GIS Extensions for Dremio - SQL Functions Reference

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Abstract

Complete Reference to the 72 GIS-related functions in the *GIS Extensions for Dremio* implementation including syntax, return type, and examples.

Contents

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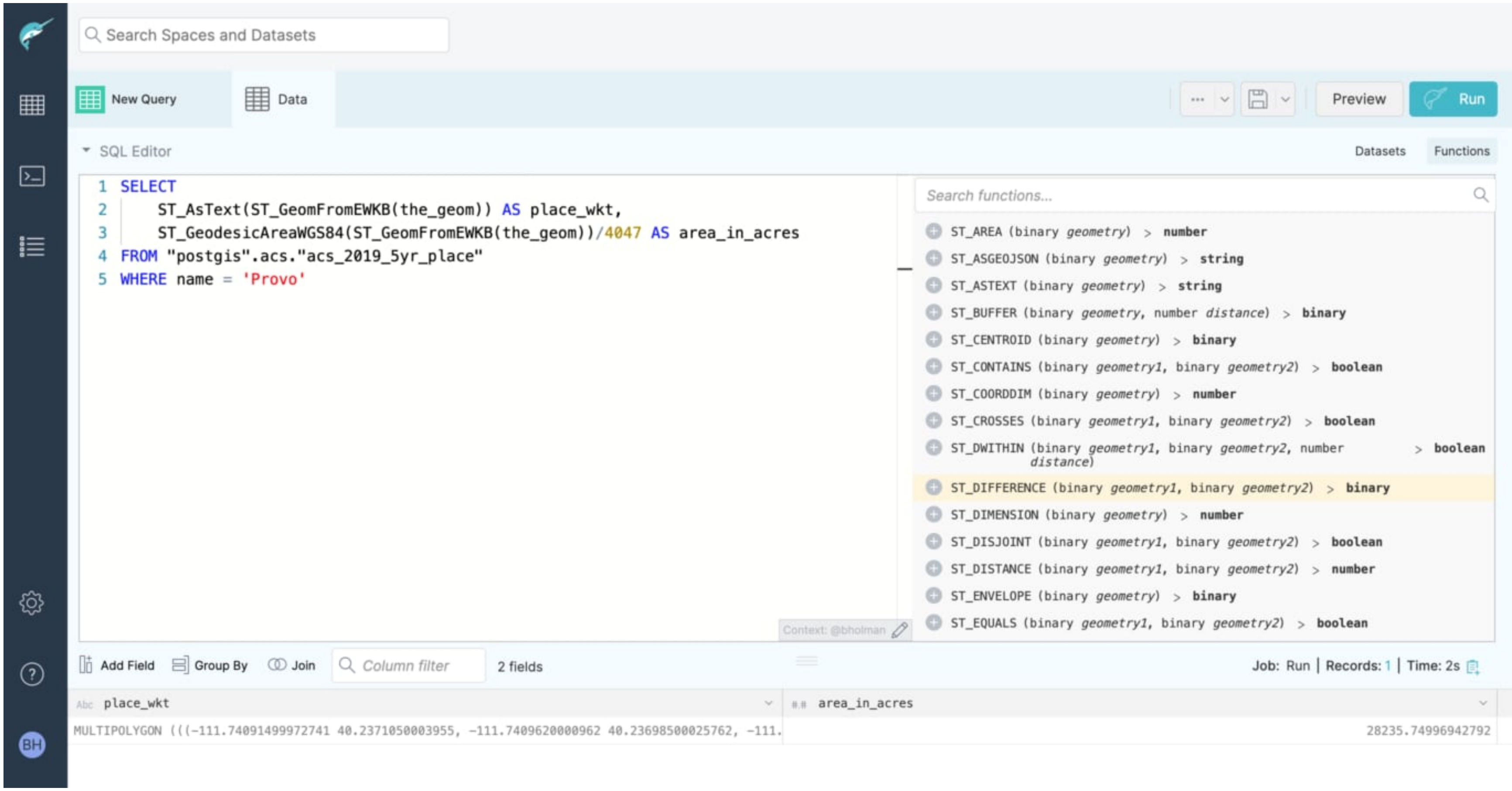
Third-Party Libraries

The **GIS Extensions** allow Dremio to perform standard GIS functions within Dremio SQL with 72 industry-standard GIS functions. These extensions use the *Esri Java Geometry Library* for the underlying implementation of the core geometry functions. The author made heavy use of Esri's *Spatial Framework for Hadoop* as a reference for a similar implementation that also relies on the same library.



```
SELECT
    ST_AsText(ST_GeomFromEWKB(the_geom)) AS place_wkt,
    ST_GeodesicAreaWGS84(ST_GeomFromEWKB(the_geom))/4047 AS area_in_acres
FROM "postgis".acs."acs_2019_5yr_place"
WHERE name = 'Provo'
```

```
ST_AREA (binary geometry) > number
ST_ASGEOJSON (binary geometry) > string
ST_ASTEXT (binary geometry) > string
ST_BUFFER (binary geometry, number distance) > binary
ST_CENTROID (binary geometry) > binary
ST_CONTAINS (binary geometry1, binary geometry2) > boolean
ST_COORDDIM (binary geometry) > number
ST_CROSSES (binary geometry1, binary geometry2) > boolean
ST_DWITHIN (binary geometry1, binary geometry2, number distance) > boolean
ST_DIFFERENCE (binary geometry1, binary geometry2) > binary
ST_DIMENSION (binary geometry) > number
ST_DISJOINT (binary geometry1, binary geometry2) > boolean
ST_DISTANCE (binary geometry1, binary geometry2) > number
ST_ENVELOPE (binary geometry) > binary
ST_EQUALS (binary geometry1, binary geometry2) > boolean
```

