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# **Feast Documentation**

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## FEATURE STORE

```
class feast.feature_store.FeatureStore(repo_path: Optional[str] = None, config:
                                     Optional[feast.repo_config.RepoConfig] = None)
```

Bases: `object`

A FeatureStore object is used to define, create, and retrieve features.

### Parameters

- **repo\_path** (*optional*) – Path to a `feature_store.yaml` used to configure the feature store.
- **config** (*optional*) – Configuration object used to configure the feature store.

```
apply(objects: Union[feast.data_source.DataSource, feast.entity.Entity, feast.feature_view.FeatureView,
                    feast.on_demand_feature_view.OnDemandFeatureView,
                    feast.request_feature_view.RequestFeatureView, feast.feature_service.FeatureService,
                    List[Union[feast.feature_view.FeatureView, feast.on_demand_feature_view.OnDemandFeatureView,
                    feast.request_feature_view.RequestFeatureView, feast.entity.Entity,
                    feast.feature_service.FeatureService, feast.data_source.DataSource]]], objects_to_delete:
Optional[List[Union[feast.feature_view.FeatureView,
                    feast.on_demand_feature_view.OnDemandFeatureView,
                    feast.request_feature_view.RequestFeatureView, feast.entity.Entity,
                    feast.feature_service.FeatureService, feast.data_source.DataSource]]] = None, partial: bool = True)
```

Register objects to metadata store and update related infrastructure.

The `apply` method registers one or more definitions (e.g., `Entity`, `FeatureView`) and registers or updates these objects in the Feast registry. Once the `apply` method has updated the infrastructure (e.g., create tables in an online store), it will commit the updated registry. All operations are idempotent, meaning they can safely be rerun.

### Parameters

- **objects** – A single object, or a list of objects that should be registered with the Feature Store.
- **objects\_to\_delete** – A list of objects to be deleted from the registry and removed from the provider’s infrastructure. This deletion will only be performed if `partial` is set to `False`.
- **partial** – If `True`, `apply` will only handle the specified objects; if `False`, `apply` will also delete all the objects in `objects_to_delete`, and tear down any associated cloud resources.

**Raises** `ValueError` – The ‘objects’ parameter could not be parsed properly.

## Examples

Register an Entity and a FeatureView.

```
>>> from feast import FeatureStore, Entity, FeatureView, Feature, ValueType, \
↳ FileSource, RepoConfig
>>> from datetime import timedelta
>>> fs = FeatureStore(repo_path="feature_repo")
>>> driver = Entity(name="driver_id", value_type=ValueTypes.INT64, description=
↳ "driver id")
>>> driver_hourly_stats = FileSource(
...     path="feature_repo/data/driver_stats.parquet",
...     event_timestamp_column="event_timestamp",
...     created_timestamp_column="created",
... )
>>> driver_hourly_stats_view = FeatureView(
...     name="driver_hourly_stats",
...     entities=["driver_id"],
...     ttl=timedelta(seconds=86400 * 1),
...     batch_source=driver_hourly_stats,
... )
>>> fs.apply([driver_hourly_stats_view, driver]) # register entity and feature.
↳ view
```

**config:** `feast.repo_config.RepoConfig`

**create\_saved\_dataset**(*from\_*: `feast.infra.offline_stores.offline_store.RetrievalJob`, *name*: `str`, *storage*: `feast.saved_dataset.SavedDatasetStorage`, *tags*: `Optional[Dict[str, str]] = None`, *feature\_service*: `Optional[feast.feature_service.FeatureService] = None`) → `feast.saved_dataset.SavedDataset`

Execute provided retrieval job and persist its outcome in given storage. Storage type (eg, BigQuery or Redshift) must be the same as globally configured offline store. After data successfully persisted saved dataset object with dataset metadata is committed to the registry. Name for the saved dataset should be unique within project, since it's possible to overwrite previously stored dataset with the same name.

**Returns** `SavedDataset` object with attached `RetrievalJob`

**Raises** `ValueError` if given retrieval job doesn't have metadata –

**delete\_feature\_service**(*name*: `str`)

Deletes a feature service.

**Parameters** *name* – Name of feature service.

**Raises** `FeatureServiceNotFoundException` – The feature view could not be found.

**delete\_feature\_view**(*name*: `str`)

Deletes a feature view.

**Parameters** *name* – Name of feature view.

**Raises** `FeatureViewNotFoundException` – The feature view could not be found.

**static ensure\_request\_data\_values\_exist**(*needed\_request\_data*: `Set[str]`, *needed\_request\_fv\_features*: `Set[str]`, *request\_data\_features*: `Dict[str, List[Any]]`)

**get\_data\_source**(*name*: `str`) → `feast.data_source.DataSource`

Retrieves the list of data sources from the registry.

**Parameters** `name` – Name of the data source.

**Returns** The specified data source.

**Raises** `DataSourceObjectNotFoundException` – The data source could not be found.

`get_entity(name: str) → feast.entity.Entity`

Retrieves an entity.

**Parameters** `name` – Name of entity.

**Returns** The specified entity.

**Raises** `EntityNotFoundException` – The entity could not be found.

`get_feature_server_endpoint() → Optional[str]`

Returns endpoint for the feature server, if it exists.

`get_feature_service(name: str, allow_cache: bool = False) → feast.feature_service.FeatureService`

Retrieves a feature service.

#### Parameters

- `name` – Name of feature service.
- `allow_cache` – Whether to allow returning feature services from a cached registry.

**Returns** The specified feature service.

**Raises** `FeatureServiceNotFoundException` – The feature service could not be found.

`get_feature_view(name: str) → feast.feature_view.FeatureView`

Retrieves a feature view.

**Parameters** `name` – Name of feature view.

**Returns** The specified feature view.

**Raises** `FeatureViewNotFoundException` – The feature view could not be found.

`get_historical_features(entity_df: Union[pandas.core.frame.DataFrame, str], features: Union[List[str], feast.feature_service.FeatureService], full_feature_names: bool = False) → feast.infra.offline_stores.offline_store.RetrievalJob`

Enrich an entity dataframe with historical feature values for either training or batch scoring.

This method joins historical feature data from one or more feature views to an entity dataframe by using a time travel join.

Each feature view is joined to the entity dataframe using all entities configured for the respective feature view. All configured entities must be available in the entity dataframe. Therefore, the entity dataframe must contain all entities found in all feature views, but the individual feature views can have different entities.

Time travel is based on the configured TTL for each feature view. A shorter TTL will limit the amount of scanning that will be done in order to find feature data for a specific entity key. Setting a short TTL may result in null values being returned.

#### Parameters

- `entity_df` (`Union[pd.DataFrame, str]`) – An entity dataframe is a collection of rows containing all entity columns (e.g., `customer_id`, `driver_id`) on which features need to be joined, as well as a `event_timestamp` column used to ensure point-in-time correctness. Either a Pandas DataFrame can be provided or a string SQL query. The query must be of a format supported by the configured offline store (e.g., BigQuery)

- **features** – A list of features, that should be retrieved from the offline store. Either a list of string feature references can be provided or a FeatureService object. Feature references are of the format “feature\_view:feature”, e.g., “customer\_fv:daily\_transactions”.
- **full\_feature\_names** – A boolean that provides the option to add the feature view prefixes to the feature names, changing them from the format “feature” to “feature\_view\_\_feature” (e.g., “daily\_transactions” changes to “customer\_fv\_\_daily\_transactions”). By default, this value is set to False.

**Returns** RetrievalJob which can be used to materialize the results.

**Raises** **ValueError** – Both or neither of features and feature\_refs are specified.

## Examples

Retrieve historical features from a local offline store.

```
>>> from feast import FeatureStore, RepoConfig
>>> import pandas as pd
>>> fs = FeatureStore(repo_path="feature_repo")
>>> entity_df = pd.DataFrame.from_dict(
...     {
...         "driver_id": [1001, 1002],
...         "event_timestamp": [
...             datetime(2021, 4, 12, 10, 59, 42),
...             datetime(2021, 4, 12, 8, 12, 10),
...         ],
...     }
... )
>>> retrieval_job = fs.get_historical_features(
...     entity_df=entity_df,
...     features=[
...         "driver_hourly_stats:conv_rate",
...         "driver_hourly_stats:acc_rate",
...         "driver_hourly_stats:avg_daily_trips",
...     ],
... )
>>> feature_data = retrieval_job.to_df()
```

**static get\_needed\_request\_data**(*grouped\_odfv\_refs*: List[Tuple[feast.on\_demand\_feature\_view.OnDemandFeatureView, List[str]]], *grouped\_request\_fv\_refs*: List[Tuple[feast.request\_feature\_view.RequestFeatureView, List[str]]]) → Tuple[Set[str], Set[str]]

**get\_on\_demand\_feature\_view**(*name*: str) → feast.on\_demand\_feature\_view.OnDemandFeatureView  
Retrieves a feature view.

**Parameters** **name** – Name of feature view.

**Returns** The specified feature view.

**Raises** **FeatureViewNotFoundException** – The feature view could not be found.

**get\_online\_features**(*features*: Union[List[str], feast.feature\_service.FeatureService], *entity\_rows*: List[Dict[str, Any]], *full\_feature\_names*: bool = False) → feast.online\_response.OnlineResponse

Retrieves the latest online feature data.



Note: This method will download the full feature registry the first time it is run. If you are using a remote registry like GCS or S3 then that may take a few seconds. The registry remains cached up to a TTL duration (which can be set to infinity). If the cached registry is stale (more time than the TTL has passed), then a new registry will be downloaded synchronously by this method. This download may introduce latency to online feature retrieval. In order to avoid synchronous downloads, please call `refresh_registry()` prior to the TTL being reached. Remember it is possible to set the cache TTL to infinity (cache forever).

#### Parameters

- **features** – List of feature references that will be returned for each entity. Each feature reference should have the following format: “feature\_view:feature” where “feature\_view” & “feature” refer to the Feature and FeatureView names respectively. Only the feature name is required.
- **entity\_rows** – A list of dictionaries where each key-value is an entity-name, entity-value pair.

**Returns** `OnlineResponse` containing the feature data in records.

**Raises** `Exception` – No entity with the specified name exists.

#### Examples

Materialize all features into the online store over the interval from 3 hours ago to 10 minutes ago, and then retrieve these online features.

```
>>> from feast import FeatureStore, RepoConfig
>>> fs = FeatureStore(repo_path="feature_repo")
>>> online_response = fs.get_online_features(
...     features=[
...         "driver_hourly_stats:conv_rate",
...         "driver_hourly_stats:acc_rate",
...         "driver_hourly_stats:avg_daily_trips",
...     ],
...     entity_rows=[{"driver_id": 1001}, {"driver_id": 1002}, {"driver_id": 1003}, {"driver_id": 1004}],
... )
>>> online_response_dict = online_response.to_dict()
```

**get\_saved\_dataset**(*name: str*) → `feast.saved_dataset.SavedDataset`

Find a saved dataset in the registry by provided name and create a retrieval job to pull whole dataset from storage (offline store).

