

# Package ‘apache.sedona’

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**Type** Package

**Title** R Interface for Apache Sedona

**Version** 1.4.1

**Maintainer** Apache Sedona <private@sedona.apache.org>

**Description** R interface for 'Apache Sedona' based on 'sparklyr'  
(<<https://sedona.apache.org>>).

**License** Apache License 2.0

**URL** <https://github.com/apache/sedona/>, <https://sedona.apache.org/>

**BugReports** <https://github.com/apache/sedona/issues>

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## R topics documented:

approx_count . . . . .	2
crs_transform . . . . .	3
minimum_bounding_box . . . . .	4

new_bounding_box . . . . .	5
sdf_register.spatial_rdd . . . . .	6
sedona_apply_spatial_partitioner . . . . .	7
sedona_build_index . . . . .	8
sedona_knn_query . . . . .	9
sedona_range_query . . . . .	11
sedona_read_dsv_to_typed_rdd . . . . .	12
sedona_read_geojson . . . . .	14
sedona_read_shapefile_to_typed_rdd . . . . .	16
sedona_render_choropleth_map . . . . .	17
sedona_render_heatmap . . . . .	19
sedona_render_scatter_plot . . . . .	21
sedona_save_spatial_rdd . . . . .	23
sedona_spatial_join . . . . .	24
sedona_spatial_join_count_by_key . . . . .	25
sedona_write_wkb . . . . .	27
spark_read_shapefile . . . . .	28
spark_write_geojson . . . . .	30
to_spatial_rdd . . . . .	32

<b>Index</b>	<b>33</b>
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---

approx_count	<i>Find the approximate total number of records within a Spatial RDD.</i>
--------------	---

---

### Description

Given a Sedona spatial RDD, find the (possibly approximated) number of total records within it.

### Usage

```
approx_count(x)
```

### Arguments

x	A Sedona spatial RDD.
---	-----------------------

### Value

Approximate number of records within the SpatialRDD.

### See Also

Other Spatial RDD aggregation routine: [minimum\\_bounding\\_box\(\)](#)

**Examples**

```

library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_shapefile_to_typed_rdd(
    sc,
    location = input_location, type = "polygon"
  )
  approx_cnt <- approx_count(rdd)
}

```

---

crs_transform	<i>Perform a CRS transformation.</i>
---------------	--------------------------------------

---

**Description**

Transform data within a spatial RDD from one coordinate reference system to another.

**Usage**

```
crs_transform(x, src_epsg_crs_code, dst_epsg_crs_code, strict = FALSE)
```

**Arguments**

x	The spatial RDD to be processed.
src_epsg_crs_code	Coordinate reference system to transform from (e.g., "epsg:4326", "epsg:3857", etc).
dst_epsg_crs_code	Coordinate reference system to transform to. (e.g., "epsg:4326", "epsg:3857", etc).
strict	If FALSE (default), then ignore the "Bursa-Wolf Parameters Required" error.

**Value**

The transformed SpatialRDD.

## Examples

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_geojson_to_typed_rdd(
    sc,
    location = input_location, type = "polygon"
  )
  crs_transform(
    rdd,
    src_epsg_crs_code = "epsg:4326", dst_epsg_crs_code = "epsg:3857"
  )
}
```

---

minimum\_bounding\_box *Find the minimal bounding box of a geometry.*

---

## Description

Given a Sedona spatial RDD, find the axis-aligned minimal bounding box of the geometry represented by the RDD.

## Usage

```
minimum_bounding_box(x)
```

## Arguments

x                    A Sedona spatial RDD.

## Value

A minimum bounding box object.

## See Also

Other Spatial RDD aggregation routine: [approx\\_count\(\)](#)

## Examples

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_shapefile_to_typed_rdd(
    sc,
    location = input_location, type = "polygon"
  )
  boundary <- minimum_bounding_box(rdd)
}
```

---

new_bounding_box	<i>Construct a bounding box object.</i>
------------------	---

---

## Description

Construct a axis-aligned rectangular bounding box object.

## Usage

```
new_bounding_box(sc, min_x = -Inf, max_x = Inf, min_y = -Inf, max_y = Inf)
```

## Arguments

sc	The Spark connection.
min_x	Minimum x-value of the bounding box, can be +/- Inf.
max_x	Maximum x-value of the bounding box, can be +/- Inf.
min_y	Minimum y-value of the bounding box, can be +/- Inf.
max_y	Maximum y-value of the bounding box, can be +/- Inf.

## Value

A bounding box object.

## Examples

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")
bb <- new_bounding_box(sc, -1, 1, -1, 1)
```

---

`sdf_register.spatial_rdd`*Import data from a spatial RDD into a Spark Dataframe.*

---

## Description

Import data from a spatial RDD (possibly with non-spatial attributes) into a Spark Dataframe.

- `sdf_register`: method for sparklyr's `sdf_register` to handle Spatial RDD
- `as.spark.dataframe`: lower level function with more fine-grained control on non-spatial columns

## Usage

```
## S3 method for class 'spatial_rdd'  
sdf_register(x, name = NULL)
```

```
as.spark.dataframe(x, non_spatial_cols = NULL, name = NULL)
```

## Arguments

<code>x</code>	A spatial RDD.
<code>name</code>	Name to assign to the resulting Spark temporary view. If unspecified, then a random name will be assigned.
<code>non_spatial_cols</code>	Column names for non-spatial attributes in the resulting Spark Dataframe. By default (NULL) it will import all field names if that property exists, in particular for shapefiles.

## Value

A Spark Dataframe containing the imported spatial data.

## Examples

