



Open CASCADE Technology and Products ver. 6.5 Public Minor Release

Release Notes

Overview

Open CASCADE Technology and Products version 6.5 is a minor release, which includes new features, improvements and bug fixes, over minor release 6.4.

Version **6.5** is binary incompatible with the previous versions of Open CASCADE Technology and Products, so applications linked against a previous version must be recompiled to run with this Version 6.5.





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Highlights

Implementation of FreeImage(plus) library

Open CASCADE Technology now uses FreeImage(Plus) third-party library (<http://freeimage.sourceforge.net>).

This library provides build-in support of popular image processing formats, such as JPEG, PNG, GIF or BMP. It should replace all obsolete code for image load/dump in the future. Currently it is used to save images from Window / OpenGL context and its use is optional.

The following modifications have been made in OCCT packages, classes, methods and enumerations in connection with this improvement:

- New DRAWEXE command **v2ddump** allows dumping the contents of 2D viewer.
- New DRAWEXE command **vdump** allows dumping the color buffer with alpha channel and depth buffer.
- DRAWEXE commands **xwd** and **vdump** have been modified to dump into JPEG, PNG, GIF, BMP formats. XWD format support has been removed.
- **V3d_View::Dump()** and **V3d_View::ToPixMap()** methods now use hardware accelerated off-screen buffer if available (required OpenGL2+ compatible GPU and up-to-date drivers).
- The method **StdSelect_ViewSelector3d::UpdateProj()** has been improved to update parameters after the first call (not the second).
- DRAWEXE 2D-Viewer (**v2dinit**) and 3D-Viewer (**vininit**) now can be used simultaneously on Windows systems.
- Work of DRAWEXE in batch mode (launched with **-f Script.tcl** or with **-v** flag) has been reorganized. Tk/Tcl control window; viewer window (commands **view**, **axo**, **smallview**, etc.); 3D-Viewer (OpenGL) window (commands **vininit**, **vdisplay**, etc.); 2D-Viewer window (commands **v2dinit**, **v2ddisplay**, etc.) are not shown in the screen. Drawing that has been done in these windows, is now performed in offscreen buffer.
- New methods **IsVirtual()** and **SetVirtual()** have been added in class **Aspect_Window** to specify a 'virtual window' which is used for off-screen rendering.
- Compress argument has been removed from method **Draw_Window::Save()**. This method has been implemented for Windows systems as well.
- New methods for off-screen buffer control: **FBCreate()**, **FBRelease()**, **FBGetDimensions()**, **FBChangeViewport()** and a new dump method **BufferDump()** have been added in classes **Graphic3d_GraphicDriver**, **OpenGL_GraphicDriver** and **Visual3d_View**.
- Method **ViewerSelector3d::InitProj()** has been removed.
- New class **Image_PixMap** implementing system-independent image-buffer control using FreeImage(Plus) library has been added.
- New values: **TOI_RGB**, **TOI_RGBA**, **TOI_RGBF**, **TOI_RGBAf** and **TOI_FLOAT**, which indicate **Image_PixMap** image type, have been added in **TypeOfImage** Enumeration.
- Method **V3d_View::ToPixMap()** now can be specified from **TypeOfImage** enumeration (**TOI_FLOAT** currently means **Depth** buffer).
- **TKDraw** package now depends on **TKService**, while **TKService** package now depends on FreeImage(Plus) library.
- New class **OpenGL_FrameBuffer**, implementing off-screen Frame Buffer Object in OpenGL, has been added.
- Structure **CALL_DEF_VIEW** has been extended with field **void* ptrFBO** to store off-screen frame buffer object used for rendering.





Reading and writing non-manifold topology via STEP interface

STEPControl, StepToTopoDS and TopoDSToStep packages have been improved to process non-manifold topology in STEP export/import routines. Since now the shared TopoDS entities can be mapped onto the shared STEP items and vice versa.

I-Deas-like STEP processing has been also introduced in STEP-reader. While an I-Deas-like STEP-file doesn't really contain shared geometry (each shared entity is replicated in STEP representation), STEPControl is now able to recognize and manage this case. Moreover, I-Deas-like STEP files do not contain information about shell-solid relations and store non-manifold solids as open shells (i.e. shared faces also become open shells). STEP reader has been enabled to reconstruct closed shells and solids for such cases.