If dataset couldn't be found by provided name `SavedDatasetNotFound` exception will be raised.

Data will be retrieved from globally configured offline store.

**Returns** `SavedDataset` with `RetrievalJob` attached

**Raises** `SavedDatasetNotFound` –

**list\_data\_sources**(*allow\_cache: bool = False*) → `List[feast.data_source.DataSource]`

Retrieves the list of data sources from the registry.

**Parameters** `allow_cache` – Whether to allow returning data sources from a cached registry.

**Returns** A list of data sources.

**list\_entities**(*allow\_cache: bool = False*) → `List[feast.entity.Entity]`

Retrieves the list of entities from the registry.

**Parameters** `allow_cache` – Whether to allow returning entities from a cached registry.

**Returns** A list of entities.

`list_feature_services()` → List[*feast.feature\_service.FeatureService*]

Retrieves the list of feature services from the registry.

**Returns** A list of feature services.

`list_feature_views(allow_cache: bool = False)` → List[*feast.feature\_view.FeatureView*]

Retrieves the list of feature views from the registry.

**Parameters** `allow_cache` – Whether to allow returning entities from a cached registry.

**Returns** A list of feature views.

`list_on_demand_feature_views(allow_cache: bool = False)` →  
List[*feast.on\_demand\_feature\_view.OnDemandFeatureView*]

Retrieves the list of on demand feature views from the registry.

**Returns** A list of on demand feature views.

`list_request_feature_views(allow_cache: bool = False)` →  
List[*feast.request\_feature\_view.RequestFeatureView*]

Retrieves the list of feature views from the registry.

**Parameters** `allow_cache` – Whether to allow returning entities from a cached registry.

**Returns** A list of feature views.

`materialize(start_date: datetime.datetime, end_date: datetime.datetime, feature_views: Optional[List[str]] = None)` → *None*

Materialize data from the offline store into the online store.

This method loads feature data in the specified interval from either the specified feature views, or all feature views if none are specified, into the online store where it is available for online serving.

**Parameters**

- **start\_date** (*datetime*) – Start date for time range of data to materialize into the online store
- **end\_date** (*datetime*) – End date for time range of data to materialize into the online store
- **feature\_views** (*List[str]*) – Optional list of feature view names. If selected, will only run materialization for the specified feature views.

**Examples**

Materialize all features into the online store over the interval from 3 hours ago to 10 minutes ago.

```

>>> from feast import FeatureStore, RepoConfig
>>> from datetime import datetime, timedelta
>>> fs = FeatureStore(repo_path="feature_repo")
>>> fs.materialize(
...     start_date=datetime.utcnow() - timedelta(hours=3), end_date=datetime.
<-utcnow() - timedelta(minutes=10)
... )
Materializing...
...

```

**materialize\_incremental**(*end\_date: datetime.datetime, feature\_views: Optional[List[str]] = None*) → None

Materialize incremental new data from the offline store into the online store.

This method loads incremental new feature data up to the specified end time from either the specified feature views, or all feature views if none are specified, into the online store where it is available for online serving. The start time of the interval materialized is either the most recent end time of a prior materialization or (now - ttl) if no such prior materialization exists.

#### Parameters

- **end\_date** (*datetime*) – End date for time range of data to materialize into the online store
- **feature\_views** (*List[str]*) – Optional list of feature view names. If selected, will only run materialization for the specified feature views.

**Raises** **Exception** – A feature view being materialized does not have a TTL set.

#### Examples

Materialize all features into the online store up to 5 minutes ago.

```
>>> from feast import FeatureStore, RepoConfig
>>> from datetime import datetime, timedelta
>>> fs = FeatureStore(repo_path="feature_repo")
>>> fs.materialize_incremental(end_date=datetime.utcnow() -
↳ timedelta(minutes=5))
Materializing...
...

```

**property project:** **str**

Gets the project of this feature store.

**refresh\_registry()**

Fetches and caches a copy of the feature registry in memory.

Explicitly calling this method allows for direct control of the state of the registry cache. Every time this method is called the complete registry state will be retrieved from the remote registry store backend (e.g., GCS, S3), and the cache timer will be reset. If `refresh_registry()` is run before `get_online_features()` is called, then `get_online_feature()` will use the cached registry instead of retrieving (and caching) the registry itself.

Additionally, the TTL for the registry cache can be set to infinity (by setting it to 0), which means that `refresh_registry()` will become the only way to update the cached registry. If the TTL is set to a value greater than 0, then once the cache becomes stale (more time than the TTL has passed), a new cache will be downloaded synchronously, which may increase latencies if the triggering method is `get_online_features()`

**property registry:** **feast.registry.Registry**

Gets the registry of this feature store.

**repo\_path:** **pathlib.Path**

**serve**(*host: str, port: int, no\_access\_log: bool*) → None

Start the feature consumption server locally on a given port.

**serve\_transformations**(*port: int*) → None

Start the feature transformation server locally on a given port.

**teardown()**

Tears down all local and cloud resources for the feature store.

**version()** → *str*

Returns the version of the current Feast SDK/CLI.

**write\_to\_online\_store**(*feature\_view\_name: str, df: pandas.core.frame.DataFrame,*  
*allow\_registry\_cache: bool = True*)

ingests data directly into the Online store

**class** `feast.repo_config.FeastConfigBaseModel`

Feast Pydantic Configuration Class

**exception** `feast.repo_config.FeastConfigError`(*error\_message, config\_path*)

**class** `feast.repo_config.RegistryConfig`(\**registry\_store\_type: pydantic.types.StrictStr = None, path: pydantic.types.StrictStr, cache\_ttl\_seconds: pydantic.types.StrictInt = 600, \*\*extra\_data: Any*)

Metadata Store Configuration. Configuration that relates to reading from and writing to the Feast registry.

**cache\_ttl\_seconds:** `pydantic.types.StrictInt`

The cache TTL is the amount of time registry state will be cached in memory. If this TTL is exceeded then the registry will be refreshed when any feature store method asks for access to registry state. The TTL can be set to infinity by setting TTL to 0 seconds, which means the cache will only be loaded once and will never expire. Users can manually refresh the cache by calling `feature_store.refresh_registry()`

**Type** `int`

**path:** `pydantic.types.StrictStr`

Path to metadata store. Can be a local path, or remote object storage path, e.g. a GCS URI

**Type** `str`

**registry\_store\_type:** `Optional[pydantic.types.StrictStr]`

Provider name or a class name that implements `RegistryStore`.

**Type** `str`

**class** `feast.repo_config.RepoConfig`(\**registry: Union[pydantic.types.StrictStr, feast.repo\_config.RegistryConfig] = 'data/registry.db', project: pydantic.types.StrictStr, provider: pydantic.types.StrictStr, online\_store: Any = None, offline\_store: Any = None, feature\_server: Any = None, flags: Any = None, repo\_path: pathlib.Path = None, \*\*data: Any*)

Repo config. Typically loaded from `feature_store.yaml`

**feature\_server:** `Optional[Any]`

Feature server configuration (optional depending on provider)

**Type** `FeatureServerConfig`

**flags:** `Any`

Feature flags for experimental features (optional)

**Type** `Flags`

**offline\_store:** `Any`

Offline store configuration (optional depending on provider)

**Type** `OfflineStoreConfig`

**online\_store:** `Any`

Online store configuration (optional depending on provider)

**Type** `OnlineStoreConfig`

**project:** `pydantic.types.StrictStr`

Feast project id. This can be any alphanumeric string up to 16 characters. You can have multiple independent feature repositories deployed to the same cloud provider account, as long as they have different project ids.

**Type** `str`

**provider:** `pydantic.types.StrictStr`

local or gcp or aws

**Type** `str`

**registry:** `Union[pydantic.types.StrictStr, feast.repo_config.RegistryConfig]`

Path to metadata store. Can be a local path, or remote object storage path, e.g. a GCS URI

**Type** `str`

## DATA SOURCE

```
class feast.data_source.DataSource(name: str, event_timestamp_column: Optional[str] = None,  
                                   created_timestamp_column: Optional[str] = None, field_mapping:  
                                   Optional[Dict[str, str]] = None, date_partition_column: Optional[str]  
                                   = None)
```

DataSource that can be used to source features.

### Parameters

- **name** – Name of data source, which should be unique within a project
- **event\_timestamp\_column** (*optional*) – Event timestamp column used for point in time joins of feature values.
- **created\_timestamp\_column** (*optional*) – Timestamp column indicating when the row was created, used for deduplicating rows.
- **field\_mapping** (*optional*) – A dictionary mapping of column names in this data source to feature names in a feature table or view. Only used for feature columns, not entity or timestamp columns.
- **date\_partition\_column** (*optional*) – Timestamp column used for partitioning.

```
abstract static from_proto(data_source: feast.core.DataSource_pb2.DataSource) → Any  
Converts data source config in protobuf spec to a DataSource class object.
```

**Parameters** **data\_source** – A protobuf representation of a DataSource.

**Returns** A DataSource class object.

**Raises** **ValueError** – The type of DataSource could not be identified.

```
get_table_column_names_and_types(config: feast.repo_config.RepoConfig) → Iterable[Tuple[str, str]]  
Returns the list of column names and raw column types.
```

**Parameters** **config** – Configuration object used to configure a feature store.

```
get_table_query_string() → str  
Returns a string that can directly be used to reference this table in SQL.
```

```
abstract static source_datatype_to_feast_value_type() → Callable[[str],  
                                                                    feast.value_type.ValueType]  
Returns the callable method that returns Feast type given the raw column type.
```

```
abstract to_proto() → feast.core.DataSource_pb2.DataSource  
Converts a DataSourceProto object to its protobuf representation.
```

```
validate(config: feast.repo_config.RepoConfig)  
Validates the underlying data source.
```

**Parameters config** – Configuration object used to configure a feature store.

**class** `feast.data_source.RequestDataSource(name: str, schema: Dict[str, feast.value_type.ValueType])`  
RequestDataSource that can be used to provide input features for on demand transforms

**Parameters**

- **name** – Name of the request data source
- **schema** – Schema mapping from the input feature name to a ValueType

**static from\_proto**(*data\_source: feast.core.DataSource\_pb2.DataSource*)  
Converts data source config in protobuf spec to a DataSource class object.

**Parameters data\_source** – A protobuf representation of a DataSource.

**Returns** A DataSource class object.

**Raises ValueError** – The type of DataSource could not be identified.

**get\_table\_column\_names\_and\_types**(*config: feast.repo\_config.RepoConfig*) → Iterable[Tuple[str, str]]  
Returns the list of column names and raw column types.

