

My Project

Contents

1	Deprecated List	1
2	Class Index	3
2.1	Class List	3
3	File Index	5
3.1	File List	5
4	Class Documentation	7
4.1	OGRAttrIndex Class Reference	7
4.2	OGRDataSource Class Reference	7
4.2.1	Detailed Description	9
4.2.2	Member Function Documentation	9
4.2.2.1	CopyLayer	9
4.2.2.2	CreateLayer	9
4.2.2.3	DeleteLayer	10
4.2.2.4	Dereference	10
4.2.2.5	DestroyDataSource	10
4.2.2.6	ExecuteSQL	11
4.2.2.7	GetDriver	11
4.2.2.8	GetLayer	11
4.2.2.9	GetLayerByName	12
4.2.2.10	GetLayerCount	12
4.2.2.11	GetName	12
4.2.2.12	GetRefCount	12
4.2.2.13	GetStyleTable	13
4.2.2.14	GetSummaryRefCount	13
4.2.2.15	Reference	13
4.2.2.16	Release	13
4.2.2.17	ReleaseResultSet	13
4.2.2.18	SetDriver	14
4.2.2.19	SetStyleTable	14

4.2.2.20	SetStyleTableDirectly	14
4.2.2.21	SyncToDisk	14
4.2.2.22	TestCapability	15
4.3	OGRLayer Class Reference	15
4.3.1	Detailed Description	17
4.3.2	Member Function Documentation	17
4.3.2.1	AlterFieldDefn	17
4.3.2.2	CreateFeature	18
4.3.2.3	CreateField	18
4.3.2.4	DeleteFeature	18
4.3.2.5	DeleteField	19
4.3.2.6	Dereference	19
4.3.2.7	GetExtent	19
4.3.2.8	GetFeature	20
4.3.2.9	GetFeatureCount	20
4.3.2.10	GetFIDColumn	21
4.3.2.11	GetGeometryColumn	21
4.3.2.12	GetGeomType	21
4.3.2.13	GetInfo	21
4.3.2.14	GetLayerDefn	22
4.3.2.15	GetName	22
4.3.2.16	GetNextFeature	22
4.3.2.17	GetRefCount	23
4.3.2.18	GetSpatialFilter	23
4.3.2.19	GetSpatialRef	23
4.3.2.20	GetStyleTable	23
4.3.2.21	Reference	23
4.3.2.22	ReorderField	24
4.3.2.23	ReorderFields	24
4.3.2.24	ResetReading	25
4.3.2.25	SetAttributeFilter	25
4.3.2.26	SetFeature	25
4.3.2.27	SetIgnoredFields	26
4.3.2.28	SetNextByIndex	26
4.3.2.29	SetSpatialFilter	26
4.3.2.30	SetSpatialFilterRect	27
4.3.2.31	SetStyleTable	27
4.3.2.32	SetStyleTableDirectly	27
4.3.2.33	SyncToDisk	28
4.3.2.34	TestCapability	28

4.4	OGRLayerAttrIndex Class Reference	29
4.5	OGRSFDriver Class Reference	29
4.5.1	Detailed Description	30
4.5.2	Member Function Documentation	30
4.5.2.1	CopyDataSource	30
4.5.2.2	CreateDataSource	30
4.5.2.3	DeleteDataSource	31
4.5.2.4	GetName	31
4.5.2.5	Open	31
4.5.2.6	TestCapability	32
4.6	OGRSFDriverRegistrar Class Reference	32
4.6.1	Detailed Description	33
4.6.2	Member Function Documentation	33
4.6.2.1	DeregisterDriver	33
4.6.2.2	GetDriver	34
4.6.2.3	GetDriverByName	34
4.6.2.4	GetDriverCount	34
4.6.2.5	GetOpenDS	34
4.6.2.6	GetOpenDSCount	34
4.6.2.7	GetRegistrar	35
4.6.2.8	Open	35
4.6.2.9	RegisterDriver	36
5	File Documentation	37
5.1	ogrsf_frmts.h File Reference	37
5.1.1	Detailed Description	38

Chapter 1

Deprecated List

Member [OGRLayer::GetInfo](#) (const char *)

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

OGRAttrIndex	7
OGRDataSource	7
OGRLayer	15
OGRLayerAttrIndex	29
OGRSFDriver	29
OGRSFDriverRegistrar	32

Chapter 3

File Index

3.1 File List

Here is a list of all documented files with brief descriptions:

ogr_attrind.h	...	??
ogrsf_frmts.h	...	37

Chapter 4

Class Documentation

4.1 OGRAttrIndex Class Reference

Public Member Functions

- virtual long **GetFirstMatch** (OGRField *psKey)=0
- virtual long * **GetAllMatches** (OGRField *psKey)=0
- virtual long * **GetAllMatches** (OGRField *psKey, long *panFIDList, int *nFIDCount, int *nLength)=0
- virtual OGRErr **AddEntry** (OGRField *psKey, long nFID)=0
- virtual OGRErr **RemoveEntry** (OGRField *psKey, long nFID)=0
- virtual OGRErr **Clear** ()=0

The documentation for this class was generated from the following file:

- ogr_attrind.h

4.2 OGRDataSource Class Reference

```
#include <ogr_sfrmts.h>
```

Public Member Functions

- virtual const char * **GetName** ()=0
Returns the name of the data source.
- virtual int **GetLayerCount** ()=0
Get the number of layers in this data source.
- virtual OGRLayer * **GetLayer** (int)=0
Fetch a layer by index.
- virtual OGRLayer * **GetLayerByName** (const char *)
Fetch a layer by name.
- virtual OGRErr **DeleteLayer** (int)
Delete the indicated layer from the datasource.
- virtual int **TestCapability** (const char *)=0
Test if capability is available.
- virtual OGRLayer * **CreateLayer** (const char *pszName, OGRSpatialReference *poSpatialRef=NULL, OGRwkbGeometryType eGType=wkbUnknown, char **papszOptions=NULL)

This method attempts to create a new layer on the data source with the indicated name, coordinate system, geometry type.

- virtual [OGRLayer](#) * [CopyLayer](#) ([OGRLayer](#) *poSrcLayer, const char *pszNewName, char **papszOptions=NULL)

Duplicate an existing layer.

- virtual [OGRStyleTable](#) * [GetStyleTable](#) ()

Returns data source style table.

- virtual void [SetStyleTableDirectly](#) ([OGRStyleTable](#) *poStyleTable)

Set data source style table.

- virtual void [SetStyleTable](#) ([OGRStyleTable](#) *poStyleTable)

Set data source style table.

- virtual [OGRLayer](#) * [ExecuteSQL](#) (const char *pszStatement, [OGRGeometry](#) *poSpatialFilter, const char *pszDialect)

Execute an SQL statement against the data store.

- virtual void [ReleaseResultSet](#) ([OGRLayer](#) *poResultSet)

Release results of [ExecuteSQL\(\)](#).

- virtual [OGRErr](#) [SyncToDisk](#) ()

Flush pending changes to disk.

- int [Reference](#) ()

Increment datasource reference count.

- int [Dereference](#) ()

Decrement datasource reference count.

- int [GetRefCount](#) () const

Fetch reference count.

- int [GetSummaryRefCount](#) () const

Fetch reference count of datasource and all owned layers.

- [OGRErr](#) [Release](#) ()

Drop a reference to this datasource, and if the reference count drops to zero close (destroy) the datasource.

- [OGRSFDriver](#) * [GetDriver](#) () const

Returns the driver that the dataset was opened with.

- void [SetDriver](#) ([OGRSFDriver](#) *poDriver)

Sets the driver that the dataset was created or opened with.

Static Public Member Functions

- static void [DestroyDataSource](#) ([OGRDataSource](#) *)

Closes opened datasource and releases allocated resources.

Protected Member Functions

- [OGRErr](#) [ProcessSQLCreateIndex](#) (const char *)
- [OGRErr](#) [ProcessSQLDropIndex](#) (const char *)
- [OGRErr](#) [ProcessSQLDropTable](#) (const char *)
- [OGRErr](#) [ProcessSQLAlterTableAddColumn](#) (const char *)
- [OGRErr](#) [ProcessSQLAlterTableDropColumn](#) (const char *)
- [OGRErr](#) [ProcessSQLAlterTableAlterColumn](#) (const char *)
- [OGRErr](#) [ProcessSQLAlterTableRenameColumn](#) (const char *)

Protected Attributes

- OGRStyleTable * **m_poStyleTable**
- int **m_nRefCount**
- OGRSFDriver * **m_poDriver**

Friends

- class **OGRSFDriverRegistrar**

4.2.1 Detailed Description

This class represents a data source. A data source potentially consists of many layers ([OGRLayer](#)). A data source normally consists of one, or a related set of files, though the name doesn't have to be a real item in the file system.

When an [OGRDataSource](#) is destroyed, all it's associated OGRLayers objects are also destroyed.

4.2.2 Member Function Documentation

4.2.2.1 OGRLayer * OGRDataSource::CopyLayer (OGRLayer * *poSrcLayer*, const char * *pszNewName*, char ** *papszOptions* = NULL) [virtual]

Duplicate an existing layer.

This method creates a new layer, duplicate the field definitions of the source layer and then duplicate each features of the source layer. The *papszOptions* argument can be used to control driver specific creation options. These options are normally documented in the format specific documentation. The source layer may come from another dataset.

This method is the same as the C function `OGR_DS_CopyLayer()`.