The following classes have been implemented in the framework of this improvement:

- In STEP reader: **StepToTopoDS_NMTool** class has been added to process non-manifold topology and I-Deas-like cases. It is similar to the existing **StepToTopoDS_Tool**. The latter auxiliary object is used to assemble **TopoDS** shapes taking into account the adjacent sub-shapes (edges, vertexes etc) in the context of a simple manifold shape (solid, shell etc). E.g. if two adjacent faces have one shared edge, this edge must be added to each face during the import process. While **Tool** object deals with sharing in a single manifold Shape, **NMTool** applies this idea to a non-manifold topology represented as a compound of several shapes. **NMTool** is aware not only of the processed shape but also of the whole non-manifold group of the shapes.
- **STEPControl_ActorRead** class has been modified to deal with non-manifold topology by means of **NMTool** object initialized for each non-manifold group. Such a group is populated when **NON_MANIFOLD_SURFACE_SHAPE_REPRESENTATION** item is detected during the reading process (or **MANIFOLD_SURFACE_SHAPE_REPRESENTATION** item is detected with **read.step.ideas**).
- Special processing has been implemented for the I-Deas-like STEP-files storing non-manifold topology via **MANIFOLD_SURFACE_SHAPE_REPRESENTATION** entity. As non-manifold topology is mapped onto **SHELL_BASED_SURFACE_MODEL** items (one per partition), the resulting shapes have **TopAbs_SHELL** type (open or closed). Thus **ActorRead** has been adjusted to reconstruct solids from the closed shells.
- In STEP-writer: **TopoDSToStep_MakeStepVertex**, **TopoDSToStep_MakeStepEdge** and **TopoDSToStep_MakeStepFace** have been adjusted to take into account non-manifold sharing as in the case of STEP reader. Note that **Transfer_FinderProcess** is used in STEP writer instead of **NMTool**.
- **STEPControl_ActorWrite** class has been adjusted to write non-manifold topology via **NON_MANIFOLD_SURFACE_SHAPE_REPRESENTATION** container. **ActorWrite** deals with compounds containing non-manifold shapes and uses **SHELL_BASED_SURFACE_MODEL** representation for each shape.

The flags **read.step.nonmanifold** and **write.step.nonmanifold** have been introduced to enable/disable non-manifold mode.

The flag **read.step.ideas** has been disabled by default to optimize the performance by avoiding additional post-processing after the shape has been restored from STEP. If this flag is on, non-manifold topology, which is read from STEP files written in I-DEAS dialect, is post-processed to reduce the number of dummy open shells by closing them with pure non-manifold partitions (also stored as open shells) and obtain a correct shape. However, this case is very specific and expected to occur rarely.



Draw commands for testing Collision Detection product

New package `ColDetectionTest` containing a set of Draw commands has been implemented to test Collision Detection product.

- New library `TKCol test` provides a plugin for Draw.
- New resource `COLDET` from `DrawPluginProducts` allows loading the commands in Draw.

Two problems have been corrected in the Collision Detection product:

- It has become possible to retrieve points on the intersection shape/ray;
- Processing of the intersection shape/sphere has been corrected.

New definition of dependencies on external libraries

The definition of dependencies on external libraries has been revised to make them easily configurable, especially under Windows

When MS VC++ projects are generated, the libraries defined in the current WOK environment were referred by all relevant projects, which complicated the environment configuration after projects generation. For example, the dependency on `FreeImage` library could be easily eliminated redefining the macro, but the linker dependency was hardcoded to the project.

To avoid this, MSVC++-specific `pragma` statements have been implemented to declare the dependency in all code that required linking to specific external libraries (`gl2ps` and `FreeImage`).

For instance, in `Image_Pixmap.cxx`, the following code added in `#ifndef HAVE_FREEIMAGE` clause:

```
#ifndef _MSC_VER
#pragma comment (lib, "FreeImage.lib")
#endif
```

The code that embeds in VC++ project files the references to `EXTERNLIB` libraries has been excluded from project generator. Consecutively the dependency on the library for the linker is synchronized with its actual use in the code when activated by `HAVE_*` macro.