```
library(sparklyr)  
library(apache.sedona)  
  
sc <- spark_connect(master = "spark://HOST:PORT")  
  
if (!inherits(sc, "test_connection")) {  
  input_location <- "/dev/null" # replace it with the path to your input file  
  rdd <- sedona_read_geojson_to_typed_rdd(  
    sc,  
    location = input_location,  
    type = "polygon"  
  )  
  sdf <- sdf_register(rdd)
```

```

input_location <- "/dev/null" # replace it with the path to your input file
rdd <- sedona_read_dsv_to_typed_rdd(
  sc,
  location = input_location,
  delimiter = ",",
  type = "point",
  first_spatial_col_index = 1L,
  repartition = 5
)
sdf <- as.spark.dataframe(rdd, non_spatial_cols = c("attr1", "attr2"))
}

```

---

sedona\_apply\_spatial\_partitioner

*Apply a spatial partitioner to a Sedona spatial RDD.*

---

## Description

Given a Sedona spatial RDD, partition its content using a spatial partitioner.

## Usage

```

sedona_apply_spatial_partitioner(
  rdd,
  partitioner = c("quadtree", "kdbtree"),
  max_levels = NULL
)

```

## Arguments

rdd	The spatial RDD to be partitioned.
partitioner	The name of a grid type to use (currently "quadtree" and "kdbtree" are supported) or an <code>org.apache.sedona.core.spatialPartitioning.SpatialPartitioner</code> JVM object. The latter option is only relevant for advanced use cases involving a custom spatial partitioner.
max_levels	Maximum number of levels in the partitioning tree data structure. If NULL (default), then use the current number of partitions within rdd as maximum number of levels. Specifying max_levels is unsupported for use cases involving a custom spatial partitioner because in these scenarios the partitioner object already has its own maximum number of levels set and there is no well-defined way to override this existing setting in the partitioning data structure.

## Value

A spatially partitioned SpatialRDD.

**Examples**

```

library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_dsv_to_typed_rdd(
    sc,
    location = input_location,
    delimiter = ",",
    type = "point",
    first_spatial_col_index = 1L
  )
  sedona_apply_spatial_partitioner(rdd, partitioner = "kdbtree")
}

```

---

sedona\_build\_index      *Build an index on a Sedona spatial RDD.*

---

**Description**

Given a Sedona spatial RDD, build the type of index specified on each of its partition(s).

**Usage**

```

sedona_build_index(
  rdd,
  type = c("quadtree", "rtree"),
  index_spatial_partitions = TRUE
)

```

**Arguments**

rdd	The spatial RDD to be indexed.
type	The type of index to build. Currently "quadtree" and "rtree" are supported.
index_spatial_partitions	If the RDD is already partitioned using a spatial partitioner, then index each spatial partition within the RDD instead of partitions within the raw RDD associated with the underlying spatial data source. Default: TRUE. Notice this option is irrelevant if the input RDD has not been partitioned using with a spatial partitioner yet.

**Value**

A spatial index object.



**Examples**

```

library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_shapefile_to_typed_rdd(
    sc,
    location = input_location,
    type = "polygon"
  )
  sedona_build_index(rdd, type = "rtree")
}

```

---

sedona_knn_query	<i>Query the k nearest spatial objects.</i>
------------------	---

---

**Description**

Given a spatial RDD, a query object  $x$ , and an integer  $k$ , find the  $k$  nearest spatial objects within the RDD from  $x$  (distance between  $x$  and another geometrical object will be measured by the minimum possible length of any line segment connecting those 2 objects).

**Usage**

```

sedona_knn_query(
  rdd,
  x,
  k,
  index_type = c("quadtree", "rtree"),
  result_type = c("rdd", "sdf", "raw")
)

```

**Arguments**

rdd	A Sedona spatial RDD.
x	The query object.
k	Number of nearest spatail objects to return.
index_type	Index to use to facilitate the KNN query. If NULL, then do not build any additional spatial index on top of $x$ . Supported index types are "quadtree" and "rtree".

**result\_type** Type of result to return. If "rdd" (default), then the k nearest objects will be returned in a Sedona spatial RDD. If "sdf", then a Spark dataframe containing the k nearest objects will be returned. If "raw", then a list of k nearest objects will be returned. Each element within this list will be a JVM object of type `org.locationtech.jts.geom.Geometry`.

### Value

The KNN query result.

### See Also

Other Sedona spatial query: [sedona\\_range\\_query\(\)](#)

### Examples

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  knn_query_pt_x <- -84.01
  knn_query_pt_y <- 34.01
  knn_query_pt_tbl <- sdf_sql(
    sc,
    sprintf(
      "SELECT ST_GeomFromText(\"POINT(%f %f)\") AS `pt`",
      knn_query_pt_x,
      knn_query_pt_y
    )
  ) %>%
  collect()
  knn_query_pt <- knn_query_pt_tbl$pt[[1]]
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_geojson_to_typed_rdd(
    sc,
    location = input_location,
    type = "polygon"
  )
  knn_result_sdf <- sedona_knn_query(
    rdd,
    x = knn_query_pt, k = 3, index_type = "rtree", result_type = "sdf"
  )
}
```

---

sedona\_range\_query      *Execute a range query.*

---

### Description

Given a spatial RDD and a query object *x*, find all spatial objects within the RDD that are covered by *x* or intersect *x*.