Job: Run | Records: 1 | Time: 2s

place_wkt	area_in_acres
MULTIPOLYGON (((-111.74091499972741 40.2371050003955, -111.7409620000962 40.23698500025762, -111.	28235.74996942792

Figure 1: DAC with GIS extensions

There were two significant gaps in the Geometry Library supplied by Esri that limited transforming geometries from `EPSG: 4326` to other coordinate systems and performing geodesic rather than 2D area and length calculations. Geodesic area function helpers backing the `ST_GeodesicAreaWGS84` function are copied almost exactly from the *Trino Geospatial Library* as found in our `FunctionHelpers.stSphericalArea()` and `FunctionHelpers.computeSphericalExcess()`. Conversion to other coordinate systems in the `ST_Transform` function leverages the Proj4J Library. All of the referenced works are also published under the *Apache 2.0 License*.

(1) ST_Area

Definition

Returns the area of polygon or multipolygon

Syntax

ST_Area(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_Area(ST_GeomFromText('POLYGON ((0 0, 8 0, 0 8, 0 0), (1 1, 1 5, 5 1, 1 1))'))`	`24.0`

(2) ST_AsGeoJSON

Definition

Returns the GeoJSON representation of *geometry*.

Syntax

ST_AsGeoJSON(binary geometry)

Return Type

`string`

Examples

Query	Result
`SELECT ST_AsGeoJSON(ST_Point(1, 2))`	`'{"type":"Point","coordinates":[1,2],"crs":{"type":"name","propert`

(3) ST_AsText

Definition

Returns the Well-Known Text (WKT) representation of *geometry*.

Syntax

ST_AsText(binary geometry)

Return Type

`string`

Examples

Query	Result
`SELECT ST_AsText(ST_Point(1, 2))`	`'POINT (1 2)'`

(4) ST_Boundary

Definition

Returns the closure of the combinatorial boundary of this Geometry.

Syntax

ST_Boundary(binary geometry)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_Boundary(ST_GeomFromText('LINESTRING (0 1, 1 0)')))`	`'MULTIPOINT ((0 1), (1 0))'`
`SELECT ST_AsText(ST_Boundary(ST_GeomFromText('POLYGON ((1 1, 4 1, 1 4))')))`	`'MULTILINESTRING ((1 1, 4 1, 1 4, 1 1))'`

(5) ST_Buffer

Definition

Returns geometry object that is the buffer surrounding source *geometry* at specified *distance*.

Syntax

ST_Buffer(binary geometry, number distance)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_Buffer(ST_Point(0, 0), 1)`	`polygon approximating a unit circle`

(6) ST_Centroid

Definition

Takes a polygon, multipolygon, or multilinestring and returns the point that is in the center of the geometry's envelope. That means that the centroid point is halfway between the geometry's minimum and maximum x and y extents.

Syntax

ST_Centroid(binary geometry)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_Centroid(ST_GeomFromText('point (2 3)')))`	`'POINT(2 3)'`
`SELECT ST_AsText(ST_Centroid(ST_GeomFromText('MULTIPOINT ((0 0), (1 1), (1 -1), (6 0))')))`	`'POINT(2 0)'`
`SELECT ST_AsText(ST_Centroid(ST_GeomFromText('linestring (0 0, 6 0)')))`	`'POINT(3 0)'`
`SELECT ST_AsText(ST_Centroid(ST_GeomFromText('POLYGON ((0 0, 0 8, 8 8, 8 0, 0 0))')))`	`'POINT(4 4)'`
`SELECT ST_AsText(ST_Centroid(ST_GeomFromText('POLYGON ((1 1, 5 1, 3 4))')))`	`'POINT(3 2)'`

(7) ST_Contains

Definition

Returns true if *geometry1* contains *geometry2*.

Syntax

ST_Contains(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_Contains(ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'), ST_Point(2, 3))`	`true`
`SELECT ST_Contains(ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'), ST_Point(8, 8))`	`false`

(8) ST_ConvexHull

Definition

Computes the convex hull of *geometry*. The convex hull is the smallest convex geometry that encloses all geometries in the input. One can think of the convex hull as the geometry obtained by wrapping an rubber band around a set of geometries.

Syntax

ST_ConvexHull(binary geometry)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_ConvexHull(ST_GeomFromText('polygon ((0 0, 8 0, 0 8, 0 0), (1 1, 1 5, 5 1, 1 1))')))`	`'POLYGON ((0 0, 8 0, 0 8, 0 0))'`

(9) ST_CoordDim

Definition

Returns count of coordinate components.