Parameters

<i>poSrcLayer</i>	source layer.
<i>pszNewName</i>	the name of the layer to create.
<i>papszOptions</i>	a StringList of name=value options. Options are driver specific.

Returns

an handle to the layer, or NULL if an error occurs.

4.2.2.2 OGRLayer * OGRDataSource::CreateLayer (const char * *pszName*, OGRSpatialReference * *poSpatialRef* = NULL, OGRwkbGeometryType *eGType* = wkbUnknown, char ** *papszOptions* = NULL) [virtual]

This method attempts to create a new layer on the data source with the indicated name, coordinate system, geometry type.

The *papszOptions* argument can be used to control driver specific creation options. These options are normally documented in the format specific documentation.

Parameters

<i>pszName</i>	the name for the new layer. This should ideally not match any existing layer on the datasource.
<i>poSpatialRef</i>	the coordinate system to use for the new layer, or NULL if no coordinate system is available.
<i>eGType</i>	the geometry type for the layer. Use wkbUnknown if there are no constraints on the types geometry to be written.
<i>papszOptions</i>	a StringList of name=value options. Options are driver specific.

Returns

NULL is returned on failure, or a new [OGRLayer](#) handle on success.

Example:

```
#include "ogr_srf_frmts.h"
#include "cpl_string.h"

...

OGRLayer *poLayer;
char      *papszOptions;

if( !poDS->TestCapability( ODS_CCreateLayer ) )
{
    ...
}

papszOptions = CSLSetNameValue( papszOptions, "DIM", "2" );
poLayer = poDS->CreateLayer( "NewLayer", NULL, wkbUnknown,
                             papszOptions );
CSLDestroy( papszOptions );

if( poLayer == NULL )
{
    ...
}
```

4.2.2.3 OGRErr OGRDataSource::DeleteLayer (int *iLayer*) [virtual]

Delete the indicated layer from the datasource.

If this method is supported the ODS_CDeleteLayer capability will test TRUE on the [OGRDataSource](#).

This method is the same as the C function OGR_DS_DeleteLayer().

Parameters

<i>iLayer</i>	the index of the layer to delete.
---------------	-----------------------------------

Returns

OGRERR_NONE on success, or OGRERR_UNSUPPORTED_OPERATION if deleting layers is not supported for this datasource.

4.2.2.4 int OGRDataSource::Dereference ()

Decrement datasource reference count.

This method is the same as the C function OGR_DS_Dereference().

Returns

the reference count after decrementing.

4.2.2.5 void OGRDataSource::DestroyDataSource (OGRDataSource * *poDS*) [static]

Closes opened datasource and releases allocated resources.

This static method will close and destroy a datasource. It is equivalent to calling delete on the object, but it ensures that the deallocation is properly executed within the GDAL libraries heap on platforms where this can matter (win32).

This method is the same as the C function `OGR_DS_Destroy()`.

Parameters

<i>poDS</i>	pointer to allocated datasource object.
-------------	---

4.2.2.6 OGRLayer * OGRDataSource::ExecuteSQL (const char * *pszStatement*, OGRGeometry * *poSpatialFilter*, const char * *pszDialect*) [virtual]

Execute an SQL statement against the data store.

The result of an SQL query is either NULL for statements that are in error, or that have no results set, or an [OGRLayer](#) pointer representing a results set from the query. Note that this [OGRLayer](#) is in addition to the layers in the data store and must be destroyed with [OGRDataSource::ReleaseResultSet\(\)](#) before the data source is closed (destroyed).

This method is the same as the C function `OGR_DS_ExecuteSQL()`.

For more information on the SQL dialect supported internally by OGR review the [OGR SQL](#) document. Some drivers (ie. Oracle and PostGIS) pass the SQL directly through to the underlying RDBMS.

Parameters

<i>pszStatement</i>	the SQL statement to execute.
<i>poSpatialFilter</i>	geometry which represents a spatial filter. Can be NULL.
<i>pszDialect</i>	allows control of the statement dialect. If set to NULL, the OGR SQL engine will be used, except for RDBMS drivers that will use their dedicated SQL engine, unless OGRSQL is explicitly passed as the dialect.

Returns

an [OGRLayer](#) containing the results of the query. Deallocate with [ReleaseResultSet\(\)](#).

4.2.2.7 OGRSFDriver * OGRDataSource::GetDriver () const

Returns the driver that the dataset was opened with.

This method is the same as the C function `OGR_DS_GetDriver()`.

Returns

NULL if driver info is not available, or pointer to a driver owned by the `OGRSFDriverManager`.

4.2.2.8 OGRLayer * OGRDataSource::GetLayer (int *iLayer*) [pure virtual]

Fetch a layer by index.

The returned layer remains owned by the [OGRDataSource](#) and should not be deleted by the application.

This method is the same as the C function `OGR_DS_GetLayer()`.

Parameters

<i>iLayer</i>	a layer number between 0 and GetLayerCount() -1.
---------------	--

Returns

the layer, or NULL if iLayer is out of range or an error occurs.

4.2.2.9 `OGRLayer * OGRDataSource::GetLayerByName (const char * pszLayerName)` [virtual]

Fetch a layer by name.

The returned layer remains owned by the [OGRDataSource](#) and should not be deleted by the application.

This method is the same as the C function `OGR_DS_GetLayerByName()`.

Parameters

<code>pszLayerName</code>	the layer name of the layer to fetch.
---------------------------	---------------------------------------

Returns

the layer, or NULL if Layer is not found or an error occurs.

4.2.2.10 `int OGRDataSource::GetLayerCount ()` [pure virtual]

Get the number of layers in this data source.

This method is the same as the C function `OGR_DS_GetLayerCount()`.

Returns

layer count.

4.2.2.11 `const char * OGRDataSource::GetName ()` [pure virtual]

Returns the name of the data source.

This string should be sufficient to open the data source if passed to the same [OGRSFDriver](#) that this data source was opened with, but it need not be exactly the same string that was used to open the data source. Normally this is a filename.

This method is the same as the C function `OGR_DS_GetName()`.

Returns

pointer to an internal name string which should not be modified or freed by the caller.

4.2.2.12 `int OGRDataSource::GetRefCount ()` const

Fetch reference count.

This method is the same as the C function `OGR_DS_GetRefCount()`.

Returns

the current reference count for the datasource object itself.

4.2.2.13 void OGRDataSource::GetStyleTable () [virtual]

Returns data source style table.

This method is the same as the C function `OGR_DS_GetStyleTable()`.

Returns

pointer to a style table which should not be modified or freed by the caller.

4.2.2.14 int OGRDataSource::GetSummaryRefCount () const

Fetch reference count of datasource and all owned layers.

This method is the same as the C function `OGR_DS_GetSummaryRefCount()`.

Returns

the current summary reference count for the datasource and its layers.

4.2.2.15 int OGRDataSource::Reference ()

Increment datasource reference count.

This method is the same as the C function `OGR_DS_Reference()`.

Returns

the reference count after incrementing.

4.2.2.16 OGRErr OGRDataSource::Release ()

Drop a reference to this datasource, and if the reference count drops to zero close (destroy) the datasource.

Internally this actually calls the `OGRSFDriverRegistrar::ReleaseDataSource()` method. This method is essentially a convenient alias.

This method is the same as the C function `OGRReleaseDataSource()`.

Returns

`OGRERR_NONE` on success or an error code.

4.2.2.17 void OGRDataSource::ReleaseResultSet (OGRLayer * poResultSet) [virtual]

Release results of [ExecuteSQL\(\)](#).

This method should only be used to deallocate `OGRLayers` resulting from an [ExecuteSQL\(\)](#) call on the same [OGRDataSource](#). Failure to deallocate a results set before destroying the [OGRDataSource](#) may cause errors.

This method is the same as the C function `OGR_L_ReleaseResultSet()`.

Parameters

<i>poResultSet</i>	the result of a previous ExecuteSQL() call.
--------------------	---

4.2.2.18 void OGRDataSource::SetDriver (OGRSFDriver * *poDriver*)

Sets the driver that the dataset was created or opened with.

Note

This method is not exposed as the OGR C API function.

Parameters

<i>poDriver</i>	pointer to driver instance associated with the data source.
-----------------	---

4.2.2.19 void OGRDataSource::SetStyleTable (OGRStyleTable * *poStyleTable*) [virtual]

Set data source style table.

This method operate exactly as [OGRDataSource::SetStyleTableDirectly\(\)](#) except that it does not assume ownership of the passed table.

This method is the same as the C function `OGR_DS_SetStyleTable()`.

Parameters

<i>poStyleTable</i>	pointer to style table to set
---------------------	-------------------------------

4.2.2.20 void OGRDataSource::SetStyleTableDirectly (OGRStyleTable * *poStyleTable*) [virtual]

Set data source style table.

This method operate exactly as [OGRDataSource::SetStyleTable\(\)](#) except that it assumes ownership of the passed table.

This method is the same as the C function `OGR_DS_SetStyleTableDirectly()`.

Parameters

<i>poStyleTable</i>	pointer to style table to set
---------------------	-------------------------------

4.2.2.21 OGRErr OGRDataSource::SyncToDisk () [virtual]

Flush pending changes to disk.

This call is intended to force the datasource to flush any pending writes to disk, and leave the disk file in a consistent state. It would not normally have any effect on read-only datasources.

Some data sources do not implement this method, and will still return `OGRERR_NONE`. An error is only returned if an error occurs while attempting to flush to disk.