**Parameters config** – Configuration object used to configure a feature store.

**get\_table\_query\_string**() → str  
Returns a string that can directly be used to reference this table in SQL.

**static source\_datatype\_to\_feast\_value\_type**() → Callable[[str], feast.value\_type.ValueType]  
Returns the callable method that returns Feast type given the raw column type.

**to\_proto**() → feast.core.DataSource\_pb2.DataSource  
Converts a DataSourceProto object to its protobuf representation.

**validate**(*config: feast.repo\_config.RepoConfig*)  
Validates the underlying data source.

**Parameters config** – Configuration object used to configure a feature store.

**class** `feast.data_source.SourceType(value)`  
DataSource value type. Used to define source types in DataSource.

## 3.1 BigQuery Source

**class** `feast.infra.offline_stores.bigquery_source.BigQuerySource(name: Optional[str] = None, event_timestamp_column: Optional[str] = "", table: Optional[str] = None, table_ref: Optional[str] = None, created_timestamp_column: Optional[str] = "", field_mapping: Optional[Dict[str, str]] = None, date_partition_column: Optional[str] = "", query: Optional[str] = None)`

**static from\_proto**(*data\_source: feast.core.DataSource\_pb2.DataSource*)  
Converts data source config in protobuf spec to a DataSource class object.



**Parameters** `data_source` – A protobuf representation of a DataSource.

**Returns** A DataSource class object.

**Raises** `ValueError` – The type of DataSource could not be identified.

**get\_table\_column\_names\_and\_types**(*config: feast.repo\_config.RepoConfig*) → Iterable[Tuple[str, str]]

Returns the list of column names and raw column types.

**Parameters** `config` – Configuration object used to configure a feature store.

**get\_table\_query\_string**() → str

Returns a string that can directly be used to reference this table in SQL

**static source\_datatype\_to\_feast\_value\_type**() → Callable[[str], feast.value\_type.ValueType]

Returns the callable method that returns Feast type given the raw column type.

**to\_proto**() → feast.core.DataSource\_pb2.DataSource

Converts a DataSourceProto object to its protobuf representation.

**validate**(*config: feast.repo\_config.RepoConfig*)

Validates the underlying data source.

**Parameters** `config` – Configuration object used to configure a feature store.

## 3.2 Redshift Source

```
class feast.infra.offline_stores.redshift_source.RedshiftSource(name: Optional[str] = None,
                                                               event_timestamp_column:
                                                               Optional[str] = "", table:
                                                               Optional[str] = None, schema:
                                                               Optional[str] = None,
                                                               created_timestamp_column:
                                                               Optional[str] = "",
                                                               field_mapping:
                                                               Optional[Dict[str, str]] = None,
                                                               date_partition_column:
                                                               Optional[str] = "", query:
                                                               Optional[str] = None)
```

**static from\_proto**(*data\_source: feast.core.DataSource\_pb2.DataSource*)

Creates a RedshiftSource from a protobuf representation of a RedshiftSource.

**Parameters** `data_source` – A protobuf representation of a RedshiftSource

**Returns** A RedshiftSource object based on the data\_source protobuf.

**get\_table\_column\_names\_and\_types**(*config: feast.repo\_config.RepoConfig*) → Iterable[Tuple[str, str]]

Returns a mapping of column names to types for this Redshift source.

**Parameters** `config` – A RepoConfig describing the feature repo

**get\_table\_query\_string**() → str

Returns a string that can directly be used to reference this table in SQL.

**property query**

Returns the Redshift options of this Redshift source.

**property schema**

Returns the schema of this Redshift source.

**static source\_datatype\_to\_feast\_value\_type()** → Callable[[str], feast.value\_type.ValueType]  
 Returns the callable method that returns Feast type given the raw column type.

**property table**

Returns the table of this Redshift source.

**to\_proto()** → feast.core.DataSource\_pb2.DataSource  
 Converts a RedshiftSource object to its protobuf representation.

**Returns** A DataSourceProto object.

**validate**(*config: feast.repo\_config.RepoConfig*)  
 Validates the underlying data source.

**Parameters config** – Configuration object used to configure a feature store.

### 3.3 File Source

```
class feast.infra.offline_stores.file_source.FileSource(path: str, name: Optional[str] = "",
    event_timestamp_column: Optional[str] = "", file_format:
    Optional[feast.data_format.FileFormat] = None, created_timestamp_column:
    Optional[str] = "", field_mapping:
    Optional[Dict[str, str]] = None,
    date_partition_column: Optional[str] = "",
    s3_endpoint_override: Optional[str] = None)
```

**static from\_proto**(*data\_source: feast.core.DataSource\_pb2.DataSource*)  
 Converts data source config in protobuf spec to a DataSource class object.

**Parameters data\_source** – A protobuf representation of a DataSource.

**Returns** A DataSource class object.

**Raises ValueError** – The type of DataSource could not be identified.

**get\_table\_column\_names\_and\_types**(*config: feast.repo\_config.RepoConfig*) → Iterable[Tuple[str, str]]  
 Returns the list of column names and raw column types.

**Parameters config** – Configuration object used to configure a feature store.

**get\_table\_query\_string**() → str  
 Returns a string that can directly be used to reference this table in SQL.

**property path**

Returns the path of this file data source.

**static source\_datatype\_to\_feast\_value\_type()** → Callable[[str], feast.value\_type.ValueType]  
 Returns the callable method that returns Feast type given the raw column type.

**to\_proto()** → feast.core.DataSource\_pb2.DataSource  
 Converts a DataSourceProto object to its protobuf representation.

**validate**(*config: feast.repo\_config.RepoConfig*)  
 Validates the underlying data source.

**Parameters config** – Configuration object used to configure a feature store.

## ENTITY

```
class feast.entity.Entity(name: str, value_type: feast.value_type.ValueType = ValueType.UNKNOWN,  
                           description: str = "", join_key: Optional[str] = None, tags: Dict[str, str] = None,  
                           labels: Optional[Dict[str, str]] = None, owner: str = "")
```

An entity defines a collection of entities for which features can be defined. An entity can also contain associated metadata.

**name**

The unique name of the entity.

**Type** str

**value\_type**

The type of the entity, such as string or float.

**Type** feast.value\_type.ValueType

**join\_key**

A property that uniquely identifies different entities within the collection. The join\_key property is typically used for joining entities with their associated features. If not specified, defaults to the name.

**Type** str

**description**

A human-readable description.

**Type** str

**tags**

A dictionary of key-value pairs to store arbitrary metadata.

**Type** Dict[str, str]

**owner**

The owner of the feature service, typically the email of the primary maintainer.

**Type** str

**created\_timestamp**

The time when the entity was created.

**Type** Optional[datetime.datetime]

**last\_updated\_timestamp**

The time when the entity was last updated.

**Type** Optional[datetime.datetime]

**classmethod** from\_proto(entity\_proto: feast.core.Entity\_pb2.Entity)

Creates an entity from a protobuf representation of an entity.

**Parameters** `entity_proto` – A protobuf representation of an entity.

**Returns** An Entity object based on the entity protobuf.

**is\_valid()**

Validates the state of this entity locally.

**Raises** `ValueError` – The entity does not have a name or does not have a type.

**to\_proto()** → `feast.core.Entity_pb2.Entity`

Converts an entity object to its protobuf representation.

**Returns** An EntityProto protobuf.

## FEATURE VIEW

```
class feast.feature_view.FeatureView(name: str, entities: List[str], ttl:
    Union[google.protobuf.duration_pb2.Duration, datetime.timedelta],
    input: Optional[feast.data_source.DataSource] = None,
    batch_source: Optional[feast.data_source.DataSource] = None,
    stream_source: Optional[feast.data_source.DataSource] = None,
    features: Optional[List[feast.feature.Feature]] = None, tags:
    Optional[Dict[str, str]] = None, online: bool = True)
```

A FeatureView defines a logical grouping of serveable features.

### Parameters

- **name** – Name of the group of features.
- **entities** – The entities to which this group of features is associated.
- **ttl** – The amount of time this group of features lives. A ttl of 0 indicates that this group of features lives forever. Note that large ttl's or a ttl of 0 can result in extremely computationally intensive queries.
- **input** – The source of data where this group of features is stored.
- **batch\_source** (*optional*) – The batch source of data where this group of features is stored.
- **stream\_source** (*optional*) – The stream source of data where this group of features is stored.
- **features** (*optional*) – The set of features defined as part of this FeatureView.
- **tags** (*optional*) – A dictionary of key-value pairs used for organizing FeatureViews.

### ensure\_valid()

Validates the state of this feature view locally.

**Raises** **ValueError** – The feature view does not have a name or does not have entities.

### classmethod from\_proto(feature\_view\_proto: feast.core.FeatureView\_pb2.FeatureView)

Creates a feature view from a protobuf representation of a feature view.

**Parameters** **feature\_view\_proto** – A protobuf representation of a feature view.

**Returns** A FeatureViewProto object based on the feature view protobuf.

### property most\_recent\_end\_time: Optional[datetime.datetime]

Retrieves the latest time up to which the feature view has been materialized.

**Returns** The latest time, or None if the feature view has not been materialized.

### to\_proto() → feast.core.FeatureView\_pb2.FeatureView

Converts a feature view object to its protobuf representation.

**Returns** A FeatureViewProto protobuf.

**with\_join\_key\_map**(*join\_key\_map*: Dict[str, str])

Sets the `join_key_map` by returning a copy of this feature view with that field set. This `join_key` mapping operation is only used as part of query operations and will not modify the underlying FeatureView.

**Parameters** `join_key_map` – A map of join keys in which the left is the `join_key` that corresponds with the feature data and the right corresponds with the entity data.

**Returns** A copy of this FeatureView with the `join_key_map` replaced with the ‘`join_key_map`’ input.

### Examples

Join a location feature data table to both the origin column and destination column of the entity data.

```
temperatures_feature_service = FeatureService( name="temperatures", features=[
    location_stats_feature_view .with_name("origin_stats") .with_join_key_map(
        {"location_id": "origin_id"}
    ),
    location_stats_feature_view .with_name("destination_stats") .with_join_key_map(
        {"location_id": "destination_id"}
    ),
],
)
```

**with\_name**(*name*: str)

Renames this feature view by returning a copy of this feature view with an alias set for the feature view name. This rename operation is only used as part of query operations and will not modify the underlying FeatureView.

**Parameters** `name` – Name to assign to the FeatureView copy.

**Returns** A copy of this FeatureView with the name replaced with the ‘`name`’ input.

**with\_projection**(*feature\_view\_projection*: feast.feature\_view\_projection.FeatureViewProjection)

Sets the feature view projection by returning a copy of this feature view with its projection set to the given projection. A projection is an object that stores the modifications to a feature view that is used during query operations.