Syntax

ST_CoordDim(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_CoordDim(ST_Point(1.5, 2.5))`	2
`SELECT ST_CoordDim(ST_GeomFromText('POINTZ (1.5 2.5 3)'))`	3

(10) ST_Crosses

Definition

Returns true if *geometry1* crosses *geometry2*, otherwise false.

Syntax

ST_Crosses(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_Crosses(ST_GeomFromText('LINESTRING (0 0, 1 1)'), ST_GeomFromText('LINESTRING (1 0, 0 1))'))`	`true`
`SELECT ST_Crosses(ST_GeomFromText('LINESTRING (2 0, 2 3)'), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'))`	`true`
`SELECT ST_Crosses(ST_GeomFromText('LINESTRING (0 2, 0 1)'), ST_GeomFromText('LINESTRING (2 0, 1 0)'))`	`false`

(11) ST_Densify

Definition

Densifies a MultiPath (polygons and polylines) *geometry* by *maxLength* so that no segments are longer than given threshold value.

Syntax

ST_Densify(binary geometry, number maxLength)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_Densify(ST_GeomFromText('POLYGON ((0 0, 8 0, 0 8, 0 0))'),4))`	`'POLYGON ((0 0, 4 0, 8 0, 5.333 2.667, 2.667 5.333, 0 8, 0 4, 0 0))'`

(12) ST_Difference

Definition

Returns a geometry object that is the difference of the source objects.

Syntax

ST_Difference(binary geometry1, binary geometry2)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_Difference(ST_GeomFromText('MULTIPOINT (1 1, 1.5 1.5, 2 2)'), ST_Point(1.5, 1.5)))`	`'MULTIPOINT ((1 1), (2 2))'`
`SELECT ST_AsText(ST_Difference(ST_GeomFromText('POLYGON ((0 0, 0 10, 10 10, 10 0))'), ST_GeomFromText('POLYGON ((0 0, 0 5, 5 5, 5 0))')))`	`'POLYGON ((5 0, 10 0, 10 10, 0 10, 0 5, 5 5, 5 0))'`

(13) ST_Dimension

Definition

Returns spatial dimension of geometry.

Syntax

ST_Dimension(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_Dimension(ST_Point(1.5, 2.5))`	`0`
`SELECT ST_Dimension(ST_GeomFromText('LINESTRING (1.5 2.5, 3.0 2.2)'))`	`1`
`SELECT ST_Dimension(ST_GeomFromText('POLYGON ((2 0, 2 3, 3 0))'))`	`2`

(14) ST_Disjoint

Definition

Returns true if the intersection of the two geometries produces an empty set; otherwise, it returns false.

Syntax

ST_Disjoint(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_Disjoint(ST_GeomFromText('LINESTRING (0 0, 0 1)'), ST_GeomFromText('LINESTRING (1 1, 1 0)'))`	`true`
`SELECT ST_Disjoint(ST_GeomFromText('LINESTRING (0 0, 1 1)'), ST_GeomFromText('LINESTRING (1 0, 0 1)'))`	`false`

(15) ST_Distance

Definition

Returns the distance between two geometry objects.

Syntax

ST_Distance(binary geometry1, binary geometry2)

Return Type

`number`

Examples

Query	Result
`SELECT ST_Distance(ST_Point(0.0,0.0), ST_Point(3.0,4.0))`	`5.0`

(16) ST_DWithin

Definition

Returns true if the two geometries are within the specified distance of one another; otherwise, it returns false.

Syntax

ST_DWithin(binary geometry1, binary geometry2, number distance)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_DWithin(ST_GeomFromText('POLYGON ((10.02 20.01, 11.92 35.64, 25.02 34.15, 19.15 33.94, 10.02 20.01))'), ST_Point (1,2),100)`	`true`
`SELECT ST_DWithin(ST_GeomFromText('POLYGON ((101.02 200.01, 111.92 350.64, 250.02 340.15, 190.15 330.94, 101.02 200.01))'), ST_Point (10.02,20.01), 100)`	`false`

(17) ST_EndPoint

Definition

Returns the last point of a Linestring.

Syntax

ST_EndPoint(binary geometry)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_EndPoint(ST_GeomFromText('LINESTRING (1.5 2.5, 3.0 2.2)')))`	`'POINT(3.0 2.2)'`

(18) ST_Envelope

Definition

Returns the minimum bounding box of the geometry object as a polygon

Syntax

ST_Envelope(binary geometry)

Return Type

`binary`

Examples

Query	Result
SELECT ST_AsText(ST_Envelope(ST_GeomFromText('LINESTRING (0 0, 2 2))')))	'POLYGON ((0 0, 2 0, 2 2, 0 2, 0 0))'
SELECT ST_AsText(ST_Envelope(ST_GeomFromText('POLYGON ((2 0, 2 3, 3 0))')))	'POLYGON ((2 0, 3 0, 3 3, 2 3, 2 0))'

(19) ST_EnvIntersects

Definition

Returns true if the envelopes of *geometry1* and *geometry2* intersect, otherwise returns false.

Syntax

ST_EnvIntersects(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
SELECT ST_EnvIntersects(ST_GeomFromText('LINESTRING (0 0, 1 1)'), ST_GeomFromText('LINESTRING (1 3, 2 2)'))	false
SELECT ST_EnvIntersects(ST_GeomFromText('LINESTRING (0 0, 2 2)'), ST_GeomFromText('LINESTRING (1 0, 3 2)'))	true

(20) ST_Equals

Definition

Returns true if the two geometries occupy the same space even if they have a different number of vertices, otherwise it returns false.