The default implementation of this method just calls the [SyncToDisk\(\)](#) method on each of the layers. Conceptionally, calling [SyncToDisk\(\)](#) on a datasource should include any work that might be accomplished by calling [SyncToDisk\(\)](#) on layers in that data source.

In any event, you should always close any opened datasource with [OGRDataSource::DestroyDataSource\(\)](#) that will ensure all data is correctly flushed.

This method is the same as the C function `OGR_DS_SyncToDisk()`.

Returns

OGRERR_NONE if no error occurs (even if nothing is done) or an error code.

4.2.2.22 int OGRDataSource::TestCapability (const char * *pszCapability*) [pure virtual]

Test if capability is available.

One of the following data source capability names can be passed into this method, and a TRUE or FALSE value will be returned indicating whether or not the capability is available for this object.

- **ODsCCreateLayer**: True if this datasource can create new layers.

The #define macro forms of the capability names should be used in preference to the strings themselves to avoid misspelling.

This method is the same as the C function OGR_DS_TestCapability().

Parameters

<i>pszCapability</i>	the capability to test.
----------------------	-------------------------

Returns

TRUE if capability available otherwise FALSE.

The documentation for this class was generated from the following files:

- [ogrsf_frmts.h](#)
- [ogrsf_frmts.dox](#)

4.3 OGRLayer Class Reference

```
#include <ogrsf_frmts.h>
```

Public Member Functions

- virtual OGRGeometry * [GetSpatialFilter](#) ()
This method returns the current spatial filter for this layer.
- virtual void [SetSpatialFilter](#) (OGRGeometry *)
Set a new spatial filter.
- virtual void [SetSpatialFilterRect](#) (double dfMinX, double dfMinY, double dfMaxX, double dfMaxY)
Set a new rectangular spatial filter.
- virtual OGRErr [SetAttributeFilter](#) (const char *)
Set a new attribute query.
- virtual void [ResetReading](#) ()=0
Reset feature reading to start on the first feature.
- virtual OGRFeature * [GetNextFeature](#) ()=0
Fetch the next available feature from this layer.
- virtual OGRErr [SetNextByIndex](#) (long nIndex)
Move read cursor to the nIndex'th feature in the current resultset.
- virtual OGRFeature * [GetFeature](#) (long nFID)
Fetch a feature by its identifier.

- virtual OGRErr [SetFeature](#) (OGRFeature *poFeature)
Rewrite an existing feature.
- virtual OGRErr [CreateFeature](#) (OGRFeature *poFeature)
Create and write a new feature within a layer.
- virtual OGRErr [DeleteFeature](#) (long nFID)
Delete feature from layer.
- virtual const char * [GetName](#) ()
Return the layer name.
- virtual OGRwkbGeometryType [GetGeomType](#) ()
Return the layer geometry type.
- virtual OGRFeatureDefn * [GetLayerDefn](#) ()=0
Fetch the schema information for this layer.
- virtual OGRSpatialReference * [GetSpatialRef](#) ()
Fetch the spatial reference system for this layer.
- virtual int [GetFeatureCount](#) (int bForce=TRUE)
Fetch the feature count in this layer.
- virtual OGRErr [GetExtent](#) (OGREnvelope *psExtent, int bForce=TRUE)
Fetch the extent of this layer.
- virtual int [TestCapability](#) (const char *)=0
Test if this layer supported the named capability.
- virtual const char * [GetInfo](#) (const char *)
Fetch metadata from layer.
- virtual OGRErr [CreateField](#) (OGRFieldDefn *poField, int bApproxOK=TRUE)
Create a new field on a layer.
- virtual OGRErr [DeleteField](#) (int iField)
Delete an existing field on a layer.
- virtual OGRErr [ReorderFields](#) (int *panMap)
Reorder all the fields of a layer.
- virtual OGRErr [AlterFieldDefn](#) (int iField, OGRFieldDefn *poNewFieldDefn, int nFlags)
Alter the definition of an existing field on a layer.
- virtual OGRErr [SyncToDisk](#) ()
Flush pending changes to disk.
- virtual OGRStyleTable * [GetStyleTable](#) ()
Returns layer style table.
- virtual void [SetStyleTableDirectly](#) (OGRStyleTable *poStyleTable)
Set layer style table.
- virtual void [SetStyleTable](#) (OGRStyleTable *poStyleTable)
Set layer style table.
- virtual OGRErr **StartTransaction** ()
- virtual OGRErr **CommitTransaction** ()
- virtual OGRErr **RollbackTransaction** ()
- virtual const char * [GetFIDColumn](#) ()
This method returns the name of the underlying database column being used as the FID column, or "" if not supported.
- virtual const char * [GetGeometryColumn](#) ()
This method returns the name of the underlying database column being used as the geometry column, or "" if not supported.
- virtual OGRErr [SetIgnoredFields](#) (const char **papszFields)
Set which fields can be omitted when retrieving features from the layer.
- int [Reference](#) ()
Increment layer reference count.
- int [Dereference](#) ()

- Decrement layer reference count.*
- int [GetRefCount](#) () const
- Fetch reference count.*
- GIntBig **GetFeaturesRead** ()
- OGRErr [ReorderField](#) (int iOldFieldPos, int iNewFieldPos)
- Reorder an existing field on a layer.*
- int **AttributeFilterEvaluationNeedsGeometry** ()
- OGRErr **InitializeIndexSupport** (const char *)
- [OGRLayerAttrIndex](#) * **GetIndex** ()

Protected Member Functions

- int **FilterGeometry** (OGRGeometry *)
- int **InstallFilter** (OGRGeometry *)

Protected Attributes

- int **m_bFilterIsEnvelope**
- OGRGeometry * **m_poFilterGeom**
- OGREnvelope **m_sFilterEnvelope**
- OGRStyleTable * **m_poStyleTable**
- OGRFeatureQuery * **m_poAttrQuery**
- [OGRLayerAttrIndex](#) * **m_poAttrIndex**
- int **m_nRefCount**
- GIntBig **m_nFeaturesRead**

4.3.1 Detailed Description

This class represents a layer of simple features, with access methods.

4.3.2 Member Function Documentation

4.3.2.1 OGRErr OGRLayer::AlterFieldDefn (int *iField*, OGRFieldDefn * *poNewFieldDefn*, int *nFlags*) [virtual]

Alter the definition of an existing field on a layer.

You must use this to alter the definition of an existing field of a real layer. Internally the OGRFeatureDefn for the layer will be updated to reflect the altered field. Applications should never modify the OGRFeatureDefn used by a layer directly.

This method should not be called while there are feature objects in existence that were obtained or created with the previous layer definition.

Not all drivers support this method. You can query a layer to check if it supports it with the `OLCAAlterFieldDefn` capability. Some drivers may only support this method while there are still no features in the layer. When it is supported, the existings features of the backing file/database should be updated accordingly. Some drivers might also not support all update flags.

This function is the same as the C function `OGR_L_AlterFieldDefn()`.

Parameters

<i>iField</i>	index of the field whose definition must be altered.
<i>poNewFieldDefn</i>	new field definition
<i>nFlags</i>	combination of <code>ALTER_NAME_FLAG</code> , <code>ALTER_TYPE_FLAG</code> and <code>ALTER_WIDTH_PRECISION_FLAG</code> to indicate which of the name and/or type and/or width and precision fields from the new field definition must be taken into account.

Returns

OGRERR_NONE on success.

Since

OGR 1.9.0

4.3.2.2 OGRErr OGRLayer::CreateFeature (OGRFeature * *poFeature*) [virtual]

Create and write a new feature within a layer.

The passed feature is written to the layer as a new feature, rather than overwriting an existing one. If the feature has a feature id other than OGRNullFID, then the native implementation may use that as the feature id of the new feature, but not necessarily. Upon successful return the passed feature will have been updated with the new feature id.

This method is the same as the C function OGR_L_CreateFeature().

Parameters

<i>poFeature</i>	the feature to write to disk.
------------------	-------------------------------

Returns

OGRERR_NONE on success.

4.3.2.3 OGRErr OGRLayer::CreateField (OGRFieldDefn * *poField*, int *bApproxOK* = TRUE) [virtual]

Create a new field on a layer.

You must use this to create new fields on a real layer. Internally the OGRFeatureDefn for the layer will be updated to reflect the new field. Applications should never modify the OGRFeatureDefn used by a layer directly.

This method should not be called while there are feature objects in existence that were obtained or created with the previous layer definition.

Not all drivers support this method. You can query a layer to check if it supports it with the OLCCreateField capability. Some drivers may only support this method while there are still no features in the layer. When it is supported, the existings features of the backing file/database should be updated accordingly.

This function is the same as the C function OGR_L_CreateField().

Parameters

<i>poField</i>	field definition to write to disk.
<i>bApproxOK</i>	If TRUE, the field may be created in a slightly different form depending on the limitations of the format driver.

Returns

OGRERR_NONE on success.

4.3.2.4 OGRErr OGRLayer::DeleteFeature (long *nFID*) [virtual]

Delete feature from layer.

The feature with the indicated feature id is deleted from the layer if supported by the driver. Most drivers do

not support feature deletion, and will return OGRERR_UNSUPPORTED_OPERATION. The [TestCapability\(\)](#) layer method may be called with OLCDeleteFeature to check if the driver supports feature deletion.

This method is the same as the C function OGR_L_DeleteFeature().

Parameters

<i>nFID</i>	the feature id to be deleted from the layer
-------------	---

Returns

OGRERR_NONE on success.

4.3.2.5 OGRErr OGRLayer::DeleteField (int *iField*) [virtual]

Delete an existing field on a layer.