Such macros have been implemented to manipulate this dependency without additional efforts. They can be enabled or disabled by modifying `env.bat` on Windows or by `automake` configuration options on Linux. Please, refer to the OCCT Overview on how to do it.

Trihedron with graduated axes in OCC viewer

The trihedron with graduated axes has been implemented in OCCT via class `CGraduatedTrihedron` from `Graphi c3d` package in addition to the default trihedron and "z-buffer" (colored) trihedron.

This trihedron is a 3D grid-like object with built-in trihedron and automatic boundary box detection for the displayed objects. It covers all displayed objects and calculates their boundary boxes "on the fly".

The trihedron and the grid itself can be shown or hidden. It is possible to customize the colors of the grid, axes, fonts of values, etc.

Removal of Wrappers, Java sample and Java redistributables

Starting from Open CASCADE Technology 6.5 **Wrappers** module (`Jcas`) has been removed from OCCT distribution. Now it belongs to OCCT Products.

Java sample and java redistributables have been completely removed from OCCT distribution.





Porting to version 6.5

Porting of user applications from the previous OCCT version (6.4) to version 6.5 requires the following major issues to be taken into account:

- If you are not comfortable with dependence on Intel TBB, FreeImage, or GL2Ps libraries, you will need to (re)build OCCT with these dependencies disabled (see section "Building OCCT" in the Overview for details).
- The low-level format version of OCAF binary and XML persistence has been incremented. Hence, the files saved by OCCT 6.5 to OCAF binary or XML format will not be readable by previous versions of OCCT.
- The **BRepMesh** triangulation algorithm has been seriously revised and now tries hard to fulfill the requested deflection and angular tolerance parameters. If you experience any problems with performance or triangulation quality (in particular, display of shapes in shading mode), consider revising the values of these parameters used in your application.
- If you were using method **ToPixMap()** of class **V3d_View** to get a buffer for passing to Windows API functions (e.g. **BitBlt**), this will not work anymore. You will need to use method **AccessBuffer()** of class **Image_PixMap** to get the raw buffer data that can be further passed to WinAPI functions.
- As the processing of message gravity parameter in **Message** package has been improved, some application messages (especially the ones generated by IGES or STEP translators) can be suppressed or new messages appear in the application. Use relevant message level parameter to tune this behavior.

If you are porting from an older version of OCCT, consult the similar section in OCCT 6.4 Release Notes document.



Modifications

Foundation Classes

21669	<p><i>Summary:</i> Invalid trunk operation in <code>OSD_FontMgr.cxx</code></p> <p>The problem of exception in <code>OSD_FontMgr::InitFontDataBase()</code> caused by hardcoded number of symbols in the parameter for truncation operation has been fixed. Now the correct parameter provided by <code>TCollection_HAsciiString::SearchFromEnd</code> method is stored in a variable, which is used for truncation.</p>
22081	<p><i>Summary:</i> Changes in <code>NCollection_CellFilter.hxx</code></p> <p><code>NCollection_CellFilter.hxx</code> has been modified to automatically correct index values out of the range <code>INT_MIN - INT_MAX</code>.</p>
22217	<p><i>Summary:</i> Annoying warnings of Intel compiler in <code>Standard_CString.hxx</code>.</p> <p>Wrong use of <code>const</code> in cast to <code>Standard_Integer</code> has been removed from <code>Standard_CString.hxx</code>. The definition of <code>M_PI_2</code> in <code>Standard_math.hxx</code> has been corrected to avoid warnings from Intel compiler.</p>

Modeling Algorithms

21292	<p><i>Summary:</i> Shading on large model too long</p> <p>The triangulation of topology based on complex NURBS (<code>BSpline</code>) surfaces and curves has been improved in <code>BRepMesh_FastDiscretFace.cxx</code> and <code>BRepMesh_FastDiscret.cxx</code>. Now the triangulation algorithm on a <code>BSpline</code> surface takes into account the number of spans and the maximum degree, which defines initial triangulation on the surface. This change can increase the time needed for triangulation of complex shapes, because the algorithm attempts to produce a more accurate result. However the time spent can be reduced by decreasing deflection parameters.</p>
22000	<p><i>Summary:</i> <code>BRepOffsetAPI_MakeOffset</code> algorithm crashes with exception.</p> <p>Acceptable tolerance of some parameters has been changed in <code>MAT2d_Circuit</code> class to avoid crashes in <code>BRepOffsetAPI_MakeOffset</code> algorithm.</p>
22012 22043	<p><i>Summary:</i> Command "checkshape" gives invalid error on attached face</p> <p>The class <code>BRepCheck_Wire</code> has been corrected to take into account the range of edges while checking edges intersection.</p>
22020	<p><i>Summary:</i> Incorrect approximation of intersection curves</p> <p>The problem of incorrect approximation of intersection curves obtained for a set of cases of intersection between cylindrical and toroidal surfaces when the values of the angles between the surfaces along the intersection curves work for zero has been fixed in <code>IntTools_FaceFace.cxx</code>.</p>