Syntax

ST_Equals(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_Equals(ST_GeomFromText('LINESTRING (0 0, 1 1)'),ST_GeomFromText('LINESTRING (1 1, 0 0)'))`	`true`
`SELECT ST_Equals(ST_GeomFromText('LINESTRING (0 0, 1 1)'),ST_GeomFromText('LINESTRING (1 0, 0 1)'))`	`false`
`SELECT ST_Equals(ST_GeomFromText('LINESTRING (0 0, 3 3)'),ST_GeomFromText('LINESTRING (3 3, 2 2, 1 1, 0 0)'))`	`true`

(21) ST_ExteriorRing

Definition

Returns the exterior ring of a polygon as a linestring.

Syntax

ST_ExteriorRing(binary geometry)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_ExteriorRing(ST_GeomFromText('POLYGON ((1 1, 1 4, 4 1))')))`	`'LINESTRING (1 1, 4 1, 1 4, 1 1)'`
`SELECT ST_AsText(ST_ExteriorRing(ST_GeomFromText('POLYGON ((0 0, 8 0, 0 8, 0 0), (1 1, 1 5, 5 1, 1 1))')))`	`'LINESTRING (0 0, 8 0, 0 8, 0 0)'`

(22) ST_Generalize

Definition

Simplifies geometries using the Douglas-Peucker algorithm. *maxDeviation* is the maximum allowed deviation from the generalized geometry to the original geometry. When *removeDegenerateParts* is true, the degenerate parts of the geometry will be removed from the output.

Syntax

ST_Generalize(binary geometry, number maxDeviation, boolean removeDegenerateParts)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_Generalize(ST_GeomFromText('POLYGON ((0 0, 1 1, 2 0, 3 2, 4 1, 5 0, 5 10, 0 10))'), 2, true))`	`'POLYGON ((0 0, 5 0, 5 10, 0 10, 0 0))'`

(23) ST_GeodesicAreaWGS84

Definition

Returns the area in square meters of a geometry on the Earth's surface using spherical model. Requires the geometry to be in the WGS84 spatial reference.

Syntax

ST_GeodesicAreaWGS84(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_GeodesicAreaWGS84(ST_GeomFromText('POLYGON ((-114.04702599994988 39.90609700007656, -114.0500520000997 37.0001909997149, -109.04517199998776 36.99897700038832, -109.05002599989996 41.000691000389395, -111.04681499981234 40.997875000031286, -111.04671399965133 42.00170200004732, -114.04147700036322 41.99387299963928, -114.04702599994988 39.90609700007656))'))/4047 AS utah_acreage`	5.416484897473004E7

(24) ST_GeodesicLengthWGS84

Definition

Returns distance along line on WGS84 spheroid, in meters, for geographic coordinates. Requires the geometry to be in the WGS84 spatial reference.

Syntax

ST_GeodesicLengthWGS84(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_GeodesicLengthWGS84(ST_GeomFromText('MultiLineString((0.0 80.0, 0.3 80.4))', 4326))`	`45026.96274781222`

(25) ST_GeometryN

Definition

Takes a geometry collection and an integer index (1-based index) and returns the nth geometry object in the collection.

Syntax

ST_GeometryN(binary geometry, number index)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_GeometryN(ST_GeomFromText('MULTIPOINT (10 40, 40 30, 20 20, 30 10)'), 3))`	`'POINT (20 20)'`
`SELECT ST_AsText(ST_GeometryN(ST_GeomFromText('MULTILINESTRING ((2 4, 10 10), (20 20, 7 8))'), 2))`	`'LINESTRING (20 20, 7 8)'`

(26) ST_GeometryType

Definition

Takes a geometry object and returns its geometry type (for example, Point, Line, Polygon, MultiPoint) as a string.

Syntax

ST_GeometryType(binary geometry)

Return Type

`string`

Examples

Query	Result
`SELECT ST_GeometryType(ST_Point(1.5, 2.5))`	`'ST_POINT'`
`SELECT ST_GeometryType(ST_GeomFromText('LINESTRING (1.5 2.5, 3.0 2.2)'))`	`'ST_LINESTRING'`
`SELECT ST_GeometryType(ST_GeomFromText('POLYGON ((2 0, 2 3, 3 0))'))`	`'ST_POLYGON'`

(27) ST_GeomFromEWKB

Definition

Converts a Hex encoded binary string from Postgres/PostGIS geometry to native geometry including embedded SRID.

Syntax

ST_GeomFromEWKB(string hexEncodedGeometry)

Return Type

`binary`

Examples

Query	Result
SELECT ST_AsText(ST_GeomFromEWKB(the_geom)) FROM table("postgis".external_query('SELECT ST_GeomFromText(''POINT(-71.064544 42.28787)'',4326) AS the_geom'))	'POINT (-71.064544 42.28787)'

(28) ST_GeomFromGeoJSON

Definition

Constructs a geometry from GeoJSON.

