the following methods:

1. [pip](#):

```
$ python -m pip install nisystemlink-clients
```

2. **easy\_install** from [setuptools](#):

```
$ python -m easy_install nisystemlink-clients
```

## 2.4 Usage

Refer to the [documentation](#) for detailed information on how to use **nisystemlink-clients**.

## 2.5 Support / Feedback

The **nisystemlink-clients** package is supported by NI. For support for **nisystemlink-clients**, open a request through the NI support portal at [ni.com](https://ni.com).

## 2.6 Bugs / Feature Requests

To report a bug or submit a feature request, please use the [GitHub issues page](#).

## 2.7 Documentation

To view the documentation, visit the [nisystemlink.clients Documentation Page](#).

## 2.8 Changelog

To view the changelog, visit the [GitHub repository CHANGELOG](#).

## 2.9 License

**nisystemlink-clients** is licensed under an MIT-style license (see [LICENSE](#)). Other incorporated projects may be licensed under different licenses. All licenses allow for non-commercial and commercial use.

## PYTHON MODULE INDEX

### n

- `nisystemlink.clients.core`, [11](#)
- `nisystemlink.clients.core.helpers`, [18](#)
- `nisystemlink.clients.dataframe.models`, [57](#)
- `nisystemlink.clients.spec.models`, [104](#)
- `nisystemlink.clients.tag`, [18](#)
- `nisystemlink.clients.testmonitor.models`, [46](#)



## Symbols

`__init__()` (*nisystemlink.clients.core.ApiError* method), 13

`__init__()` (*nisystemlink.clients.core.ApiException* method), 14

`__init__()` (*nisystemlink.clients.core.CloudHttpConfiguration* method), 15

`__init__()` (*nisystemlink.clients.core.HttpConfiguration* method), 16

`__init__()` (*nisystemlink.clients.core.JupyterHttpConfiguration* method), 17

`__init__()` (*nisystemlink.clients.dataframe.DataFrameClient* method), 53

`__init__()` (*nisystemlink.clients.spec.SpecClient* method), 102

`__init__()` (*nisystemlink.clients.tag.TagData* method), 24

`__init__()` (*nisystemlink.clients.tag.TagDataUpdate* method), 26

`__init__()` (*nisystemlink.clients.tag.TagManager* method), 27

`__init__()` (*nisystemlink.clients.tag.TagValueReader* method), 43

`__init__()` (*nisystemlink.clients.tag.TagValueWriter* method), 44

`__init__()` (*nisystemlink.clients.testmonitor.TestMonitorClient* method), 46

## A

`add_tags()` (*nisystemlink.clients.tag.TagSelection* method), 35

`ALL` (*nisystemlink.clients.tag.TagUpdateFields* attribute), 42

`api_info()` (*nisystemlink.clients.dataframe.DataFrameClient* method), 53

`api_info()` (*nisystemlink.clients.spec.SpecClient* method), 102

`api_keys` (*nisystemlink.clients.core.CloudHttpConfiguration* property), 15

`api_keys` (*nisystemlink.clients.core.HttpConfiguration* property), 16

`api_keys` (*nisystemlink.clients.core.JupyterHttpConfiguration* property), 17

`api_name` (*nisystemlink.clients.tag.DataType* property), 21

`ApiException`, 14

`append_table_data()` (*nisystemlink.clients.dataframe.DataFrameClient* method), 56

`args` (*nisystemlink.clients.core.ApiError* attribute), 13

`AsyncTagQueryResultCollection` (class in *nisystemlink.clients.tag*), 18

`available` (*nisystemlink.clients.dataframe.models.Operation* attribute), 82

`available` (*nisystemlink.clients.spec.models.Operation* attribute), 123

`available` (*nisystemlink.clients.testmonitor.models.Operation* attribute), 49

## B

`block` (*nisystemlink.clients.spec.models.Specification* attribute), 135

`block` (*nisystemlink.clients.spec.models.SpecificationDefinition* attribute), 141

`block` (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), 149

`Bool` (*nisystemlink.clients.dataframe.models.DataType* attribute), 69

`BOOLEAN` (*nisystemlink.clients.tag.DataType* attribute), 21

`BufferedTagWriter` (class in *nisystemlink.clients.tag*), 19

## C

`category` (*nisystemlink.clients.spec.models.Specification* attribute), 135

`category` (*nisystemlink.clients.spec.models.SpecificationDefinition* attribute), 141

category (nisystemlink.clients.spec.models.SpecificationWithHistory attribute), 150

cert\_path (nisystemlink.clients.core.CloudHttpConfiguration property), 15

cert\_path (nisystemlink.clients.core.HttpConfiguration property), 16

cert\_path (nisystemlink.clients.core.JupyterHttpConfiguration property), 17

clear\_buffered\_writes() (nisystemlink.clients.tag.BufferedTagWriter method), 19

