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## 1 Transformations

### 1.1 wkb2geos

GEOSGeom wkb2geos(wkb\* geomWKB)

The functions gets a pointer to a wkb struct and uses GEOS library to create a GEOSGeometry. In case **geomWKB** is **NULL** **wkb2geos** returns **NULL**.

### 1.2 geos2wkb

wkb\* geos2wkb(const GEOSGeometry\* geosGeometry)

The function gets a pointer to a GEOSGeometry and uses GEOS library to create a wkb struct. In case **geosGeometry** is **NULL**, **malloc** cannot reserve the needed memory or GEOS **GEOSGeomToWKB\_buf** function returns **NULL** the function also returns a pointer to a **NULL wkb struct**.

### 1.3 wkbFROMSTR

```
int wkbFROMSTR(char* geomWKT, int* len, wkb **geomWKB, int srid)
```

The function is used when reading data from disk. It gets a WKT geometry representation `geomWKT` and the `srid` of it and creates the wkb struct `geomWKB`. In case `geomWKT` is `str_nil` or there is some error when creating the GEOSGeometry or the wkb struct from it the function creates a `wkb_nil`. It returns the number of characters in `geomWKT` or 0 if an error occurred. `*len` is set to the size of the `geomWKB` but I am not sure why this is needed. The function returns the size of the created `geomWKT` and it is important in order to return the correct value.

### 1.4 wkbTOSTR

```
int wkbTOSTR(char **geomWKT, int* len, wkb *geomWKB)
```

The functions is used when writting data to disk. It gets a wkb struct `geomWKB` and creates the WKT representation of it `geomWKT`. If an error occurs when creating the GEOSGeometry from the `geomWKB` or when creating the WKT from the GEOSGeometry "`nil`" is returned as `geomWKT`. `*len` has the length of `geomWKT` including quotes and `'\0'` character, and is very important for the correct storage of the data.

### 1.5 wkbFromText

```
str wkbFromText(wkb **geomWKB, str *geomWKT, int* srid, int *tpe)
```

The function uses the `wkbFROMSTR` to create a `geomWKB` out of `geomWKT`. The function is used by the SQL functions

- `ST_GeomFromText`
- `ST_GeometryFromText`
- `ST_PointFromText`
- `ST_LineFromText`
- `ST_PolygonFromText`
- `ST_MPointFromText`
- `ST_MLineFromText`
- `ST_MPolyFromText`
- `ST_GeomCollFromText`

`*tpe` is used to indicate the geometry type that should be created. Although all SQL functions use the same `wkbFromText` c function a check is performed whether the `geomWKT` created a `geomWKB` of the same type as `*tpe`.

## 2 Basic Methods on geometric objects (OGC)

### 2.1 wkbDimension

```
str wkbDimension(int *dimension, wkb **geomWKB)
```

### 2.2 wkbGeometryType

```
str wkbGeometryType(char** out, wkb** geomWKB, int* flag)
```

### 2.3 wkbGetSRID

```
str wkbGetSRID(int *out, wkb **geomWKB)
```

### 2.4 Envelope

### 2.5 wkbAsText

```
str wkbAsText(str *txt, wkb **geomWKB)
```

The function uses the `wkbFROMSTR` to create a `geomWKT` from `geomWKB`. The function is used by the SQL function `ST_AsText`.

### 2.6 AsBinary

### 2.7 wkbIsEmpty

```
str wkbIsEmpty(bit *out, wkb **geomWKB)
```

### 2.8 wkbIsSimple

```
str wkbIsSimple(bit *out, wkb **geomWKB)
```

### 2.9 Is3D

### 2.10 IsMeasured

### 2.11 wkbBoundary

```
str wkbBoundary(wkb **boundaryWKB, wkb **geomWKB)
```

## 3 Notes on sql level

### 3.1 int atom\_cast(atom \*a, sql\_subtype \*tp)

It is called to check the arguments of a function (once for each argument) `sql_subtype *tp` has the type of the expected argument and `sql_subtype *at = &a->tpe` has the type of the provided argument.