22051	<p><i>Summary:</i> Wrong center of mass calculation for Compound of faces</p> <p>The problem with volume properties computation in package BRepGProp has been fixed in the static function roughBaryCenter() that took into account an additional origin point (0,0,0) for the barycentre computation by shape vertices.</p>
22053	<p><i>Summary:</i> Synchronization of the implementation and the documentation for Geom_ConicalSurface</p> <p>The commentaries in file Geom_ConicalSurface.hxx have been corrected to match with the actual implementation of the algorithm.</p>
22064	<p><i>Summary:</i> 3D offset algorithm crashes with exception on the customer's shape</p> <p>3D offset algorithm Geom_OffsetSurface.cxx has been improved to avoid crashes. There is still a limitation: the offset value should be sufficiently small to avoid situations when some faces of the initial shape do not correspond to the resulting shape. If the offset value is too big, some offset faces become degenerated or "turn inside out" and the correct result cannot be guaranteed.</p>
22073	<p><i>Summary:</i>Exception in BRepOffsetAPI_MakePipeShell::Build method</p> <p>BRepOffsetAPI_MakePipeShell algorithm has been modified: the first and the last parameters are located at the knots of the intermediate surface to provide its successful segmentation.</p>
22130	<p><i>Summary:</i> Bug in Bnd_2x.</p> <p>A misprint has been fixed in method Bnd_B2x::IsIn defining if one box is completely inside the other box.</p>
22131	<p><i>Summary:</i> Protection and improvements in BOPTools</p> <p>Protection against zero magnitude of the first derivative during computation of the tangent to an edge has been introduced in methods BOPTools_Tool s2D::EdgeTangent and BOPTools_Tool s3D::EdgeTangent.</p>
22133	<p><i>Summary:</i> Incorrect rotation part computation in gp_Trsf2d</p> <p>A misprint has been fixed in method gp_Trsf2d::RotationPart.</p>
22134	<p><i>Summary:</i> Uninitialized variables in IntSurf_Quadric</p> <p>Uninitialized local variables have been fixed in constructor and IntSurf_Quadric::SetValue method.</p>



22135	<p>Summary: Fixes of potential hang-up and zero derivatives in Extrema</p> <p>The following modifications have been introduced in Extrema package to improve the performance and address other issues:</p> <ul style="list-style-type: none"> Protection against zero step and potential hang-up in definition of a degenerated isoline in static function IsoIsDeg from Extrema_ExtPS; Performance improvement by avoiding of checking degenerated isolines on plane in method Extrema_ExtPS::Initialize; Protection against zero derivatives in method Extrema_FuncExtCC::GetStateNumber; Removed uninitialized fields from constructor of FuncExtPC.
22136	<p>Summary: Incorrect definition of negative transformation in gp_Trsf2d</p> <p>The definition of negative transformation in gp_Trsf2d has been changed to take into account the sign of determinant.</p>
22137	<p>Summary: Fix of minor problems in IntTools</p> <p>The following modifications have been introduced in IntTools package to improve the performance and address other issues:</p> <ul style="list-style-type: none"> Fixed misprint of U and V in static function CheckSampling from IntTools_BeanFaceIntersector; Range check of intersection and check for minimal parametric range of intersection to protect from extremely small ranges in IntTools_BeanBeanIntersector::ComputeRangeFromStartPoint; Corrected handling of end knots in static function ComputeGridPoints from IntTools_BeanFaceIntersector; Fix for steps and extremity cases in static function CorrectSurfaceBoundaries from IntTools_FaceFace; Exception handling added in IntTools_BeanBeanIntersector::ComputeUsingExtrema; <p>Protection on degenerated and non geometric edges added in IntTools_EdgeEdge.cxx</p>
22140	<p>Summary: Improvements in LocOpe</p> <p>The following modifications have been introduced in LocOpe package to improve the performance and address other issues:</p> <ul style="list-style-type: none"> Improved handling of closed and periodic surfaces in LocOpe_SplitShape.cxx. Corrected handling of reversed edges in LocOpe_WiresOnShape.cxx.
22141	<p>Summary: Protection in math for division on zero</p> <p>Protection against division by zero has been implemented in math_DirectPolynomialRoots.cxx.</p>