clear\_retention() (nisystemlink.clients.tag.TagData method), 25

clear\_tags() (nisystemlink.clients.tag.TagSelection method), 36

close() (nisystemlink.clients.tag.TagSelection method), 36

close() (nisystemlink.clients.tag.TagSubscription method), 42

close\_async() (nisystemlink.clients.tag.TagSelection method), 36

close\_async() (nisystemlink.clients.tag.TagSubscription method), 42

CloudHttpConfiguration (class in nisystemlink.clients.core), 15

code (nisystemlink.clients.core.ApiError attribute), 13

collect\_aggregates (nisystemlink.clients.tag.TagData property), 25

collect\_aggregates (nisystemlink.clients.tag.TagDataUpdate property), 27

COLLECT\_AGGREGATES (nisystemlink.clients.tag.TagUpdateFields attribute), 43

column (nisystemlink.clients.dataframe.models.ColumnFilter attribute), 63

column (nisystemlink.clients.dataframe.models.ColumnOrder attribute), 65

column\_type (nisystemlink.clients.dataframe.models.Column attribute), 62

columns (nisystemlink.clients.dataframe.models.CreateTableRequest attribute), 67

columns (nisystemlink.clients.dataframe.models.DataFrame attribute), 69

columns (nisystemlink.clients.dataframe.models.ExportTableDataRequest attribute), 75

columns (nisystemlink.clients.dataframe.models.ModifyTableRequest attribute), 77

columns (nisystemlink.clients.dataframe.models.TableMetadata attribute), 99

ColumnType (class in nisystemlink.clients.dataframe.models), 65

conditions (nisystemlink.clients.spec.models.Specification attribute), 135

conditions (nisystemlink.clients.spec.models.SpecificationDefinition attribute), 141

conditions (nisystemlink.clients.spec.models.SpecificationWithHistory attribute), 150

ConditionType (class in nisystemlink.clients.spec.models), 107

construct() (nisystemlink.clients.core.ApiError class method), 13

continuation\_token (nisystemlink.clients.spec.models.QuerySpecificationsRequest attribute), 130

copy() (nisystemlink.clients.core.ApiError method), 13

COUNT (nisystemlink.clients.tag.RetentionType attribute), 24

count (nisystemlink.clients.tag.TagWithAggregates property), 45

create\_products (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52

create\_results (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52

create\_selection() (nisystemlink.clients.tag.TagManager method), 28

create\_specifications (nisystemlink.clients.spec.models.V1Operations attribute), 165

create\_specs() (nisystemlink.clients.spec.SpecClient method), 103

create\_steps (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52

create\_subscription() (nisystemlink.clients.tag.TagSelection method), 36

create\_subscription\_async() (nisystemlink.clients.tag.TagSelection method), 37

create\_table() (nisystemlink.clients.dataframe.DataFrameClient method), 54

create\_tables (nisystemlink.clients.dataframe.models.OperationsV1 attribute), 83

create\_writer() (nisystemlink.clients.tag.TagManager method), 28

created\_at (nisystemlink.clients.dataframe.models.TableMetadata attribute), 99

created\_at (nisystemlink.clients.spec.models.SpecificationCreation attribute), 135



- attribute), 136
- created\_by (nisystemlink.clients.spec.models.SpecificationCreation attribute), 136
- created\_specs (nisystemlink.clients.spec.models.CreateSpecificationsPartialSuccess attribute), 113
- CSV (nisystemlink.clients.dataframe.models.ExportFormat attribute), 73
- current\_page (nisystemlink.clients.tag.AsyncTagQueryResultCollection property), 18
- ## D
- data (nisystemlink.clients.dataframe.models.DataFrame attribute), 69
- data\_type (nisystemlink.clients.dataframe.models.Column attribute), 62
- data\_type (nisystemlink.clients.tag.TagData property), 25
- data\_type (nisystemlink.clients.tag.TagDataUpdate property), 27
- data\_type (nisystemlink.clients.tag.TagValueReader property), 43
- data\_type (nisystemlink.clients.tag.TagValueWriter property), 44
- data\_type (nisystemlink.clients.tag.TagWithAggregates property), 45
- DataFrameClient (class in nisystemlink.clients.dataframe), 53
- DataType (class in nisystemlink.clients.dataframe.models), 69
- DataType (class in nisystemlink.clients.tag), 21
- DATE\_TIME (nisystemlink.clients.tag.DataType attribute), 21
- decimation (nisystemlink.clients.dataframe.models.QueryDecimatedDataRequest attribute), 91
- DecimationMethod (class in nisystemlink.clients.dataframe.models), 70
- DEFAULT\_TIMEOUT\_MILLISECONDS (nisystemlink.clients.core.CloudHttpConfiguration attribute), 15
- DEFAULT\_TIMEOUT\_MILLISECONDS (nisystemlink.clients.core.HttpConfiguration attribute), 16
- DEFAULT\_TIMEOUT\_MILLISECONDS (nisystemlink.clients.core.JupyterHttpConfiguration attribute), 17
- delete() (nisystemlink.clients.tag.TagManager method), 28
- delete\_async() (nisystemlink.clients.tag.TagManager method), 29
- delete\_many\_products (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52
- delete\_many\_results (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52
- delete\_many\_steps (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52
- delete\_products (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52
- delete\_result (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52
- delete\_specifications (nisystemlink.clients.spec.models.V1Operations attribute), 165
- delete\_specs() (nisystemlink.clients.spec.SpecClient method), 103
- delete\_step (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52
- delete\_table() (nisystemlink.clients.dataframe.DataFrameClient method), 55
- delete\_tables (nisystemlink.clients.dataframe.models.OperationsV1 attribute), 83
- delete\_tables() (nisystemlink.clients.dataframe.DataFrameClient method), 55
- delete\_tags\_from\_server() (nisystemlink.clients.tag.TagSelection method), 37
- delete\_tags\_from\_server\_async() (nisystemlink.clients.tag.TagSelection method), 37
- deleted\_spec\_ids (nisystemlink.clients.spec.models.DeleteSpecificationsPartialSuccess attribute), 121
- deleted\_table\_ids (nisystemlink.clients.dataframe.models.DeleteTablesPartialSuccess attribute), 73
- descending (nisystemlink.clients.dataframe.models.ColumnOrderBy attribute), 65
- dict() (nisystemlink.clients.core.ApiError method), 13
- discrete (nisystemlink.clients.spec.models.NumericConditionValue attribute), 122
- discrete (nisystemlink.clients.spec.models.StringConditionValue attribute), 151
- DOUBLE (nisystemlink.clients.tag.DataType attribute), 21
- DURATION (nisystemlink.clients.tag.RetentionType attribute), 24