### Usage

```
sedona_range_query(
  rdd,
  x,
  query_type = c("cover", "intersect"),
  index_type = c("quadtree", "rtree"),
  result_type = c("rdd", "sdf", "raw")
)
```

### Arguments

rdd	A Sedona spatial RDD.
x	The query object.
query_type	Type of spatial relationship involved in the query. Currently "cover" and "intersect" are supported.
index_type	Index to use to facilitate the KNN query. If NULL, then do not build any additional spatial index on top of <i>x</i> . Supported index types are "quadtree" and "rtree".
result_type	Type of result to return. If "rdd" (default), then the <i>k</i> nearest objects will be returned in a Sedona spatial RDD. If "sdf", then a Spark dataframe containing the <i>k</i> nearest objects will be returned. If "raw", then a list of <i>k</i> nearest objects will be returned. Each element within this list will be a JVM object of type <code>org.locationtech.jts.geom.Geometry</code> .

### Value

The range query result.

### See Also

Other Sedona spatial query: [sedona\\_knn\\_query\(\)](#)

### Examples

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")
```

```

if (!inherits(sc, "test_connection")) {
  range_query_min_x <- -87
  range_query_max_x <- -50
  range_query_min_y <- 34
  range_query_max_y <- 54
  geom_factory <- invoke_new(
    sc,
    "org.locationtech.jts.geom.GeometryFactory"
  )
  range_query_polygon <- invoke_new(
    sc,
    "org.locationtech.jts.geom.Envelope",
    range_query_min_x,
    range_query_max_x,
    range_query_min_y,
    range_query_max_y
  ) %>%
    invoke(geom_factory, "toGeometry", .)
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_geojson_to_typed_rdd(
    sc,
    location = input_location,
    type = "polygon"
  )
  range_query_result_sdf <- sedona_range_query(
    rdd,
    x = range_query_polygon,
    query_type = "intersect",
    index_type = "rtree",
    result_type = "sdf"
  )
}

```

---

```
sedona_read_dsv_to_typed_rdd
```

*Create a typed SpatialRDD from a delimiter-separated values data source.*

---

### Description

Create a typed SpatialRDD (namely, a PointRDD, a PolygonRDD, or a LineStringRDD) from a data source containing delimiter-separated values. The data source can contain spatial attributes (e.g., longitude and latitude) and other attributes. Currently only inputs with spatial attributes occupying a contiguous range of columns (i.e., [first\_spatial\_col\_index, last\_spatial\_col\_index]) are supported.

### Usage

```
sedona_read_dsv_to_typed_rdd(
```

```

    sc,
    location,
    delimiter = c(",", "\\t", "?", "'", "\"", "_", "-", "%", "~", "|", ";"),
    type = c("point", "polygon", "linestring"),
    first_spatial_col_index = 0L,
    last_spatial_col_index = NULL,
    has_non_spatial_attrs = TRUE,
    storage_level = "MEMORY_ONLY",
    repartition = 1L
  )

```

### Arguments

<code>sc</code>	A <code>spark_connection</code> .
<code>location</code>	Location of the data source.
<code>delimiter</code>	Delimiter within each record. Must be one of <code>'</code> , <code>\t</code> , <code>?</code> , <code>'</code> , <code>\</code> , <code>"</code> , <code>_</code> , <code>-</code> , <code>%</code> , <code>~</code> , <code> </code> , <code>;</code> .
<code>type</code>	Type of the SpatialRDD (must be one of "point", "polygon", or "linestring").
<code>first_spatial_col_index</code>	Zero-based index of the left-most column containing spatial attributes (default: 0).
<code>last_spatial_col_index</code>	Zero-based index of the right-most column containing spatial attributes (default: NULL). Note <code>last_spatial_col_index</code> does not need to be specified when creating a PointRDD because it will automatically have the implied value of ( <code>first_spatial_col_index + 1</code> ). For all other types of RDDs, if <code>last_spatial_col_index</code> is unspecified, then it will assume the value of -1 (i.e., the last of all input columns).
<code>has_non_spatial_attrs</code>	Whether the input contains non-spatial attributes.
<code>storage_level</code>	Storage level of the RDD (default: MEMORY_ONLY).
<code>repartition</code>	The minimum number of partitions to have in the resulting RDD (default: 1).

### Value

A typed SpatialRDD.

### See Also

Other Sedona RDD data interface functions: [sedona\\_read\\_geojson\(\)](#), [sedona\\_read\\_shapefile\\_to\\_typed\\_rdd\(\)](#), [sedona\\_save\\_spatial\\_rdd\(\)](#), [sedona\\_write\\_wkb\(\)](#)

### Examples

```

library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

```

```

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your csv file
  rdd <- sedona_read_dsv_to_typed_rdd(
    sc,
    location = input_location,
    delimiter = ",",
    type = "point",
    first_spatial_col_index = 1L
  )
}

```

---

sedona\_read\_geojson    *Read geospatial data into a Spatial RDD*

---

### Description

Import spatial object from an external data source into a Sedona SpatialRDD.

- sedona\_read\_shapefile: from a shapefile
- sedona\_read\_geojson: from a geojson file
- sedona\_read\_wkt: from a geojson file
- sedona\_read\_wkb: from a geojson file

### Usage

```

sedona_read_geojson(
  sc,
  location,
  allow_invalid_geometries = TRUE,
  skip_syntactically_invalid_geometries = TRUE,
  storage_level = "MEMORY_ONLY",
  repartition = 1L
)

```

```

sedona_read_wkb(
  sc,
  location,
  wkb_col_idx = 0L,
  allow_invalid_geometries = TRUE,
  skip_syntactically_invalid_geometries = TRUE,
  storage_level = "MEMORY_ONLY",
  repartition = 1L
)

```

