dgnlib

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Chapter 1

Class Index

1.1 Class List

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Chapter 2

File Index

2.1 File List

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

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Chapter 3

Class Documentation

3.1 _DGNTagDef Struct Reference

`#include <dgnlib.h>`

Public Attributes

- char * name
- int id
- char * prompt
- int type
- tagValueUnion defaultValue

3.1.1 Detailed Description

Tag definition.

Structure holding definition of one tag within a DGNTagSet.

3.1.2 Member Data Documentation

3.1.2.1 char* _DGNTagDef::name

Name of this tag.

3.1.2.2 int _DGNTagDef::id

Tag index/identifier.

3.1.2.3 char* _DGNTagDef::prompt

User prompt when requesting value.

3.1.2.4 int _DGNTagDef::type

Tag type (one of DGNTT_STRING(1), DGNTT_INTEGER(3) or DGNTT_FLOAT(4).

3.1.2.5 tagValueUnion _DGNTagDef::defaultValue

Default tag value

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

- dgnlib.h

3.2 DGNElemArc Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- DGNPoint origin
- double primary_axis
- double secondary_axis
- double rotation
- int **quat** [4]
- double startang
- double sweepang

3.2.1 Detailed Description

Ellipse element

The core.stype code is DGNST_ARC.

Used for: DGNT_ELLIPSE(15), DGNT_ARC(16)

3.2.2 Member Data Documentation

3.2.2.1 DGNPoint DGNElemArc::origin

Origin of ellipse

3.2.2.2 double DGNElemArc::primary_axis

Primary axis length

3.2.2.3 double DGNElemArc::secondary_axis

Secondary axis length

3.2.2.4 double DGNElemArc::rotation

Counterclockwise rotation in degrees

3.2.2.5 double DGNElemArc::startang

Start angle (degrees counterclockwise of primary axis)

3.2.2.6 double DGNElemArc::sweepang

Sweep angle (degrees)

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

- dgnlib.h

3.3 DGNElemBSplineCurveHeader Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- long desc_words
- unsigned char order
- unsigned char properties
- unsigned char curve_type
- short num_poles
- short num_knots

3.3.1 Detailed Description

B-Spline Curve Header element

The core.stype code is DGNST_BSPLINE_CURVE_HEADER.

Used for: DGNT_BSPLINE_CURVE_HEADER(27)

3.3.2 Member Data Documentation

3.3.2.1 long DGNElemBSplineCurveHeader::desc_words

Total length of B-Spline curve in words, excluding the first 20 words (header + desc_words field)

3.3.2.2 unsigned char DGNElemBSplineCurveHeader::order

B-spline order: 2-15

3.3.2.3 unsigned char DGNElemBSplineCurveHeader::properties

Properties: ORing of DGNBSC_ flags

3.3.2.4 unsigned char DGNElemBSplineCurveHeader::curve_type

curve type

3.3.2.5 short DGNElemBSplineCurveHeader::num_poles

number of poles, max. 101

3.3.2.6 short DGNElemBSplineCurveHeader::num_knots

number of knots

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

- dgnlib.h

3.4 DGNElemBSplineSurfaceBoundary Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- short number
- short numverts
- DGNPoint vertices [1]

3.4.1 Detailed Description

B-Spline Surface Boundary element

The core.stype code is DGNST_BSPLINE_SURFACE_BOUNDARY

Used for: DGNT_BSPLINE_SURFACE_BOUNDARY(25)

3.4.2 Member Data Documentation

3.4.2.1 short DGNElemBSplineSurfaceBoundary::number

boundary number

3.4.2.2 short DGNElemBSplineSurfaceBoundary::numverts

number of boundary vertices

3.4.2.3 DGNPoint DGNElemBSplineSurfaceBoundary::vertices[1]

Array of 1 or more 2D boundary vertices (in UV space)

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

- dgnlib.h

3.5 DGNElemBSplineSurfaceHeader Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- long desc_words
- unsigned char curve_type
- unsigned char u_order
- unsigned short u_properties
- short num_poles_u
- short num_knots_u
- short rule_lines_u
- unsigned char v_order
- unsigned short v_properties
- short num_poles_v
- short num_knots_v
- short rule_lines_v
- short num_bounds

3.5.1 Detailed Description

B-Spline Surface Header element

The core.stype code is DGNST_BSPLINE_SURFACE_HEADER.

Used for: DGNT_BSPLINE_SURFACE_HEADER(24)

3.5.2 Member Data Documentation

3.5.2.1 long DGNElemBSplineSurfaceHeader::desc_words

Total length of B-Spline surface in words, excluding the first 20 words (header + desc_words field)

3.5.2.2 unsigned char DGNElemBSplineSurfaceHeader::curve_type

curve type

3.5.2.3 unsigned char DGNElemBSplineSurfaceHeader::u_order

B-spline U order: 2-15

3.5.2.4 unsigned short DGNElemBSplineSurfaceHeader::u_properties

surface U properties: ORing of DGNBSC_ flags

3.5.2.5 short DGNElemBSplineSurfaceHeader::num_poles_u

number of poles

3.5.2.6 short DGNElemBSplineSurfaceHeader::num_knots_u

number of knots

3.5.2.7 short DGNElemBSplineSurfaceHeader::rule_lines_u

number of rule lines

3.5.2.8 unsigned char DGNElemBSplineSurfaceHeader::v_order

B-spline V order: 2-15

3.5.2.9 unsigned short DGNElemBSplineSurfaceHeader::v_properties

surface V properties: Oring of DGNBSS_ flags

3.5.2.10 short DGNElemBSplineSurfaceHeader::num_poles_v

number of poles

3.5.2.11 short DGNElemBSplineSurfaceHeader::num_knots_v

number of knots

3.5.2.12 short DGNElemBSplineSurfaceHeader::rule_lines_v

number of rule lines

3.5.2.13 short DGNElemBSplineSurfaceHeader::num_bounds

number of boundaries

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

- dgnlib.h

3.6 DGNElemCellHeader Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int totlength
- char name [7]
- unsigned short cclass
- unsigned short levels [4]
- DGNPoint rnglow
- DGNPoint rnghigh
- double trans [9]
- DGNPoint origin
- double **xscale**
- double **yscale**
- double **rotation**

3.6.1 Detailed Description

Cell Header.

The core.stype code is DGNST_CELL_HEADER.

Returned for DGNT_CELL_HEADER(2).

3.6.2 Member Data Documentation

3.6.2.1 int DGNElemCellHeader::totlength

Total length of cell in words, excluding the first 19 words (header + totlength field)

3.6.2.2 char DGNElemCellHeader::name[7]

Cell name

3.6.2.3 unsigned short DGNElemCellHeader::cclass

Class bitmap

3.6.2.4 unsigned short DGNElemCellHeader::levels[4]

Levels used in cell

3.6.2.5 DGNPoint DGNElemCellHeader::rnglow

X/Y/Z minimums for cell

3.6.2.6 DGNPoint DGNElemCellHeader::rnghigh

X/Y/Z maximums for cell

3.6.2.7 double DGNElemCellHeader::trans[9]

2D/3D Transformation Matrix

3.6.2.8 DGNPoint DGNElemCellHeader::origin

Cell Origin

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

- dgnlib.h

3.7 DGNElemCellLibrary Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- short celltype
- short attindx
- char name [7]
- int numwords
- short dispsymb
- unsigned short cclass
- unsigned short levels [4]
- char description [28]

3.7.1 Detailed Description

Cell Library.

The core.stype code is DGNST_CELL_LIBRARY.

Returned for DGNT_CELL_LIBRARY(1).

3.7.2 Member Data Documentation

3.7.2.1 short DGNElemCellLibrary::celltype

Cell type.

3.7.2.2 short DGNElemCellLibrary::attindx

Attribute linkage.

3.7.2.3 char DGNElemCellLibrary::name[7]

Cell name

3.7.2.4 int DGNElemCellLibrary::numwords

Number of words in cell definition

3.7.2.5 short DGNElemCellLibrary::dispsymb

Display symbol

3.7.2.6 unsigned short DGNElemCellLibrary::cclass

Class bitmap

3.7.2.7 unsigned short DGNElemCellLibrary::levels[4]

Levels used in cell

3.7.2.8 char DGNElemCellLibrary::description[28]

Description

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

- dgnlib.h

3.8 DGNElemColorTable Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int **screen_flag**
- GByte color_info [256][3]

3.8.1 Detailed Description

Color table.

The core.stype code is DGNST_COLORTABLE.

Returned for DGNT_GROUP_DATA(5) elements, with a level number of DGN_GDL_COLOR_-TABLE(1).

3.8.2 Member Data Documentation

3.8.2.1 GByte DGNElemColorTable::color_info[256][3]

Color table, 256 colors by red (0), green(1) and blue(2) component.

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

- dgnlib.h

3.9 DGNElemComplexHeader Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int totlength
- int numelems
- int surftype
- int boundelms

3.9.1 Detailed Description

Complex header element

The core.stype code is DGNST_COMPLEX_HEADER.