## E

end\_of\_data (nisystemlink.clients.dataframe.models.AppendTableDataRequest attribute), 61  
 EntryExit (nisystemlink.clients.dataframe.models.DecimationMethod attribute), 70  
 error (nisystemlink.clients.core.ApiException property), 15  
 error (nisystemlink.clients.dataframe.models.DeleteTablesPartialSuccess attribute), 73  
 error (nisystemlink.clients.dataframe.models.ModifyTablesPartialSuccess attribute), 80  
 error (nisystemlink.clients.spec.models.CreateSpecificationsPartialSuccess attribute), 113  
 error (nisystemlink.clients.spec.models.DeleteSpecificationsPartialSuccess attribute), 121  
 error (nisystemlink.clients.spec.models.UpdateSpecificationsPartialSuccess attribute), 158  
 export\_table\_data() (nisystemlink.clients.dataframe.DataFrameClient method), 57  
 ExportFormat (class in nisystemlink.clients.dataframe.models), 73

## F

failed\_modifications (nisystemlink.clients.dataframe.models.ModifyTablesPartialSuccess attribute), 80  
 failed\_spec\_ids (nisystemlink.clients.spec.models.DeleteSpecificationsPartialSuccess attribute), 121  
 failed\_specs (nisystemlink.clients.spec.models.CreateSpecificationsPartialSuccess attribute), 113  
 failed\_specs (nisystemlink.clients.spec.models.UpdateSpecificationsPartialSuccess attribute), 158  
 failed\_table\_ids (nisystemlink.clients.dataframe.models.DeleteTablesPartialSuccess attribute), 73  
 filter (nisystemlink.clients.dataframe.models.QueryTablesRequest attribute), 95  
 filter (nisystemlink.clients.spec.models.QuerySpecificationsRequest attribute), 130  
 FilterOperation (class in nisystemlink.clients.dataframe.models), 76  
 filters (nisystemlink.clients.dataframe.models.ExportTableDataRequest attribute), 76  
 Float32 (nisystemlink.clients.dataframe.models.DataType attribute), 69  
 Float64 (nisystemlink.clients.dataframe.models.DataType attribute), 69  
 frame (nisystemlink.clients.dataframe.models.AppendTableDataRequest attribute), 61  
 frame (nisystemlink.clients.dataframe.models.PagedTableRows attribute), 85  
 frame (nisystemlink.clients.dataframe.models.TableRows attribute), 102  
 from\_orm() (nisystemlink.clients.core.ApiError class method), 14  
 from\_tagdata() (nisystemlink.clients.tag.TagDataUpdate class method), 27  
 FUNCTIONAL (nisystemlink.clients.spec.models.SpecificationType attribute), 143  
 G  
 get\_configuration() (nisystemlink.clients.core.HttpConfigurationManager class method), 17  
 get\_products (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52  
 get\_results (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52  
 get\_results\_property\_keys (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52  
 get\_steps (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52  
 get\_table\_data() (nisystemlink.clients.dataframe.DataFrameClient method), 56  
 get\_table\_metadata() (nisystemlink.clients.dataframe.DataFrameClient method), 54  
 get\_tag\_reader() (nisystemlink.clients.tag.ITagReader method), 22  
 get\_tag\_reader() (nisystemlink.clients.tag.TagManager method), 29  
 get\_tag\_reader() (nisystemlink.clients.tag.TagSelection method), 37  
 get\_tag\_writer() (nisystemlink.clients.tag.BufferedTagWriter method), 19  
 get\_tag\_writer() (nisystemlink.clients.tag.ITagWriter method), 23  
 H  
 HTTP\_LOCALHOST\_CONFIGURATION\_ID (nisystemlink.clients.core.HttpConfigurationManager attribute), 17  
 HTTP\_MASTER\_CONFIGURATION\_ID (nisystemlink.clients.core.HttpConfigurationManager attribute), 17