```

sedona_read_wkt(

```

```

    sc,
    location,
    wkt_col_idx = 0L,
    allow_invalid_geometries = TRUE,
    skip_syntactically_invalid_geometries = TRUE,
    storage_level = "MEMORY_ONLY",
    repartition = 1L
  )

  sedona_read_shapefile(sc, location, storage_level = "MEMORY_ONLY")

```

### Arguments

<code>sc</code>	A <code>spark_connection</code> .
<code>location</code>	Location of the data source.
<code>allow_invalid_geometries</code>	Whether to allow topology-invalid geometries to exist in the resulting RDD.
<code>skip_syntactically_invalid_geometries</code>	Whether to allows Sedona to automatically skip syntax-invalid geometries, rather than throwing errorings.
<code>storage_level</code>	Storage level of the RDD (default: <code>MEMORY_ONLY</code> ).
<code>repartition</code>	The minimum number of partitions to have in the resulting RDD (default: 1).
<code>wkb_col_idx</code>	Zero-based index of column containing hex-encoded WKB data (default: 0).
<code>wkt_col_idx</code>	Zero-based index of column containing hex-encoded WKB data (default: 0).

### Value

A `SpatialRDD`.

### See Also

Other Sedona RDD data interface functions: [sedona\\_read\\_dsv\\_to\\_typed\\_rdd\(\)](#), [sedona\\_read\\_shapefile\\_to\\_typed\\_rdd\(\)](#), [sedona\\_save\\_spatial\\_rdd\(\)](#), [sedona\\_write\\_wkb\(\)](#)

### Examples

```

library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_geojson(sc, location = input_location)
}

```

---

sedona\_read\_shapefile\_to\_typed\_rdd

*(Deprecated) Create a typed SpatialRDD from a shapefile or geojson data source.*

---

## Description

### [Deprecated]

Constructors of typed RDD (PointRDD, PolygonRDD, LineStringRDD) are soft deprecated, use non-types versions

Create a typed SpatialRDD (namely, a PointRDD, a PolygonRDD, or a LineStringRDD)

- sedona\_read\_shapefile\_to\_typed\_rdd: from a shapefile data source
- sedona\_read\_geojson\_to\_typed\_rdd: from a GeoJSON data source

## Usage

```
sedona_read_shapefile_to_typed_rdd(
  sc,
  location,
  type = c("point", "polygon", "linestring"),
  storage_level = "MEMORY_ONLY"
)
```

```
sedona_read_geojson_to_typed_rdd(
  sc,
  location,
  type = c("point", "polygon", "linestring"),
  has_non_spatial_attrs = TRUE,
  storage_level = "MEMORY_ONLY",
  repartition = 1L
)
```

## Arguments

sc	A spark_connection.
location	Location of the data source.
type	Type of the SpatialRDD (must be one of "point", "polygon", or "linestring").
storage_level	Storage level of the RDD (default: MEMORY_ONLY).
has_non_spatial_attrs	Whether the input contains non-spatial attributes.
repartition	The minimum number of partitions to have in the resulting RDD (default: 1).

## Value

A typed SpatialRDD.



**See Also**

Other Sedona RDD data interface functions: [sedona\\_read\\_dsv\\_to\\_typed\\_rdd\(\)](#), [sedona\\_read\\_geojson\(\)](#), [sedona\\_save\\_spatial\\_rdd\(\)](#), [sedona\\_write\\_wkb\(\)](#)

**Examples**

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your shapefile
  rdd <- sedona_read_shapefile_to_typed_rdd(
    sc,
    location = input_location, type = "polygon"
  )
}
```

---

sedona\_render\_choropleth\_map

*Visualize a Sedona spatial RDD using a choropleth map.*

---

**Description**

Generate a choropleth map of a pair RDD assigning integral values to polygons.

**Usage**

```
sedona_render_choropleth_map(
  pair_rdd,
  resolution_x,
  resolution_y,
  output_location,
  output_format = c("png", "gif", "svg"),
  boundary = NULL,
  color_of_variation = c("red", "green", "blue"),
  base_color = c(0, 0, 0),
  shade = TRUE,
  reverse_coords = FALSE,
  overlay = NULL,
  browse = interactive()
)
```

**Arguments**

pair_rdd	A pair RDD with Sedona Polygon objects being keys and java.lang.Long being values.
resolution_x	Resolution on the x-axis.
resolution_y	Resolution on the y-axis.
output_location	Location of the output image. This should be the desired path of the image file excluding extension in its file name.
output_format	File format of the output image. Currently "png", "gif", and "svg" formats are supported (default: "png").
boundary	Only render data within the given rectangular boundary. The boundary parameter can be set to either a numeric vector of c(min_x, max_x, min_y, max_y) values, or with a bounding box object e.g., new_bounding_box(sc, min_x, max_x, min_y, max_y), or NULL (the default). If boundary is NULL, then the minimum bounding box of the input spatial RDD will be computed and used as boundary for rendering.
color_of_variation	Which color channel will vary depending on values of data points. Must be one of "red", "green", or "blue". Default: red.
base_color	Color of any data point with value 0. Must be a numeric vector of length 3 specifying values for red, green, and blue channels. Default: c(0, 0, 0).
shade	Whether data point with larger magnitude will be displayed with darker color. Default: TRUE.
reverse_coords	Whether to reverse spatial coordinates in the plot (default: FALSE).
overlay	A viz_op object containing a raster image to be displayed on top of the resulting image.
browse	Whether to open the rendered image in a browser (default: interactive()).

**Value**

No return value.