Used for: DGNT_COMPLEX_CHAIN_HEADER(12), DGNT_COMPLEX_SHAPE_HEADER(14), DGNT_3DSURFACE_HEADER(18) and DGNT_3DSOLID_HEADER(19).

Compatible with DGNT_TEXT_NODE (7), see DGNAddRawAttrLink()

3.9.2 Member Data Documentation

3.9.2.1 int DGNElemComplexHeader::totlength

Total length of surface in words, excluding the first 19 words (header + totlength field)

3.9.2.2 int DGNElemComplexHeader::numelems

of elements in surface

3.9.2.3 int DGNElemComplexHeader::surftype

surface/solid type (only used for 3D surface/solid). One of DGNSUT_∗ or DGNSOT_∗.

3.9.2.4 int DGNElemComplexHeader::boundelms

of elements in each boundary (only used for 3D surface/solid).

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

- dgnlib.h

3.10 DGNElemCone Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- short unknown
- int quat [4]
- DGNPoint center_1
- double radius_1
- DGNPoint center_2
- double radius_2

3.10.1 Detailed Description

Cone element

The core.stype code is DGNST_CONE.

Used for: DGNT_CONE(23)

3.10.2 Member Data Documentation

3.10.2.1 short DGNElemCone::unknown

Unknown data

3.10.2.2 int DGNElemCone::quat[4]

Orientation quaternion

3.10.2.3 DGNPoint DGNElemCone::center_1

center of first circle

3.10.2.4 double DGNElemCone::radius_1

radius of first circle

3.10.2.5 DGNPoint DGNElemCone::center_2

center of second circle

3.10.2.6 double DGNElemCone::radius_2

radius of second circle

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

- dgnlib.h

3.11 DGNElemCore Struct Reference

`#include <dgnlib.h>`

Public Attributes

- int **offset**
- int **size**
- int element_id
- int stype
- int level
- int type
- int complex
- int deleted
- int graphic_group
- int properties
- int color
- int weight
- int style
- int attr_bytes
- unsigned char * attr_data
- int raw_bytes
- unsigned char * raw_data

3.11.1 Detailed Description

Core element structure.

Core information kept about each element that can be read from a DGN file. This structure is the first component of each specific element structure (like DGNElemMultiPoint). Normally the DGNElemCore.stype field would be used to decide what specific structure type to case the DGNElemCore pointer to.

3.11.2 Member Data Documentation

3.11.2.1 int DGNElemCore::element_id

Element number (zero based)

3.11.2.2 int DGNElemCore::stype

Structure type: (DGNST_*)

3.11.2.3 int DGNElemCore::level

Element Level: 0-63

3.11.2.4 int DGNElemCore::type

Element type (DGNT_)

3.11.2.5 int DGNElemCore::complex

Is element complex?

3.11.2.6 int DGNElemCore::deleted

Is element deleted?

3.11.2.7 int DGNElemCore::graphic_group

Graphic group number

3.11.2.8 int DGNElemCore::properties

Properties: ORing of DGNPF_ flags

3.11.2.9 int DGNElemCore::color

Color index (0-255)

3.11.2.10 int DGNElemCore::weight

Line Weight (0-31)

3.11.2.11 int DGNElemCore::style

Line Style: One of DGNS_∗ values

3.11.2.12 int DGNElemCore::attr_bytes

Bytes of attribute data, usually zero.

3.11.2.13 unsigned char∗ DGNElemCore::attr_data

Raw attribute data

3.11.2.14 int DGNElemCore::raw_bytes

Bytes of raw data, usually zero.

3.11.2.15 unsigned char∗ DGNElemCore::raw_data

All raw element data including header.

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

- dgnlib.h

3.12 DGNElementInfo Struct Reference

`#include <dgnlib.h>`

Public Attributes

- unsigned char level
- unsigned char type
- unsigned char stype
- unsigned char flags
- long offset

3.12.1 Detailed Description

Element summary information.

Minimal information kept about each element if an element summary index is built for a file by DGNGetElementIndex().

3.12.2 Member Data Documentation

3.12.2.1 unsigned char DGNElementInfo::level

Element Level: 0-63

3.12.2.2 unsigned char DGNElementInfo::type

Element type (DGNT_*)

3.12.2.3 unsigned char DGNElementInfo::stype

Structure type (DGNST_*)

3.12.2.4 unsigned char DGNElementInfo::flags

Other flags

3.12.2.5 long DGNElementInfo::offset

Offset within file (private)

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

- dgnlib.h

3.13 DGNElemKnotWeight Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- float array [1]

3.13.1 Detailed Description

B-Spline Knot/Weight element

The core.stype code is DGNST_KNOT_WEIGHT

Used for: DGNT_BSPLINE_KNOT(26), DGNT_BSPLINE_WEIGHT_FACTOR(28)

3.13.2 Member Data Documentation

3.13.2.1 float DGNElemKnotWeight::array[1]

array (variable length). Length is given in the corresponding B-Spline header.

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

- dgnlib.h

3.14 DGNElemMultiPoint Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int num_vertices
- DGNPoint vertices [2]

3.14.1 Detailed Description

Multipoint element

The core.stype code is DGNST_MULTIPOINT.

Used for: DGNT_LINE(3), DGNT_LINE_STRING(4), DGNT_SHAPE(6), DGNT_CURVE(11), DGNT_BSPLINE_POLE(21)

3.14.2 Member Data Documentation

3.14.2.1 int DGNElemMultiPoint::num_vertices

Number of vertices in "vertices"

3.14.2.2 DGNPoint DGNElemMultiPoint::vertices[2]

Array of two or more vertices

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

- dgnlib.h

3.15 DGNElemSharedCellDefn Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int totlength

3.15.1 Detailed Description

Shared Cell Definition.

The core.stype code is DGNST_SHARED_CELL_DEFN.

Returned for DGNT_SHARED_CELL_DEFN(2).

3.15.2 Member Data Documentation

3.15.2.1 int DGNElemSharedCellDefn::totlength

Total length of cell in words, excluding the first 19 words (header + totlength field)

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

- dgnlib.h

3.16 DGNElemTagSet Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int tagCount
- int tagSet
- int flags
- char * tagSetName
- DGNTagDef * tagList

3.16.1 Detailed Description

Tag Set.

The core.stype code is DGNST_TAG_SET.

Returned for DGNT_APPLICATION_ELEM(66), Level: 24.

3.16.2 Member Data Documentation

3.16.2.1 int DGNElemTagSet::tagCount

Number of tags in tagList.

3.16.2.2 int DGNElemTagSet::tagSet

Tag set index.

3.16.2.3 int DGNElemTagSet::flags

Tag flags - not too much known.

3.16.2.4 char* DGNElemTagSet::tagSetName

Tag set name.

3.16.2.5 DGNTagDef* DGNElemTagSet::tagList

List of tag definitions in this set.

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

- dgnlib.h

3.17 DGNElemTagValue Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int tagType
- int tagSet
- int tagIndex
- int tagLength
- tagValueUnion tagValue

3.17.1 Detailed Description

Tag Value.

The core.stype code is DGNST_TAG_VALUE.

Returned for DGNT_TAG_VALUE(37).

3.17.2 Member Data Documentation

3.17.2.1 int DGNElemTagValue::tagType

Tag type indicator, DGNTT_∗

3.17.2.2 int DGNElemTagValue::tagSet

Which tag set does this relate to?

3.17.2.3 int DGNElemTagValue::tagIndex

Tag index within tag set.

3.17.2.4 int DGNElemTagValue::tagLength

Length of tag information (text)

3.17.2.5 tagValueUnion DGNElemTagValue::tagValue

Textual value of tag

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

- dgnlib.h

3.18 DGNElemTCB Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int dimension
- double origin_x
- double origin_y
- double origin_z
- long uor_per_subunit
- char sub_units [3]
- long subunits_per_master
- char master_units [3]
- DGNViewInfo **views** [8]

3.18.1 Detailed Description

Terminal Control Block (header).

The core.stype code is DGNST_TCB.

Returned for DGNT_TCB(9).

The first TCB in the file is used to determine the dimension (2D vs. 3D), and transformation from UOR (units of resolution) to subunits, and subunits to master units. This is handled transparently within DGNReadElement(), so it is not normally necessary to handle this element type at the application level, though it can be useful to get the sub_units, and master_units names.

3.18.2 Member Data Documentation

3.18.2.1 int DGNElemTCB::dimension

Dimension (2 or 3)

3.18.2.2 double DGNElemTCB::origin_x

X origin of UOR space in master units(?)

3.18.2.3 double DGNElemTCB::origin_y

Y origin of UOR space in master units(?)

3.18.2.4 double DGNElemTCB::origin_z

Z origin of UOR space in master units(?)

3.18.2.5 long DGNElemTCB::uor_per_subunit

UOR per subunit.

3.18.2.6 char DGNElemTCB::sub_units[3]

User name for subunits (2 chars)

3.18.2.7 long DGNElemTCB::subunits_per_master

Subunits per master unit.

