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CORE

⬭ **IFC** SDK

SEPT.
2022

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# OVERVIEW

ODA IFC SDK is a de-facto standard library for working with IFC models using ODA C++ API or Standard Data Access Interface (SDAI, ISO 10303-24). Internally, IFC SDK implementation is based on a sophisticated EXPRESS engine, which includes a full set of features needed to manage meta-data described using EXPRESS language, and classes for working with IFC data itself, including interpretation of EXPRESS source code needed for dynamically calculated values access and validations.

During the several years of development, the library acquired a bunch of standardized features described within different ISO 10303 parts, as standard validations which are incorporated into Validation Engine, support of several exchange structure formats, like most popular Step Physical File (.ifc), ifcXML and experimental ifcHDF5, and a set of extended features as BIM Collaboration Format support, ability of working with IDS requirements, mvdXML API and ifcJSON which were developed by buildingSMART International as parts of OpenBIM concept.

The significant part of IFC SDK implementation is dedicated to IFC models visualization, which is highly integrated within standard ODA Core rendering mechanisms and based on Kernel geometrical and modeling libraries. IFC Visualization includes implementation of modeling operations using one of ODA polygonal or solid modelers, support for visualization styles for 2D/3D objects and early version of textures support. The visualization area of SDK is in the permanent process of development, we are trying to keep pace with time by implementation of new IFC geometrical capabilities.

Due to high integration within the ODA ecosystem with all its advantages like strong infrastructure with automatic testing on most popular platforms (Windows, Mac and Linux are supported), detailed documentation and customers support, the IFC SDK, endorsing ideas of OpenBIM, has found a number of users between software vendors all over the world.

# ■ Features

- ▫ Established IFC2x, IFC2X2, IFC2X3 and IFC4 schemas support for working with Late-Bound SDAI or C++ API, or access to IFC data on abstract level using Common Data Access interface

- ▫ Early-Bound API as a set of generated C++ classes for each supported IFC schema

- ▫ Supported IFC formats geometry visualization based on ODA Core mechanisms, including IfcAdvancedBrep objects, visual styles and 2D geometry support

- ▫ ifcXML, ifcHDF5 and ifcZIP formats are supported for storing IFC models besides the standard exchange structure, a text format called Step Physical File

- ▫ Validation Engine - the simple way to check model against both standardized errors described within ISO 10303 and custom format-dependent ones

- ▫ Common Data Access interface is another one format-agnostic way to get attribute values data from IFC instances. It also provides dynamic property sets values as part of standard CDA, so such data can be simply used for visualization within application's user interface

- ▫ BIM Collaboration Format (BCFZIP) files reading, editing and writing

- ▫ Ifc2Dwg extension allows geometry conversion into .dwg format

- ▫ OpenIFCViewer is the powerful tool for IFC models visualization (based on ODA Visualize SDK), navigation and investigation. It also includes a set of additional plugins and features as BIM Collaboration Format Manager for BCF reviews creation and management, Validation Tool which generates attractive HTML reports about errors found, Collision Detection palette which shows any collisions within IFC model geometrical representation and more

- IFC4.3 Official and experimental IFC4.3 Release Candidate 4 schemas support

- IFC4.3 Rail/Road geometry visualization, including transition curves implementation and new kinds of 3D operations over them

- ODA B-Rep objects direct conversion into IfcAdvancedBrep using a simple API

- Property Set Definition/Quantity Take Off (PSD/QTO) Engine-the ability of working with machine-readable property/quantity sets meta-data for custom attribute sets creation, validation and management within the IFC model

- Model Operations API includes simple editing of IFC models as deletion and cloning of IfcRoot'ed objects together with geometrical representations within same or other models, this functionality will be a base for future Federated IFC Models feature

- BIM Collaboration Format 3.0 support in addition to the older version of format

- Recent IDS 0.9 format support allows to perform checkings of custom requirements using Validation Engine

- New and extremely helpful OpenIFCViewer plugins as TreeView for convenient IFC model investigation as tree structure, curves geometry and curvature dumpers and visualizers, IfcProfileDef visualizer, different filters of instances for fast objects search etc.