**Parameters** `feature_view_projection` – The FeatureViewProjection object to link to this OnDemandFeatureView.

**Returns** A copy of this FeatureView with its projection replaced with the ‘`feature_view_projection`’ argument.

## ON DEMAND FEATURE VIEW

```
class feast.on_demand_feature_view.OnDemandFeatureView(name: str, features:  
                                                    List[feast.feature.Feature], inputs: Dict[str,  
                                                    Union[feast.feature_view.FeatureView,  
                                                    feast.feature_view_projection.FeatureViewProjection,  
                                                    feast.data_source.RequestDataSource]], udf:  
                                                    method)
```

[Experimental] An OnDemandFeatureView defines on demand transformations on existing feature view values and request data.

### Parameters

- **name** – Name of the group of features.
- **features** – Output schema of transformation with feature names
- **inputs** – The input feature views passed into the transform.
- **udf** – User defined transformation function that takes as input pandas dataframes

```
classmethod from_proto(on_demand_feature_view_proto:  
                       feast.core.OnDemandFeatureView_pb2.OnDemandFeatureView)
```

Creates an on demand feature view from a protobuf representation.

**Parameters** **on\_demand\_feature\_view\_proto** – A protobuf representation of an on-demand feature view.

**Returns** A OnDemandFeatureView object based on the on-demand feature view protobuf.

### infer\_features()

Infers the set of features associated to this feature view from the input source.

**Raises** **RegistryInferenceFailure** – The set of features could not be inferred.

```
to_proto() → feast.core.OnDemandFeatureView_pb2.OnDemandFeatureView
```

Converts an on demand feature view object to its protobuf representation.

**Returns** A OnDemandFeatureViewProto protobuf.

```
feast.on_demand_feature_view.on_demand_feature_view(features: List[feast.feature.Feature], inputs:  
                                                    Dict[str, Union[feast.feature_view.FeatureView,  
                                                    feast.data_source.RequestDataSource]])
```

Declare an on-demand feature view

### Parameters

- **features** – Output schema with feature names
- **inputs** – The inputs passed into the transform.

**Returns** An On Demand Feature View.



## FEATURE

```
class feast.feature.Feature(name: str, dtype: feast.value_type.ValueType, labels: Optional[Dict[str, str]] = None)
```

A Feature represents a class of serveable feature.

### Parameters

- **name** – Name of the feature.
- **dtype** – The type of the feature, such as string or float.
- **labels** (*optional*) – User-defined metadata in dictionary form.

```
property dtype: feast.value_type.ValueType
```

Gets the data type of this feature.

```
classmethod from_proto(feature_proto: feast.core.Feature_pb2.FeatureSpecV2)
```

**Parameters** **feature\_proto** – FeatureSpecV2 protobuf object

**Returns** Feature object

```
property labels: Dict[str, str]
```

Gets the labels of this feature.

```
property name
```

Gets the name of this feature.

```
to_proto() → feast.core.Feature_pb2.FeatureSpecV2
```

Converts Feature object to its Protocol Buffer representation.

**Returns** A FeatureSpecProto protobuf.



## FEATURE SERVICE

```
class feast.feature_service.FeatureService(name: str, features:
    List[Union[feast.feature_view.FeatureView,
    feast.on_demand_feature_view.OnDemandFeatureView]],
    tags: Dict[str, str] = None, description: str = "", owner: str
    = "")
```

A feature service defines a logical group of features from one or more feature views. This group of features can be retrieved together during training or serving.

**name**

The unique name of the feature service.

**Type** str

**feature\_view\_projections**

A list containing feature views and feature view projections, representing the features in the feature service.

**Type** List[feast.feature\_view\_projection.FeatureViewProjection]

**description**

A human-readable description.

**Type** str

**tags**

A dictionary of key-value pairs to store arbitrary metadata.

**Type** Dict[str, str]

**owner**

The owner of the feature service, typically the email of the primary maintainer.

**Type** str

**created\_timestamp**

The time when the feature service was created.

**Type** Optional[datetime.datetime]

**last\_updated\_timestamp**

The time when the feature service was last updated.

**Type** Optional[datetime.datetime]

**classmethod from\_proto**(feature\_service\_proto: feast.core.FeatureService\_pb2.FeatureService)

Converts a FeatureServiceProto to a FeatureService object.

**Parameters** feature\_service\_proto – A protobuf representation of a FeatureService.

**to\_proto()** → `feast.core.FeatureService_pb2.FeatureService`  
Converts a feature service to its protobuf representation.

**Returns** A `FeatureServiceProto` protobuf.

## REGISTRY

```
class feast.registry.FeastObjectType(value)
```

An enumeration.

```
class feast.registry.Registry(registry_config: Optional[feast.repo_config.RegistryConfig], repo_path: Optional[pathlib.Path])
```

Registry: A registry allows for the management and persistence of feature definitions and related metadata.

```
apply_data_source(data_source: feast.data_source.DataSource, project: str, commit: bool = True)
```

Registers a single data source with Feast

**Parameters**

- **data\_source** – A data source that will be registered
- **project** – Feast project that this data source belongs to
- **commit** – Whether to immediately commit to the registry

```
apply_entity(entity: feast.entity.Entity, project: str, commit: bool = True)
```

Registers a single entity with Feast

**Parameters**

- **entity** – Entity that will be registered
- **project** – Feast project that this entity belongs to
- **commit** – Whether the change should be persisted immediately

```
apply_feature_service(feature_service: feast.feature_service.FeatureService, project: str, commit: bool = True)
```

Registers a single feature service with Feast

**Parameters**

- **feature\_service** – A feature service that will be registered
- **project** – Feast project that this entity belongs to

```
apply_feature_view(feature_view: feast.base_feature_view.BaseFeatureView, project: str, commit: bool = True)
```

Registers a single feature view with Feast

**Parameters**

- **feature\_view** – Feature view that will be registered
- **project** – Feast project that this feature view belongs to
- **commit** – Whether the change should be persisted immediately

**apply\_materialization**(*feature\_view: feast.feature\_view.FeatureView, project: str, start\_date: datetime.datetime, end\_date: datetime.datetime, commit: bool = True*)

Updates materialization intervals tracked for a single feature view in Feast

**Parameters**

- **feature\_view** – Feature view that will be updated with an additional materialization interval tracked
- **project** – Feast project that this feature view belongs to
- **start\_date** (*datetime*) – Start date of the materialization interval to track
- **end\_date** (*datetime*) – End date of the materialization interval to track
- **commit** – Whether the change should be persisted immediately

**apply\_saved\_dataset**(*saved\_dataset: feast.saved\_dataset.SavedDataset, project: str, commit: bool = True*)

Registers a single entity with Feast

**Parameters**

- **saved\_dataset** – SavedDataset that will be added / updated to registry
- **project** – Feast project that this dataset belongs to
- **commit** – Whether the change should be persisted immediately

**commit()**

Commits the state of the registry cache to the remote registry store.

**delete\_data\_source**(*name: str, project: str, commit: bool = True*)

Deletes a data source or raises an exception if not found.

**Parameters**

- **name** – Name of data source
- **project** – Feast project that this data source belongs to
- **commit** – Whether the change should be persisted immediately

**delete\_entity**(*name: str, project: str, commit: bool = True*)

Deletes an entity or raises an exception if not found.

**Parameters**

- **name** – Name of entity
- **project** – Feast project that this entity belongs to
- **commit** – Whether the change should be persisted immediately

**delete\_feature\_service**(*name: str, project: str, commit: bool = True*)

Deletes a feature service or raises an exception if not found.

**Parameters**

- **name** – Name of feature service
- **project** – Feast project that this feature service belongs to
- **commit** – Whether the change should be persisted immediately

**delete\_feature\_view**(*name: str, project: str, commit: bool = True*)

Deletes a feature view or raises an exception if not found.

**Parameters**

- **name** – Name of feature view
- **project** – Feast project that this feature view belongs to
- **commit** – Whether the change should be persisted immediately

**get\_data\_source**(*name: str, project: str, allow\_cache: bool = False*) → `feast.data_source.DataSource`  
Retrieves a data source.

#### Parameters

- **name** – Name of data source
- **project** – Feast project that this data source belongs to
- **allow\_cache** – Whether to allow returning this data source from a cached registry

**Returns** Returns either the specified data source, or raises an exception if none is found

**get\_entity**(*name: str, project: str, allow\_cache: bool = False*) → `feast.entity.Entity`  
Retrieves an entity.

#### Parameters

- **name** – Name of entity
- **project** – Feast project that this entity belongs to
- **allow\_cache** – Whether to allow returning this entity from a cached registry

**Returns** Returns either the specified entity, or raises an exception if none is found

**get\_feature\_service**(*name: str, project: str, allow\_cache: bool = False*) →  
*feast.feature\_service.FeatureService*  
Retrieves a feature service.

#### Parameters

- **name** – Name of feature service
- **project** – Feast project that this feature service belongs to
- **allow\_cache** – Whether to allow returning this feature service from a cached registry

**Returns** Returns either the specified feature service, or raises an exception if none is found

**get\_feature\_view**(*name: str, project: str, allow\_cache: bool = False*) → `feast.feature_view.FeatureView`  
Retrieves a feature view.

#### Parameters

- **name** – Name of feature view
- **project** – Feast project that this feature view belongs to
- **allow\_cache** – Allow returning feature view from the cached registry

**Returns** Returns either the specified feature view, or raises an exception if none is found

**get\_infra**(*project: str, allow\_cache: bool = False*) → `feast.infra.infra_object.Infra`  
Retrieves the stored Infra object.

#### Parameters

- **project** – Feast project that the Infra object refers to
- **allow\_cache** – Whether to allow returning this entity from a cached registry

**Returns** The stored Infra object.

**get\_on\_demand\_feature\_view**(*name: str, project: str, allow\_cache: bool = False*) → *feast.on\_demand\_feature\_view.OnDemandFeatureView*

Retrieves an on demand feature view.

### Parameters

- **name** – Name of on demand feature view
- **project** – Feast project that this on demand feature view belongs to
- **allow\_cache** – Whether to allow returning this on demand feature view from a cached registry

**Returns** Returns either the specified on demand feature view, or raises an exception if none is found

**get\_saved\_dataset**(*name: str, project: str, allow\_cache: bool = False*) → *feast.saved\_dataset.SavedDataset*

Retrieves a saved dataset.