[http\\_status\\_code](#) (*nisystemlink.clients.core.ApiException* property), 15  
[HttpConfiguration](#) (class in *nisystemlink.clients.core*), 16  
[HttpConfigurationManager](#) (class in *nisystemlink.clients.core*), 17  
**I**  
[id](#) (*nisystemlink.clients.dataframe.models.TableMetadata* attribute), 99  
[id](#) (*nisystemlink.clients.dataframe.models.TableMetadataModification* attribute), 100  
[id](#) (*nisystemlink.clients.spec.models.CreatedSpecification* attribute), 119  
[id](#) (*nisystemlink.clients.spec.models.SpecificationServerManager* attribute), 143  
[id](#) (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), 150  
[Index](#) (*nisystemlink.clients.dataframe.models.ColumnType* attribute), 65  
[inner\\_errors](#) (*nisystemlink.clients.core.ApiError* attribute), 13  
[inner\\_exception](#) (*nisystemlink.clients.core.ApiException* property), 15  
[Int32](#) (*nisystemlink.clients.dataframe.models.DataType* attribute), 70  
[INT32](#) (*nisystemlink.clients.tag.DataType* attribute), 21  
[Int64](#) (*nisystemlink.clients.dataframe.models.DataType* attribute), 70  
[intervals](#) (*nisystemlink.clients.dataframe.models.DecimationOptions* attribute), 71  
[INVALID](#) (*nisystemlink.clients.tag.RetentionType* attribute), 24  
[ITagReader](#) (class in *nisystemlink.clients.tag*), 21  
[ITagWriter](#) (class in *nisystemlink.clients.tag*), 23  
[IteratorFileLike](#) (class in *nisystemlink.clients.core.helpers*), 18  
**J**  
[json\(\)](#) (*nisystemlink.clients.core.ApiError* method), 14  
[JupyterHttpConfiguration](#) (class in *nisystemlink.clients.core*), 17  
**K**  
[keywords](#) (*nisystemlink.clients.spec.models.Specification* attribute), 135  
[keywords](#) (*nisystemlink.clients.spec.models.SpecificationDefinition* attribute), 141  
[keywords](#) (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), 150  
[keywords](#) (*nisystemlink.clients.tag.TagData* property), 25  
[keywords](#) (*nisystemlink.clients.tag.TagDataUpdate* property), 27  
[KEYWORDS](#) (*nisystemlink.clients.tag.TagUpdateFields* attribute), 43  
**L**  
[limit](#) (*nisystemlink.clients.spec.models.Specification* attribute), 136  
[limit](#) (*nisystemlink.clients.spec.models.SpecificationDefinition* attribute), 141  
[limit](#) (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), 150  
[list\\_tables](#) (*nisystemlink.clients.dataframe.models.OperationsV1* attribute), 84  
[list\\_tables\(\)](#) (*nisystemlink.clients.dataframe.DataFrameClient* method), 53  
[Lossy](#) (*nisystemlink.clients.dataframe.models.DecimationMethod* attribute), 70  
**M**  
[max](#) (*nisystemlink.clients.spec.models.ConditionRange* attribute), 107  
[max](#) (*nisystemlink.clients.spec.models.SpecificationLimit* attribute), 142  
[max](#) (*nisystemlink.clients.tag.TagWithAggregates* property), 45  
[MaxMin](#) (*nisystemlink.clients.dataframe.models.DecimationMethod* attribute), 70  
[mean](#) (*nisystemlink.clients.tag.TagWithAggregates* property), 45  
[message](#) (*nisystemlink.clients.core.ApiError* attribute), 13  
[message](#) (*nisystemlink.clients.core.ApiException* property), 15  
[metadata](#) (*nisystemlink.clients.tag.TagSelection* property), 38  
[metadata\\_modified\\_at](#) (*nisystemlink.clients.dataframe.models.TableMetadata* attribute), 99  
[metadata\\_revision](#) (*nisystemlink.clients.dataframe.models.ModifyTableRequest* attribute), 77  
[metadata\\_revision](#) (*nisystemlink.clients.dataframe.models.TableMetadata* attribute), 99  
[metadata\\_revision](#) (*nisystemlink.clients.dataframe.models.TableMetadataModification* attribute), 100  
[method](#) (*nisystemlink.clients.dataframe.models.DecimationOptions* attribute), 71  
[min](#) (*nisystemlink.clients.spec.models.ConditionRange* attribute), 107

min (nisystemlink.clients.spec.models.SpecificationLimit attribute), 142  
 min (nisystemlink.clients.tag.TagWithAggregates property), 45  
 modified\_table\_ids (nisystemlink.clients.dataframe.models.ModifyTablesPartialSuccess attribute), 80  
 modify\_metadata (nisystemlink.clients.dataframe.models.OperationsV1 attribute), 84  
 modify\_table() (nisystemlink.clients.dataframe.DataFrameClient method), 55  
 modify\_tables() (nisystemlink.clients.dataframe.DataFrameClient method), 55  
 module  
   nisystemlink.clients.core, 11  
   nisystemlink.clients.core.helpers, 18  
   nisystemlink.clients.dataframe.models, 57  
   nisystemlink.clients.spec.models, 104  
   nisystemlink.clients.tag, 18  
   nisystemlink.clients.testmonitor.models, 46  
 move\_next\_page\_async() (nisystemlink.clients.tag.AsyncTagQueryResultCollection method), 18