**See Also**

Other Sedona visualization routines: [sedona\\_render\\_heatmap\(\)](#), [sedona\\_render\\_scatter\\_plot\(\)](#)

**Examples**

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  pt_input_location <- "/dev/null" # replace it with the path to your input file
  pt_rdd <- sedona_read_dsv_to_typed_rdd(
```

```

    sc,
    location = pt_input_location,
    type = "point",
    first_spatial_col_index = 1
  )
  polygon_input_location <- "/dev/null" # replace it with the path to your input file
  polygon_rdd <- sedona_read_geojson_to_typed_rdd(
    sc,
    location = polygon_input_location,
    type = "polygon"
  )
  join_result_rdd <- sedona_spatial_join_count_by_key(
    pt_rdd,
    polygon_rdd,
    join_type = "intersect",
    partitioner = "quadtree"
  )
  sedona_render_choropleth_map(
    join_result_rdd,
    400,
    200,
    output_location = tempfile("choropleth-map-"),
    boundary = c(-86.8, -86.6, 33.4, 33.6),
    base_color = c(255, 255, 255)
  )
}

```

---

sedona\_render\_heatmap *Visualize a Sedona spatial RDD using a heatmap.*

---

## Description

Generate a heatmap of geometrical object(s) within a Sedona spatial RDD.

## Usage

```

sedona_render_heatmap(
  rdd,
  resolution_x,
  resolution_y,
  output_location,
  output_format = c("png", "gif", "svg"),
  boundary = NULL,
  blur_radius = 10L,
  overlay = NULL,
  browse = interactive()
)

```

**Arguments**

rdd	A Sedona spatial RDD.
resolution_x	Resolution on the x-axis.
resolution_y	Resolution on the y-axis.
output_location	Location of the output image. This should be the desired path of the image file excluding extension in its file name.
output_format	File format of the output image. Currently "png", "gif", and "svg" formats are supported (default: "png").
boundary	Only render data within the given rectangular boundary. The boundary parameter can be set to either a numeric vector of c(min_x, max_y, min_y, max_y) values, or with a bounding box object e.g., new_bounding_box(sc, min_x, max_y, min_y, max_y), or NULL (the default). If boundary is NULL, then the minimum bounding box of the input spatial RDD will be computed and used as boundary for rendering.
blur_radius	Controls the radius of a Gaussian blur in the resulting heatmap.
overlay	A viz_op object containing a raster image to be displayed on top of the resulting image.
browse	Whether to open the rendered image in a browser (default: interactive()).

**Value**

No return value.

**See Also**

Other Sedona visualization routines: [sedona\\_render\\_choropleth\\_map\(\)](#), [sedona\\_render\\_scatter\\_plot\(\)](#)

**Examples**

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_dsv_to_typed_rdd(
    sc,
    location = input_location,
    type = "point"
  )

  sedona_render_heatmap(
    rdd,
    resolution_x = 800,
    resolution_y = 600,
```

```

    output_location = tempfile("points-"),
    output_format = "png",
    boundary = c(-91, -84, 30, 35),
    blur_radius = 10
  )
}

```

---

sedona\_render\_scatter\_plot

*Visualize a Sedona spatial RDD using a scatter plot.*

---

## Description

Generate a scatter plot of geometrical object(s) within a Sedona spatial RDD.

## Usage

```

sedona_render_scatter_plot(
  rdd,
  resolution_x,
  resolution_y,
  output_location,
  output_format = c("png", "gif", "svg"),
  boundary = NULL,
  color_of_variation = c("red", "green", "blue"),
  base_color = c(0, 0, 0),
  shade = TRUE,
  reverse_coords = FALSE,
  overlay = NULL,
  browse = interactive()
)

```

## Arguments

rdd	A Sedona spatial RDD.
resolution_x	Resolution on the x-axis.
resolution_y	Resolution on the y-axis.
output_location	Location of the output image. This should be the desired path of the image file excluding extension in its file name.
output_format	File format of the output image. Currently "png", "gif", and "svg" formats are supported (default: "png").
boundary	Only render data within the given rectangular boundary. The boundary parameter can be set to either a numeric vector of c(min_x, max_y, min_y, max_y) values, or with a bounding box object e.g., new_bounding_box(sc, min_x, max_y,

min\_y, max\_y), or NULL (the default). If boundary is NULL, then the minimum bounding box of the input spatial RDD will be computed and used as boundary for rendering.

color_of_variation	Which color channel will vary depending on values of data points. Must be one of "red", "green", or "blue". Default: red.
base_color	Color of any data point with value 0. Must be a numeric vector of length 3 specifying values for red, green, and blue channels. Default: c(0, 0, 0).
shade	Whether data point with larger magnitude will be displayed with darker color. Default: TRUE.
reverse_coords	Whether to reverse spatial coordinates in the plot (default: FALSE).
overlay	A viz_op object containing a raster image to be displayed on top of the resulting image.
browse	Whether to open the rendered image in a browser (default: interactive()).

### Value

No return value.