### Parameters

- **name** – Name of dataset
- **project** – Feast project that this dataset belongs to
- **allow\_cache** – Whether to allow returning this dataset from a cached registry

**Returns** Returns either the specified SavedDataset, or raises an exception if none is found

**list\_data\_sources**(*project: str, allow\_cache: bool = False*) → List[*feast.data\_source.DataSource*]

Retrieve a list of data sources from the registry

### Parameters

- **project** – Filter data source based on project name
- **allow\_cache** – Whether to allow returning data sources from a cached registry

**Returns** List of data sources

**list\_entities**(*project: str, allow\_cache: bool = False*) → List[*feast.entity.Entity*]

Retrieve a list of entities from the registry

### Parameters

- **allow\_cache** – Whether to allow returning entities from a cached registry
- **project** – Filter entities based on project name

**Returns** List of entities

**list\_feature\_services**(*project: str, allow\_cache: bool = False*) → List[*feast.feature\_service.FeatureService*]

Retrieve a list of feature services from the registry

### Parameters

- **allow\_cache** – Whether to allow returning entities from a cached registry
- **project** – Filter entities based on project name

**Returns** List of feature services

**list\_feature\_views**(*project: str, allow\_cache: bool = False*) → List[*feast.feature\_view.FeatureView*]

Retrieve a list of feature views from the registry

### Parameters



- **allow\_cache** – Allow returning feature views from the cached registry
- **project** – Filter feature views based on project name

**Returns** List of feature views

**list\_on\_demand\_feature\_views**(*project: str, allow\_cache: bool = False*) → List[*feast.on\_demand\_feature\_view.OnDemandFeatureView*]

Retrieve a list of on demand feature views from the registry

**Parameters**

- **project** – Filter on demand feature views based on project name
- **allow\_cache** – Whether to allow returning on demand feature views from a cached registry

**Returns** List of on demand feature views

**list\_request\_feature\_views**(*project: str, allow\_cache: bool = False*) → List[*feast.request\_feature\_view.RequestFeatureView*]

Retrieve a list of request feature views from the registry

**Parameters**

- **allow\_cache** – Allow returning feature views from the cached registry
- **project** – Filter feature views based on project name

**Returns** List of feature views

**list\_saved\_datasets**(*project: str, allow\_cache: bool = False*) → List[*feast.saved\_dataset.SavedDataset*]

Retrieves a list of all saved datasets in specified project

**Parameters**

- **project** – Feast project
- **allow\_cache** – Whether to allow returning this dataset from a cached registry

**Returns** Returns the list of SavedDatasets

**refresh()**

Refreshes the state of the registry cache by fetching the registry state from the remote registry store.

**teardown()**

Tears down (removes) the registry.

**to\_dict**(*project: str*) → Dict[str, List[Any]]

Returns a dictionary representation of the registry contents for the specified project.

For each list in the dictionary, the elements are sorted by name, so this method can be used to compare two registries.

**Parameters** **project** – Feast project to convert to a dict

**update\_infra**(*infra: feast.infra.infra\_object.Infra, project: str, commit: bool = True*)

Updates the stored Infra object.

**Parameters**

- **infra** – The new Infra object to be stored.
- **project** – Feast project that the Infra object refers to
- **commit** – Whether the change should be persisted immediately



## PROVIDER

```
class feast.infra.provider.Provider(config: feast.repo_config.RepoConfig)
```

```
get_feature_server_endpoint() → Optional[str]
```

Returns endpoint for the feature server, if it exists.

```
ingest_df(feature_view: feast.feature_view.FeatureView, entities: List[feast.entity.Entity], df: pandas.core.frame.DataFrame)
```

Ingests a DataFrame directly into the online store

```
abstract online_read(config: feast.repo_config.RepoConfig, table: feast.feature_view.FeatureView, entity_keys: List[feast.types.EntityKey_pb2.EntityKey], requested_features: Optional[List[str]] = None) → List[Tuple[Optional[datetime.datetime], Optional[Dict[str, feast.types.Value_pb2.Value]]]]
```

Read feature values given an Entity Key. This is a low level interface, not expected to be used by the users directly.

**Returns** Data is returned as a list, one item per entity key. Each item in the list is a tuple of event\_ts for the row, and the feature data as a dict from feature names to values. Values are returned as Value proto message.

```
abstract online_write_batch(config: feast.repo_config.RepoConfig, table: feast.feature_view.FeatureView, data: List[Tuple[feast.types.EntityKey_pb2.EntityKey, Dict[str, feast.types.Value_pb2.Value], datetime.datetime, Optional[datetime.datetime]]], progress: Optional[Callable[[int], Any]]) → None
```

Write a batch of feature rows to the online store. This is a low level interface, not expected to be used by the users directly.

If a tz-naive timestamp is passed to this method, it is assumed to be UTC.

#### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **data** – a list of quadruplets containing Feature data. Each quadruplet contains an Entity Key, a dict containing feature values, an event timestamp for the row, and the created timestamp for the row if it exists.
- **progress** – Optional function to be called once every mini-batch of rows is written to the online store. Can be used to display progress.

**plan\_infra**(*config: feast.repo\_config.RepoConfig, desired\_registry\_proto: feast.core.Registry\_pb2.Registry*) → *feast.infra.infra\_object.Infra*  
 Returns the Infra required to support the desired registry.

**Parameters**

- **config** – The RepoConfig for the current FeatureStore.
- **desired\_registry\_proto** – The desired registry, in proto form.

**abstract retrieve\_saved\_dataset**(*config: feast.repo\_config.RepoConfig, dataset: feast.saved\_dataset.SavedDataset*) → *feast.infra.offline\_stores.offline\_store.RetrievalJob*

Read saved dataset from offline store. All parameters for retrieval (like path, datetime boundaries, column names for both keys and features, etc) are determined from SavedDataset object.

**Returns** RetrievalJob object, which is lazy wrapper for actual query performed under the hood.

**abstract teardown\_infra**(*project: str, tables: Sequence[feast.feature\_view.FeatureView], entities: Sequence[feast.entity.Entity]*)

Tear down all cloud resources for a repo.

**Parameters**

- **project** – Feast project to which tables belong
- **tables** – Tables that are declared in the feature repo.
- **entities** – Entities that are declared in the feature repo.

**abstract update\_infra**(*project: str, tables\_to\_delete: Sequence[feast.feature\_view.FeatureView], tables\_to\_keep: Sequence[feast.feature\_view.FeatureView], entities\_to\_delete: Sequence[feast.entity.Entity], entities\_to\_keep: Sequence[feast.entity.Entity], partial: bool*)

Reconcile cloud resources with the objects declared in the feature repo.

**Parameters**

- **project** – Project to which tables belong
- **tables\_to\_delete** – Tables that were deleted from the feature repo, so provider needs to clean up the corresponding cloud resources.
- **tables\_to\_keep** – Tables that are still in the feature repo. Depending on implementation, provider may or may not need to update the corresponding resources.
- **entities\_to\_delete** – Entities that were deleted from the feature repo, so provider needs to clean up the corresponding cloud resources.
- **entities\_to\_keep** – Entities that are still in the feature repo. Depending on implementation, provider may or may not need to update the corresponding resources.
- **partial** – if true, then tables\_to\_delete and tables\_to\_keep are *not* exhaustive lists. There may be other tables that are not touched by this update.

## 10.1 Passthrough Provider

**class** `feast.infra.passthrough_provider.PassthroughProvider`(*config: feast.repo\_config.RepoConfig*)  
 The Passthrough provider delegates all operations to the underlying online and offline stores.

**ingest\_df**(*feature\_view: feast.feature\_view.FeatureView, entities: List[feast.entity.Entity], df: pandas.core.frame.DataFrame*)

Ingests a DataFrame directly into the online store

**online\_read**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, entity\_keys: List[feast.types.EntityKey\_pb2.EntityKey], requested\_features: List[str] = None*) → List

Read feature values given an Entity Key. This is a low level interface, not expected to be used by the users directly.

**Returns** Data is returned as a list, one item per entity key. Each item in the list is a tuple of event\_ts for the row, and the feature data as a dict from feature names to values. Values are returned as Value proto message.

**online\_write\_batch**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, data: List[Tuple[feast.types.EntityKey\_pb2.EntityKey, Dict[str, feast.types.Value\_pb2.Value], datetime.datetime, Optional[datetime.datetime]]], progress: Optional[Callable[[int], Any]]*) → None

Write a batch of feature rows to the online store. This is a low level interface, not expected to be used by the users directly.

If a tz-naive timestamp is passed to this method, it is assumed to be UTC.

### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **data** – a list of quadruplets containing Feature data. Each quadruplet contains an Entity Key, a dict containing feature values, an event timestamp for the row, and the created timestamp for the row if it exists.
- **progress** – Optional function to be called once every mini-batch of rows is written to the online store. Can be used to display progress.

**retrieve\_saved\_dataset**(*config: feast.repo\_config.RepoConfig, dataset: feast.saved\_dataset.SavedDataset*) → feast.infra.offline\_stores.offline\_store.RetrievalJob

Read saved dataset from offline store. All parameters for retrieval (like path, datetime boundaries, column names for both keys and features, etc) are determined from SavedDataset object.

**Returns** RetrievalJob object, which is lazy wrapper for actual query performed under the hood.

**teardown\_infra**(*project: str, tables: Sequence[feast.feature\_view.FeatureView], entities: Sequence[feast.entity.Entity]*) → None

Tear down all cloud resources for a repo.

### Parameters

- **project** – Feast project to which tables belong
- **tables** – Tables that are declared in the feature repo.
- **entities** – Entities that are declared in the feature repo.

**update\_infra**(*project: str, tables\_to\_delete: Sequence[feast.feature\_view.FeatureView], tables\_to\_keep: Sequence[feast.feature\_view.FeatureView], entities\_to\_delete: Sequence[feast.entity.Entity], entities\_to\_keep: Sequence[feast.entity.Entity], partial: bool*)

Reconcile cloud resources with the objects declared in the feature repo.

#### Parameters

- **project** – Project to which tables belong
- **tables\_to\_delete** – Tables that were deleted from the feature repo, so provider needs to clean up the corresponding cloud resources.
- **tables\_to\_keep** – Tables that are still in the feature repo. Depending on implementation, provider may or may not need to update the corresponding resources.
- **entities\_to\_delete** – Entities that were deleted from the feature repo, so provider needs to clean up the corresponding cloud resources.
- **entities\_to\_keep** – Entities that are still in the feature repo. Depending on implementation, provider may or may not need to update the corresponding resources.
- **partial** – if true, then `tables_to_delete` and `tables_to_keep` are *not* exhaustive lists. There may be other tables that are not touched by this update.

## 10.2 Local Provider

**class** `feast.infra.local.LocalProvider`(*config: feast.repo\_config.RepoConfig*)

This class only exists for backwards compatibility.

**plan\_infra**(*config: feast.repo\_config.RepoConfig, desired\_registry\_proto: feast.core.Registry\_pb2.Registry*) → `feast.infra.infra_object.Infra`

Returns the Infra required to support the desired registry.

#### Parameters

- **config** – The `RepoConfig` for the current `FeatureStore`.
- **desired\_registry\_proto** – The desired registry, in proto form.