## N

name (nisystemlink.clients.core.ApiError attribute), 13  
 name (nisystemlink.clients.dataframe.models.Column attribute), 62  
 name (nisystemlink.clients.dataframe.models.ColumnMetadataPatch attribute), 64  
 name (nisystemlink.clients.dataframe.models.CreateTableRequest attribute), 67  
 name (nisystemlink.clients.dataframe.models.ModifyTableRequest attribute), 77  
 name (nisystemlink.clients.dataframe.models.TableMetadata attribute), 99  
 name (nisystemlink.clients.dataframe.models.TableMetadataModification attribute), 100  
 name (nisystemlink.clients.spec.models.Condition attribute), 106  
 name (nisystemlink.clients.spec.models.Specification attribute), 136  
 name (nisystemlink.clients.spec.models.SpecificationDefinition attribute), 141  
 name (nisystemlink.clients.spec.models.SpecificationWithHistory attribute), 150  
 nisystemlink.clients.core  
   module, 11  
 nisystemlink.clients.core.helpers  
   module, 18  
 nisystemlink.clients.dataframe.models  
   module, 57  
 nisystemlink.clients.spec.models  
   module, 104  
 nisystemlink.clients.tag  
   module, 18  
 nisystemlink.clients.testmonitor.models  
   module, 46  
 NONE (nisystemlink.clients.tag.RetentionType attribute), 24  
 Normal (nisystemlink.clients.dataframe.models.ColumnType attribute), 65  
 Nullable (nisystemlink.clients.dataframe.models.ColumnType attribute), 65  
 NUMERIC (nisystemlink.clients.spec.models.ConditionType attribute), 107

## O

open() (nisystemlink.clients.tag.TagManager method), 29  
 open\_async() (nisystemlink.clients.tag.TagManager method), 30  
 open\_selection() (nisystemlink.clients.tag.TagManager method), 30  
 open\_selection\_async() (nisystemlink.clients.tag.TagManager method), 31  
 open\_tags() (nisystemlink.clients.tag.TagSelection method), 38  
 operation (nisystemlink.clients.dataframe.models.ColumnFilter attribute), 63  
 operations (nisystemlink.clients.dataframe.models.ApiInfo attribute), 59  
 operations (nisystemlink.clients.testmonitor.models.ApiInfo attribute), 48  
 order\_by (nisystemlink.clients.dataframe.models.ExportTableDataRequest attribute), 76  
 order\_by (nisystemlink.clients.dataframe.models.QueryTableDataRequest attribute), 93  
 order\_by (nisystemlink.clients.dataframe.models.QueryTablesRequest attribute), 95  
 order\_by (nisystemlink.clients.spec.models.QuerySpecificationsRequest attribute), 130  
 order\_by\_descending (nisystemlink.clients.dataframe.models.QueryTablesRequest attribute), 95  
 order\_by\_descending (nisystemlink.clients.spec.models.QuerySpecificationsRequest attribute), 130

## P

PARAMETRIC (nisystemlink.clients.spec.models.SpecificationType attribute), 107

attribute), 143  
 parse\_file() (nisystemlink.clients.core.ApiError class method), 14  
 parse\_obj() (nisystemlink.clients.core.ApiError class method), 14  
 parse\_raw() (nisystemlink.clients.core.ApiError class method), 14  
 password (nisystemlink.clients.core.CloudHttpConfiguration property), 15  
 password (nisystemlink.clients.core.HttpConfiguration property), 16  
 password (nisystemlink.clients.core.JupyterHttpConfiguration property), 18  
 path (nisystemlink.clients.tag.TagData property), 25  
 path (nisystemlink.clients.tag.TagDataUpdate property), 27  
 path (nisystemlink.clients.tag.TagValueReader property), 43  
 path (nisystemlink.clients.tag.TagValueWriter property), 44  
 path (nisystemlink.clients.tag.TagWithAggregates property), 45  
 paths (nisystemlink.clients.tag.TagSelection property), 38  
 PERMANENT (nisystemlink.clients.tag.RetentionType attribute), 24  
 product\_id (nisystemlink.clients.spec.models.SpecificationUserManaged attribute), 144  
 product\_id (nisystemlink.clients.spec.models.SpecificationWithHistory attribute), 150  
 product\_id (nisystemlink.clients.spec.models.UpdatedSpecification attribute), 163  
 product\_ids (nisystemlink.clients.spec.models.QuerySpecificationsRequest attribute), 131  
 projection (nisystemlink.clients.spec.models.QuerySpecificationsRequest attribute), 131  
 properties (nisystemlink.clients.dataframe.models.Column attribute), 62  
 properties (nisystemlink.clients.dataframe.models.ColumnMetadataPatch attribute), 64  
 properties (nisystemlink.clients.dataframe.models.CreateTableRequest attribute), 67  
 properties (nisystemlink.clients.dataframe.models.ModifyTableRequest attribute), 77  
 properties (nisystemlink.clients.dataframe.models.TableMetadata attribute), 99  
 properties (nisystemlink.clients.dataframe.models.TableMetadataModification attribute), 100  
 properties (nisystemlink.clients.spec.models.Specification attribute), 136  
 properties (nisystemlink.clients.spec.models.SpecificationDefinition attribute), 141  
 properties (nisystemlink.clients.spec.models.SpecificationWithHistory attribute), 150  
 properties (nisystemlink.clients.tag.TagData property), 25  
 properties (nisystemlink.clients.tag.TagDataUpdate property), 27  
 PROPERTIES (nisystemlink.clients.tag.TagUpdateFields attribute), 43  
**Q**  
 query() (nisystemlink.clients.tag.TagManager method), 31  
 query\_async() (nisystemlink.clients.tag.TagManager method), 31  
 query\_decimated\_data() (nisystemlink.clients.dataframe.DataFrameClient method), 57  
 query\_paths (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52  
 query\_products (nisystemlink.clients.testmonitor.models.V2Operations attribute), 52  
 query\_results (nisystemlink.clients.testmonitor.models.V2Operations attribute), 53  
 query\_specifications (nisystemlink.clients.spec.models.V1Operations attribute), 165  
 query\_specs() (nisystemlink.clients.spec.SpecClient method), 103  
 query\_steps (nisystemlink.clients.testmonitor.models.V2Operations attribute), 53  
 query\_table\_data() (nisystemlink.clients.dataframe.DataFrameClient method), 56  
 query\_tables() (nisystemlink.clients.dataframe.DataFrameClient method), 54