22142	<p><i>Summary:</i> Improvements and Fixes in Message</p> <p>Message filtering according to gravity has been corrected in method Message_Printer0Stream::Send. Now the gravities are considered as described in the header.</p>
22147	<p><i>Summary:</i> Integration of OCCT performance meter</p> <p>Common functionality on performance measurement has been added in OCCT for profiling purposes.</p> <p>New class OSD_PerfMeter enables measuring the CPU time between two points of code execution, regardless of the scope of these points.</p> <p>A meter is identified by its name (string of chars), so multiple objects in various places of the user's code may point to the same meter. The results are printed to stdout upon finish of the program.</p>
22154	<p><i>Summary:</i> Protection of empty wire in ShapeFix_Face</p> <p>ShapeFix_Face algorithm has been modified to avoid taking into account empty wires (containing no edges).</p>
22155	<p><i>Summary:</i> Improvement caching in TDF_Label</p> <p>Caching in TDF_Label has been improved: the last found child is stored if it is not zero.</p>
22171 22244	<p><i>Summary:</i> Regression in BRepExtrema</p> <p>The algorithm finding minimal distance BRepExtrema_DistanceSS.cxx::Perform has been fixed to avoid computation error.</p>
22188	<p><i>Summary:</i> Visualization of solid fails (in BRepMesh_FastDiscretFace)</p> <p>Protection has been added in method BRepMesh_FastDiscretFace::Control, which returns square root of the maximal distance, to avoid square root calculation from a negative distance value.</p>
22194	<p><i>Summary:</i> Exception in LocOpe_SplitShape algorithm</p> <p>The method LocOpe_SplitShape::AddOpenWire has been modified to avoid exception.</p>
22233	<p><i>Summary:</i> Problem with triangulation</p> <p>The problem with BSpline surfaces, which are significantly different in the parametric and 3D space, has been fixed. Filtering of extra samples has been introduced in method RepMesh_FastDiscretFace::InternalVertices. Performance of angular checks computation has been improved.</p>



Visualization

21902	<p><i>Summary:</i> Improve by capability to make off-screen snapshots of 2d, 3d, and axo viewers</p> <p>FreeImage(Plus) third-party library has been integrated to OCCT (see full description in Highlights section).</p>
22017	<p><i>Summary:</i> Misuse of environment variables in visualization classes</p> <p>The environment variables were queried in some methods of Visual3d_ViewMapping visualization package without any caching, which affected the performance if such methods were called frequently.</p> <p>The frequency of calling environment variables has been optimized in many ways, e.g. an environment variable is called only once and the result is saved in a static variable.</p>
22024	<p><i>Summary:</i> A new type of trihedron: graduated axes</p> <p>The trihedron with graduated axes has been implemented in OCCT (see full description in Highlights section).</p>
22031	<p><i>Summary:</i> Crash in AIS_LocalContext::ClearDetected()</p> <p>The mechanism that cleans up all entity owners and other references when an object is destroyed has been implemented. All references belonging to an object (including selectable and detected ones) are now removed when the object is removed from AIS context.</p>
22055	<p><i>Summary:</i> Zoom at a point</p> <p>The methods, which allow zooming relatively to the current cursor position instead of the view centre, have been added to V3d_View:</p> <ul style="list-style-type: none"> Method StartZoomAtPoint(xpix, ypix) defines the pixel for zooming ; Method ZoomAtPoint(mouseStartX, mouseStartY, mouseEndX, mouseEndY) zooms the model at the pixel defined by the previous method.
22068	<p><i>Summary:</i> Color scale imposed above another Color scale</p> <p>To prevent several overlapping color scales from appearing in the screen, the corresponding Visual3d_LayerItem instance is removed by method V3d_LayerMgr::ColorScaleErase().</p>
22095	<p><i>Summary:</i> Incorrect triangulation on some faces of the attached STEP file</p> <p>The problem caused by self intersection in 2D space has been solved by implementation of processing of free mesh boundaries in the triangulation algorithm</p> <p>MeshAlgo_Delaunay::FrontierAdjust method analyzes mesh boundaries in 2D and removes the ones not connected to any triangle.</p> <p>Additionally, static variables have been removed from BRep_Tools to enable the triangulation algorithm to work in parallel mode</p>
22099	<p><i>Summary:</i> Bug fix in the BrepMesh package</p> <p>Protection on void box has been added to BRepMesh_IncrementalMesh::Perform() method.</p>