You must use this to delete existing fields on a real layer. Internally the OGRFeatureDefn for the layer will be updated to reflect the deleted field. Applications should never modify the OGRFeatureDefn used by a layer directly.

This method should not be called while there are feature objects in existence that were obtained or created with the previous layer definition.

Not all drivers support this method. You can query a layer to check if it supports it with the OLCDeleteField capability. Some drivers may only support this method while there are still no features in the layer. When it is supported, the existings features of the backing file/database should be updated accordingly.

This function is the same as the C function OGR_L_DeleteField().

Parameters

<i>iField</i>	index of the field to delete.
---------------	-------------------------------

Returns

OGRERR_NONE on success.

Since

OGR 1.9.0

4.3.2.6 int OGRLayer::Dereference ()

Decrement layer reference count.

This method is the same as the C function OGR_L_Dereference().

Returns

the reference count after decrementing.

4.3.2.7 OGRErr OGRLayer::GetExtent (OGREnvelope * *psExtent*, int *bForce* = TRUE) [virtual]

Fetch the extent of this layer.

Returns the extent (MBR) of the data in the layer. If *bForce* is FALSE, and it would be expensive to establish the extent then OGRERR_FAILURE will be returned indicating that the extent isn't know. If *bForce* is TRUE then some implementations will actually scan the entire layer once to compute the MBR of all the features in the layer.

Depending on the drivers, the returned extent may or may not take the spatial filter into account. So it is safer to call [GetExtent\(\)](#) without setting a spatial filter.

Layers without any geometry may return OGRERR_FAILURE just indicating that no meaningful extents could be collected.

Note that some implementations of this method may alter the read cursor of the layer.

This method is the same as the C function `OGR_L_GetExtent()`.

Parameters

<i>psExtent</i>	the structure in which the extent value will be returned.
<i>bForce</i>	Flag indicating whether the extent should be computed even if it is expensive.

Returns

OGRERR_NONE on success, OGRERR_FAILURE if extent not known.

4.3.2.8 OGRFeature * OGRLayer::GetFeature (long nFID) [virtual]

Fetch a feature by its identifier.

This function will attempt to read the identified feature. The nFID value cannot be OGRNullFID. Success or failure of this operation is unaffected by the spatial or attribute filters.

If this method returns a non-NULL feature, it is guaranteed that its feature id (`OGRFeature::GetFID()`) will be the same as nFID.

Use `OGRLayer::TestCapability(OLCRandomRead)` to establish if this layer supports efficient random access reading via [GetFeature\(\)](#); however, the call should always work if the feature exists as a fallback implementation just scans all the features in the layer looking for the desired feature.

Sequential reads are generally considered interrupted by a [GetFeature\(\)](#) call.

The returned feature should be free with `OGRFeature::DestroyFeature()`.

This method is the same as the C function `OGR_L_GetFeature()`.

Parameters

<i>nFID</i>	the feature id of the feature to read.
-------------	--

Returns

a feature now owned by the caller, or NULL on failure.

4.3.2.9 int OGRLayer::GetFeatureCount (int bForce = TRUE) [virtual]

Fetch the feature count in this layer.

Returns the number of features in the layer. For dynamic databases the count may not be exact. If bForce is FALSE, and it would be expensive to establish the feature count a value of -1 may be returned indicating that the count isn't know. If bForce is TRUE some implementations will actually scan the entire layer once to count objects.

The returned count takes the spatial filter into account.

Note that some implementations of this method may alter the read cursor of the layer.

This method is the same as the C function `OGR_L_GetFeatureCount()`.

Parameters

<i>bForce</i>	Flag indicating whether the count should be computed even if it is expensive.
---------------	---

Returns

feature count, -1 if count not known.

4.3.2.10 `const char * OGRLayer::GetFIDColumn ()` [virtual]

This method returns the name of the underlying database column being used as the FID column, or "" if not supported.

This method is the same as the C function `OGR_L_GetFIDColumn()`.

Returns

fid column name.

4.3.2.11 `const char * OGRLayer::GetGeometryColumn ()` [virtual]

This method returns the name of the underlying database column being used as the geometry column, or "" if not supported.

This method is the same as the C function `OGR_L_GetGeometryColumn()`.

Returns

geometry column name.

4.3.2.12 `OGRwkbGeometryType OGRLayer::GetGeomType ()` [virtual]

Return the layer geometry type.

This returns the same result as `GetLayerDefn()->GetGeomType()`, but for a few drivers, calling `GetGeomType()` directly can avoid lengthy layer definition initialization.

This method is the same as the C function `OGR_L_GetGeomType()`.

If this method is derived in a driver, it must be done such that it returns the same content as `GetLayerDefn()->GetGeomType()`.

Returns

the geometry type

Since

OGR 1.8.0

4.3.2.13 `const char * OGRLayer::GetInfo (const char * pszTag)` [virtual]

Fetch metadata from layer.

This method can be used to fetch various kinds of metadata or layer specific information encoded as a string. It is anticipated that various tag values will be defined with well known semantics, while other tags will be used for driver/application specific purposes.

This method is deprecated and will be replaced with a more general metadata model in the future. At this time no drivers return information via the `GetInfo()` call.

Parameters

<i>pszTag</i>	the tag for which information is being requested.
---------------	---

Returns

the value of the requested tag, or NULL if that tag does not have a value, or is unknown.

Deprecated

4.3.2.14 `OGRFeatureDefn * OGRLayer::GetLayerDefn ()` [pure virtual]

Fetch the schema information for this layer.

The returned `OGRFeatureDefn` is owned by the `OGRLayer`, and should not be modified or freed by the application. It encapsulates the attribute schema of the features of the layer.

This method is the same as the C function `OGR_L_GetLayerDefn()`.

Returns

feature definition.

4.3.2.15 `const char * OGRLayer::GetName ()` [virtual]

Return the layer name.

This returns the same content as `GetLayerDefn()->GetName()`, but for a few drivers, calling `GetName()` directly can avoid lengthy layer definition initialization.

This method is the same as the C function `OGR_L_GetName()`.

If this method is derived in a driver, it must be done such that it returns the same content as `GetLayerDefn()->GetName()`.

Returns

the layer name (must not be freed)

Since

OGR 1.8.0

4.3.2.16 `OGRFeature * OGRLayer::GetNextFeature ()` [pure virtual]

Fetch the next available feature from this layer.

The returned feature becomes the responsibility of the caller to delete with `OGRFeature::DestroyFeature()`. It is critical that all features associated with an `OGRLayer` (more specifically an `OGRFeatureDefn`) be deleted before that layer/datasource is deleted.

Only features matching the current spatial filter (set with `SetSpatialFilter()`) will be returned.

This method implements sequential access to the features of a layer. The `ResetReading()` method can be used to start at the beginning again.

This method is the same as the C function `OGR_L_GetNextFeature()`.

Returns

a feature, or NULL if no more features are available.

4.3.2.17 int OGRLayer::GetRefCount () const

Fetch reference count.

This method is the same as the C function `OGR_L_GetRefCount()`.

Returns

the current reference count for the layer object itself.

4.3.2.18 OGRGeometry * OGRLayer::GetSpatialFilter () [virtual]

This method returns the current spatial filter for this layer.

The returned pointer is to an internally owned object, and should not be altered or deleted by the caller.

This method is the same as the C function `OGR_L_GetSpatialFilter()`.

Returns

spatial filter geometry.

4.3.2.19 OGRSpatialReference * OGRLayer::GetSpatialRef () [inline, virtual]

Fetch the spatial reference system for this layer.

The returned object is owned by the [OGRLayer](#) and should not be modified or freed by the application.

This method is the same as the C function `OGR_L_GetSpatialRef()`.

Returns

spatial reference, or NULL if there isn't one.

4.3.2.20 void OGRLayer::GetStyleTable () [virtual]

Returns layer style table.

This method is the same as the C function `OGR_L_GetStyleTable()`.

Returns

pointer to a style table which should not be modified or freed by the caller.

4.3.2.21 int OGRLayer::Reference ()

Increment layer reference count.

This method is the same as the C function `OGR_L_Reference()`.

Returns

the reference count after incrementing.

4.3.2.22 OGRErr OGRLayer::ReorderField (int *iOldFieldPos*, int *iNewFieldPos*)

Reorder an existing field on a layer.

This method is a conveniency wrapper of [ReorderFields\(\)](#) dedicated to move a single field. It is a non-virtual method, so drivers should implement [ReorderFields\(\)](#) instead.

You must use this to reorder existing fields on a real layer. Internally the OGRFeatureDefn for the layer will be updated to reflect the reordering of the fields. Applications should never modify the OGRFeatureDefn used by a layer directly.

This method should not be called while there are feature objects in existence that were obtained or created with the previous layer definition.

The field definition that was at initial position *iOldFieldPos* will be moved at position *iNewFieldPos*, and elements between will be shuffled accordingly.

For example, let suppose the fields were "0","1","2","3","4" initially. `ReorderField(1, 3)` will reorder them as "0","2","3","1","4".

Not all drivers support this method. You can query a layer to check if it supports it with the `OLCReorderFields` capability. Some drivers may only support this method while there are still no features in the layer. When it is supported, the existings features of the backing file/database should be updated accordingly.

This function is the same as the C function `OGR_L_ReorderField()`.

Parameters

<i>iOldFieldPos</i>	previous position of the field to move. Must be in the range <code>[0,GetFieldCount()-1]</code> .
<i>iNewFieldPos</i>	new position of the field to move. Must be in the range <code>[0,GetFieldCount()-1]</code> .