## R

- `range` (*nisystemlink.clients.spec.models.NumericConditionValue* attribute), 122
- `read()` (*nisystemlink.clients.core.helpers.IteratorFileLike* method), 18
- `read()` (*nisystemlink.clients.tag.ITagReader* method), 22
- `read()` (*nisystemlink.clients.tag.TagManager* method), 32
- `read()` (*nisystemlink.clients.tag.TagSelection* method), 38
- `read()` (*nisystemlink.clients.tag.TagValueReader* method), 43
- `read_async()` (*nisystemlink.clients.tag.ITagReader* method), 22
- `read_async()` (*nisystemlink.clients.tag.TagManager* method), 32
- `read_async()` (*nisystemlink.clients.tag.TagSelection* method), 39
- `read_async()` (*nisystemlink.clients.tag.TagValueReader* method), 44
- `read_data` (*nisystemlink.clients.dataframe.models.Operations* attribute), 84
- `reference_time` (*nisystemlink.clients.dataframe.models.QueryTablesRequest* attribute), 95
- `refresh()` (*nisystemlink.clients.tag.TagManager* method), 33
- `refresh()` (*nisystemlink.clients.tag.TagSelection* method), 39
- `refresh_async()` (*nisystemlink.clients.tag.TagManager* method), 33
- `refresh_async()` (*nisystemlink.clients.tag.TagSelection* method), 39
- `refresh_metadata()` (*nisystemlink.clients.tag.TagSelection* method), 40
- `refresh_metadata_async()` (*nisystemlink.clients.tag.TagSelection* method), 40
- `refresh_values()` (*nisystemlink.clients.tag.TagSelection* method), 40
- `refresh_values_async()` (*nisystemlink.clients.tag.TagSelection* method), 40
- `remove_tags()` (*nisystemlink.clients.tag.TagSelection* method), 41
- `replace` (*nisystemlink.clients.dataframe.models.ModifyTablesRequest* attribute), 81
- `replace_keywords()` (*nisystemlink.clients.tag.TagData* method), 25
- `replace_properties()` (*nisystemlink.clients.tag.TagData* method), 25
- `reset_aggregates()` (*nisystemlink.clients.tag.TagSelection* method), 41
- `reset_aggregates_async()` (*nisystemlink.clients.tag.TagSelection* method), 41
- `reset_async()` (*nisystemlink.clients.tag.AsyncTagQueryResultCollection* method), 19
- `resource_id` (*nisystemlink.clients.core.ApiError* attribute), 13
- `resource_type` (*nisystemlink.clients.core.ApiError* attribute), 13
- `response_format` (*nisystemlink.clients.dataframe.models.ExportTableDataRequest* attribute), 76
- `RETENTION` (*nisystemlink.clients.tag.TagUpdateFields* attribute), 43
- `retention_count` (*nisystemlink.clients.tag.TagData* property), 25
- `retention_days` (*nisystemlink.clients.tag.TagData* property), 25
- `retention_type` (*nisystemlink.clients.tag.TagData* property), 25
- `RetentionType` (class in *nisystemlink.clients.tag*), 24
- `row_count` (*nisystemlink.clients.dataframe.models.TableMetadata* attribute), 99
- `rows_modified_at` (*nisystemlink.clients.dataframe.models.TableMetadata* attribute), 99