Syntax

ST_GeomFromGeoJSON(string geoJsonString)

Return Type

`binary`

Examples

Query	Result
SELECT ST_AsText(ST_GeomFromGeoJSON('{"type":"Point", "coordinates":[1.2, 2.4]}'))	'POINT (1.2 2.4)'
SELECT ST_AsText(ST_GeomFromGeoJSON('{"type":"LineString", "coordinates":[[1,2], [3,4]]}'))	'LINESTRING (1 2, 3 4)'

(29) ST_GeomFromText

Definition

Takes a well-known text representation and returns a geometry object. Set *ignoreErrors* to *true* to ignore bad data or *false* to fail and show the bad WKT value.

Syntax

ST_GeomFromText(string wktString, boolean ignoreErrors)

Return Type

`binary`

---

(30) ST_GeomFromText

Definition

Takes a well-known text representation and a spatial reference ID and returns a geometry object. Set *ignoreErrors* to *true* to ignore bad data or *false* to fail and show the bad WKT value.

Syntax

ST_GeomFromText(string wktString, boolean ignoreErrors, number SRID)

Return Type

`binary`

---

(31) ST_GeomFromWKB

Definition

Takes a well-known binary (WKB) representation and returns a geometry object.

Syntax

ST_GeomFromWKB(binary wkbValue)

Return Type

```
binary
```

---

(32) ST_GeomFromWKB

Definition

Takes a well-known binary (WKB) representation and a spatial reference ID and returns a geometry object.

Syntax

ST_GeomFromWKB(binary wkbValue, number SRID)

Return Type

```
binary
```

---

(33) ST_GeoSize

Definition

Takes a geometry object and returns its size in bytes.

Syntax

ST_GeoSize(binary geometry)

Return Type

```
number
```

---

(34) ST_InteriorRingN

Definition

Returns a LineString which is the nth interior ring of the input Polygon (1-based index)

Syntax

ST_InteriorRingN(binary geometry, number index)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_InteriorRingN(ST_GeomFromText('polygon ((0 0, 8 0, 0 8, 0 0), (1 1, 1 5, 5 1, 1 1))'), 1))`	`'LINESTRING (1 1, 1 5, 5 1, 1 1)'`

(35) ST_Intersection

Definition

Returns a geometry object that is the geometric intersection of the source objects.

Syntax

ST_Intersection(binary geometry1, binary geometry2)

Return Type

`binary`

Examples

Query	Result
SELECT ST_AsText(ST_Intersection(ST_Point(1,1), ST_Point(1,1)))	'POINT (1 1)'
SELECT ST_AsText(ST_Intersection(ST_GeomFromText('LINESTRING(0 2, 0 0, 2 0)'), ST_GeomFromText('LINESTRING(0 3, 0 1, 1 0, 3 0)')))	'MULTILINESTRING ((1 0, 2 0), (0 2, 0 1))'
SELECT ST_AsText(ST_Intersection(ST_GeomFromText('POLYGON ((2 0, 2 3, 3 0))'), ST_GeomFromText('POLYGON ((1 1, 4 1, 4 4, 1 4))')))	'POLYGON ((2 1, 2.666666666666667 1, 2 3, 2 1))'

(36) ST_Intersects

Definition

Returns true if *geometry1* intersects with *geometry2*, otherwise returns false.

Syntax

ST_Intersects(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
SELECT ST_Intersects(ST_GeomFromText('LINESTRING (2 0, 2 3)'), ST_GeomFromText('POLYGON ((1 1, 4 1, 4 4, 1 4))'))	true
SELECT ST_Intersects(ST_GeomFromText('LINESTRING (8 7, 7 8)'), ST_GeomFromText('POLYGON ((1 1, 4 1, 4 4, 1 4))'))	false

(37) ST_Is3D

Definition

Returns true if the geometry object is three-dimensional including height ‘Z’, otherwise returns false.

Syntax

ST_Is3D(binary geometry)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_Is3D(ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'))`	`false`
`SELECT ST_Is3D(ST_GeomFromText('LINESTRING (0 0, 3 4, 0 4, 0 0)'))`	`false`
`SELECT ST_Is3D(ST_Point(3, 4))`	`false`
`SELECT ST_Is3D(ST_PointZ(3, 4, 2))`	`true`

(38) ST_IsClosed

Definition

Return true if the linestring or multi-line has start and end points that are coincident.

Syntax

ST_IsClosed(binary geometry)

Return Type

`boolean`

Examples

Query	Result
SELECT ST_IsClosed(ST_GeomFromText('LINESTRING(0 0, 3 4, 0 4, 0 0)'))	true
SELECT ST_IsClosed(ST_GeomFromText('LINESTRING(0 0, 3 4)'))	false

(39) ST_IsEmpty

Definition

Return true if the geometry object is empty of geometric information.

Syntax

ST_IsEmpty(binary geometry)

Return Type

`boolean`

Examples

Query	Result
SELECT ST_IsEmpty(ST_Point(1.5, 2.5))	false
SELECT ST_IsEmpty(ST_GeomFromText('POINT EMPTY'))	true

(40) ST_IsMeasured

Definition

Returns true if the geometry object is measured including an additional dimension ‘M’, otherwise returns false.