## 10.3 GCP Provider

**class** `feast.infra.gcp.GcpProvider`(*config: feast.repo\_config.RepoConfig*)

This class only exists for backwards compatibility.

## 10.4 AWS Provider

**class** `feast.infra.aws.AwsProvider`(*config: feast.repo\_config.RepoConfig*)

**get\_feature\_server\_endpoint**() → `Optional[str]`

Returns endpoint for the feature server, if it exists.

**teardown\_infra**(*project: str, tables: Sequence[feast.feature\_view.FeatureView], entities: Sequence[feast.entity.Entity]*) → `None`

Tear down all cloud resources for a repo.

### Parameters

- **project** – Feast project to which tables belong
- **tables** – Tables that are declared in the feature repo.
- **entities** – Entities that are declared in the feature repo.

**update\_infra**(*project: str, tables\_to\_delete: Sequence[feast.feature\_view.FeatureView], tables\_to\_keep: Sequence[feast.feature\_view.FeatureView], entities\_to\_delete: Sequence[feast.entity.Entity], entities\_to\_keep: Sequence[feast.entity.Entity], partial: bool*)

Reconcile cloud resources with the objects declared in the feature repo.

### Parameters

- **project** – Project to which tables belong
- **tables\_to\_delete** – Tables that were deleted from the feature repo, so provider needs to clean up the corresponding cloud resources.
- **tables\_to\_keep** – Tables that are still in the feature repo. Depending on implementation, provider may or may not need to update the corresponding resources.
- **entities\_to\_delete** – Entities that were deleted from the feature repo, so provider needs to clean up the corresponding cloud resources.
- **entities\_to\_keep** – Entities that are still in the feature repo. Depending on implementation, provider may or may not need to update the corresponding resources.
- **partial** – if true, then `tables_to_delete` and `tables_to_keep` are *not* exhaustive lists. There may be other tables that are not touched by this update.





## OFFLINE STORE

**class** `feast.infra.offline_stores.offline_store.OfflineStore`

OfflineStore is an object used for all interaction between Feast and the service used for offline storage of features.

**abstract static** `pull_all_from_table_or_query`(*config: feast.repo\_config.RepoConfig, data\_source: feast.data\_source.DataSource, join\_key\_columns: List[str], feature\_name\_columns: List[str], event\_timestamp\_column: str, start\_date: datetime.datetime, end\_date: datetime.datetime*) → `feast.infra.offline_stores.offline_store.RetrievalJob`

Note that `join_key_columns`, `feature_name_columns`, `event_timestamp_column`, and `created_timestamp_column` have all already been mapped to column names of the source table and those column names are the values passed into this function.

**abstract static** `pull_latest_from_table_or_query`(*config: feast.repo\_config.RepoConfig, data\_source: feast.data\_source.DataSource, join\_key\_columns: List[str], feature\_name\_columns: List[str], event\_timestamp\_column: str, created\_timestamp\_column: Optional[str], start\_date: datetime.datetime, end\_date: datetime.datetime*) → `feast.infra.offline_stores.offline_store.RetrievalJob`

Note that `join_key_columns`, `feature_name_columns`, `event_timestamp_column`, and `created_timestamp_column` have all already been mapped to column names of the source table and those column names are the values passed into this function.

**class** `feast.infra.offline_stores.offline_store.RetrievalJob`

RetrievalJob is used to manage the execution of a historical feature retrieval

**abstract property metadata:**

`Optional[feast.infra.offline_stores.offline_store.RetrievalMetadata]`

Return metadata information about retrieval. Should be available even before materializing the dataset itself.

**abstract persist**(*storage: feast.saved\_dataset.SavedDatasetStorage*)

Run the retrieval and persist the results in the same offline store used for read.

**to\_arrow**(*validation\_reference: Optional[ValidationReference] = None*) → `pyarrow.lib.Table`

Return dataset as pyarrow Table synchronously :param `validation_reference`: If provided resulting dataset will be validated against this reference profile.

**to\_df**(*validation\_reference: Optional[ValidationReference] = None*) → `pandas.core.frame.DataFrame`

Return dataset as Pandas DataFrame synchronously including on demand transforms :param `validation_reference`: If provided resulting dataset will be validated against this reference profile.

## 11.1 File Offline Store

**class** `feast.infra.offline_stores.file.FileOfflineStore`

```
static pull_all_from_table_or_query(config: feast.repo_config.RepoConfig, data_source:
    feast.data_source.DataSource, join_key_columns: List[str],
    feature_name_columns: List[str], event_timestamp_column:
    str, start_date: datetime.datetime, end_date:
    datetime.datetime) →
    feast.infra.offline_stores.offline_store.RetrievalJob
```

Note that `join_key_columns`, `feature_name_columns`, `event_timestamp_column`, and `created_timestamp_column` have all already been mapped to column names of the source table and those column names are the values passed into this function.

```
static pull_latest_from_table_or_query(config: feast.repo_config.RepoConfig, data_source:
    feast.data_source.DataSource, join_key_columns: List[str],
    feature_name_columns: List[str],
    event_timestamp_column: str, created_timestamp_column:
    Optional[str], start_date: datetime.datetime, end_date:
    datetime.datetime) →
    feast.infra.offline_stores.offline_store.RetrievalJob
```

Note that `join_key_columns`, `feature_name_columns`, `event_timestamp_column`, and `created_timestamp_column` have all already been mapped to column names of the source table and those column names are the values passed into this function.

```
class feast.infra.offline_stores.file.FileOfflineStoreConfig(*, type:
    typing_extensions.Literal[file] =
    'file')
```

Offline store config for local (file-based) store

```
type: typing_extensions.Literal[file]
```

Offline store type selector

```
class feast.infra.offline_stores.file.FileRetrievalJob(evaluation_function: Callable,
    full_feature_names: bool,
    on_demand_feature_views: Op-
    tional[List[feast.on_demand_feature_view.OnDemandFeatureV
    = None, metadata: Op-
    tional[feast.infra.offline_stores.offline_store.RetrievalMetadata,
    = None))
```

**property metadata:**

```
Optional[feast.infra.offline_stores.offline_store.RetrievalMetadata]
```

Return metadata information about retrieval. Should be available even before materializing the dataset itself.

```
persist(storage: feast.saved_dataset.SavedDatasetStorage)
```

Run the retrieval and persist the results in the same offline store used for read.

## 11.2 BigQuery Offline Store

**class** `feast.infra.offline_stores.bigquery.BigQueryOfflineStore`

**static pull\_all\_from\_table\_or\_query**(*config: feast.repo\_config.RepoConfig, data\_source: feast.data\_source.DataSource, join\_key\_columns: List[str], feature\_name\_columns: List[str], event\_timestamp\_column: str, start\_date: datetime.datetime, end\_date: datetime.datetime*) → `feast.infra.offline_stores.offline_store.RetrievalJob`

Note that `join_key_columns`, `feature_name_columns`, `event_timestamp_column`, and `created_timestamp_column` have all already been mapped to column names of the source table and those column names are the values passed into this function.

**static pull\_latest\_from\_table\_or\_query**(*config: feast.repo\_config.RepoConfig, data\_source: feast.data\_source.DataSource, join\_key\_columns: List[str], feature\_name\_columns: List[str], event\_timestamp\_column: str, created\_timestamp\_column: Optional[str], start\_date: datetime.datetime, end\_date: datetime.datetime*) → `feast.infra.offline_stores.offline_store.RetrievalJob`

Note that `join_key_columns`, `feature_name_columns`, `event_timestamp_column`, and `created_timestamp_column` have all already been mapped to column names of the source table and those column names are the values passed into this function.

**class** `feast.infra.offline_stores.bigquery.BigQueryOfflineStoreConfig`(\**, type: typing\_extensions.Literal[bigquery] = 'bigquery', dataset: pydantic.types.StrictStr = 'feast', project\_id: pydantic.types.StrictStr = None, location: pydantic.types.StrictStr = None*)

Offline store config for GCP BigQuery

**dataset:** `pydantic.types.StrictStr`

(optional) BigQuery Dataset name for temporary tables

**location:** `Optional[pydantic.types.StrictStr]`

(optional) GCP location name used for the BigQuery offline store. Examples of location names include US, EU, us-central1, us-west4. If a location is not specified, the location defaults to the US multi-regional location. For more information on BigQuery data locations see: <https://cloud.google.com/bigquery/docs/locations>

**project\_id:** `Optional[pydantic.types.StrictStr]`

(optional) GCP project name used for the BigQuery offline store

**type:** `typing_extensions.Literal[bigquery]`

Offline store type selector

```
class feast.infra.offline_stores.bigquery.BigQueryRetrievalJob(query: Union[str, Callable[[],
    AbstractContextManager[str]]],
    client: google.cloud.bigquery.client.Client,
    config: feast.repo_config.RepoConfig,
    full_feature_names: bool,
    on_demand_feature_views: Optional[List[feast.on_demand_feature_view.OnDemandFeatureView]] = None,
    metadata: Optional[feast.infra.offline_stores.offline_store.RetrievalMetadata] = None)
```

**property metadata:**

**Optional[feast.infra.offline\_stores.offline\_store.RetrievalMetadata]**

Return metadata information about retrieval. Should be available even before materializing the dataset itself.

**persist** (storage: feast.saved\_dataset.SavedDatasetStorage)

Run the retrieval and persist the results in the same offline store used for read.

**to\_bigquery** (job\_config: Optional[google.cloud.bigquery.job.query.QueryJobConfig] = None, timeout: int = 1800, retry\_cadence: int = 10) → Optional[str]

Triggers the execution of a historical feature retrieval query and exports the results to a BigQuery table. Runs for a maximum amount of time specified by the timeout parameter (defaulting to 30 minutes).

**Parameters**

- **job\_config** – An optional bigquery.QueryJobConfig to specify options like destination table, dry run, etc.
- **timeout** – An optional number of seconds for setting the time limit of the QueryJob.
- **retry\_cadence** – An optional number of seconds for setting how long the job should be checked for completion.

**Returns** Returns the destination table name or returns None if job\_config.dry\_run is True.

**to\_sql**() → str

Returns the SQL query that will be executed in BigQuery to build the historical feature table.

```
feast.infra.offline_stores.bigquery.block_until_done(client: google.cloud.bigquery.client.Client,
    bq_job: Union[google.cloud.bigquery.job.query.QueryJob,
    google.cloud.bigquery.job.load.LoadJob],
    timeout: int = 1800, retry_cadence: float = 1)
```

Waits for bq\_job to finish running, up to a maximum amount of time specified by the timeout parameter (defaulting to 30 minutes).

**Parameters**

- **client** – A bigquery.client.Client to monitor the bq\_job.
- **bq\_job** – The bigquery.job.QueryJob that blocks until done running.
- **timeout** – An optional number of seconds for setting the time limit of the job.
- **retry\_cadence** – An optional number of seconds for setting how long the job should be checked for completion.