3.18.2.8 char DGNElemTCB::master_units[3]

User name for master units (2 chars)

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

- dgnlib.h

3.19 DGNElemText Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int font_id
- int justification
- double length_mult
- double height_mult
- double rotation
- DGNPoint origin
- char string [1]

3.19.1 Detailed Description

Text element

The core.stype code is DGNST_TEXT.

NOTE: Currently we are not capturing the "editable fields" information.

Used for: DGNT_TEXT(17).

3.19.2 Member Data Documentation

3.19.2.1 int DGNElemText::font_id

Microstation font id, no list available

3.19.2.2 int DGNElemText::justification

Justification, see DGNJ_*

3.19.2.3 double DGNElemText::length_mult

Char width in master (if square)

3.19.2.4 double DGNElemText::height_mult

Char height in master units

3.19.2.5 double DGNElemText::rotation

Counterclockwise rotation in degrees

3.19.2.6 DGNPoint DGNElemText::origin

Bottom left corner of text.

3.19.2.7 char DGNElemText::string[1]

Actual text (length varies, terminated

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

- dgnlib.h

3.20 DGNElemTextNode Struct Reference

`#include <dgnlib.h>`

Public Attributes

- DGNElemCore **core**
- int totlength
- int numelems
- int node_number
- short max_length
- short max_used
- short font_id
- short justification
- long line_spacing
- double length_mult
- double height_mult
- double rotation
- DGNPoint origin

3.20.1 Detailed Description

Text Node Header.

The core.stype code is DGNST_TEXT_NODE.

Used for DGNT_TEXT_NODE (7). First fields (up to numelems) are compatible with DGNT_-COMPLEX_HEADER (7),

See also:

DGNAddRawAttrLink()

3.20.2 Member Data Documentation

3.20.2.1 int DGNElemTextNode::totlength

Total length of the node (bytes = totlength * 2 + 38)

3.20.2.2 int DGNElemTextNode::numelems

Number of text strings

3.20.2.3 int DGNElemTextNode::node_number

text node number

3.20.2.4 short DGNElemTextNode::max_length

maximum length allowed, characters

3.20.2.5 short DGNElemTextNode::max_used

maximum length used

3.20.2.6 short DGNElemTextNode::font_id

text font used

3.20.2.7 short DGNElemTextNode::justification

justification type, see DGNJ_

3.20.2.8 long DGNElemTextNode::line_spacing

spacing between text strings

3.20.2.9 double DGNElemTextNode::length_mult

length multiplier

3.20.2.10 double DGNElemTextNode::height_mult

height multiplier

3.20.2.11 double DGNElemTextNode::rotation

rotation angle (2d)

3.20.2.12 DGNPoint DGNElemTextNode::origin

Snap origin (as defined by user)

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

- dgnlib.h

3.21 DGNPoint Struct Reference

`#include <dgnlib.h>`

Public Attributes

- double x
- double y
- double z

3.21.1 Detailed Description

DGN Point structure.

Note that the DGNReadElement() function transforms points into "master" coordinate system space when they are in the file in UOR (units of resolution) coordinates.

3.21.2 Member Data Documentation

3.21.2.1 double DGNPoint::x

x (normally eastwards) coordinate.

3.21.2.2 double DGNPoint::y

y (normally northwards) coordinate.

3.21.2.3 double DGNPoint::z

z, up coordinate. Zero for 2D objects.

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

- dgnlib.h

Chapter 4

File Documentation

4.1 dgnlib.h File Reference

```
#include "cpl_conv.h"
```

Classes

- struct DGNPoint
- struct DGNElementInfo
- struct DGNElemCore
- struct DGNElemMultiPoint
- struct DGNElemArc
- struct DGNElemText
- struct DGNElemComplexHeader
- struct DGNElemColorTable
- struct **DGNViewInfo**
- struct DGNElemTCB
- struct DGNElemCellHeader
- struct DGNElemCellLibrary
- struct DGNElemSharedCellDefn
- union **tagValueUnion**
- struct DGNElemTagValue
- struct _DGNTagDef
- struct DGNElemTagSet
- struct DGNElemCone
- struct DGNElemTextNode
- struct DGNElemBSplineSurfaceHeader
- struct DGNElemBSplineCurveHeader
- struct DGNElemBSplineSurfaceBoundary
- struct DGNElemKnotWeight

Defines

- #define **CPLE_DGN_ERROR_BASE**
- #define **CPLE_ElementTooBig** CPLE_DGN_ERROR_BASE+1
- #define **DGNTT_STRING** 1
- #define **DGNTT_INTEGER** 3
- #define **DGNTT_FLOAT** 4
- #define DGNST_CORE 1
- #define DGNST_MULTIPOINT 2
- #define DGNST_COLORTABLE 3
- #define DGNST_TCB 4
- #define DGNST_ARC 5
- #define DGNST_TEXT 6
- #define DGNST_COMPLEX_HEADER 7
- #define DGNST_CELL_HEADER 8
- #define DGNST_TAG_VALUE 9
- #define DGNST_TAG_SET 10
- #define DGNST_CELL_LIBRARY 11
- #define DGNST_CONE 12
- #define DGNST_TEXT_NODE 13
- #define DGNST_BSPLINE_SURFACE_HEADER 14
- #define DGNST_BSPLINE_CURVE_HEADER 15
- #define DGNST_BSPLINE_SURFACE_BOUNDARY 16
- #define DGNST_KNOT_WEIGHT 17
- #define DGNST_SHARED_CELL_DEFN 18
- #define **DGNT_CELL_LIBRARY** 1
- #define **DGNT_CELL_HEADER** 2
- #define **DGNT_LINE** 3
- #define **DGNT_LINE_STRING** 4
- #define **DGNT_GROUP_DATA** 5
- #define **DGNT_SHAPE** 6
- #define **DGNT_TEXT_NODE** 7
- #define **DGNT_DIGITIZER_SETUP** 8
- #define **DGNT_TCB** 9
- #define **DGNT_LEVEL_SYMBOLOGY** 10
- #define **DGNT_CURVE** 11
- #define **DGNT_COMPLEX_CHAIN_HEADER** 12
- #define **DGNT_COMPLEX_SHAPE_HEADER** 14
- #define **DGNT_ELLIPSE** 15
- #define **DGNT_ARC** 16
- #define **DGNT_TEXT** 17
- #define **DGNT_3DSURFACE_HEADER** 18
- #define **DGNT_3DSOLID_HEADER** 19
- #define **DGNT_BSPLINE_POLE** 21
- #define **DGNT_POINT_STRING** 22
- #define **DGNT_BSPLINE_SURFACE_HEADER** 24
- #define **DGNT_BSPLINE_SURFACE_BOUNDARY** 25
- #define **DGNT_BSPLINE_KNOT** 26
- #define **DGNT_BSPLINE_CURVE_HEADER** 27
- #define **DGNT_BSPLINE_WEIGHT_FACTOR** 28

- #define **DGNT_CONE** 23
- #define **DGNT_SHARED_CELL_DEFN** 34
- #define **DGNT_SHARED_CELL_ELEM** 35
- #define **DGNT_TAG_VALUE** 37
- #define **DGNT_APPLICATION_ELEM** 66
- #define **DGNS_SOLID** 0
- #define **DGNS_DOTTED** 1
- #define **DGNS_MEDIUM_DASH** 2
- #define **DGNS_LONG_DASH** 3
- #define **DGNS_DOT_DASH** 4
- #define **DGNS_SHORT_DASH** 5
- #define **DGNS_DASH_DOUBLE_DOT** 6
- #define **DGNS_LONG_DASH_SHORT_DASH** 7
- #define **DGNSUT_SURFACE_OF_PROJECTION** 0
- #define **DGNSUT_BOUNDED_PLANE** 1
- #define **DGNSUT_BOUNDED_PLANE2** 2
- #define **DGNSUT_RIGHT_CIRCULAR_CYLINDER** 3
- #define **DGNSUT_RIGHT_CIRCULAR_CONE** 4
- #define **DGNSUT_TABULATED_CYLINDER** 5
- #define **DGNSUT_TABULATED_CONE** 6
- #define **DGNSUT_CONVOLUTE** 7
- #define **DGNSUT_SURFACE_OF_REVOLUTION** 8
- #define **DGNSUT_WARPED_SURFACE** 9
- #define **DGNSOT_VOLUME_OF_PROJECTION** 0
- #define **DGNSOT_VOLUME_OF_REVOLUTION** 1
- #define **DGNSOT_BOUNDED_VOLUME** 2
- #define **DGNC_PRIMARY** 0
- #define **DGNC_PATTERN_COMPONENT** 1
- #define **DGNC_CONSTRUCTION_ELEMENT** 2
- #define **DGNC_DIMENSION_ELEMENT** 3
- #define **DGNC_PRIMARY_RULE_ELEMENT** 4
- #define **DGNC_LINEAR_PATTERNED_ELEMENT** 5
- #define **DGNC_CONSTRUCTION_RULE_ELEMENT** 6
- #define **DGN_GDL_COLOR_TABLE** 1
- #define **DGN_GDL_NAMED_VIEW** 3
- #define **DGN_GDL_REF_FILE** 9
- #define **DGNPF_HOLE** 0x8000
- #define **DGNPF_SNAPPABLE** 0x4000
- #define **DGNPF_PLANAR** 0x2000
- #define **DGNPF_ORIENTATION** 0x1000
- #define **DGNPF_ATTRIBUTES** 0x0800
- #define **DGNPF_MODIFIED** 0x0400
- #define **DGNPF_NEW** 0x0200
- #define **DGNPF_LOCKED** 0x0100
- #define **DGNPF_CLASS** 0x000f
- #define **DGNEIF_DELETED** 0x01
- #define **DGNEIF_COMPLEX** 0x02
- #define **DGNJ_LEFT_TOP** 0
- #define **DGNJ_LEFT_CENTER** 1
- #define **DGNJ_LEFT_BOTTOM** 2