22100	<p><i>Summary:</i> Bug fix in the AIS package</p> <p>The exception-handling mechanism initializing <code>aLength</code> variable has been added in the constructor of <code>AIS_Axis</code> package.</p> <p>The constructor of <code>AIS_Axis</code> class calls from <code>UnitsAPI</code> library the method, which tries to find its data using OCCT resource manager (resources <code>CSF_UnitsDefinition</code> and <code>CSF_UnitsLexicon</code>).</p> <p>Sometimes the application has to set the variables itself (environment settings are avoided by end users). In that case <code>AIS_Axis</code> constructor can be called before the correct initialization of the resource variables. The improvement catches the corresponding exception and provides a static value for the required axis length.</p>
22104	<p><i>Summary:</i> Explicit destructor call in <code>OpenGL_FontMgr.cxx</code> leads to double deletion</p> <p><code>FTFace</code> explicit destructor has been removed from <code>OpenGL_FontMgr.cxx</code> to avoid double deletion in some cases.</p>
22115	<p><i>Summary:</i> Troubles with drawing by means of <code>Visual3d_Layer</code>.</p> <p><code>PtrUnderLayer</code> and <code>PtrOverLayer</code> pointers are now initialized in <code>Visual3d_TransientManager</code> to correctly set the pointers to the overlay and underlay when <code>Graphi c3d_CView</code> is used.</p>
22122	<p><i>Summary:</i> A slight regression in performance is noticed for a big amount of interactive objects in OCCT 6.4</p> <p>Management of presentations by the OCCT visualization engine (<code>TKOpenGL</code> library) has been improved to increase the performance. The time spent to compute presentations has been reduced in several times</p> <p>Previously the time was wasted on copying presentation data between the array form (used to display the presentations) and the list form (used to compute or update the presentation data). Now each presentation (a structure in terms of <code>TKOpenGL</code>) always holds its elements as a list, and no copying occurs.</p> <p>Performance boost is most visible in case of numerous (several thousands) interactive objects.</p>
22199	<p><i>Summary:</i> OpenGL memory leaks in <code>TKOpenGL</code></p> <p>The problem of memory leaks in <code>OpenGL</code> has been solved by introducing <code>Delete</code> message handlers in <code>TelType</code> enumeration items from <code>OpenGL_tsm.hxx</code>. The handlers deallocate all memory occupied by the corresponding element.</p> <p>Another source of memory leak, resulting from independent memory allocation for each kind of array (vertices, normals, texels, etc.), has been fixed in <code>Graphi c3d_ArrayOfPrimitives</code>.</p>
22236	<p><i>Summary:</i> Regression: edges not drawn for mesh faces with different colors on front/back sides</p> <p>The problem with incorrect presentation of <code>MeshVS</code> edges in <code>OpenGL</code> package has been corrected. The edge drawing algorithm has been modified to draw edges of <code>AIS_Shape</code>, <code>MeshVS</code>, etc. correctly when the "Vertex Buffer Objects" extension is on.</p>