**Raises**

- `BigQueryJobStillRunning` exception if the function has blocked longer than 30 minutes. –
- `BigQueryJobCancelled` exception to signify when that the job has been cancelled (i.e. from timeout or `KeyboardInterrupt`) –

## 11.3 Redshift Offline Store

`class feast.infra.offline_stores.redshift.RedshiftOfflineStore`

```
static pull_all_from_table_or_query(config: feast.repo_config.RepoConfig, data_source: feast.data_source.DataSource, join_key_columns: List[str], feature_name_columns: List[str], event_timestamp_column: str, start_date: datetime.datetime, end_date: datetime.datetime) → feast.infra.offline_stores.offline_store.RetrievalJob
```

Note that `join_key_columns`, `feature_name_columns`, `event_timestamp_column`, and `created_timestamp_column` have all already been mapped to column names of the source table and those column names are the values passed into this function.

```
static pull_latest_from_table_or_query(config: feast.repo_config.RepoConfig, data_source: feast.data_source.DataSource, join_key_columns: List[str], feature_name_columns: List[str], event_timestamp_column: str, created_timestamp_column: Optional[str], start_date: datetime.datetime, end_date: datetime.datetime) → feast.infra.offline_stores.offline_store.RetrievalJob
```

Note that `join_key_columns`, `feature_name_columns`, `event_timestamp_column`, and `created_timestamp_column` have all already been mapped to column names of the source table and those column names are the values passed into this function.

```
class feast.infra.offline_stores.redshift.RedshiftOfflineStoreConfig(*, type: typing_extensions.Literal[redshift] = 'redshift', cluster_id: pydantic.types.StrictStr, region: pydantic.types.StrictStr, user: pydantic.types.StrictStr, database: pydantic.types.StrictStr, s3_staging_location: pydantic.types.StrictStr, iam_role: pydantic.types.StrictStr)
```

Offline store config for AWS Redshift

**cluster\_id:** `pydantic.types.StrictStr`  
Redshift cluster identifier

**database:** `pydantic.types.StrictStr`  
Redshift database name

**iam\_role:** `pydantic.types.StrictStr`  
IAM Role for Redshift, granting it access to S3

**region:** `pydantic.types.StrictStr`

Redshift cluster's AWS region

**s3\_staging\_location:** `pydantic.types.StrictStr`

S3 path for importing & exporting data to Redshift

**type:** `typing_extensions.Literal[redshift]`

Offline store type selector

**user:** `pydantic.types.StrictStr`

Redshift user name

```
class feast.infra.offline_stores.redshift.RedshiftRetrievalJob(query: Union[str, Callable[[], AbstractContextManager[str]]], redshift_client, s3_resource, config: feast.repo_config.RepoConfig, full_feature_names: bool, on_demand_feature_views: Optional[List[feast.on_demand_feature_view.OnDemandFeatureView]] = None, metadata: Optional[feast.infra.offline_stores.offline_store.RetrievalMetadata] = None)
```

**property metadata:**

**Optional[feast.infra.offline\_stores.offline\_store.RetrievalMetadata]**

Return metadata information about retrieval. Should be available even before materializing the dataset itself.

**persist** (*storage: feast.saved\_dataset.SavedDatasetStorage*)

Run the retrieval and persist the results in the same offline store used for read.

**to\_redshift** (*table\_name: str*) → `None`

Save dataset as a new Redshift table

**to\_s3**() → `str`

Export dataset to S3 in Parquet format and return path

## ONLINE STORE

**class** `feast.infra.online_stores.online_store.OnlineStore`

OnlineStore is an object used for all interaction between Feast and the service used for online storage of features.

**abstract online\_read**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, entity\_keys: List[feast.types.EntityKey\_pb2.EntityKey], requested\_features: Optional[List[str]] = None*) → List[Tuple[Optional[datetime.datetime], Optional[Dict[str, feast.types.Value\_pb2.Value]]]]

Read feature values given an Entity Key. This is a low level interface, not expected to be used by the users directly.

### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **entity\_keys** – a list of entity keys that should be read from the FeatureStore.
- **requested\_features** – (Optional) A subset of the features that should be read from the FeatureStore.

**Returns** Data is returned as a list, one item per entity key. Each item in the list is a tuple of event\_ts for the row, and the feature data as a dict from feature names to values. Values are returned as Value proto message.

**abstract online\_write\_batch**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, data: List[Tuple[feast.types.EntityKey\_pb2.EntityKey, Dict[str, feast.types.Value\_pb2.Value], datetime.datetime, Optional[datetime.datetime]]], progress: Optional[Callable[[int], Any]]*) → None

Write a batch of feature rows to the online store. This is a low level interface, not expected to be used by the users directly.

If a tz-naive timestamp is passed to this method, it should be assumed to be UTC by implementors.

### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **data** – a list of quadruplets containing Feature data. Each quadruplet contains an Entity Key,
- **values** (a dict containing feature) –

- **row** (an event timestamp for the) –
- **and** –
- **exists.** (the created timestamp for the row if it) –
- **progress** – Optional function to be called once every mini-batch of rows is written to
- **progress.** (the online store. Can be used to display) –

**plan**(*config: feast.repo\_config.RepoConfig, desired\_registry\_proto: feast.core.Registry\_pb2.Registry*) → List[feast.infra.infra\_object.InfraObject]  
Returns the set of InfraObjects required to support the desired registry.

#### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **desired\_registry\_proto** – The desired registry, in proto form.

## 12.1 Sqlite Online Store

**class** `feast.infra.online_stores.sqlite.SqliteOnlineStore`

OnlineStore is an object used for all interaction between Feast and the service used for offline storage of features.

**\_conn**

SQLite connection.

**Type** Optional[sqlite3.Connection]

**online\_read**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, entity\_keys: List[feast.types.EntityKey\_pb2.EntityKey], requested\_features: Optional[List[str]] = None*) → List[Tuple[Optional[datetime.datetime], Optional[Dict[str, feast.types.Value\_pb2.Value]]]]  
Read feature values given an Entity Key. This is a low level interface, not expected to be used by the users directly.

#### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **entity\_keys** – a list of entity keys that should be read from the FeatureStore.
- **requested\_features** – (Optional) A subset of the features that should be read from the FeatureStore.

**Returns** Data is returned as a list, one item per entity key. Each item in the list is a tuple of event\_ts for the row, and the feature data as a dict from feature names to values. Values are returned as Value proto message.

**online\_write\_batch**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, data: List[Tuple[feast.types.EntityKey\_pb2.EntityKey, Dict[str, feast.types.Value\_pb2.Value], datetime.datetime, Optional[datetime.datetime]]], progress: Optional[Callable[[int], Any]]*) → None

Write a batch of feature rows to the online store. This is a low level interface, not expected to be used by the users directly.

If a tz-naive timestamp is passed to this method, it should be assumed to be UTC by implementors.

#### Parameters



- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **data** – a list of quadruplets containing Feature data. Each quadruplet contains an Entity Key,
- **values** (a dict containing feature) –
- **row** (an event timestamp for the) –
- **and** –
- **exists.** (the created timestamp for the row if it) –
- **progress** – Optional function to be called once every mini-batch of rows is written to
- **progress.** (the online store. Can be used to display) –

**plan**(*config: feast.repo\_config.RepoConfig, desired\_registry\_proto: feast.core.Registry\_pb2.Registry*) → List[feast.infra.infra\_object.InfraObject]  
Returns the set of InfraObjects required to support the desired registry.

#### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **desired\_registry\_proto** – The desired registry, in proto form.

```
class feast.infra.online_stores.sqlite.SQLiteOnlineStoreConfig(*, type:
    typing_extensions.Literal[sqlite,
    feast.infra.online_stores.sqlite.SQLiteOnlineStore]
    = 'sqlite', path:
    pydantic.types.StrictStr =
    'data/online.db')
```

Online store config for local (SQLite-based) store

**path:** `pydantic.types.StrictStr`  
(optional) Path to sqlite db

**type:** `typing_extensions.Literal[sqlite, feast.infra.online_stores.sqlite.SQLiteOnlineStore]`  
Online store type selector

**class** `feast.infra.online_stores.sqlite.SQLiteTable`(*path: str, name: str*)  
A SQLite table managed by Feast.

**path**  
The absolute path of the SQLite file.

**Type** `str`

**name**  
The name of the table.

**conn**  
SQLite connection.

**Type** `sqlite3.Connection`

**static from\_infra\_object\_proto**(*infra\_object\_proto: feast.core.InfraObject\_pb2.InfraObject*) → Any  
Returns an InfraObject created from a protobuf representation.

**Parameters** `infra_object_proto` – A protobuf representation of an InfraObject.

**Raises** `FeastInvalidInfraObjectType` – The type of InfraObject could not be identified.

**static from\_proto**(*sqlite\_table\_proto: feast.core.SQLiteTable\_pb2.SQLiteTable*) → Any

Converts a protobuf representation of a subclass to an object of that subclass.

**Parameters** **infra\_object\_proto** – A protobuf representation of an InfraObject.

**Raises** **FeastInvalidInfraObjectType** – The type of InfraObject could not be identified.

**teardown**()

Tears down the infrastructure object.

**to\_infra\_object\_proto**() → feast.core.InfraObject\_pb2.InfraObject

Converts an InfraObject to its protobuf representation, wrapped in an InfraObjectProto.

**to\_proto**() → Any

Converts an InfraObject to its protobuf representation.

**update**()

Deploys or updates the infrastructure object.

## 12.2 Datastore Online Store

**class** `feast.infra.online_stores.datastore.DatastoreOnlineStore`

OnlineStore is an object used for all interaction between Feast and the service used for offline storage of features.

**online\_read**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, entity\_keys: List[feast.types.EntityKey\_pb2.EntityKey], requested\_features: Optional[List[str]] = None*) → List[Tuple[Optional[datetime.datetime], Optional[Dict[str, feast.types.Value\_pb2.Value]]]]

Read feature values given an Entity Key. This is a low level interface, not expected to be used by the users directly.

### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **entity\_keys** – a list of entity keys that should be read from the FeatureStore.
- **requested\_features** – (Optional) A subset of the features that should be read from the FeatureStore.

**Returns** Data is returned as a list, one item per entity key. Each item in the list is a tuple of event\_ts for the row, and the feature data as a dict from feature names to values. Values are returned as Value proto message.

**online\_write\_batch**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, data: List[Tuple[feast.types.EntityKey\_pb2.EntityKey, Dict[str, feast.types.Value\_pb2.Value], datetime.datetime, Optional[datetime.datetime]]], progress: Optional[Callable[[int], Any]]*) → None

Write a batch of feature rows to the online store. This is a low level interface, not expected to be used by the users directly.