### See Also

Other Sedona visualization routines: [sedona\\_render\\_choropleth\\_map\(\)](#), [sedona\\_render\\_heatmap\(\)](#)

### Examples

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_dsv_to_typed_rdd(
    sc,
    location = input_location,
    type = "point"
  )

  sedona_render_scatter_plot(
    rdd,
    resolution_x = 800,
    resolution_y = 600,
    output_location = tempfile("points-"),
    output_format = "png",
    boundary = c(-91, -84, 30, 35)
  )
}
```

---

`sedona_save_spatial_rdd`*Save a Spark dataframe containing exactly 1 spatial column into a file.*

---

### Description

Export serialized data from a Spark dataframe containing exactly 1 spatial column into a file.

### Usage

```
sedona_save_spatial_rdd(  
  x,  
  spatial_col,  
  output_location,  
  output_format = c("wkb", "wkt", "geojson")  
)
```

### Arguments

<code>x</code>	A Spark dataframe object in sparklyr or a dplyr expression representing a Spark SQL query.
<code>spatial_col</code>	The name of the spatial column.
<code>output_location</code>	Location of the output file.
<code>output_format</code>	Format of the output.

### Value

No return value.

### See Also

Other Sedona RDD data interface functions: [sedona\\_read\\_dsv\\_to\\_typed\\_rdd\(\)](#), [sedona\\_read\\_geojson\(\)](#), [sedona\\_read\\_shapefile\\_to\\_typed\\_rdd\(\)](#), [sedona\\_write\\_wkb\(\)](#)

### Examples

```
library(sparklyr)  
library(apache.sedona)  
  
sc <- spark_connect(master = "spark://HOST:PORT")  
  
if (!inherits(sc, "test_connection")) {  
  tbl <- dplyr::tbl(  
    sc,  
    dplyr::sql("SELECT ST_GeomFromText('POINT(-71.064544 42.28787)') AS `pt`")  
  )  
  sedona_save_spatial_rdd(  

```

```
tbl %>% dplyr::mutate(id = 1),
  spatial_col = "pt",
  output_location = "/tmp/pts.wkb",
  output_format = "wkb"
)
}
```

---

sedona\_spatial\_join    *Perform a spatial join operation on two Sedona spatial RDDs.*

---

### Description

Given `spatial_rdd` and `query_window_rdd`, return a pair RDD containing all pairs of geometrical elements (p, q) such that p is an element of `spatial_rdd`, q is an element of `query_window_rdd`, and (p, q) satisfies the spatial relation specified by `join_type`.

### Usage

```
sedona_spatial_join(
  spatial_rdd,
  query_window_rdd,
  join_type = c("contain", "intersect"),
  partitioner = c("quadtree", "kdbtree"),
  index_type = c("quadtree", "rtree")
)
```

### Arguments

<code>spatial_rdd</code>	Spatial RDD containing geometries to be queried.
<code>query_window_rdd</code>	Spatial RDD containing the query window(s).
<code>join_type</code>	Type of the join query (must be either "contain" or "intersect"). If <code>join_type</code> is "contain", then a geometry from <code>spatial_rdd</code> will match a geometry from the <code>query_window_rdd</code> if and only if the former is fully contained in the latter. If <code>join_type</code> is "intersect", then a geometry from <code>spatial_rdd</code> will match a geometry from the <code>query_window_rdd</code> if and only if the former intersects the latter.
<code>partitioner</code>	Spatial partitioning to apply to both <code>spatial_rdd</code> and <code>query_window_rdd</code> to facilitate the join query. Can be either a grid type (currently "quadtree" and "kdbtree" are supported) or a custom spatial partitioner object. If <code>partitioner</code> is NULL, then assume the same spatial partitioner has been applied to both <code>spatial_rdd</code> and <code>query_window_rdd</code> already and skip the partitioning step.
<code>index_type</code>	Controls how <code>spatial_rdd</code> and <code>query_window_rdd</code> will be indexed (unless they are indexed already). If "NONE", then no index will be constructed and matching geometries will be identified in a doubly nested- loop iterating through all possible pairs of elements from <code>spatial_rdd</code> and <code>query_window_rdd</code> , which will be inefficient for large data sets.



**Value**

A spatial RDD containing the join result.

**See Also**

Other Sedona spatial join operator: [sedona\\_spatial\\_join\\_count\\_by\\_key\(\)](#)

**Examples**

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_dsv_to_typed_rdd(
    sc,
    location = input_location,
    delimiter = ",",
    type = "point",
    first_spatial_col_index = 1L
  )
  query_rdd_input_location <- "/dev/null" # replace it with the path to your input file
  query_rdd <- sedona_read_shapefile_to_typed_rdd(
    sc,
    location = query_rdd_input_location,
    type = "polygon"
  )
  join_result_rdd <- sedona_spatial_join(
    rdd,
    query_rdd,
    join_type = "intersect",
    partitioner = "quadtree"
  )
}
```

---

`sedona_spatial_join_count_by_key`

*Perform a spatial count-by-key operation based on two Sedona spatial RDDs.*

---

**Description**

For each element  $p$  from `spatial_rdd`, count the number of unique elements  $q$  from `query_window_rdd` such that  $(p, q)$  satisfies the spatial relation specified by `join_type`.

**Usage**

```
sedona_spatial_join_count_by_key(
  spatial_rdd,
  query_window_rdd,
  join_type = c("contain", "intersect"),
  partitioner = c("quadtree", "kdbtree"),
  index_type = c("quadtree", "rtree")
)
```

**Arguments**

<code>spatial_rdd</code>	Spatial RDD containing geometries to be queried.
<code>query_window_rdd</code>	Spatial RDD containing the query window(s).
<code>join_type</code>	Type of the join query (must be either "contain" or "intersect"). If <code>join_type</code> is "contain", then a geometry from <code>spatial_rdd</code> will match a geometry from the <code>query_window_rdd</code> if and only if the former is fully contained in the latter. If <code>join_type</code> is "intersect", then a geometry from <code>spatial_rdd</code> will match a geometry from the <code>query_window_rdd</code> if and only if the former intersects the latter.
<code>partitioner</code>	Spatial partitioning to apply to both <code>spatial_rdd</code> and <code>query_window_rdd</code> to facilitate the join query. Can be either a grid type (currently "quadtree" and "kdbtree" are supported) or a custom spatial partitioner object. If <code>partitioner</code> is NULL, then assume the same spatial partitioner has been applied to both <code>spatial_rdd</code> and <code>query_window_rdd</code> already and skip the partitioning step.
<code>index_type</code>	Controls how <code>spatial_rdd</code> and <code>query_window_rdd</code> will be indexed (unless they are indexed already). If "NONE", then no index will be constructed and matching geometries will be identified in a doubly nested- loop iterating through all possible pairs of elements from <code>spatial_rdd</code> and <code>query_window_rdd</code> , which will be inefficient for large data sets.