- #define **DGNJ_LEFTMARGIN_TOP** 3
- #define **DGNJ_LEFTMARGIN_CENTER** 4
- #define **DGNJ_LEFTMARGIN_BOTTOM** 5
- #define **DGNJ_CENTER_TOP** 6
- #define **DGNJ_CENTER_CENTER** 7
- #define **DGNJ_CENTER_BOTTOM** 8
- #define **DGNJ_RIGHTMARGIN_TOP** 9
- #define **DGNJ_RIGHTMARGIN_CENTER** 10
- #define **DGNJ_RIGHTMARGIN_BOTTOM** 11
- #define **DGNJ_RIGHT_TOP** 12
- #define **DGNJ_RIGHT_CENTER** 13
- #define **DGNJ_RIGHT_BOTTOM** 14
- #define **DGNO_CAPTURE_RAW_DATA** 0x01
- #define **DGNLT_DMRS** 0x0000
- #define **DGNLT_INFORMIX** 0x3848
- #define **DGNLT_ODBC** 0x5e62
- #define **DGNLT_ORACLE** 0x6091
- #define **DGNLT_RIS** 0x71FB
- #define **DGNLT_SYBASE** 0x4f58
- #define **DGNLT_XBASE** 0x1971
- #define **DGNLT_SHAPE_FILL** 0x0041
- #define **DGNLT_ASSOC_ID** 0x7D2F
- #define **DGNCF_USE_SEED_UNITS** 0x01
- #define **DGNCF_USE_SEED_ORIGIN** 0x02
- #define **DGNCF_COPY_SEED_FILE_COLOR_TABLE** 0x04
- #define **DGNCF_COPY_WHOLE_SEED_FILE** 0x08
- #define **DGNBSC_CURVE_DISPLAY** 0x10
- #define **DGNBSC_POLY_DISPLAY** 0x20
- #define **DGNBSC_RATIONAL** 0x40
- #define **DGNBSC_CLOSED** 0x80
- #define **DGNBSS_ARC_SPACING** 0x40
- #define **DGNBSS_CLOSED** 0x80

Typedefs

- typedef struct _DGNTagDef DGNTagDef
- typedef void * DGNHandle

Functions

- DGNHandle CPL_DLL DGNOpen (const char *, int)
- void CPL_DLL DGNSetOptions (DGNHandle, int)
- int CPL_DLL DGNTestOpen (GByte *, int)
- const DGNElementInfo CPL_DLL * DGNGetElementIndex (DGNHandle, int *)
- int CPL_DLL DGNGetExtents (DGNHandle, double *)
- int CPL_DLL DGNGetDimension (DGNHandle)
- DGNElemCore CPL_DLL * DGNReadElement (DGNHandle)
- void CPL_DLL DGNFreeElement (DGNHandle, DGNElemCore *)
- void CPL_DLL DGNRewind (DGNHandle)

- int CPL_DLL DGNGotoElement (DGNHandle, int)
- void CPL_DLL DGNClose (DGNHandle)
- int CPL_DLL DGNLoadTCB (DGNHandle)
- int CPL_DLL DGNLookupColor (DGNHandle, int, int *, int *, int *)
- int CPL_DLL DGNGetShapeFillInfo (DGNHandle, DGNElemCore *, int *)
- int CPL_DLL DGNGetAssocID (DGNHandle, DGNElemCore *)
- int CPL_DLL DGNGetElementExtents (DGNHandle, DGNElemCore *, DGNPoint *, DGNPoint *)
- void CPL_DLL DGNDumpElement (DGNHandle, DGNElemCore *, FILE *)
- const char CPL_DLL * DGNTypeToName (int)
- void CPL_DLL **DGNRotationToQuaternion** (double, int *)
- void CPL_DLL **DGNQuaternionToMatrix** (int *, float *)
- int CPL_DLL DGNStrokeArc (DGNHandle, DGNElemArc *, int, DGNPoint *)
- int CPL_DLL DGNStrokeCurve (DGNHandle, DGNElemMultiPoint *, int, DGNPoint *)
- void CPL_DLL DGNSetSpatialFilter (DGNHandle hDGN, double dfXMin, double dfYMin, double dfXMax, double dfYMax)
- int CPL_DLL DGNGetAttrLinkSize (DGNHandle, DGNElemCore *, int)
- unsigned char CPL_DLL * DGNGetLinkage (DGNHandle hDGN, DGNElemCore *psElement, int iIndex, int *pnLinkageType, int *pnEntityNum, int *pnMSLink, int *pnLinkSize)
- int CPL_DLL DGNWriteElement (DGNHandle, DGNElemCore *)
- int CPL_DLL DGNResizeElement (DGNHandle, DGNElemCore *, int)
- DGNHandle CPL_DLL DGNCreate (const char *pszNewFilename, const char *pszSeedFile, int nCreationFlags, double dfOriginX, double dfOriginY, double dfOriginZ, int nMasterUnitPerSubUnit, int nUORPerSubUnit, const char *pszMasterUnits, const char *pszSubUnits)
- DGNElemCore CPL_DLL * DGNCloneElement (DGNHandle hDGNSrc, DGNHandle hDGNDst, DGNElemCore *psSrcElement)
- int CPL_DLL DGNUpdateElemCore (DGNHandle hDGN, DGNElemCore *psElement, int nLevel, int nGraphicGroup, int nColor, int nWeight, int nStyle)
- int CPL_DLL DGNUpdateElemCoreExtended (DGNHandle hDGN, DGNElemCore *psElement)
- DGNElemCore CPL_DLL * DGNCreateMultiPointElem (DGNHandle hDGN, int nType, int nPointCount, DGNPoint *pasVertices)
- DGNElemCore CPL_DLL * **DGNCreateArcElem2D** (DGNHandle hDGN, int nType, double dfOriginX, double dfOriginY, double dfPrimaryAxis, double dfSecondaryAxis, double dfRotation, double dfStartAngle, double dfSweepAngle)
- DGNElemCore CPL_DLL * DGNCreateArcElem (DGNHandle hDGN, int nType, double dfOriginX, double dfOriginY, double dfOriginZ, double dfPrimaryAxis, double dfSecondaryAxis, double dfStartAngle, double dfSweepAngle, double dfRotation, int *panQuaternion)
- DGNElemCore CPL_DLL * DGNCreateConeElem (DGNHandle hDGN, double center_1X, double center_1Y, double center_1Z, double radius_1, double center_2X, double center_2Y, double center_2Z, double radius_2, int *panQuaternion)
- DGNElemCore CPL_DLL * DGNCreateTextElem (DGNHandle hDGN, const char *pszText, int nFontId, int nJustification, double dfLengthMult, double dfHeightMult, double dfRotation, int *panQuaternion, double dfOriginX, double dfOriginY, double dfOriginZ)
- DGNElemCore CPL_DLL * DGNCreateColorTableElem (DGNHandle hDGN, int nScreenFlag, GByte abyColorInfo[256][3])
- DGNElemCore CPL_DLL * DGNCreateComplexHeaderElem (DGNHandle hDGN, int nType, int nTotLength, int nNumElems)
- DGNElemCore CPL_DLL * DGNCreateComplexHeaderFromGroup (DGNHandle hDGN, int nType, int nNumElems, DGNElemCore **papsElems)
- DGNElemCore CPL_DLL * DGNCreateSolidHeaderElem (DGNHandle hDGN, int nType, int nSurfType, int nBoundElems, int nTotLength, int nNumElems)

- DGNElemCore CPL_DLL * DGNCreateSolidHeaderFromGroup (DGNHandle hDGN, int nType, int nSurfType, int nBoundElems, int nNumElems, DGNElemCore **papsElems)
- DGNElemCore CPL_DLL * DGNCreateCellHeaderElem (DGNHandle hDGN, int nTotLength, const char *pszName, short nClass, short *panLevels, DGNPoint *psRangeLow, DGNPoint *psRangeHigh, DGNPoint *psOrigin, double dfXScale, double dfYScale, double dfRotation)
- DGNElemCore CPL_DLL * DGNCreateCellHeaderFromGroup (DGNHandle hDGN, const char *pszName, short nClass, short *panLevels, int nNumElems, DGNElemCore **papsElems, DGNPoint *psOrigin, double dfXScale, double dfYScale, double dfRotation)
- int CPL_DLL DGNAddMSLink (DGNHandle hDGN, DGNElemCore *psElement, int nLinkageType, int nEntityNum, int nMSLink)
- int CPL_DLL DGNAddRawAttrLink (DGNHandle hDGN, DGNElemCore *psElement, int nLinkSize, unsigned char *pabyRawLinkData)
- int CPL_DLL DGNAddShapeFillInfo (DGNHandle hDGN, DGNElemCore *psElement, int nColor)
- int CPL_DLL DGNElemTypeHasDispHdr (int nElemType)

4.1.1 Detailed Description

Definitions of public structures and API of DGN Library.