If a tz-naive timestamp is passed to this method, it should be assumed to be UTC by implementors.

### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView

- **data** – a list of quadruplets containing Feature data. Each quadruplet contains an Entity Key,
- **values** (a dict containing feature) –
- **row** (an event timestamp for the) –
- **and** –
- **exists.** (the created timestamp for the row if it) –
- **progress** – Optional function to be called once every mini-batch of rows is written to
- **progress.** (the online store. Can be used to display) –

```
class feast.infra.online_stores.datastore.DatastoreOnlineStoreConfig(*, type: typing_extensions.Literal[datastore]
                                                                    = 'datastore', project_id:
                                                                    pydantic.types.StrictStr =
                                                                    None, namespace:
                                                                    pydantic.types.StrictStr =
                                                                    None, write_concurrency:
                                                                    pydantic.types.PositiveInt
                                                                    = 40, write_batch_size:
                                                                    pydantic.types.PositiveInt
                                                                    = 50)
```

Online store config for GCP Datastore

**namespace:** `Optional[pydantic.types.StrictStr]`  
(optional) Datastore namespace

**project\_id:** `Optional[pydantic.types.StrictStr]`  
(optional) GCP Project Id

**type:** `typing_extensions.Literal[datastore]`  
Online store type selector

**write\_batch\_size:** `Optional[pydantic.types.PositiveInt]`  
(optional) Amount of feature rows per batch being written into Datastore

**write\_concurrency:** `Optional[pydantic.types.PositiveInt]`  
(optional) Amount of threads to use when writing batches of feature rows into Datastore

```
class feast.infra.online_stores.datastore.DatastoreTable(project: str, name: str, project_id:
                                                         Optional[str] = None, namespace:
                                                         Optional[str] = None)
```

A Datastore table managed by Feast.

**project**  
The Feast project of the table.

**Type** `str`

**name**  
The name of the table.

**project\_id**  
The GCP project id.

**Type** `optional`

**namespace**  
Datastore namespace.

Type optional

**static from\_infra\_object\_proto**(*infra\_object\_proto: feast.core.InfraObject\_pb2.InfraObject*) → Any  
Returns an InfraObject created from a protobuf representation.

**Parameters** **infra\_object\_proto** – A protobuf representation of an InfraObject.

**Raises** **FeastInvalidInfraObjectType** – The type of InfraObject could not be identified.

**static from\_proto**(*datastore\_table\_proto: feast.core.DatastoreTable\_pb2.DatastoreTable*) → Any  
Converts a protobuf representation of a subclass to an object of that subclass.

**Parameters** **infra\_object\_proto** – A protobuf representation of an InfraObject.

**Raises** **FeastInvalidInfraObjectType** – The type of InfraObject could not be identified.

**teardown**()

Tears down the infrastructure object.

**to\_infra\_object\_proto**() → *feast.core.InfraObject\_pb2.InfraObject*

Converts an InfraObject to its protobuf representation, wrapped in an InfraObjectProto.

**to\_proto**() → Any

Converts an InfraObject to its protobuf representation.

**update**()

Deploys or updates the infrastructure object.

## 12.3 DynamoDB Online Store

**class** `feast.infra.online_stores.dynamodb.DynamoDBOnlineStore`

Online feature store for AWS DynamoDB.

**\_dynamodb\_client**

Boto3 DynamoDB client.

**\_dynamodb\_resource**

Boto3 DynamoDB resource.

**online\_read**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, entity\_keys: List[feast.types.EntityKey\_pb2.EntityKey], requested\_features: Optional[List[str]] = None*) → List[Tuple[Optional[datetime.datetime], Optional[Dict[str, feast.types.Value\_pb2.Value]]]]

Retrieve feature values from the online DynamoDB store.

Note: This method is currently not optimized to retrieve a lot of data at a time as it does sequential gets from the DynamoDB table.

**Parameters**

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView.
- **entity\_keys** – a list of entity keys that should be read from the FeatureStore.

**online\_write\_batch**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, data: List[Tuple[feast.types.EntityKey\_pb2.EntityKey, Dict[str, feast.types.Value\_pb2.Value], datetime.datetime, Optional[datetime.datetime]]], progress: Optional[Callable[[int], Any]]*) → None

Write a batch of feature rows to online DynamoDB store.

Note: This method applies a `batch_writer` to automatically handle any unprocessed items and resend them as needed, this is useful if you're loading a lot of data at a time.

#### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView.
- **data** – a list of quadruplets containing Feature data. Each quadruplet contains an Entity Key,
- **values** (a dict containing feature) –
- **row** (an event timestamp for the) –
- **and** –
- **exists.** (the created timestamp for the row if it) –
- **progress** – Optional function to be called once every mini-batch of rows is written to
- **progress.** (the online store. Can be used to display) –

**teardown**(*config: feast.repo\_config.RepoConfig, tables: Sequence[feast.feature\_view.FeatureView], entities: Sequence[feast.entity.Entity]*)

Delete tables from the DynamoDB Online Store.

#### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **tables** – Tables to delete from the feature repo.

**update**(*config: feast.repo\_config.RepoConfig, tables\_to\_delete: Sequence[feast.feature\_view.FeatureView], tables\_to\_keep: Sequence[feast.feature\_view.FeatureView], entities\_to\_delete: Sequence[feast.entity.Entity], entities\_to\_keep: Sequence[feast.entity.Entity], partial: bool*)

Update tables from the DynamoDB Online Store.

#### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **tables\_to\_delete** – Tables to delete from the DynamoDB Online Store.
- **tables\_to\_keep** – Tables to keep in the DynamoDB Online Store.

```
class feast.infra.online_stores.dynamodb.DynamoDBOnlineStoreConfig(*, type: typing_extensions.Literal[dynamodb]
                                                                    = 'dynamodb', region:
                                                                    pydantic.types.StrictStr)
```

Online store config for DynamoDB store

**region:** `pydantic.types.StrictStr`  
AWS Region Name

**type:** `typing_extensions.Literal[dynamodb]`  
Online store type selector

```
class feast.infra.online_stores.dynamodb.DynamoDBTable(name: str, region: str)
    A DynamoDB table managed by Feast.
```

**name**  
The name of the table.

**region**

The region of the table.

**Type** `str`

**static from\_infra\_object\_proto**(*infra\_object\_proto: feast.core.InfraObject\_pb2.InfraObject*) → Any  
Returns an InfraObject created from a protobuf representation.

**Parameters** `infra_object_proto` – A protobuf representation of an InfraObject.

**Raises** `FeastInvalidInfraObjectType` – The type of InfraObject could not be identified.

**static from\_proto**(*dynamodb\_table\_proto: feast.core.DynamoDBTable\_pb2.DynamoDBTable*) → Any  
Converts a protobuf representation of a subclass to an object of that subclass.

**Parameters** `infra_object_proto` – A protobuf representation of an InfraObject.

**Raises** `FeastInvalidInfraObjectType` – The type of InfraObject could not be identified.

**teardown()**

Tears down the infrastructure object.

**to\_infra\_object\_proto**() → `feast.core.InfraObject_pb2.InfraObject`

Converts an InfraObject to its protobuf representation, wrapped in an InfraObjectProto.

**to\_proto**() → Any

Converts an InfraObject to its protobuf representation.

**update()**

Deploys or updates the infrastructure object.

## 12.4 Redis Online Store

`class feast.infra.online_stores.redis.RedisOnlineStore`

**online\_read**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, entity\_keys: List[feast.types.EntityKey\_pb2.EntityKey], requested\_features: Optional[List[str]] = None*) → List[Tuple[Optional[datetime.datetime], Optional[Dict[str, feast.types.Value\_pb2.Value]]]]

Read feature values given an Entity Key. This is a low level interface, not expected to be used by the users directly.

**Parameters**

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **entity\_keys** – a list of entity keys that should be read from the FeatureStore.
- **requested\_features** – (Optional) A subset of the features that should be read from the FeatureStore.

**Returns** Data is returned as a list, one item per entity key. Each item in the list is a tuple of event\_ts for the row, and the feature data as a dict from feature names to values. Values are returned as Value proto message.

**online\_write\_batch**(*config: feast.repo\_config.RepoConfig, table: feast.feature\_view.FeatureView, data: List[Tuple[feast.types.EntityKey\_pb2.EntityKey, Dict[str, feast.types.Value\_pb2.Value], datetime.datetime, Optional[datetime.datetime]]], progress: Optional[Callable[[int], Any]]*) → None

Write a batch of feature rows to the online store. This is a low level interface, not expected to be used by the users directly.

If a tz-naive timestamp is passed to this method, it should be assumed to be UTC by implementors.

#### Parameters

- **config** – The RepoConfig for the current FeatureStore.
- **table** – Feast FeatureView
- **data** – a list of quadruplets containing Feature data. Each quadruplet contains an Entity Key,
- **values** (a dict containing feature) –
- **row** (an event timestamp for the) –
- **and** –
- **exists.** (the created timestamp for the row if it) –
- **progress** – Optional function to be called once every mini-batch of rows is written to
- **progress.** (the online store. Can be used to display) –

**teardown**(*config: feast.repo\_config.RepoConfig, tables: Sequence[feast.feature\_view.FeatureView], entities: Sequence[feast.entity.Entity]*)

We delete the keys in redis for tables/views being removed.

**update**(*config: feast.repo\_config.RepoConfig, tables\_to\_delete: Sequence[feast.feature\_view.FeatureView], tables\_to\_keep: Sequence[feast.feature\_view.FeatureView], entities\_to\_delete: Sequence[feast.entity.Entity], entities\_to\_keep: Sequence[feast.entity.Entity], partial: bool*)

Look for join\_keys (list of entities) that are not in use anymore (usually this happens when the last feature view that was using specific compound key is deleted) and remove all features attached to this “join\_keys”.

```
class feast.infra.online_stores.redis.RedisOnlineStoreConfig(*, type:
    typing_extensions.Literal[redis] =
    'redis', redis_type:
    feast.infra.online_stores.redis.RedisType
    = RedisType.redis,
    connection_string:
    pydantic.types.StrictStr =
    'localhost:6379', key_ttl_seconds: int
    = None)
```

Online store config for Redis store

**connection\_string:** `pydantic.types.StrictStr`

Connection string containing the host, port, and configuration parameters for Redis format: host:port,parameter1,parameter2 eg. redis:6379,db=0

**key\_ttl\_seconds:** `Optional[int]`

(Optional) redis key bin ttl (in seconds) for expiring entities

**redis\_type:** `feast.infra.online_stores.redis.RedisType`

redis or redis\_cluster

**Type** Redis type

**type:** `typing_extensions.Literal[redis]`  
Online store type selector

**class** `feast.infra.online_stores.redis.RedisType(value)`  
An enumeration.



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