Application Framework

22032	<p><i>Summary:</i> The method <code>Last()</code> from <code>TDataStd_TreeNode</code> seems slow in case of search for the last tree node</p> <p>The method <code>TDataStd_TreeNode::InsertAfter()</code> has been fixed to update <code>myLast</code> field or set it to <code>NULL</code>.</p>
22152	<p><i>Summary:</i> Redefinition of several executable units to toolkits</p> <p>The following executable units have been merged to toolkits to optimize the structure of OCCT units:</p> <ul style="list-style-type: none"> ▪ <code>BinLPlugin</code> ▪ <code>BinPlugin</code> ▪ <code>BinTObjPlugin</code> ▪ <code>BinXCAFPlugin</code> ▪ <code>StdLPlugin</code> ▪ <code>StdPlugin</code> ▪ <code>XCAFPlugin</code> ▪ <code>XmlLPlugin</code> ▪ <code>XmlPlugin</code> ▪ <code>XmlTObjPlugin</code> ▪ <code>XmlXCAFPlugin</code> <p>This means that <code>***Plugin</code> units have been removed and their contents placed in <code>PLUGIN</code> macros in the corresponding <code>***Drivers</code> packages. <code>StdResource::Plugin</code> file has been updated by replacing <code>***Plugin</code> names by <code>TK***</code>.</p>

Data Exchange

21771	<p><i>Summary:</i> Method <code>ShapeAnalysis_FreeBounds::ConnectWiresToWires</code> can not build one wire from a few connected wires</p> <p>The processing of wires having orientation <code>TopAbs_REVERSED</code> with method <code>ShapeExtend_WireData::Init()</code> has been improved. The algorithm has been modified to take into account the wire orientation.</p>
21967	<p><i>Summary:</i> Some warnings after reading from STEP were lost</p> <p>The algorithms <code>ShapeFix_Face</code> and <code>ShapeFix_Wire</code> have been modified to provide correct reading from Step files.</p>
22098	<p><i>Summary:</i> Correction of <code>VRMLData</code> package.</p> <p>Initialization of <code>TopoDS_Face</code> from <code>VrmlData_IndexedFace</code> node has been corrected with respect to Normals.</p> <p>Internal data member <code>myLineCount</code> has been added in class <code>VrmlData_Node</code>. This data member tracks the position of this node in VRML file (only in Debug build). This feature helps to identify the problematic data when there is an error detected after VRML import.</p>



22114	<p><i>Summary:</i> Non-manifold topology in STEP</p> <p>STEP interface has been improved to read and write non-manifold topology(see full description in Highlights section)</p>
22116	<p><i>Summary:</i> Crash with work of <code>IGESDimeLeaderArrow</code></p> <p><code>IGESDimeLeaderArrow</code> has been modified to check the existence of <code>segmentTails</code>.</p>
22126	<p><i>Summary:</i> Problem of incorrect writing of tabulated cylinder</p> <p>The algorithms for parameterization (<code>GeomToIGES_GeomSurface</code>) and conversion of a tabulated cylinder into IGES format (<code>BRepToIGES_BRWrite</code>) have been corrected.</p>
22156	<p><i>Summary:</i> STEP file with junk at the end can not be read</p> <p>STEP file parsing mechanism has been improved to handle STEP files having junk or errors after the actual end of STEP data. STEP lexical rules in file <code>step.lex</code> have been modified to provide this.</p>
22192	<p><i>Summary:</i> Bug in color visualization of transformed shape after reading a document in <code>BinXCAF</code> format</p> <p>Location saving and reading mechanism has been improved to correctly store data in <code>BinXCAF</code> and <code>XmlXCAF</code> formats. Old versions of save files are still supported by single-side backward compatibility.</p> <p>The problem consisted in that the locations were not shared between <code>BinMNameNamingShapeDriver</code> and <code>BinMXCAFDoc_LocationDriver</code>. The implemented solution provides saving only location IDs instead of saving locations "as is" in the document tree. The location values are saved into the shape section of a save file.</p> <p>The following methods have been added in API:</p> <ul style="list-style-type: none"> <code>BinMNameNamingShapeDriver</code>, <code>XmlMNameNamingShapeDriver</code>: <code>GetShapesLocations()</code> returns the reference to the location defined as shared between <code>BinMNameNamingShapeDriver</code> and <code>BinMXCAFDoc_LocationDriver</code>; <code>BinMXCAFDoc_LocationDriver</code>, <code>BinMXCAFDoc_LocationDriver</code>: <code>SetSharedLocations(LocationSetPtr theLocations)</code> saves a pointer to the locations set as shared. <p>Several obsolete methods have been removed (methods for writing) or changed for backward compatibility (methods for reading).</p>
22237	<p><i>Summary:</i> Regression in STEP reader</p> <p><code>StepToTopoDS_TranslateEdge.cxx</code> and <code>StepToTopoDS_TranslateVertex.cxx</code> have been corrected to access <code>Handle(TCollection_HAsciiString)</code> objects with <code>IsNull()</code> check.</p>