Syntax

ST_IsMeasured(binary geometry)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_IsMeasured(ST_PointZ(3, 4, 2))`	`false`
`SELECT ST_IsMeasured(ST_GeomFromText('POINT M (1 1 80)'))`	`true`
`SELECT ST_IsMeasured(ST_GeomFromText('POINT ZM (1 1 5 60)'))`	`true`

(41) ST_IsRing

Definition

Returns true if the geometry is a linestring and the linestring is closed and simple.

Syntax

ST_IsRing(binary geometry)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_IsRing(ST_GeomFromText('LINESTRING (0 0, 3 4, 0 4, 0 0)'))`	`true`

Query	Result
SELECT ST_IsRing(ST_GeomFromText('LINESTRING (0 0, 1 1, 1 2, 2 1, 1 1, 0 0)'))	false
SELECT ST_IsRing(ST_GeomFromText('LINESTRING (0 0, 3 4)'))	false

(42) ST_IsSimple

Definition

Returns true if the geometry object is simple as defined by the Open Geospatial Consortium (OGC), otherwise, it returns false

Syntax

ST_IsSimple(binary geometry)

Return Type

`boolean`

Examples

Query	Result
SELECT ST_IsSimple(ST_Point(1.5, 2.5))	true
SELECT ST_IsSimple(ST_GeomFromText('LINESTRING (0 0, 1 1, 0 1, 1 0)'))	false

(43) ST_JSONPath

Definition

Extract a portion of *jsonData* as a string by following the specified path in the JSON Object from *jsonPath*.

Syntax

ST_JSONPath(string jsonPath, string jsonData)

Return Type

`string`

Examples

Query	Result

`SELECT`
`ST_JSONPath('/coordinates[Array][0]',ST_AsGeoJSON(ST_Envelope(the_geom)))`
`FROM utah_county_taxparcels`	

`SELECT`
`ST_JSONPath('/crs[Object]/properties[Object]/name',ST_AsGeoJSON(ST_Envelope(the_geom)))`
`FROM utah_county_taxparcels`	

Example JSON Path Syntax (similar to XPath for XML):
‘/data[Array]’
‘/data[Array][1]/id[String]’
‘/data[Array][1]/likes[Object]’
‘/data[Array][1]/likes[Object]/summary[Object]/total_count[String]’
‘/data[Array][3]’
‘/data[Array][id=131272076894593_1420960724592382]/likes[Object]/summary[Object]/total_count’
‘/fbids[String]’
‘/quoteSummary[Object]/result[Array][0]/defaultKeyStatistics[Object]/enterpriseValue[Object]/fmt[String]’
‘/quoteSummary[Object]/result[Array][0]/defaultKeyStatistics[Object]/forwardPE[Object]/raw[Double]’
‘quoteSummary[6]/result[4][0]/defaultKeyStatistics[6]/sharesOutstanding[6]/raw[1]’
‘quoteSummary[6]/result[Array]’
‘quoteSummary[6]/result[Array][0]’
‘quoteSummary[Object]/result[Array][0]/defaultKeyStatistics[Object]/lastSplitDate[Object]/raw1[Long]’
‘quoteSummary[Object]/result[Array][0]/defaultKeyStatistics[Object]/sharesOutstanding[Object]/raw[Integer]’

(44) ST_Length

Definition

Returns the length of a line string or multiline string.

Syntax

ST_Length(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_Length(ST_GeomFromText('LINESTRING (0 0, 3 4)'))`	`5.0`
`SELECT ST_Length(ST_GeomFromText('MULTILINESTRING ((1 0, 2 0), (0 2, 0 1))'))`	`2.0`

(45) ST_M

Definition

Takes a Point as an input parameter and returns its measure m-coordinate.

Syntax

ST_M(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_M(ST_GeomFromText('POINT M (1 1 80)'))`	`80.0`
`SELECT ST_M(ST_GeomFromText('POINT ZM (1 1 5 60)'))`	`60.0`

(46) ST_MaxM

Definition

Takes a geometry as an input parameter and returns its maximum measure m-coordinate.

Syntax

ST_MaxM(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_MaxM(ST_GeomFromText('LINESTRING M (1.5 2.5 2, 3.0 2.2 1)'))`	`2.0`
`SELECT ST_MaxM(ST_GeomFromText('POINT M (1.5 2.5 3)'))`	`3.0`

(47) ST_MaxX

Definition

Takes a geometry as an input parameter and returns its maximum x-coordinate.

Syntax

ST_MaxX(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_MaxX(ST_GeomFromText('LINESTRING M (1.5 2.5 2, 3.0 2.2 1)'))`	3.0
`SELECT ST_MaxX(ST_GeomFromText('POINT M (1.5 2.5 3)'))`	1.5

(48) ST_MaxY

Definition

Takes a geometry as an input parameter and returns its maximum y-coordinate.

Syntax

ST_MaxY(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_MaxY(ST_GeomFromText('LINESTRING M (1.5 2.5 2, 3.0 2.2 1)'))`	2.5
`SELECT ST_MaxY(ST_GeomFromText('POINT M (1.5 2.5 3)'))`	2.5

(49) ST_MaxZ

Definition

Takes a geometry as an input parameter and returns its maximum z-coordinate.