Returns

OGRErr_NONE on success.

Since

OGR 1.9.0

4.3.2.23 OGRErr OGRLayer::ReorderFields (int * *panMap*) [virtual]

Reorder all the fields of a layer.

You must use this to reorder existing fields on a real layer. Internally the OGRFeatureDefn for the layer will be updated to reflect the reordering of the fields. Applications should never modify the OGRFeatureDefn used by a layer directly.

This method should not be called while there are feature objects in existence that were obtained or created with the previous layer definition.

panMap is such that, for each field definition at position *i* after reordering, its position before reordering was *panMap[i]*.

For example, let suppose the fields were "0","1","2","3","4" initially. `ReorderFields([0,2,3,1,4])` will reorder them as "0","2","3","1","4".

Not all drivers support this method. You can query a layer to check if it supports it with the `OLCReorderFields` capability. Some drivers may only support this method while there are still no features in the layer. When it is supported, the existings features of the backing file/database should be updated accordingly.

This function is the same as the C function `OGR_L_ReorderFields()`.

Parameters

<i>panMap</i>	an array of GetLayerDefn()->GetFieldCount() elements which is a permutation of <code>[0, GetLayerDefn()->GetFieldCount()-1]</code> .
---------------	--

Returns

OGRERR_NONE on success.

Since

OGR 1.9.0

4.3.2.24 void OGRLayer::ResetReading () [pure virtual]

Reset feature reading to start on the first feature.

This affects [GetNextFeature\(\)](#).

This method is the same as the C function `OGR_L_ResetReading()`.

4.3.2.25 void OGRLayer::SetAttributeFilter (const char * *pszQuery*) [virtual]

Set a new attribute query.

This method sets the attribute query string to be used when fetching features via the [GetNextFeature\(\)](#) method. Only features for which the query evaluates as true will be returned.

The query string should be in the format of an SQL WHERE clause. For instance "population > 1000000 and population < 5000000" where population is an attribute in the layer. The query format is normally a restricted form of SQL WHERE clause as described in the "WHERE" section of the [OGR SQL](#) tutorial. In some cases (RDBMS backed drivers) the native capabilities of the database may be used to interpret the WHERE clause in which case the capabilities will be broader than those of OGR SQL.

Note that installing a query string will generally result in resetting the current reading position (ala [ResetReading\(\)](#)).

This method is the same as the C function `OGR_L_SetAttributeFilter()`.

Parameters

<i>pszQuery</i>	query in restricted SQL WHERE format, or NULL to clear the current query.
-----------------	---

Returns

OGRERR_NONE if successfully installed, or an error code if the query expression is in error, or some other failure occurs.

4.3.2.26 OGRErr OGRLayer::SetFeature (OGRFeature * *poFeature*) [virtual]

Rewrite an existing feature.

This method will write a feature to the layer, based on the feature id within the OGRFeature.

Use `OGRLayer::TestCapability(OLCRandomWrite)` to establish if this layer supports random access writing via [SetFeature\(\)](#).

This method is the same as the C function `OGR_L_SetFeature()`.

Parameters

<i>poFeature</i>	the feature to write.
------------------	-----------------------

Returns

OGRERR_NONE if the operation works, otherwise an appropriate error code.

4.3.2.27 OGRErr OGRLayer::SetIgnoredFields (const char ** *papszFields*) [virtual]

Set which fields can be omitted when retrieving features from the layer.

If the driver supports this functionality (testable using OLCIgnoreFields capability), it will not fetch the specified fields in subsequent calls to [GetFeature\(\)](#) / [GetNextFeature\(\)](#) and thus save some processing time and/or bandwidth.

Besides field names of the layers, the following special fields can be passed: "OGR_GEOMETRY" to ignore geometry and "OGR_STYLE" to ignore layer style.

By default, no fields are ignored.

This method is the same as the C function `OGR_L_SetIgnoredFields()`

Parameters

<i>papszFields</i>	an array of field names terminated by NULL item. If NULL is passed, the ignored list is cleared.
--------------------	--

Returns

OGRERR_NONE if all field names have been resolved (even if the driver does not support this method)

4.3.2.28 OGRErr OGRLayer::SetNextByIndex (long *nIndex*) [virtual]

Move read cursor to the *nIndex*'th feature in the current resultset.

This method allows positioning of a layer such that the [GetNextFeature\(\)](#) call will read the requested feature, where *nIndex* is an absolute index into the current result set. So, setting it to 3 would mean the next feature read with [GetNextFeature\(\)](#) would have been the 4th feature to have been read if sequential reading took place from the beginning of the layer, including accounting for spatial and attribute filters.

Only in rare circumstances is [SetNextByIndex\(\)](#) efficiently implemented. In all other cases the default implementation which calls [ResetReading\(\)](#) and then calls [GetNextFeature\(\)](#) *nIndex* times is used. To determine if fast seeking is available on the current layer use the [TestCapability\(\)](#) method with a value of `OLCFastSetNextByIndex`.

This method is the same as the C function `OGR_L_SetNextByIndex()`.

Parameters

<i>nIndex</i>	the index indicating how many steps into the result set to seek.
---------------	--

Returns

OGRERR_NONE on success or an error code.

4.3.2.29 void OGRLayer::SetSpatialFilter (OGRGeometry * *poFilter*) [virtual]

Set a new spatial filter.

This method set the geometry to be used as a spatial filter when fetching features via the [GetNextFeature\(\)](#) method. Only features that geometrically intersect the filter geometry will be returned.

Currently this test is may be inaccurately implemented, but it is guaranteed that all features who's envelope (as returned by `OGRGeometry::getEnvelope()`) overlaps the envelope of the spatial filter will be returned. This can result in more shapes being returned that should strictly be the case.

This method makes an internal copy of the passed geometry. The passed geometry remains the responsibility of the caller, and may be safely destroyed.

For the time being the passed filter geometry should be in the same SRS as the layer (as returned by [OGRLayer::GetSpatialRef\(\)](#)). In the future this may be generalized.

This method is the same as the C function `OGR_L_SetSpatialFilter()`.

Parameters

<i>poFilter</i>	the geometry to use as a filtering region. NULL may be passed indicating that the current spatial filter should be cleared, but no new one instituted.
-----------------	--

4.3.2.30 void OGRLayer::SetSpatialFilterRect (double dfMinX, double dfMinY, double dfMaxX, double dfMaxY) [virtual]

Set a new rectangular spatial filter.

This method set rectangle to be used as a spatial filter when fetching features via the [GetNextFeature\(\)](#) method. Only features that geometrically intersect the given rectangle will be returned.

The x/y values should be in the same coordinate system as the layer as a whole (as returned by [OGRLayer::GetSpatialRef\(\)](#)). Internally this method is normally implemented as creating a 5 vertex closed rectangular polygon and passing it to [OGRLayer::SetSpatialFilter\(\)](#). It exists as a convenience.

The only way to clear a spatial filter set with this method is to call `OGRLayer::SetSpatialFilter(NULL)`.

This method is the same as the C function `OGR_L_SetSpatialFilterRect()`.

Parameters

<i>dfMinX</i>	the minimum X coordinate for the rectangular region.
<i>dfMinY</i>	the minimum Y coordinate for the rectangular region.
<i>dfMaxX</i>	the maximum X coordinate for the rectangular region.
<i>dfMaxY</i>	the maximum Y coordinate for the rectangular region.

4.3.2.31 void OGRLayer::SetStyleTable (OGRStyleTable * poStyleTable) [virtual]

Set layer style table.

This method operate exactly as [OGRLayer::SetStyleTableDirectly\(\)](#) except that it does not assume ownership of the passed table.

This method is the same as the C function `OGR_L_SetStyleTable()`.

Parameters

<i>poStyleTable</i>	pointer to style table to set
---------------------	-------------------------------

4.3.2.32 void OGRLayer::SetStyleTableDirectly (OGRStyleTable * poStyleTable) [virtual]

Set layer style table.

This method operate exactly as [OGRLayer::SetStyleTable\(\)](#) except that it assumes ownership of the passed table.

This method is the same as the C function `OGR_L_SetStyleTableDirectly()`.

Parameters

<i>poStyleTable</i>	pointer to style table to set
---------------------	-------------------------------

4.3.2.33 `OGRERR OGRLayer::SyncToDisk ()` [virtual]

Flush pending changes to disk.

This call is intended to force the layer to flush any pending writes to disk, and leave the disk file in a consistent state. It would not normally have any effect on read-only datasources.

Some layers do not implement this method, and will still return `OGRERR_NONE`. The default implementation just returns `OGRERR_NONE`. An error is only returned if an error occurs while attempting to flush to disk.

In any event, you should always close any opened datasource with `OGRDataSource::DestroyDataSource()` that will ensure all data is correctly flushed.

This method is the same as the C function `OGR_L_SyncToDisk()`.

Returns

`OGRERR_NONE` if no error occurs (even if nothing is done) or an error code.

4.3.2.34 `int OGRLayer::TestCapability (const char * pszCap)` [pure virtual]

Test if this layer supported the named capability.

The capability codes that can be tested are represented as strings, but `#defined` constants exists to ensure correct spelling. Specific layer types may implement class specific capabilities, but this can't generally be discovered by the caller.