4.1.2 Define Documentation

4.1.2.1 #define DGNST_ARC 5

DGNElemCore style: Element uses DGNElemArc structure

4.1.2.2 #define DGNST_BSPLINE_CURVE_HEADER 15

DGNElemCore style: Element uses DGNElemBSplineCurveHeader structure

4.1.2.3 #define DGNST_BSPLINE_SURFACE_BOUNDARY 16

DGNElemCore style: Element uses DGNElemBSplineSurfaceBoundary structure

4.1.2.4 #define DGNST_BSPLINE_SURFACE_HEADER 14

DGNElemCore style: Element uses DGNElemBSplineSurfaceHeader structure

4.1.2.5 #define DGNST_CELL_HEADER 8

DGNElemCore style: Element uses DGNElemCellHeader structure

4.1.2.6 #define DGNST_CELL_LIBRARY 11

DGNElemCore style: Element uses DGNElemCellLibrary structure

4.1.2.7 #define DGNST_COLORTABLE 3

DGNElemCore style: Element uses DGNElemColorTable structure

4.1.2.8 #define DGNST_COMPLEX_HEADER 7

DGNElemCore style: Element uses DGNElemComplexHeader structure

4.1.2.9 #define DGNST_CONE 12

DGNElemCore style: Element uses DGNElemCone structure

4.1.2.10 #define DGNST_CORE 1

DGNElemCore style: Element uses DGNElemCore structure

4.1.2.11 #define DGNST_KNOT_WEIGHT 17

DGNElemCore style: Element uses DGNElemKnotWeight structure

4.1.2.12 #define DGNST_MULTIPOINT 2

DGNElemCore style: Element uses DGNElemMultiPoint structure

4.1.2.13 #define DGNST_SHARED_CELL_DEFN 18

DGNElemCore style: Element uses DGNElemSharedCellDefn structure

4.1.2.14 #define DGNST_TAG_SET 10

DGNElemCore style: Element uses DGNElemTagSet structure

4.1.2.15 #define DGNST_TAG_VALUE 9

DGNElemCore style: Element uses DGNElemTagValue structure

4.1.2.16 #define DGNST_TCB 4

DGNElemCore style: Element uses DGNElemTCB structure

4.1.2.17 #define DGNST_TEXT 6

DGNElemCore style: Element uses DGNElemText structure

4.1.2.18 #define DGNST_TEXT_NODE 13

DGNElemCore style: Element uses DGNElemTextNode structure

4.1.3 Typedef Documentation

4.1.3.1 typedef void* DGNHandle

Opaque handle representing DGN file, used with DGN API.

4.1.3.2 typedef struct _DGNTagDef DGNTagDef

Tag definition.

Structure holding definition of one tag within a DGNTagSet.

4.1.4 Function Documentation

4.1.4.1 int CPL_DLL DGNAddMSLink (DGNHandle *hDGN*, DGNElemCore * *psElement*, int *nLinkageType*, int *nEntityNum*, int *nMSLink*)

Add a database link to element.

The target element must already have raw_data loaded, and it will be resized (see DGNResizeElement()) as needed for the new attribute data. Note that the element is not written to disk immediate. Use DGNWriteElement() for that.

Parameters:

hDGN the file to which the element corresponds.

psElement the element being updated.

nLinkageType link type (DGNLT_*). Usually one of DGNLT_DMRS, DGNLT_INFORMIX, DGNLT_ODBC, DGNLT_ORACLE, DGNLT_RIS, DGNLT_SYBASE, or DGNLT_XBASE.

nEntityNum indicator of the table referenced on target database.

nMSLink indicator of the record referenced on target table.

Returns:

-1 on failure, or the link index.

4.1.4.2 int CPL_DLL DGNAddRawAttrLink (DGNHandle *hDGN*, DGNElemCore * *psElement*, int *nLinkSize*, unsigned char * *pabyRawLinkData*)

Add a raw attribute linkage to element.

Given a raw data buffer, append it to this element as an attribute linkage without trying to interprete the linkage data.

The target element must already have raw_data loaded, and it will be resized (see DGNResizeElement()) as needed for the new attribute data. Note that the element is not written to disk immediate. Use DGNWriteElement() for that.

This function will take care of updating the "totlength" field of complex chain or shape headers to account for the extra attribute space consumed in the header element.

Parameters:

hDGN the file to which the element corresponds.

psElement the element being updated.

nLinkSize the size of the linkage in bytes.

pabyRawLinkData the raw linkage data (nLinkSize bytes worth).

Returns:

-1 on failure, or the link index.

4.1.4.3 int CPL_DLL DGNAddShapeFillInfo (DGNHandle *hDGN*, DGNElemCore * *psElement*, int *nColor*)

Add a shape fill attribute linkage.

The target element must already have raw_data loaded, and it will be resized (see DGNResizeElement()) as needed for the new attribute data. Note that the element is not written to disk immediate. Use DGNWriteElement() for that.

Parameters:

hDGN the file to which the element corresponds.

psElement the element being updated.

nColor fill color (color index from palette).

Returns:

-1 on failure, or the link index.

4.1.4.4 DGNElemCore CPL_DLL* DGNCloneElement (DGNHandle *hDGNSrc*, DGNHandle *hDGNDst*, DGNElemCore * *psSrcElement*)

Clone a retargetted element.

Creates a copy of an element in a suitable form to write to a different file than that it was read from.

NOTE: At this time the clone operation will fail if the source and destination file have a different origin or master/sub units.

Parameters:

hDGNSrc the source file (from which psSrcElement was read).

hDGNDst the destination file (to which the returned element may be written).

psSrcElement the element to be cloned (from hDGNSrc).

Returns:

NULL on failure, or an appropriately modified copy of the source element suitable to write to hDGNDst.

4.1.4.5 void CPL_DLL DGNClose (DGNHandle *hDGN*)

Close DGN file.

Parameters:

hDGN Handle from DGNOpen() for file to close.

4.1.4.6 DGNHandle CPL_DLL DGNCreate (const char * *pszNewFilename*, const char * *pszSeedFile*, int *nCreationFlags*, double *dfOriginX*, double *dfOriginY*, double *dfOriginZ*, int *nSubUnitsPerMasterUnit*, int *nUORPerSubUnit*, const char * *pszMasterUnits*, const char * *pszSubUnits*)

Create new DGN file.

This function will create a new DGN file based on the provided seed file, and return a handle on which elements may be read and written.

The following creation flags may be passed:

- DGNCF_USE_SEED_UNITS: The master and subunit resolutions and names from the seed file will be used in the new file. The nMasterUnitPerSubUnit, nUORPerSubUnit, pszMasterUnits, and pszSubUnits arguments will be ignored.
- DGNCF_USE_SEED_ORIGIN: The origin from the seed file will be used and the X, Y and Z origin passed into the call will be ignored.
- DGNCF_COPY_SEED_FILE_COLOR_TABLE: Should the first color table occuring in the seed file also be copied?
- DGNCF_COPY_WHOLE_SEED_FILE: By default only the first three elements (TCB, Digitizer Setup and Level Symbology) are copied from the seed file. If this flag is provided the entire seed file is copied verbatim (with the TCB origin and units possibly updated).

Parameters:

pszNewFilename the filename to create. If it already exists it will be overwritten.

pszSeedFile the seed file to copy header from.

nCreationFlags An ORing of DGNCF_* flags that are to take effect.

dfOriginX the X origin for the file.

dfOriginY the Y origin for the file.

dfOriginZ the Z origin for the file.

nSubUnitPerMasterUnit the number of subunits in one master unit.

nUORPerSubUnit the number of UOR (units of resolution) per subunit.

pszMasterUnits the name of the master units (2 characters).

pszSubUnits the name of the subunits (2 characters).

4.1.4.7 DGNElemCore CPL_DLL* DGNCreateArcElem (DGNHandle *hDGN*, int *nType*, double *dfOriginX*, double *dfOriginY*, double *dfOriginZ*, double *dfPrimaryAxis*, double *dfSecondaryAxis*, double *dfStartAngle*, double *dfSweepAngle*, double *dfRotation*, int * *panQuaternion*)

Create Arc or Ellipse element.