**Value**

A spatial RDD containing the join-count-by-key results.

**See Also**

Other Sedona spatial join operator: [sedona\\_spatial\\_join\(\)](#)

**Examples**

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
```

```
rdd <- sedona_read_dsv_to_typed_rdd(  
  sc,  
  location = input_location,  
  delimiter = ",",  
  type = "point",  
  first_spatial_col_index = 1L  
)  
query_rdd_input_location <- "/dev/null" # replace it with the path to your input file  
query_rdd <- sedona_read_shapefile_to_typed_rdd(  
  sc,  
  location = query_rdd_input_location,  
  type = "polygon"  
)  
join_result_rdd <- sedona_spatial_join_count_by_key(  
  rdd,  
  query_rdd,  
  join_type = "intersect",  
  partitioner = "quadtree"  
)  
}
```

---

sedona\_write\_wkb      *Write SpatialRDD into a file.*

---

## Description

Export serialized data from a Sedona SpatialRDD into a file.

- sedona\_write\_wkb:
- sedona\_write\_wkt:
- sedona\_write\_geojson:

## Usage

```
sedona_write_wkb(x, output_location)
```

```
sedona_write_wkt(x, output_location)
```

```
sedona_write_geojson(x, output_location)
```

## Arguments

x	The SpatialRDD object.
output_location	Location of the output file.

## Value

No return value.

**See Also**

Other Sedona RDD data interface functions: [sedona\\_read\\_dsv\\_to\\_typed\\_rdd\(\)](#), [sedona\\_read\\_geojson\(\)](#), [sedona\\_read\\_shapefile\\_to\\_typed\\_rdd\(\)](#), [sedona\\_save\\_spatial\\_rdd\(\)](#)

**Examples**

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- sedona_read_wkb(
    sc,
    location = input_location,
    wkb_col_idx = 0L
  )
  sedona_write_wkb(rdd, "/tmp/wkb_output.tsv")
}
```

---

spark\_read\_shapefile *Read geospatial data into a Spark DataFrame.*

---

**Description**

Functions to read geospatial data from a variety of formats into Spark DataFrames.

- spark\_read\_shapefile: from a shapefile
- spark\_read\_geojson: from a geojson file
- spark\_read\_geoparquet: from a geoparquet file
- spark\_read\_geotiff: from a GeoTiff file, or a folder containing GeoTiff files

**Usage**

```
spark_read_shapefile(sc, name = NULL, path = name, options = list(), ...)
```

```
spark_read_geojson(
  sc,
  name = NULL,
  path = name,
  options = list(),
  repartition = 0,
  memory = TRUE,
  overwrite = TRUE
)
```

```

spark_read_geoparquet(
  sc,
  name = NULL,
  path = name,
  options = list(),
  repartition = 0,
  memory = TRUE,
  overwrite = TRUE
)

spark_read_geotiff(
  sc,
  name = NULL,
  path = name,
  options = list(),
  repartition = 0,
  memory = TRUE,
  overwrite = TRUE
)

```

### Arguments

sc	A spark_connection.
name	The name to assign to the newly generated table.
path	The path to the file. Needs to be accessible from the cluster. Supports the "hdfs://", "s3a://" and "file://" protocols.
options	A list of strings with additional options. See <a href="https://spark.apache.org/docs/latest/sql-programming-guide.html#configuration">https://spark.apache.org/docs/latest/sql-programming-guide.html#configuration</a> .
...	Optional arguments; currently unused.
repartition	The number of partitions used to distribute the generated table. Use 0 (the default) to avoid partitioning.
memory	Boolean; should the data be loaded eagerly into memory? (That is, should the table be cached?)
overwrite	Boolean; overwrite the table with the given name if it already exists?

### Value

A tbl

### See Also

Other Sedona DF data interface functions: [spark\\_write\\_geojson\(\)](#)

## Examples

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  input_location <- "/dev/null" # replace it with the path to your input file
  rdd <- spark_read_shapefile(sc, location = input_location)
}
```

---

spark\_write\_geojson *Write geospatial data from a Spark DataFrame.*

---

## Description

Functions to write geospatial data into a variety of formats from Spark DataFrames.

- spark\_write\_geojson: to GeoJSON
- spark\_write\_geoparquet: to GeoParquet
- spark\_write\_geotiff: to GeoTiff from Array[Double] rasters
- spark\_write\_raster: to raster tiles after using RS output functions (RS\_AsXXX)

## Usage