## S

- `schema()` (*nisystemlink.clients.core.ApiError* class method), 14
- `schema_json()` (*nisystemlink.clients.core.ApiError* class method), 14
- `send_buffered_writes()` (*nisystemlink.clients.tag.BufferedTagWriter* method), 19
- `send_buffered_writes_async()` (*nisystemlink.clients.tag.BufferedTagWriter* method), 20
- `server_uri` (*nisystemlink.clients.core.CloudHttpConfiguration* property), 15
- `server_uri` (*nisystemlink.clients.core.HttpConfiguration* property), 16
- `server_uri` (*nisystemlink.clients.core.JupyterHttpConfiguration* property), 18
- `set_retention_count()` (*nisystemlink.clients.tag.TagData* method), 26
- `set_retention_days()` (*nisystemlink.clients.tag.TagData* method), 26
- `spec_id` (*nisystemlink.clients.spec.models.SpecificationUserManaged* attribute), 144
- `spec_id` (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), 150
- `spec_id` (*nisystemlink.clients.spec.models.UpdatedSpecification* attribute), 163

SpecClient (class in *nisystemlink.clients.spec*), 102  
 SpecificationType (class in *nisystemlink.clients.spec.models*), 143  
 specs (*nisystemlink.clients.spec.models.CreateSpecificationsRequest* attribute), 131  
 specs (*nisystemlink.clients.spec.models.QuerySpecifications* attribute), 128  
 specs (*nisystemlink.clients.spec.models.UpdateSpecificationsRequest* attribute), 162  
 step (*nisystemlink.clients.spec.models.ConditionRange* attribute), 107  
 String (*nisystemlink.clients.dataframe.models.DataType* attribute), 70  
 STRING (*nisystemlink.clients.spec.models.ConditionType* attribute), 107  
 STRING (*nisystemlink.clients.tag.DataType* attribute), 21  
 substitutions (*nisystemlink.clients.dataframe.models.QueryTablesRequest* attribute), 95  
 supports\_append (*nisystemlink.clients.dataframe.models.TableMetadata* attribute), 99  
 symbol (*nisystemlink.clients.spec.models.Specification* attribute), 136  
 symbol (*nisystemlink.clients.spec.models.SpecificationDefinition* attribute), 141  
 symbol (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), 150

## T

TableMetadataModification (in module *nisystemlink.clients.dataframe.models*), 101  
 tables (*nisystemlink.clients.dataframe.models.ModifyTablesRequest* attribute), 81  
 tables (*nisystemlink.clients.dataframe.models.PagedTables* attribute), 89  
 tag\_changed (*nisystemlink.clients.tag.TagSubscription* attribute), 42  
 TagData (class in *nisystemlink.clients.tag*), 24  
 TagDataUpdate (class in *nisystemlink.clients.tag*), 26  
 TagManager (class in *nisystemlink.clients.tag*), 27  
 TagPathUtilities (class in *nisystemlink.clients.tag*), 34  
 TagQueryResultCollection (class in *nisystemlink.clients.tag*), 35  
 TagSelection (class in *nisystemlink.clients.tag*), 35  
 TagSubscription (class in *nisystemlink.clients.tag*), 42  
 TagUpdateFields (class in *nisystemlink.clients.tag*), 42  
 TagValueReader (class in *nisystemlink.clients.tag*), 43  
 TagValueWriter (class in *nisystemlink.clients.tag*), 44  
 TagWithAggregates (class in *nisystemlink.clients.tag*), 45  
 take (*nisystemlink.clients.dataframe.models.QueryTableData* attribute), 93  
 take (*nisystemlink.clients.dataframe.models.QueryTablesRequest* attribute), 96  
 take (*nisystemlink.clients.spec.models.QuerySpecificationsRequest* attribute), 131  
 TestMonitorClient (class in *nisystemlink.clients.testmonitor*), 46  
 timeout\_milliseconds (*nisystemlink.clients.core.CloudHttpConfiguration* property), 15  
 timeout\_milliseconds (*nisystemlink.clients.core.HttpConfiguration* property), 16  
 timeout\_milliseconds (*nisystemlink.clients.core.JupyterHttpConfiguration* property), 18  
 Timestamp (*nisystemlink.clients.dataframe.models.DataType* attribute), 70  
 timestamp (*nisystemlink.clients.tag.TagWithAggregates* property), 45  
 total\_count (*nisystemlink.clients.tag.AsyncTagQueryResultCollection* property), 19  
 total\_count (*nisystemlink.clients.tag.TagQueryResultCollection* property), 35  
 total\_row\_count (*nisystemlink.clients.dataframe.models.PagedTableRows* attribute), 86  
 type (*nisystemlink.clients.spec.models.Specification* attribute), 136  
 type (*nisystemlink.clients.spec.models.SpecificationDefinition* attribute), 141  
 type (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), 150  
 typical (*nisystemlink.clients.spec.models.SpecificationLimit* attribute), 142

## U

UINT64 (*nisystemlink.clients.tag.DataType* attribute), 21  
 unit (*nisystemlink.clients.spec.models.NumericConditionValue* attribute), 122  
 unit (*nisystemlink.clients.spec.models.Specification* attribute), 136  
 unit (*nisystemlink.clients.spec.models.SpecificationDefinition* attribute), 141  
 unit (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), 150  
 UNKNOWN (*nisystemlink.clients.tag.DataType* attribute), 21  
 update() (*nisystemlink.clients.tag.TagManager* method), 34  
 update\_async() (*nisystemlink.clients.tag.TagManager* method), 34  
 update\_forward\_refs() (*nisystemlink.clients.core.ApiError* class method),