Create a new 2D or 3D arc or ellipse element. The start angle, and sweep angle are ignored for DGNT_ELLIPSE but used for DGNT_ARC.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

Parameters:

hDGN the DGN file on which the element will eventually be written.

nType either DGNT_ELLIPSE or DGNT_ARC to select element type.

dfOriginX the origin (center of rotation) of the arc (X).

dfOriginY the origin (center of rotation) of the arc (Y).

dfOriginZ the origin (center of rotation) of the arc (Y).

dfPrimaryAxis the length of the primary axis.

dfSecondaryAxis the length of the secondary axis.

dfStartAngle start angle, degrees counterclockwise of primary axis.

dfSweepAngle sweep angle, degrees

dfRotation Counterclockwise rotation in degrees.

panQuaternion 3D orientation quaternion (NULL to use rotation).

Returns:

the new element (DGNElemArc) or NULL on failure.

4.1.4.8 DGNElemCore CPL_DLL* DGNCreateCellHeaderElem (DGNHandle *hDGN*, int *nTotLength*, const char * *pszName*, short *nClass*, short * *panLevels*, DGNPoint * *psRangeLow*, DGNPoint * *psRangeHigh*, DGNPoint * *psOrigin*, double *dfXScale*, double *dfYScale*, double *dfRotation*)

Create cell header.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

Generally speaking the function DGNCreateCellHeaderFromGroup() should be used instead of this function.

Parameters:

hDGN the file handle on which the element is to be written.

nTotLength total length of cell in words not including the 38 bytes of the cell header that occur before the totlength indicator.

nClass the class value for the cell.

panLevels an array of shorts holding the bit mask of levels in effect for this cell. This array should contain 4 shorts (64 bits).

psRangeLow the cell diagonal origin in original cell file coordinates.

psRangeHigh the cell diagonal top left corner in original cell file coordinates.

psOrigin the origin of the cell in output file coordinates.

dfXScale the amount of scaling applied in the X dimension in mapping from cell file coordinates to output file coordinates.

dfYScale the amount of scaling applied in the Y dimension in mapping from cell file coordinates to output file coordinates.

dfRotation the amount of rotation (degrees counterclockwise) in mapping from cell coordinates to output file coordinates.

Returns:

the new element (DGNElemCellHeader) or NULL on failure.

4.1.4.9 DGNElemCore CPL_DLL* DGNCreateCellHeaderFromGroup (DGNHandle *hDGN*, const char * *pszName*, short *nClass*, short * *panLevels*, int *nNumElems*, DGNElemCore ** *papsElems*, DGNPoint * *psOrigin*, double *dfXScale*, double *dfYScale*, double *dfRotation*)

Create cell header from a group of elements.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

This function will compute the total length, bounding box, and diagonal range values from the set of provided elements. Note that the proper diagonal range values will only be written if 1.0 is used for the x and y scale values, and 0.0 for the rotation. Use of other values will result in incorrect scaling handles being presented to the user in Microstation when they select the element.

Parameters:

hDGN the file handle on which the element is to be written.

nClass the class value for the cell.

panLevels an array of shorts holding the bit mask of levels in effect for this cell. This array should contain 4 shorts (64 bits). This array would normally be passed in as NULL, and the function will build a mask from the passed list of elements.

psOrigin the origin of the cell in output file coordinates.

dfXScale the amount of scaling applied in the X dimension in mapping from cell file coordinates to output file coordinates.

dfYScale the amount of scaling applied in the Y dimension in mapping from cell file coordinates to output file coordinates.

dfRotation the amount of rotation (degrees counterclockwise) in mapping from cell coordinates to output file coordinates.

Returns:

the new element (DGNElemCellHeader) or NULL on failure.

4.1.4.10 DGNElemCore CPL_DLL* DGNCreateColorTableElem (DGNHandle *hDGN*, int *nScreenFlag*, GByte *abyColorInfo*[256][3])

Create color table element.

Creates a color table element with the indicated color table.

Note that color table elements are actally of type DGNT_GROUP_DATA(5) and always on level 1. Do not alter the level with DGNUpdateElemCore() or the element will essentially be corrupt.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

Parameters:

hDGN the file to which the element will eventually be written.

nScreenFlag the screen to which the color table applies (0 = left, 1 = right).

abyColorInfo[8][3] array of 256 color entries. The first is the background color.

Returns:

the new element (DGNElemColorTable) or NULL on failure.

4.1.4.11 DGNElemCore CPL_DLL* DGNCreateComplexHeaderElem (DGNHandle *hDGN*, int *nType*, int *nTotLength*, int *nNumElems*)

Create complex chain/shape header.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

The nTotLength is the sum of the size of all elements in the complex group plus 5. The DGNCreateComplexHeaderFromGroup() can be used to build a complex element from the members more conveniently.

Parameters:

hDGN the file on which the element will be written.

nType DGNT_COMPLEX_CHAIN_HEADER or DGNT_COMPLEX_SHAPE_HEADER. depending on whether the list is open or closed (last point equal to last) or if the object represents a surface or a solid.

nTotLength the value of the totlength field in the element.

nNumElems the number of elements in the complex group not including the header element.

Returns:

the new element (DGNElemComplexHeader) or NULL on failure.

4.1.4.12 DGNElemCore CPL_DLL* DGNCreateComplexHeaderFromGroup (DGNHandle *hDGN*, int *nType*, int *nNumElems*, DGNElemCore ** *papsElems*)

Create complex chain/shape header.

This function is similar to DGNCreateComplexHeaderElem(), but it takes care of computing the total size of the set of elements being written, and collecting the bounding extents. It also takes care of some other convenience issues, like marking all the member elements as complex, and setting the level based on the level of the member elements.

Parameters:

hDGN the file on which the element will be written.

nType DGNT_COMPLEX_CHAIN_HEADER or DGNT_COMPLEX_SHAPE_HEADER. depending on whether the list is open or closed (last point equal to last) or if the object represents a surface or a solid.

nNumElems the number of elements in the complex group not including the header element.

papsElems array of pointers to nNumElems elements in the complex group. Some updates may be made to these elements.

Returns:

the new element (DGNElemComplexHeader) or NULL on failure.

4.1.4.13 DGNElemCore CPL_DLL* DGNCreateConeElem (DGNHandle *hDGN*, double *dfCenter_1X*, double *dfCenter_1Y*, double *dfCenter_1Z*, double *dfRadius_1*, double *dfCenter_2X*, double *dfCenter_2Y*, double *dfCenter_2Z*, double *dfRadius_2*, int * *panQuaternion*)

Create Cone element.

Create a new 3D cone element.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

Parameters:

hDGN the DGN file on which the element will eventually be written.

dfCenter1X the center of the first bounding circle (X).

dfCenter1Y the center of the first bounding circle (Y).

dfCenter1Z the center of the first bounding circle (Z).

dfRadius1 the radius of the first bounding circle.

dfCenter2X the center of the second bounding circle (X).

dfCenter2Y the center of the second bounding circle (Y).

dfCenter2Z the center of the second bounding circle (Z).

dfRadius2 the radius of the second bounding circle.

panQuaternion 3D orientation quaternion (NULL for default orientation - circles parallel to the X-Y plane).

Returns:

the new element (DGNElemCone) or NULL on failure.

4.1.4.14 DGNElemCore CPL_DLL* DGNCreateMultiPointElem (DGNHandle *hDGN*, int *nType*, int *nPointCount*, DGNPoint * *pasVertices*)

Create new multi-point element.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

NOTE: There are restrictions on the nPointCount for some elements. For instance, DGNT_LINE can only have 2 points. Maximum element size precludes very large numbers of points.

Parameters:

hDGN the file on which the element will eventually be written.

nType the type of the element to be created. It must be one of DGNT_LINE, DGNT_LINE_STRING, DGNT_SHAPE, DGNT_CURVE or DGNT_BSPLINE_POLE.

nPointCount the number of points in the pasVertices list.

pasVertices the list of points to be written.

Returns:

the new element (a DGNElemMultiPoint structure) or NULL on failure.

4.1.4.15 DGNElemCore CPL_DLL* DGNCreateSolidHeaderElem (DGNHandle *hDGN*, int *nType*, int *nSurfType*, int *nBoundElems*, int *nTotLength*, int *nNumElems*)

Create 3D solid/surface.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

The nTotLength is the sum of the size of all elements in the solid group plus 6. The DGNCreateSolidHeaderFromGroup() can be used to build a solid element from the members more conveniently.

Parameters:

hDGN the file on which the element will be written.

nType DGNT_3DSURFACE_HEADER or DGNT_3DSOLID_HEADER.

nSurfType the surface/solid type, one of DGNSUT_* or DGNSOT_*.

nBoundElems the number of elements in each boundary.

nTotLength the value of the totlength field in the element.

nNumElems the number of elements in the solid not including the header element.

Returns:

the new element (DGNElemComplexHeader) or NULL on failure.