Syntax

ST_MaxZ(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_MaxZ(ST_GeomFromText('LINESTRING ZM (1.5 2.5 2 60, 3.0 2.2 1 80)'))`	2.0
`SELECT ST_MaxZ(ST_GeomFromText('LINESTRING Z (1.5 2.5 3, 3.0 2.2 4)'))`	4.0

(50) ST_MinM

Definition

Takes a geometry as an input parameter and returns its minimum m-coordinate.

Syntax

ST_MinM(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_MinM(ST_GeomFromText('LINESTRING M (1.5 2.5 2, 3.0 2.2 1)'))`	1.0
`SELECT ST_MinM(ST_GeomFromText('POINT M (1.5 2.5 3)'))`	3.0

(51) ST_MinX

Definition

Takes a geometry as an input parameter and returns its minimum x-coordinate.

Syntax

ST_MinX(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_MinX(ST_GeomFromText('LINESTRING M (1.25 2.5 2, 3.0 2.2 1)'))`	1.25
`SELECT ST_MinX(ST_GeomFromText('POINT M (1.75 2.5 3)'))`	1.75

(52) ST_MinY

Definition

Takes a geometry as an input parameter and returns its minimum y-coordinate.

Syntax

ST_MinY(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_MinY(ST_GeomFromText('LINESTRING M (1.5 2.5 2, 3.0 2.2 1)'))`	`2.2`
`SELECT ST_MinY(ST_GeomFromText('POINT M (1.5 2.25 3)'))`	`2.25`

(53) ST_MinZ

Definition

Takes a geometry as an input parameter and returns its minimum z-coordinate.

Syntax

ST_MinZ(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_MinZ(ST_GeomFromText('LINESTRING ZM (1.5 2.5 2 60, 3.0 2.2 1 80)'))`	`1.0`
`SELECT ST_MinZ(ST_GeomFromText('LINESTRING Z (1.5 2.5 3, 3.0 2.2 4)'))`	`3.0`

(54) ST_NumGeometries

Definition

Returns the number of geometries in the geometry collection.

Syntax

ST_NumGeometries(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_NumGeometries(ST_GeomFromText('MULTIPOINT ((10 40), (40 30), (20 20), (30 10))'))`	4
`SELECT ST_NumGeometries(ST_GeomFromText('MULTILINESTRING ((2 4, 10 10), (20 20, 7 8))'))`	2

(55) ST_NumInteriorRing

Definition

Returns the number of interior rings in the polygon geometry.

Syntax

ST_NumInteriorRing(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_NumInteriorRing(ST_GeomFromText('POLYGON ((0 0, 8 0, 0 8, 0 0), (1 1, 1 5, 5 1, 1 1))'))`	1

(56) ST_NumPoints

Definition

Returns the number of points (vertices) in the geometry. For polygons, both the starting and ending vertices are counted, even though they occupy the same location.

Syntax

ST_NumPoints(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_NumPoints(ST_Point(1.5, 2.5))`	1
`SELECT ST_NumPoints(ST_GeomFromText('LINESTRING (1.5 2.5, 3.0 2.2)'))`	2
`SELECT ST_NumPoints((ST_GeomFromText('POLYGON ((0 0, 10 0, 0 10, 0 0))')))`	4

(57) ST_Overlaps

Definition

Returns true if *geometry1* overlaps *geometry2*.

Syntax

ST_Overlaps(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_Overlaps(ST_GeomFromText('POLYGON ((2 0, 2 3, 3 0))'), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'))`	`true`
`SELECT ST_Overlaps(ST_GeomFromText('POLYGON ((2 0, 2 1, 3 1))'), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'))`	`false`

(58) ST_Point

Definition

Returns a 2D point geometry from the provided lon (x) and lat (y) values.

Syntax

ST_Pointnumber lon, number lat

Return Type

`binary`

---

(59) ST_PointN

Definition

Returns the point that is the nth vertex in an LineString or MultiPoint (1-based index)

Syntax

ST_PointN(binary geometry, number index)

Return Type

`binary`

Examples

Query	Result
`SELECT ST_AsText(ST_PointN(ST_GeomFromText('LINESTRING (1.5 2.5, 3.0 2.2)'), 2))`	`'POINT (3 2.2)'`

(60) ST_PointZ

Definition

Returns a 3D point geometry from the provided lon (x), lat (y), and elev (z) values.

Syntax

ST_PointZnumber lon, number lat, number elev

Return Type

`binary`

---

(61) ST_Relate

Definition

Compares the two geometries and returns true if the geometries meet the conditions specified by the DE-9IM pattern matrix string, otherwise, false is returned.

Syntax

ST_Relate(binary geometry1, binary geometry2, string relation)

Return Type

`binary`

Examples

Query	Result
SELECT ST_Relate(ST_GeomFromText('POLYGON ((2 0, 2 1, 3 1))'), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'), '****T****')	true
SELECT ST_Relate(ST_GeomFromText('POLYGON ((2 0, 2 1, 3 1))'), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'), 'T********')	false
SELECT ST_Relate(ST_GeomFromText('LINESTRING (0 0, 3 3)'), ST_GeomFromText('LINESTRING (1 1, 4 4)'), 'T********')	true
SELECT ST_Relate(ST_GeomFromText('LINESTRING (0 0, 3 3)'), ST_GeomFromText('LINESTRING (1 1, 4 4)'), '****T****')	false

(62) ST_SetSRID

Definition

Sets the Spatial Reference ID of *SRID* of the geometry.