- **OLCRandomRead** / "RandomRead": TRUE if the `GetFeature()` method is implemented in an optimized way for this layer, as opposed to the default implementation using `ResetReading()` and `GetNextFeature()` to find the requested feature id.
- **OLCSequentialWrite** / "SequentialWrite": TRUE if the `CreateFeature()` method works for this layer. Note this means that this particular layer is writable. The same `OGRLayer` class may returned FALSE for other layer instances that are effectively read-only.
- **OLCRandomWrite** / "RandomWrite": TRUE if the `SetFeature()` method is operational on this layer. Note this means that this particular layer is writable. The same `OGRLayer` class may returned FALSE for other layer instances that are effectively read-only.
- **OLCFastSpatialFilter** / "FastSpatialFilter": TRUE if this layer implements spatial filtering efficiently. Layers that effectively read all features, and test them with the `OGRFeature` intersection methods should return FALSE. This can be used as a clue by the application whether it should build and maintain its own spatial index for features in this layer.
- **OLCFastFeatureCount** / "FastFeatureCount": TRUE if this layer can return a feature count (via `GetFeatureCount()`) efficiently ... ie. without counting the features. In some cases this will return TRUE until a spatial filter is installed after which it will return FALSE.
- **OLCFastGetExtent** / "FastGetExtent": TRUE if this layer can return its data extent (via `GetExtent()`) efficiently ... ie. without scanning all the features. In some cases this will return TRUE until a spatial filter is installed after which it will return FALSE.
- **OLCFastSetNextByIndex** / "FastSetNextByIndex": TRUE if this layer can perform the `SetNextByIndex()` call efficiently, otherwise FALSE.
- **OLCCreateField** / "CreateField": TRUE if this layer can create new fields on the current layer using `CreateField()`, otherwise FALSE.
- **OLCDeleteField** / "DeleteField": TRUE if this layer can delete existing fields on the current layer using `DeleteField()`, otherwise FALSE.
- **OLCReorderFields** / "ReorderFields": TRUE if this layer can reorder existing fields on the current layer using `ReorderField()` or `ReorderFields()`, otherwise FALSE.

- **OLCAAlterFieldDefn** / "AlterFieldDefn": TRUE if this layer can alter the definition of an existing field on the current layer using [AlterFieldDefn\(\)](#), otherwise FALSE.
- **OLCDeleteFeature** / "DeleteFeature": TRUE if the [DeleteFeature\(\)](#) method is supported on this layer, otherwise FALSE.
- **OLCStringsAsUTF8** / "StringsAsUTF8": TRUE if values of OFTString fields are assured to be in UTF-8 format. If FALSE the encoding of fields is uncertain, though it might still be UTF-8.
- **OLCTransactions** / "Transactions": TRUE if the [StartTransaction\(\)](#), [CommitTransaction\(\)](#) and [RollbackTransaction\(\)](#) methods work in a meaningful way, otherwise FALSE.
- **OLCIgnoreFields** / "IgnoreFields": TRUE if fields, geometry and style will be omitted when fetching features as set by [SetIgnoredFields\(\)](#) method.

This method is the same as the C function [OGR_L_TestCapability\(\)](#).

Parameters

<i>pszCap</i>	the name of the capability to test.
---------------	-------------------------------------

Returns

TRUE if the layer has the requested capability, or FALSE otherwise. OGRLayers will return FALSE for any unrecognised capabilities.

The documentation for this class was generated from the following files:

- [ogrsf_frmts.h](#)
- [ogrsf_frmts.dox](#)

4.4 OGRLayerAttrIndex Class Reference

Public Member Functions

- virtual OGRErr **Initialize** (const char *pszIndexPath, [OGRLayer](#) *)=0
- virtual OGRErr **CreateIndex** (int iField)=0
- virtual OGRErr **DropIndex** (int iField)=0
- virtual OGRErr **IndexAllFeatures** (int iField=-1)=0
- virtual OGRErr **AddToIndex** (OGRFeature *poFeature, int iField=-1)=0
- virtual OGRErr **RemoveFromIndex** (OGRFeature *poFeature)=0
- virtual [OGRAttrIndex](#) * **GetFieldIndex** (int iField)=0

Protected Attributes

- [OGRLayer](#) * **poLayer**
- char * **pszIndexPath**

The documentation for this class was generated from the following file:

- [ogr_attrind.h](#)

4.5 OGRSFDriver Class Reference

```
#include <ogrsf_frmts.h>
```

Public Member Functions

- virtual const char * [GetName](#) ()=0
Fetch name of driver (file format). This name should be relatively short (10-40 characters), and should reflect the underlying file format. For instance "ESRI Shapefile".
- virtual [OGRDataSource](#) * [Open](#) (const char *pszName, int bUpdate=FALSE)=0
Attempt to open file with this driver.
- virtual int [TestCapability](#) (const char *)=0
Test if capability is available.
- virtual [OGRDataSource](#) * [CreateDataSource](#) (const char *pszName, char **=NULL)
This method attempts to create a new data source based on the passed driver.
- virtual OGRErr [DeleteDataSource](#) (const char *pszName)
Delete a datasource.
- virtual [OGRDataSource](#) * [CopyDataSource](#) ([OGRDataSource](#) *poSrcDS, const char *pszNewName, char **papszOptions=NULL)
This method creates a new datasource by copying all the layers from the source datasource.

4.5.1 Detailed Description

Represents an operational format driver.

One [OGRSFDriver](#) derived class will normally exist for each file format registered for use, regardless of whether a file has or will be opened. The list of available drivers is normally managed by the [OGRSFDriverRegistrar](#).

4.5.2 Member Function Documentation

4.5.2.1 [OGRDataSource](#) * [OGRSFDriver::CopyDataSource](#) ([OGRDataSource](#) * poSrcDS, const char * pszNewName, char ** papszOptions = NULL) [virtual]

This method creates a new datasource by copying all the layers from the source datasource.

It is important to call [OGRDataSource::DestroyDataSource\(\)](#) when the datasource is no longer used to ensure that all data has been properly flushed to disk.

This method is the same as the C function [OGR_Dr_CopyDataSource\(\)](#).

Parameters

<i>poSrcDS</i>	source datasource
<i>pszNewName</i>	the name for the new data source. UTF-8 encoded.
<i>papszOptions</i>	a StringList of name=value options. Options are driver specific, and driver information can be found at the following url: http://www.gdal.org/ogr/ogr_formats.html

Returns

NULL is returned on failure, or a new [OGRDataSource](#) handle on success.

4.5.2.2 [OGRDataSource](#) * [OGRSFDriver::CreateDataSource](#) (const char * pszName, char ** papszOptions = NULL) [virtual]

This method attempts to create a new data source based on the passed driver.

The papszOptions argument can be used to control driver specific creation options. These options are normally documented in the format specific documentation.

It is important to call [OGRDataSource::DestroyDataSource\(\)](#) when the datasource is no longer used to ensure that all data has been properly flushed to disk.

This method is the same as the C function `OGR_Dr_CreateDataSource()`.

Note

This method does **NOT** attach driver instance to the returned data source, so caller should expect that `OGRDataSource::GetDriver()` will return NULL pointer. In order to attach driver to the returned data source, it is required to use C function `OGR_Dr_CreateDataSource`. This behavior is related to fix of issue reported in [Ticket #1233](#).

Parameters

<i>pszName</i>	the name for the new data source. UTF-8 encoded.
<i>papszOptions</i>	a StringList of name=value options. Options are driver specific, and driver information can be found at the following url: http://www.gdal.org/ogr/ogr_formats.html

Returns

NULL is returned on failure, or a new `OGRDataSource` on success.

4.5.2.3 OGRErr OGRSFDriver::DeleteDataSource (const char * pszDataSource) [virtual]

Delete a datasource.

Delete (from the disk, in the database, ...) the named datasource. Normally it would be safest if the datasource was not open at the time.

Whether this is a supported operation on this driver case be tested using `TestCapability()` on `ODrCDeleteDataSource`.

This method is the same as the C function `OGR_Dr_DeleteDataSource()`.

Parameters

<i>pszDataSource</i>	the name of the datasource to delete.
----------------------	---------------------------------------

Returns

`OGRERR_NONE` on success, and `OGRERR_UNSUPPORTED_OPERATION` if this is not supported by this driver.

4.5.2.4 const char * OGRSFDriver::GetName () [pure virtual]

Fetch name of driver (file format). This name should be relatively short (10-40 characters), and should reflect the underlying file format. For instance "ESRI Shapefile".

This method is the same as the C function `OGR_Dr_GetName()`.

Returns

driver name. This is an internal string and should not be modified or freed.

4.5.2.5 OGRDataSource * OGRSFDriver::Open (const char * pszName, int bUpdate = FALSE) [pure virtual]

Attempt to open file with this driver.

This method is what `OGRSFDriverRegistrar` uses to implement its `Open()` method. See it for more details.

Note, drivers do not normally set their own `m_poDriver` value, so a direct call to this method (instead of indirectly via [OGRSFDriverRegistrar](#)) will usually result in a datasource that does not know what driver it relates to if `GetDriver()` is called on the datasource. The application may directly call `SetDriver()` after opening with this method to avoid this problem.

For drivers supporting the VSI virtual file API, it is possible to open a file in a .zip archive (see `VSIInstallZipFileHandler()`), in a .tar/.tar.gz/.tgz archive (see `VSIInstallTarFileHandler()`) or on a HTTP / FTP server (see `VSIInstallCurlFileHandler()`)

This method is the same as the C function `OGR_Dr_Open()`.

Parameters

<i>pszName</i>	the name of the file, or data source to try and open.
<i>bUpdate</i>	TRUE if update access is required, otherwise FALSE (the default).