4.1.4.16 DGNElemCore CPL_DLL* DGNCreateSolidHeaderFromGroup (DGNHandle *hDGN*, int *nType*, int *nSurfType*, int *nBoundElems*, int *nNumElems*, DGNElemCore ** *papsElems*)

Create 3D solid/surface header.

This function is similar to DGNCreateSolidHeaderElem(), but it takes care of computing the total size of the set of elements being written, and collecting the bounding extents. It also takes care of some other convenience issues, like marking all the member elements as complex, and setting the level based on the level of the member elements.

Parameters:

hDGN the file on which the element will be written.

nType DGNT_3DSURFACE_HEADER or DGNT_3DSOLID_HEADER.

nSurfType the surface/solid type, one of DGNSUT_* or DGNSOT_*.

nBoundElems the number of boundary elements.

nNumElems the number of elements in the solid not including the header element.

papsElems array of pointers to nNumElems elements in the solid. Some updates may be made to these elements.

Returns:

the new element (DGNElemComplexHeader) or NULL on failure.

4.1.4.17 DGNElemCore CPL_DLL* DGNCreateTextElem (DGNHandle *hDGN*, const char * *pszText*, int *nFontId*, int *nJustification*, double *dfLengthMult*, double *dfHeightMult*, double *dfRotation*, int * *panQuaternion*, double *dfOriginX*, double *dfOriginY*, double *dfOriginZ*)

Create text element.

The newly created element will still need to be written to file using DGNWriteElement(). Also the level and other core values will be defaulted. Use DGNUpdateElemCore() on the element before writing to set these values.

Parameters:

hDGN the file on which the element will eventually be written.

pszText the string of text.

nFontId microstation font id for the text. 1 may be used as default.

nJustification text justification. One of DGNJ_LEFT_TOP, DGNJ_LEFT_CENTER, DGNJ_LEFT_-BOTTOM, DGNJ_CENTER_TOP, DGNJ_CENTER_CENTER, DGNJ_CENTER_BOTTOM, DGNJ_RIGHT_TOP, DGNJ_RIGHT_CENTER, DGNJ_RIGHT_BOTTOM.

dfLengthMult character width in master units.

dfHeightMult character height in master units.

dfRotation Counterclockwise text rotation in degrees.

panQuaternion 3D orientation quaternion (NULL to use rotation).

dfOriginX Text origin (X).

dfOriginY Text origin (Y).

dfOriginZ Text origin (Z).

Returns:

the new element (DGNElemText) or NULL on failure.

4.1.4.18 void CPL_DLL DGNDumpElement (DGNHandle *hDGN*, DGNElemCore * *psElement*, FILE * *fp*)

Emit textual report of an element.

This function exists primarily for debugging, and will produce a textual report about any element type to the designated file.

Parameters:

hDGN the file from which the element originated.

psElement the element to report on.

fp the file (such as stdout) to report the element information to.

4.1.4.19 int CPL_DLL DGNElemTypeHasDispHdr (int *nElemType*)

Does element type have display header.

Parameters:

nElemType element type (0-63) to test.

Returns:

TRUE if elements of passed in type have a display header after the core element header, or FALSE otherwise.

4.1.4.20 void CPL_DLL DGNFreeElement (DGNHandle *hDGN*, DGNElemCore * *psElement*)

Free an element structure.

This function will deallocate all resources associated with any element structure returned by DGNReadElement().

Parameters:

hDGN handle to file from which the element was read.

psElement the element structure returned by DGNReadElement().

4.1.4.21 int CPL_DLL DGNGetAssocID (DGNHandle *hDGN*, DGNElemCore * *psElem*)

Fetch association id for an element.

This method will check if an element has an association id, and if so returns it, otherwise returning -1. Association ids are kept as a user attribute linkage where present.

Parameters:

hDGN the file.

psElem the element.

Returns:

The id or -1 on failure.

4.1.4.22 int CPL_DLL DGNGetAttrLinkSize (DGNHandle *hDGN*, DGNElemCore * *psElement*, int *nOffset*)

Get attribute linkage size.

Returns the size, in bytes, of the attribute linkage starting at byte offset nOffset. On failure a value of 0 is returned.

Parameters:

hDGN the file from which the element originated.

psElement the element to report on.

nOffset byte offset within attribute data of linkage to check.

Returns:

size of linkage in bytes, or zero.

4.1.4.23 int CPL_DLL DGNGetDimension (DGNHandle *hDGN*)

Return 2D/3D dimension of file.

Return 2 or 3 depending on the dimension value of the provided file.

4.1.4.24 int CPL_DLL DGNGetElementExtents (DGNHandle *hDGN*, DGNElemCore * *psElement*, DGNPoint * *psMin*, DGNPoint * *psMax*)

Fetch extents of an element.

This function will return the extents of the passed element if possible. The extents are extracted from the element header if it contains them, and transformed into master georeferenced format. Some element types do not have extents at all and will fail.

This call will also fail if the extents raw data for the element is not available. This will occur if it was not the most recently read element, and if the raw_data field is not loaded.

Parameters:

hDGN the handle of the file to read from.

psElement the element to extract extents from.

psMin structure loaded with X, Y and Z minimum values for the extent.

psMax structure loaded with X, Y and Z maximum values for the extent.

Returns:

TRUE on success of FALSE if extracting extents fails.

4.1.4.25 const DGNElementInfo CPL_DLL* DGNGetElementIndex (DGNHandle *hDGN*, int * *pnElementCount*)

Fetch element index.

This function will return an array with brief information about every element in a DGN file. It requires one pass through the entire file to generate (this is not repeated on subsequent calls).

The returned array of DGNElementInfo structures contain the level, type, stype, and other flags for each element in the file. This can facilitate application level code representing the number of elements of various types effeciently.

Note that while building the index requires one pass through the whole file, it does not generally request much processing for each element.

Parameters:

hDGN the file to get an index for.

pnElementCount the integer to put the total element count into.

Returns:

a pointer to an internal array of DGNElementInfo structures (there will be *pnElementCount entries in the array), or NULL on failure. The returned array should not be modified or freed, and will last only as long as the DGN file remains open.

4.1.4.26 int CPL_DLL DGNGetExtents (DGNHandle *hDGN*, double * *padfExtents*)

Fetch overall file extents.

The extents are collected for each element while building an index, so if an index has not already been built, it will be built when DGNGetExtents() is called.

The Z min/max values are generally meaningless (0 and 0xffffffff in uor space).

Parameters:

hDGN the file to get extents for.

padfExtents pointer to an array of six doubles into which are loaded the values xmin, ymin, zmin, xmax, ymax, and zmax.

Returns:

TRUE on success or FALSE on failure.

4.1.4.27 unsigned char CPL_DLL* DGNGetLinkage (DGNHandle *hDGN*, DGNElemCore * *psElement*, int *iIndex*, int * *pnLinkageType*, int * *pnEntityNum*, int * *pnMSLink*, int * *pnLength*)

Returns requested linkage raw data.

A pointer to the raw data for the requested attribute linkage is returned as well as (potentially) various information about the linkage including the linkage type, database entity number and MSLink value, and the length of the raw linkage data in bytes.

If the requested linkage (iIndex) does not exist a value of zero is returned.

The entity number is (loosely speaking) the index of the table within the current database to which the MSLINK value will refer. The entity number should be used to lookup the table name in the MSCATALOG table. The MSLINK value is the key value for the record in the target table.

Parameters:

hDGN the file from which the element originated.

psElement the element to report on.

iIndex the zero based index of the linkage to fetch.

pnLinkageType variable to return linkage type. This may be one of the predefined DGNLT_ values or a different value. This pointer may be NULL.

pnEntityNum variable to return the entity number in or NULL if not required.

pnMSLink variable to return the MSLINK value in, or NULL if not required.

pnLength variable to returned the linkage size in bytes or NULL.

Returns:

pointer to raw internal linkage data. This data should not be altered or freed. NULL returned on failure.

4.1.4.28 int CPL_DLL DGNGetShapeFillInfo (DGNHandle *hDGN*, DGNElemCore * *psElem*, int * *pnColor*)

Fetch fill color for a shape.

This method will check for a 0x0041 user attribute linkaged with fill color information for the element. If found the function returns TRUE, and places the fill color in *pnColor, otherwise FALSE is returned and *pnColor is not updated.

Parameters:

hDGN the file.

psElem the element.

pnColor the location to return the fill color.

Returns:

TRUE on success or FALSE on failure.

4.1.4.29 int CPL_DLL DGNGotoElement (DGNHandle *hDGN*, int *element_id*)

Seek to indicated element.

Changes what element will be read on the next call to DGNReadElement(). Note that this function requires and index, and one will be built if not already available.

Parameters:

hDGN the file to affect.

element_id the element to seek to. These values are sequentially ordered starting at zero for the first element.

Returns:

returns TRUE on success or FALSE on failure.

4.1.4.30 int CPL_DLL DGNLoadTCB (DGNHandle *hDGN*)

Load TCB if not already loaded.