Syntax

ST_SetSRID(binary geometry, number SRID)

Return Type

`binary`

(63) ST_Simplify

Definition

Simplifies the geometry or determines if the geometry is simple. The goal is to produce a geometry that is valid to store without additional processing.

Syntax

ST_Simplify(binary geometry)

Return Type

`binary`

(64) ST_StartPoint

Definition

Returns the first point of a Linestring.

Syntax

ST_StartPoint(binary geometry)

Return Type

`binary`

Examples

Query	Result
SELECT ST_AsText(ST_StartPoint(ST_GeomFromText('LINESTRING (1.5 2.5, 3.0 2.2)')))	'POINT(1.5 2.5)'

(65) ST_SymmetricDiff

Definition

Returns a geometry object that is the symmetric difference of the source objects.

Syntax

ST_SymmetricDiff(binary geometry1, binary geometry2)

Return Type

`binary`

Examples

Query	Result

SELECT ST_AsText(ST_SymmetricDiff(ST_GeomFromText('LINESTRING (0 2, 2 2)'), ST_GeomFromText('LINESTRING (1 2, 3 2)')))
SELECT ST_AsText(ST_SymmetricDiff(ST_GeomFromText('POLYGON ((0 0, 2 0, 2 2, 0 2, 0 0))'), ST_GeomFromText('POLYGON ((1 1, 3 1, 3 3, 1 3, 1 1))'))) --> 'MULTIPOLYGON (((0 0, 2 0, 2 1, 1 1, 1 2, 0 2, 0 0)), ((2 1, 3 1, 3 3, 1 3, 1 2, 2 2, 2 1)))'
	'MULTILINESTRING ((0 2, 1 2), (2 2, 3 2))'

(66) ST_Touches

Definition

Returns true if none of the points common to both geometries intersect the interiors of both geometries, otherwise, it returns false. At least one geometry must be a LineString, Polygon, MultiLineString, or MultiPolygon.

Syntax

ST_Touches(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_Touches(ST_Point(1, 2), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'))`	`true`
`SELECT ST_Touches(ST_Point(8, 8), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'))`	`false`

(67) ST_Transform

Definition

Takes the two-dimensional geometry as input and returns values converted from the spatial source reference specified by *sourceSRID* to the one specified by *targetSRID*.

Syntax

ST_Transform(binary geometry, number sourceSRID, number targetSRID)

Return Type

`binary`

Examples

Query	Result
SELECT ST_AsText(ST_Transform(ST_GeomFromText('POLYGON ((-114.04702599994988 39.90609700007656, -114.0500520000997 37.0001909997149, -109.04517199998776 36.99897700038832, -109.05002599989996 41.000691000389395, -111.04681499981234 40.997875000031286, -111.04671399965133 42.00170200004732, -114.04147700036322 41.99387299963928, -114.04702599994988 39.90609700007656))'), 4326, 3857))	'POLYGON ((-12695656.860801652 4852305.919673687, -12695993.71359747 4439133.410181124, -12138853.020503571 4438964.195256694, -12139393.365302108 5012443.58678148, -12361674.899993964 5012028.231889712, -12361663.65670747 5161234.398812287, -12695039.148993252 5160061.69329091, -12695656.860801652 4852305.919673687))'

(68) ST_Union

Definition

Returns a geometry as the union of the two supplied geometries.

Syntax

ST_Union(binary geometry1, binary geometry2)

Return Type

```
binary
```

Examples

Query	Result
SELECT ST_AsText(ST_Union(ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'), ST_GeomFromText('POLYGON ((4 1, 4 4, 4 8, 8 1))')))	'POLYGON ((1 1, 4 1, 8 1, 4 8, 4 4, 1 4, 1 1))'

(69) ST_Within

Definition

Returns true if *geometry1* is completely inside *geometry2*.

Syntax

ST_Within(binary geometry1, binary geometry2)

Return Type

`boolean`

Examples

Query	Result
`SELECT ST_Within(ST_Point(2, 3), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'))`	`true`
`SELECT ST_Within(ST_Point(8, 8), ST_GeomFromText('POLYGON ((1 1, 1 4, 4 4, 4 1))'))`	`false`

(70) ST_X

Definition

Takes a Point as an input parameter and returns its longitude (x) coordinate.

Syntax

ST_X(binary geometry)

Return Type

`number`

Examples

Query	Result
SELECT ST_X(ST_Point(5, 7))	5.0

(71) ST_Y

Definition

Takes a Point as an input parameter and returns its latitude (y) coordinate.

Syntax

ST_Y(binary geometry)

Return Type

`number`

Examples

Query	Result
SELECT ST_Y(ST_GeomFromText('POINT (5 7)'))	7.0

(72) ST_Z

Definition

Takes a Point as an input parameter and returns its elevation (z) coordinate.

Syntax

ST_Z(binary geometry)

Return Type

`number`

Examples

Query	Result
`SELECT ST_Z(ST_GeomFromText('POINT Z (5 7 9)'))`	`9.0`