Returns

NULL on error or if the pass name is not supported by this driver, otherwise a pointer to an [OGRDataSource](#). This [OGRDataSource](#) should be closed by deleting the object when it is no longer needed.

4.5.2.6 int OGRSFDriver::TestCapability (const char * *pszCapability*) [pure virtual]

Test if capability is available.

One of the following data source capability names can be passed into this method, and a TRUE or FALSE value will be returned indicating whether or not the capability is available for this object.

- **ODrCCreateDataSource**: True if this driver can support creating data sources.
- **ODrCDeleteDataSource**: True if this driver supports deleting data sources.

The `#define` macro forms of the capability names should be used in preference to the strings themselves to avoid misspelling.

This method is the same as the C function `OGR_Dr_TestCapability()`.

Parameters

<i>pszCapability</i>	the capability to test.
----------------------	-------------------------

Returns

TRUE if capability available otherwise FALSE.

The documentation for this class was generated from the following files:

- [ogrsf_frmts.h](#)
- [ogrsf_frmts.dox](#)

4.6 OGRSFDriverRegistrar Class Reference

```
#include <ogrsf_frmts.h>
```

Public Member Functions

- [OGRDataSource](#) * **OpenShared** (const char *pszName, int bUpdate=FALSE, [OGRSFDriver](#) **ppoDriver=NULL)
- OGRErr **ReleaseDataSource** ([OGRDataSource](#) *)
- void **RegisterDriver** ([OGRSFDriver](#) *poDriver)
Add a driver to the list of registered drivers.
- void **DeregisterDriver** ([OGRSFDriver](#) *poDriver)
Remove the passed driver from the list of registered drivers.
- int **GetDriverCount** (void)
Fetch the number of registered drivers.
- [OGRSFDriver](#) * **GetDriver** (int iDriver)
Fetch the indicated driver.
- [OGRSFDriver](#) * **GetDriverByName** (const char *)
Fetch the indicated driver.
- int **GetOpenDSCount** ()
Return the number of opened datasources.
- [OGRDataSource](#) * **GetOpenDS** (int)
Return the iDS th datasource opened.
- void **AutoLoadDrivers** ()

Static Public Member Functions

- static [OGRSFDriverRegistrar](#) * **GetRegistrar** ()
Return the driver manager, creating one if none exist.
- static [OGRDataSource](#) * **Open** (const char *pszName, int bUpdate=FALSE, [OGRSFDriver](#) **ppoDriver=NULL)
Open a file / data source with one of the registered drivers.

4.6.1 Detailed Description

Singleton manager for [OGRSFDriver](#) instances that will be used to try and open datasources. Normally the registrar is populated with standard drivers using the [OGRRegisterAll\(\)](#) function and does not need to be directly accessed. The driver registrar and all registered drivers may be cleaned up on shutdown using [OGRCleanupAll\(\)](#).

4.6.2 Member Function Documentation

4.6.2.1 void OGRSFDriverRegistrar::DeregisterDriver ([OGRSFDriver](#) * poDriver)

Remove the passed driver from the list of registered drivers.

This method is the same as the C function [OGRDeregisterDriver\(\)](#).

Parameters

<i>poDriver</i>	the driver to deregister.
-----------------	---------------------------

Since

GDAL 1.8.0

4.6.2.2 **OGRSFDriver * OGRSFDriverRegistrar::GetDriver (int *iDriver*)**

Fetch the indicated driver.

This method is the same as the C function `OGRGetDriver()`.

Parameters

<i>iDriver</i>	the driver index, from 0 to GetDriverCount() -1.
----------------	--

Returns

the driver, or NULL if *iDriver* is out of range.

4.6.2.3 **OGRSFDriver * OGRSFDriverRegistrar::GetDriverByName (const char * *pszName*)**

Fetch the indicated driver.

This method is the same as the C function `OGRGetDriverByName`

Parameters

<i>pszName</i>	the driver name
----------------	-----------------

Returns

the driver, or NULL if no driver with that name is found

4.6.2.4 **int OGRSFDriverRegistrar::GetDriverCount (void)**

Fetch the number of registered drivers.

This method is the same as the C function `OGRGetDriverCount()`.

Returns

the drivers count.

4.6.2.5 **OGRDataSource * OGRSFDriverRegistrar::GetOpenDS (int *iDS*)**

Return the *iDS* th datasource opened.

This method is the same as the C function `OGRGetOpenDS()`.

Parameters

<i>iDS</i>	the index of the dataset to return (between 0 and GetOpenDSCount() - 1)
------------	---

4.6.2.6 **int OGRSFDriverRegistrar::GetOpenDSCount () [inline]**

Return the number of opened datasources.

This method is the same as the C function `OGRGetOpenDSCount()`

Returns

the number of opened datasources.

4.6.2.7 OGRSFDriverRegistrar * OGRSFDriverRegistrar::GetRegistrar () [static]

Return the driver manager, creating one if none exist.

Returns

the driver manager.

4.6.2.8 OGRDataSource * OGRSFDriverRegistrar::Open (const char * pszName, int bUpdate = FALSE, OGRSFDriver ** ppoDriver = NULL) [static]

Open a file / data source with one of the registered drivers.

This method loops through all the drivers registered with the driver manager trying each until one succeeds with the given data source. This method is static. Applications don't normally need to use any other [OGRSFDriverRegistrar](#) methods directly, nor do they normally need to have a pointer to an [OGRSFDriverRegistrar](#) instance.

If this method fails, CPLGetLastErrorMsg() can be used to check if there is an error message explaining why.

For drivers supporting the VSI virtual file API, it is possible to open a file in a .zip archive (see VSInstallZipFileHandler()), in a .tar/.tar.gz/.tgz archive (see VSInstallTarFileHandler()) or on a HTTP / FTP server (see VSInstallCurlFileHandler())

This method is the same as the C function OGROpen().

Parameters

<i>pszName</i>	the name of the file, or data source to open. UTF-8 encoded.
<i>bUpdate</i>	FALSE for read-only access (the default) or TRUE for read-write access.
<i>ppoDriver</i>	if non-NULL, this argument will be updated with a pointer to the driver which was used to open the data source.

Returns

NULL on error or if the pass name is not supported by this driver, otherwise a pointer to an [OGRDataSource](#). This [OGRDataSource](#) should be closed by deleting the object when it is no longer needed.

Example:

```
OGRDataSource      *poDS;

poDS = OGRSFDriverRegistrar::Open( "polygon.shp" );
if( poDS == NULL )
{
    return;
}

... use the data source ...

OGRDataSource::DestroyDataSource( poDS );
```

4.6.2.9 void OGRSFDriverRegistrar::RegisterDriver (OGRSFDriver * *poDriver*)

Add a driver to the list of registered drivers.

If the passed driver is already registered (based on pointer comparison) then the driver isn't registered. New drivers are added at the end of the list of registered drivers.

This method is the same as the C function OGRRegisterDriver().

Parameters

<i>poDriver</i>	the driver to add.
-----------------	--------------------

The documentation for this class was generated from the following files:

- [ogrsf_frmts.h](#)
- [ogrsf_frmts.dox](#)

Chapter 5

File Documentation

5.1 ogrsf_frmts.h File Reference

```
#include "ogr_feature.h"
#include "ogr_featurestyle.h"
```

Classes

- class [OGRLayer](#)
- class [OGRDataSource](#)
- class [OGRSFDriver](#)
- class [OGRSFDriverRegistrar](#)

Functions

- CPL_C_START void CPL_DLL [OGRRegisterAll](#) ()
Register all drivers.
- void CPL_DLL **RegisterOGRFileGDB** ()
- void CPL_DLL **RegisterOGRShape** ()
- void CPL_DLL **RegisterOGRNTF** ()
- void CPL_DLL **RegisterOGRFME** ()
- void CPL_DLL **RegisterOGRSDTS** ()
- void CPL_DLL **RegisterOGRTiger** ()
- void CPL_DLL **RegisterOGRS57** ()
- void CPL_DLL **RegisterOGRTAB** ()
- void CPL_DLL **RegisterOGRMIF** ()
- void CPL_DLL **RegisterOGROGDI** ()
- void CPL_DLL **RegisterOGRODBC** ()
- void CPL_DLL **RegisterOGRPG** ()
- void CPL_DLL **RegisterOGRMSSQLSpatial** ()
- void CPL_DLL **RegisterOGRMySQL** ()
- void CPL_DLL **RegisterOGROCI** ()
- void CPL_DLL **RegisterOGRDGN** ()
- void CPL_DLL **RegisterOGRGML** ()
- void CPL_DLL **RegisterOGRLIBKML** ()
- void CPL_DLL **RegisterOGRKML** ()
- void CPL_DLL **RegisterOGRGeoJSON** ()
- void CPL_DLL **RegisterOGRAVCBin** ()