[14](#)  
[update\\_products](#) (*nisystemlink.clients.testmonitor.models.V2Operations* attribute), [53](#)  
[update\\_results](#) (*nisystemlink.clients.testmonitor.models.V2Operations* attribute), [53](#)  
[update\\_specifications](#) (*nisystemlink.clients.spec.models.V1Operations* attribute), [165](#)  
[update\\_specs\(\)](#) (*nisystemlink.clients.spec.SpecClient* method), [103](#)  
[update\\_steps](#) (*nisystemlink.clients.testmonitor.models.V2Operations* attribute), [53](#)  
[updated\\_at](#) (*nisystemlink.clients.spec.models.SpecificationUpdated* attribute), [143](#)  
[updated\\_by](#) (*nisystemlink.clients.spec.models.SpecificationUpdated* attribute), [144](#)  
[updated\\_specs](#) (*nisystemlink.clients.spec.models.UpdateSpecificationsPartialSuccess* attribute), [158](#)  
[user\\_agent](#) (*nisystemlink.clients.core.CloudHttpConfiguration* property), [16](#)  
[user\\_agent](#) (*nisystemlink.clients.core.HttpConfiguration* property), [17](#)  
[user\\_agent](#) (*nisystemlink.clients.core.JupyterHttpConfiguration* property), [18](#)  
[username](#) (*nisystemlink.clients.core.CloudHttpConfiguration* property), [16](#)  
[username](#) (*nisystemlink.clients.core.HttpConfiguration* property), [17](#)  
[username](#) (*nisystemlink.clients.core.JupyterHttpConfiguration* property), [18](#)

## V

[validate\(\)](#) (*nisystemlink.clients.core.ApiError* class method), [14](#)  
[validate\(\)](#) (*nisystemlink.clients.tag.TagPathUtilities* class method), [34](#)  
[validate\\_path\(\)](#) (*nisystemlink.clients.tag.TagData* method), [26](#)  
[validate\\_query\(\)](#) (*nisystemlink.clients.tag.TagPathUtilities* class method), [35](#)  
[validate\\_type\(\)](#) (*nisystemlink.clients.tag.TagData* method), [26](#)  
[value](#) (*nisystemlink.clients.dataframe.models.ColumnFilter* attribute), [63](#)  
[value](#) (*nisystemlink.clients.spec.models.Condition* attribute), [106](#)  
[value](#) (*nisystemlink.clients.tag.TagWithAggregates* property), [45](#)  
[values](#) (*nisystemlink.clients.tag.TagSelection* property), [41](#)  
[version](#) (*nisystemlink.clients.dataframe.models.Operation* attribute), [82](#)  
[version](#) (*nisystemlink.clients.spec.models.CreatedSpecification* attribute), [119](#)  
[version](#) (*nisystemlink.clients.spec.models.Operation* attribute), [123](#)  
[version](#) (*nisystemlink.clients.spec.models.SpecificationServerManaged* attribute), [143](#)  
[version](#) (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), [150](#)  
[version](#) (*nisystemlink.clients.testmonitor.models.Operation* attribute), [49](#)

## W

[with\\_traceback\(\)](#) (*nisystemlink.clients.core.ApiException* method), [15](#)  
[workspace](#) (*nisystemlink.clients.dataframe.models.CreateTableRequest* attribute), [67](#)  
[workspace](#) (*nisystemlink.clients.dataframe.models.ModifyTableRequest* attribute), [77](#)  
[workspace](#) (*nisystemlink.clients.dataframe.models.TableMetadata* attribute), [99](#)  
[workspace](#) (*nisystemlink.clients.dataframe.models.TableMetadataModification* attribute), [100](#)  
[workspace](#) (*nisystemlink.clients.spec.models.SpecificationUserManaged* attribute), [144](#)  
[workspace](#) (*nisystemlink.clients.spec.models.SpecificationWithHistory* attribute), [150](#)  
[workspace](#) (*nisystemlink.clients.spec.models.UpdatedSpecification* attribute), [164](#)  
[write\(\)](#) (*nisystemlink.clients.tag.BufferedTagWriter* method), [20](#)  
[write\(\)](#) (*nisystemlink.clients.tag.ITagWriter* method), [23](#)  
[write\(\)](#) (*nisystemlink.clients.tag.TagValueWriter* method), [44](#)  
[write\\_async\(\)](#) (*nisystemlink.clients.tag.BufferedTagWriter* method), [20](#)  
[write\\_async\(\)](#) (*nisystemlink.clients.tag.ITagWriter* method), [23](#)  
[write\\_async\(\)](#) (*nisystemlink.clients.tag.TagValueWriter* method), [45](#)  
[write\\_data](#) (*nisystemlink.clients.dataframe.models.OperationsV1* attribute), [84](#)



## X

`x_column` (*nisystemlink.clients.dataframe.models.DecimationOptions*  
*attribute*), [71](#)

## Y

`y_columns` (*nisystemlink.clients.dataframe.models.DecimationOptions*  
*attribute*), [71](#)