```
spark_write_geojson(
  x,
  path,
  mode = NULL,
  options = list(),
  partition_by = NULL,
  ...
)

spark_write_geoparquet(
  x,
  path,
  mode = NULL,
  options = list(),
  partition_by = NULL,
  ...
)

spark_write_geotiff(
  x,
  path,
```

```

    mode = NULL,
    options = list(),
    partition_by = NULL,
    ...
)

spark_write_raster(
  x,
  path,
  mode = NULL,
  options = list(),
  partition_by = NULL,
  ...
)

```

### Arguments

x	A Spark DataFrame or dplyr operation
path	The path to the file. Needs to be accessible from the cluster. Supports the <code>"hdfs://"</code> , <code>"s3a://"</code> and <code>"file://"</code> protocols.
mode	A character element. Specifies the behavior when data or table already exists. Supported values include: <code>'error'</code> , <code>'append'</code> , <code>'overwrite'</code> and <code>ignore</code> . Notice that <code>'overwrite'</code> will also change the column structure. For more details see also <a href="https://spark.apache.org/docs/latest/sql-programming-guide.html#save-modes">https://spark.apache.org/docs/latest/sql-programming-guide.html#save-modes</a> for your version of Spark.
options	A list of strings with additional options.
partition_by	A character vector. Partitions the output by the given columns on the file system.
...	Optional arguments; currently unused.

### See Also

Other Sedona DF data interface functions: `spark_read_shapefile()`

### Examples

```

library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  tbl <- dplyr::tbl(
    sc,
    dplyr::sql("SELECT ST_GeomFromText('POINT(-71.064544 42.28787)') AS `pt`")
  )
  spark_write_geojson(
    tbl %>% dplyr::mutate(id = 1),
    output_location = "/tmp/pts.geojson"
  )
}

```

```
  )
}
```

---

to_spatial_rdd	<i>Export a Spark SQL query with a spatial column into a Sedona spatial RDD.</i>
----------------	--

---

### Description

Given a Spark dataframe object or a dplyr expression encapsulating a Spark SQL query, build a Sedona spatial RDD that will encapsulate the same query or data source. The input should contain exactly one spatial column and all other non-spatial columns will be treated as custom user-defined attributes in the resulting spatial RDD.

### Usage

```
to_spatial_rdd(x, spatial_col)
```

### Arguments

x	A Spark dataframe object in sparklyr or a dplyr expression representing a Spark SQL query.
spatial_col	The name of the spatial column.

### Value

A SpatialRDD encapsulating the query.

### Examples

```
library(sparklyr)
library(apache.sedona)

sc <- spark_connect(master = "spark://HOST:PORT")

if (!inherits(sc, "test_connection")) {
  tbl <- dplyr::tbl(
    sc,
    dplyr::sql("SELECT ST_GeomFromText('POINT(-71.064544 42.28787)') AS `pt`")
  )
  rdd <- to_spatial_rdd(tbl, "pt")
}
```



# Index

- \* **Sedona DF data interface functions**
  - spark\_read\_shapefile, 28
  - spark\_write\_geojson, 30
- \* **Sedona RDD data interface functions**
  - sedona\_read\_dsv\_to\_typed\_rdd, 12
  - sedona\_read\_geojson, 14
  - sedona\_read\_shapefile\_to\_typed\_rdd, 16
  - sedona\_save\_spatial\_rdd, 23
  - sedona\_write\_wkb, 27
- \* **Sedona spatial join operator**
  - sedona\_spatial\_join, 24
  - sedona\_spatial\_join\_count\_by\_key, 25
- \* **Sedona spatial query**
  - sedona\_knn\_query, 9
  - sedona\_range\_query, 11
- \* **Sedona visualization routines**
  - sedona\_render\_choropleth\_map, 17
  - sedona\_render\_heatmap, 19
  - sedona\_render\_scatter\_plot, 21
- \* **Spatial RDD aggregation routine**
  - approx\_count, 2
  - minimum\_bounding\_box, 4
- approx\_count, 2, 4
- as.spark.dataframe
  - (sdf\_register.spatial\_rdd), 6
- crs\_transform, 3
- minimum\_bounding\_box, 2, 4
- new\_bounding\_box, 5
- sdf\_register.spatial\_rdd, 6
- sedona\_apply\_spatial\_partitioner, 7
- sedona\_build\_index, 8
- sedona\_knn\_query, 9, 11
- sedona\_range\_query, 10, 11
- sedona\_read\_dsv\_to\_typed\_rdd, 12, 15, 17, 23, 28
- sedona\_read\_geojson, 13, 14, 17, 23, 28
- sedona\_read\_geojson\_to\_typed\_rdd
  - (sedona\_read\_shapefile\_to\_typed\_rdd), 16
- sedona\_read\_shapefile
  - (sedona\_read\_geojson), 14
- sedona\_read\_shapefile\_to\_typed\_rdd, 13, 15, 16, 23, 28
- sedona\_read\_wkb (sedona\_read\_geojson), 14
- sedona\_read\_wkt (sedona\_read\_geojson), 14
- sedona\_render\_choropleth\_map, 17, 20, 22
- sedona\_render\_heatmap, 18, 19, 22
- sedona\_render\_scatter\_plot, 18, 20, 21
- sedona\_save\_spatial\_rdd, 13, 15, 17, 23, 28
- sedona\_spatial\_join, 24, 26
- sedona\_spatial\_join\_count\_by\_key, 25, 25
- sedona\_write\_geojson
  - (sedona\_write\_wkb), 27
- sedona\_write\_wkb, 13, 15, 17, 23, 27
- sedona\_write\_wkt (sedona\_write\_wkb), 27
- spark\_read\_geojson
  - (spark\_read\_shapefile), 28
- spark\_read\_geoparquet
  - (spark\_read\_shapefile), 28
- spark\_read\_geotiff
  - (spark\_read\_shapefile), 28
- spark\_read\_shapefile, 28, 31
- spark\_write\_geojson, 29, 30
- spark\_write\_geoparquet
  - (spark\_write\_geojson), 30
- spark\_write\_geotiff
  - (spark\_write\_geojson), 30
- spark\_write\_raster

(spark\_write\_geojson), [30](#)

to\_spatial\_rdd, [32](#)