- void CPL_DLL **RegisterOGRVCE00** ()
- void CPL_DLL **RegisterOGRREC** ()
- void CPL_DLL **RegisterOGRMEM** ()
- void CPL_DLL **RegisterOGRVRT** ()
- void CPL_DLL **RegisterOGRDODS** ()
- void CPL_DLL **RegisterOGRSQLite** ()
- void CPL_DLL **RegisterOGRCSV** ()
- void CPL_DLL **RegisterOGRILI1** ()
- void CPL_DLL **RegisterOGRILI2** ()
- void CPL_DLL **RegisterOGRGRASS** ()
- void CPL_DLL **RegisterOGRPGeo** ()
- void CPL_DLL **RegisterOGRDXFDWG** ()
- void CPL_DLL **RegisterOGRDXF** ()
- void CPL_DLL **RegisterOGRDWG** ()
- void CPL_DLL **RegisterOGRSDE** ()
- void CPL_DLL **RegisterOGRIDB** ()
- void CPL_DLL **RegisterOGRGMT** ()
- void CPL_DLL **RegisterOGRBNA** ()
- void CPL_DLL **RegisterOGRGPX** ()
- void CPL_DLL **RegisterOGRGeoconcept** ()
- void CPL_DLL **RegisterOGRIngres** ()
- void CPL_DLL **RegisterOGRPCIDSK** ()
- void CPL_DLL **RegisterOGRXPlane** ()
- void CPL_DLL **RegisterOGRNAS** ()
- void CPL_DLL **RegisterOGRGeoRSS** ()
- void CPL_DLL **RegisterOGRGTM** ()
- void CPL_DLL **RegisterOGRVFK** ()
- void CPL_DLL **RegisterOGRPGDump** ()
- void CPL_DLL **RegisterOGRGPSBabel** ()
- void CPL_DLL **RegisterOGRSUA** ()
- void CPL_DLL **RegisterOGROpenAir** ()
- void CPL_DLL **RegisterOGRPDS** ()
- void CPL_DLL **RegisterOGRWFS** ()
- void CPL_DLL **RegisterOGRSOSI** ()
- void CPL_DLL **RegisterOGRHTF** ()
- void CPL_DLL **RegisterOGRAeronavFAA** ()
- void CPL_DLL **RegisterOGRGeomedia** ()
- void CPL_DLL **RegisterOGRMDB** ()
- void CPL_DLL **RegisterOGRDIGEO** ()
- void CPL_DLL **RegisterOGRGFT** ()
- void CPL_DLL **RegisterOGRSVG** ()
- void CPL_DLL **RegisterOGR CouchDB** ()
- void CPL_DLL **RegisterOGRIdrisi** ()
- void CPL_DLL **RegisterOGRARCGEN** ()
- void CPL_DLL **RegisterOGRSEGUKOOA** ()
- void CPL_DLL **RegisterOGRSEGY** ()
- void CPL_DLL **RegisterOGRXLS** ()

5.1.1 Detailed Description

Classes related to registration of format support, and opening datasets.

Index

- AlterFieldDefn
 - [OGRLayer, 17](#)
- CopyDataSource
 - [OGRSFDriver, 30](#)
- CopyLayer
 - [OGRDataSource, 9](#)
- CreateDataSource
 - [OGRSFDriver, 30](#)
- CreateFeature
 - [OGRLayer, 18](#)
- CreateField
 - [OGRLayer, 18](#)
- CreateLayer
 - [OGRDataSource, 9](#)
- DeleteDataSource
 - [OGRSFDriver, 31](#)
- DeleteFeature
 - [OGRLayer, 18](#)
- DeleteField
 - [OGRLayer, 19](#)
- DeleteLayer
 - [OGRDataSource, 10](#)
- Dereference
 - [OGRDataSource, 10](#)
 - [OGRLayer, 19](#)
- DeregisterDriver
 - [OGRSFDriverRegistrar, 33](#)
- DestroyDataSource
 - [OGRDataSource, 10](#)
- ExecuteSQL
 - [OGRDataSource, 11](#)
- GetDriver
 - [OGRDataSource, 11](#)
 - [OGRSFDriverRegistrar, 33](#)
- GetDriverByName
 - [OGRSFDriverRegistrar, 34](#)
- GetDriverCount
 - [OGRSFDriverRegistrar, 34](#)
- GetExtent
 - [OGRLayer, 19](#)
- GetFIDColumn
 - [OGRLayer, 21](#)
- GetFeature
 - [OGRLayer, 20](#)
- GetFeatureCount
 - [OGRLayer, 20](#)
- GetGeomType
 - [OGRLayer, 21](#)
- GetGeometryColumn
 - [OGRLayer, 21](#)
- GetInfo
 - [OGRLayer, 21](#)
- GetLayer
 - [OGRDataSource, 11](#)
- GetLayerByName
 - [OGRDataSource, 12](#)
- GetLayerCount
 - [OGRDataSource, 12](#)
- GetLayerDefn
 - [OGRLayer, 22](#)
- GetName
 - [OGRDataSource, 12](#)
 - [OGRLayer, 22](#)
 - [OGRSFDriver, 31](#)
- GetNextFeature
 - [OGRLayer, 22](#)
- GetOpenDS
 - [OGRSFDriverRegistrar, 34](#)
- GetOpenDSCount
 - [OGRSFDriverRegistrar, 34](#)
- GetRefCount
 - [OGRDataSource, 12](#)
 - [OGRLayer, 22](#)
- GetRegistrar
 - [OGRSFDriverRegistrar, 35](#)
- GetSpatialFilter
 - [OGRLayer, 23](#)
- GetSpatialRef
 - [OGRLayer, 23](#)
- GetStyleTable
 - [OGRDataSource, 12](#)
 - [OGRLayer, 23](#)
- GetSummaryRefCount
 - [OGRDataSource, 13](#)
- OGRAttrIndex, [7](#)
- OGRDataSource, [7](#)
 - [CopyLayer, 9](#)
 - [CreateLayer, 9](#)
 - [DeleteLayer, 10](#)
 - [Dereference, 10](#)
 - [DestroyDataSource, 10](#)
 - [ExecuteSQL, 11](#)
 - [GetDriver, 11](#)
 - [GetLayer, 11](#)
 - [GetLayerByName, 12](#)

- GetLayerCount, [12](#)
- GetName, [12](#)
- GetRefCount, [12](#)
- GetStyleTable, [12](#)
- GetSummaryRefCount, [13](#)
- Reference, [13](#)
- Release, [13](#)
- ReleaseResultSet, [13](#)
- SetDriver, [13](#)
- SetStyleTable, [14](#)
- SetStyleTableDirectly, [14](#)
- SyncToDisk, [14](#)
- TestCapability, [15](#)
- OGRLayer, [15](#)
 - AlterFieldDefn, [17](#)
 - CreateFeature, [18](#)
 - CreateField, [18](#)
 - DeleteFeature, [18](#)
 - DeleteField, [19](#)
 - Dereference, [19](#)
 - GetExtent, [19](#)
 - GetFIDColumn, [21](#)
 - GetFeature, [20](#)
 - GetFeatureCount, [20](#)
 - GetGeomType, [21](#)
 - GetGeometryColumn, [21](#)
 - GetInfo, [21](#)
 - GetLayerDefn, [22](#)
 - GetName, [22](#)
 - GetNextFeature, [22](#)
 - GetRefCount, [22](#)
 - GetSpatialFilter, [23](#)
 - GetSpatialRef, [23](#)
 - GetStyleTable, [23](#)
 - Reference, [23](#)
 - ReorderField, [23](#)
 - ReorderFields, [24](#)
 - ResetReading, [25](#)
 - SetAttributeFilter, [25](#)
 - SetFeature, [25](#)
 - SetIgnoredFields, [26](#)
 - SetNextByIndex, [26](#)
 - SetSpatialFilter, [26](#)
 - SetSpatialFilterRect, [27](#)
 - SetStyleTable, [27](#)
 - SetStyleTableDirectly, [27](#)
 - SyncToDisk, [27](#)
 - TestCapability, [28](#)
- OGRLayerAttrIndex, [29](#)
- OGRSFDriver, [29](#)
 - CopyDataSource, [30](#)
 - CreateDataSource, [30](#)
 - DeleteDataSource, [31](#)
 - GetName, [31](#)
 - Open, [31](#)
 - TestCapability, [32](#)
- OGRSFDriverRegistrar, [32](#)
 - DeregisterDriver, [33](#)
 - GetDriver, [33](#)
 - GetDriverByName, [34](#)
 - GetDriverCount, [34](#)
 - GetOpenDS, [34](#)
 - GetOpenDSCount, [34](#)
 - GetRegistrar, [35](#)
 - Open, [35](#)
 - RegisterDriver, [35](#)
- ogrsf_frmts.h, [37](#)
- Open
 - OGRSFDriver, [31](#)
 - OGRSFDriverRegistrar, [35](#)
- Reference
 - OGRDataSource, [13](#)
 - OGRLayer, [23](#)
- RegisterDriver
 - OGRSFDriverRegistrar, [35](#)
- Release
 - OGRDataSource, [13](#)
- ReleaseResultSet
 - OGRDataSource, [13](#)
- ReorderField
 - OGRLayer, [23](#)
- ReorderFields
 - OGRLayer, [24](#)
- ResetReading
 - OGRLayer, [25](#)
- SetAttributeFilter
 - OGRLayer, [25](#)
- SetDriver
 - OGRDataSource, [13](#)
- SetFeature
 - OGRLayer, [25](#)
- SetIgnoredFields
 - OGRLayer, [26](#)
- SetNextByIndex
 - OGRLayer, [26](#)
- SetSpatialFilter
 - OGRLayer, [26](#)
- SetSpatialFilterRect
 - OGRLayer, [27](#)
- SetStyleTable
 - OGRDataSource, [14](#)
 - OGRLayer, [27](#)
- SetStyleTableDirectly
 - OGRDataSource, [14](#)
 - OGRLayer, [27](#)
- SyncToDisk
 - OGRDataSource, [14](#)
 - OGRLayer, [27](#)
- TestCapability
 - OGRDataSource, [15](#)
 - OGRLayer, [28](#)
 - OGRSFDriver, [32](#)