This function will load the TCB element if it is not already loaded. It is used primarily to ensure the TCB is loaded before doing any operations that require TCB values (like creating new elements).

Returns:

FALSE on failure or TRUE on success.

4.1.4.31 int CPL_DLL DGNLookupColor (DGNHandle *hDGN*, int *color_index*, int * *red*, int * *green*, int * *blue*)

Translate color index into RGB values.

If no color table has yet been encountered in the file a hard-coded "default" color table will be used. This seems to be what Microstation uses as a color table when there isn't one in a DGN file but I am not absolutely convinced it is appropriate.

Parameters:

hDGN the file.

color_index the color index to lookup.

red location to put red component.

green location to put green component.

blue location to put blue component.

Returns:

TRUE on success or FALSE on failure. May fail if color_index is out of range.

4.1.4.32 DGNHandle CPL_DLL DGNOpen (const char * *pszFilename*, int *bUpdate*)

Open a DGN file.

The file is opened, and minimally verified to ensure it is a DGN (ISFF) file. If the file cannot be opened for read access an error with code CPLE_OpenFailed with be reported via CPLError() and NULL returned. If the file header does not appear to be a DGN file, an error with code CPLE_AppDefined will be reported via CPLError(), and NULL returned.

If successful a handle for further access is returned. This should be closed with DGNClose() when no longer needed.

DGNOpen() does not scan the file on open, and should be very fast even for large files.

Parameters:

pszFilename name of file to try opening.

bUpdate should the file be opened with read+update (r+) mode?

Returns:

handle to use for further access to file using DGN API, or NULL if open fails.

4.1.4.33 DGNElemCore CPL_DLL* DGNReadElement (DGNHandle *hDGN*)

Read a DGN element.

This function will return the next element in the file, starting with the first. It is affected by DGNGotoElement() calls.

The element is read into a structure which includes the DGNElemCore structure. It is expected that applications will inspect the stype field of the returned DGNElemCore and use it to cast the pointer to the appropriate element structure type such as DGNElemMultiPoint.

Parameters:

hDGN the handle of the file to read from.

Returns:

pointer to element structure, or NULL on EOF or processing error. The structure should be freed with DGNFreeElement() when no longer needed.

4.1.4.34 int CPL_DLL DGNResizeElement (DGNHandle *hDGN*, DGNElemCore * *psElement*, int *nNewSize*)

Resize an existing element.

If the new size is the same as the old nothing happens.

Otherwise, the old element in the file is marked as deleted, and the DGNElemCore.offset and element_id are set to -1 indicating that the element should be written to the end of file when next written by DGNWriteElement(). The internal raw data buffer is updated to the new size.

Only elements with "raw_data" loaded may be moved.

In normal use the DGNResizeElement() call would be called on a previously loaded element, and afterwards the raw_data would be updated before calling DGNWriteElement(). If DGNWriteElement() isn't called after DGNResizeElement() then the element will be lost having been marked as deleted in it's old position but never written at the new location.

Parameters:

hDGN the DGN file on which the element lives.

psElement the element to alter.

nNewSize the desired new size of the element in bytes. Must be a multiple of 2.

Returns:

TRUE on success, or FALSE on error.

4.1.4.35 void CPL_DLL DGNRewind (DGNHandle *hDGN*)

Rewind element reading.

Rewind the indicated DGN file, so the next element read with DGNReadElement() will be the first. Does not require indexing like the more general DGNReadElement() function.

Parameters:

hDGN handle to file.

4.1.4.36 void CPL_DLL DGNSetOptions (DGNHandle *hDGN*, int *nOptions*)

Set file access options.

Sets a flag affecting how the file is accessed. Currently there is only one support flag:

DGNO_CAPTURE_RAW_DATA: If this is enabled (it is off by default), then the raw binary data associated with elements will be kept in the raw_data field within the DGNElemCore when they are read. This is required if the application needs to interprete the raw data itself. It is also necessary if the element is to be written back to this file, or another file using DGNWriteElement(). Off by default (to conserve memory).

Parameters:

hDGN handle to file returned by DGNOpen().

nOptions ORed option flags.

4.1.4.37 void CPL_DLL DGNSetSpatialFilter (DGNHandle *hDGN*, double *dfXMin*, double *dfYMin*, double *dfXMax*, double *dfYMax*)

Set rectangle for which features are desired.

If a spatial filter is set with this function, DGNReadElement() will only return spatial elements (elements with a known bounding box) and only those elements for which this bounding box overlaps the requested region.

If all four values (dfXMin, dfXMax, dfYMin and dfYMax) are zero, the spatial filter is disabled. Note that installing a spatial filter won't reduce the amount of data read from disk. All elements are still scanned, but the amount of processing work for elements outside the spatial filter is minimized.

Parameters:

hDGN Handle from DGNOpen() for file to update.

dfXMin minimum x coordinate for extents (georeferenced coordinates).

dfYMin minimum y coordinate for extents (georeferenced coordinates).

dfXMax maximum x coordinate for extents (georeferenced coordinates).

dfYMax maximum y coordinate for extents (georeferenced coordinates).

4.1.4.38 int CPL_DLL DGNStrokeArc (DGNHandle *hFile*, DGNElemArc * *psArc*, int *nPoints*, DGNPoint * *pasPoints*)

Generate a polyline approximation of an arc.

Produce a series of equidistant (actually equi-angle) points along an arc. Currently this only works for 2D arcs (and ellipses).

Parameters:

hFile the DGN file to which the arc belongs (currently not used).

psArc the arc to be approximated.

nPoints the number of points to use to approximate the arc.

pasPoints the array of points into which to put the results. There must be room for at least nPoints points.

Returns:

TRUE on success or FALSE on failure.

4.1.4.39 int CPL_DLL DGNStrokeCurve (DGNHandle *hFile*, DGNElemMultiPoint * *psCurve*, int *nPoints*, DGNPoint * *pasPoints*)

Generate a polyline approximation of an curve.

Produce a series of equidistant points along a microstation curve element. Currently this only works for 2D.

Parameters:

hFile the DGN file to which the arc belongs (currently not used).

psCurve the curve to be approximated.

nPoints the number of points to use to approximate the curve.

pasPoints the array of points into which to put the results. There must be room for at least nPoints points.

Returns:

TRUE on success or FALSE on failure.

4.1.4.40 int CPL_DLL DGNTestOpen (GByte * *pabyHeader*, int *nByteCount*)

Test if header is DGN.

Parameters:

pabyHeader block of header data from beginning of file.

nByteCount number of bytes in pabyHeader.

Returns:

TRUE if the header appears to be from a DGN file, otherwise FALSE.

4.1.4.41 const char CPL_DLL* DGNTypeToName (int *nType*)

Convert type to name.

Returns a human readable name for an element type such as DGNT_LINE.

Parameters:

nType the DGNT_* type code to translate.

Returns:

a pointer to an internal string with the translation. This string should not be modified or freed.

4.1.4.42 int CPL_DLL DGNUpdateElemCore (DGNHandle *hDGN*, DGNElemCore * *psElement*, int *nLevel*, int *nGraphicGroup*, int *nColor*, int *nWeight*, int *nStyle*)

Change element core values.

The indicated values in the element are updated in the structure, as well as in the raw data. The updated element is not written to disk. That must be done with DGNWriteElement(). The element must have raw_data loaded.

Parameters:

hDGN the file on which the element belongs.

psElement the element to modify.

nLevel the new level value.

nGraphicGroup the new graphic group value.

nColor the new color index.

nWeight the new element weight.

nStyle the new style value for the element.

Returns:

Returns TRUE on success or FALSE on failure.

4.1.4.43 int CPL_DLL DGNUpdateElemCoreExtended (DGNHandle *hDGN*, DGNElemCore * *psElement*)

Update internal raw data representation.

The raw_data representation of the passed element is updated to reflect the various core fields. The DGNElemCore level, type, complex, deleted, graphic_group, properties, color, weight and style values are all applied to the raw_data representation. Spatial bounds, element type specific information and attributes are not updated in the raw data.

Parameters:

hDGN the file to which the element belongs.

psElement the element to be updated.

Returns:

TRUE on success, or FALSE on failure.

4.1.4.44 int CPL_DLL DGNWriteElement (DGNHandle *hDGN*, DGNElemCore * *psElement*)

Write element to file.

Only elements with "raw_data" loaded may be written. This should include elements created with the various DGNCreate*() functions, and those read from the file with the DGNO_CAPTURE_RAW_DATA flag turned on with DGNSetOptions().

The passed element is written to the indicated file. If the DGNElemCore.offset field is -1 then the element is written at the end of the file (and offset/element are reset properly) otherwise the element is written back to the location indicated by DGNElemCore.offset.

If the element is added at the end of the file, and if an element index has already been built, it will be updated to reference the new element.

This function takes care of ensuring that the end-of-file marker is maintained after the last element.

Parameters:

hDGN the file to write the element to.

psElement the element to write.

Returns:

TRUE on success or FALSE in case of failure.

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