Draw

21979	<p><i>Summary:</i> DRAW crashes on exit after some tests when MMGT_OPT=0</p> <p>The problem with instability in OCCT tests in case if MMGT_OPT=0 has been fixed.</p>
21996	<p><i>Summary:</i> VISUALISATION module not load</p> <p>DRAWEXE has been improved to correctly load VISUALIZATION module on Windows 64-bit.</p>
22078	<p><i>Summary:</i> Moving Qmchecktopo & Qmtri area from TKEMeshTest to TKTopTest</p> <p>The commands Qmtriarea and Qmchecktopo have been transferred from TKEMeshTest (Products) to TKTopTest (ros) to be able to check not only Express Mesh but also Brep Mesh. These commands perform advanced checks on triangulation area and topology.</p>
22211	<p><i>Summary:</i> Remove file init.tcl from package Draw</p> <p>Obsolete file init.tcl has been removed from Draw package.</p>

Dependencies and Packaging**Configuration**

22107	<p><i>Summary:</i> Problems handling characters from second half of ASCII table</p> <p>Special characters from the last half of ASCII table have been removed from OCCT source files to allow compiling OCCT to the customers with multi-byte environment, e.g. from Japan. Commentaries in some source files have been translated from French into English.</p>
22190	<p><i>Summary:</i> Problem of launching MS Visual Studio 2005 with /useenv</p> <p>Occurrences of OCCT installation directory have become quoted in batch scripts for OCCT configuration on Windows, which allows the scripts to work for OCCT installed to a path containing spaces.</p>
22191	<p><i>Summary:</i> Adjustment of environment bat files for correct launching of VC projects</p> <p>Batch scripts for OCCT configuration on Windows have been improved to be operable on workstations where Visual Studio and / or OCCT are installed to paths containing spaces.</p> <p>This improvement consists in the following changes:</p> <ul style="list-style-type: none"> Warning on possible need to re-build if manifest fails on 64-bit platforms is made with echo instead of simply rem, to be visible to the user launching msvc.bat. Default name of directory for TBB has been corrected to correspond to the Intel distribution, i.e. including its version: tbb30_018oss instead of tbb. Definition of environment variable CSD_DEFINES has been added to env_build.bat.





22193	<p><i>Summary:</i> Improve management of dependency on Intel TBB on Windows</p> <p>OCCT has become independent from Intel TBB by default. Environment variable <code>\$(CSF_DEFINES)</code> has replaced hardcoded option <code>HAVE_TBB</code> for MS Visual Studio preprocessor definition. This variable can be defined in <code>env_build.bat</code> as empty string or <code>HAVE_TBB</code>. The projects will be generated with reference to variable <code>\$(CSF_DEFINES)</code> instead of <code>HAVE_TBB</code>, so that modifying <code>env_build.bat</code> could allow switching on or off the dependency on TBB.</p>
22218	<p><i>Summary:</i> Make use of GL2PS library optional</p> <p>The use of GL2PS library has become optional. New macro <code>HAVE_GL2PS</code>, which includes <code>gl2ps</code> functionality and links to <code>gl2ps.lib</code>, has been implemented for OpenGL package. The macro for <code>Image</code> and <code>FreeImage</code> libraries has been modified to specify link libraries (<code>FreeImage.lib</code> and <code>FreeImagePlus.lib</code>) with <code>HAVE_FREEIMAGE</code>.</p>

WOK

22106	<p><i>Summary:</i> Incorrect behavior of lexical analyzer (flex) during extraction steps on modern Linux systems</p> <p>Lexical analyzers flex-2.5.3 and bison-1.25 have been integrated into WOK binaries to avoid problems with generation of platform-depended code.</p>
22124	<p><i>Summary:</i> Necessity to obtain current version of OCCT in different automatic scripts</p> <p>The procedure of getting the current OCCT version has been implemented as an independent WOK command <code>OCCTGetVersion</code>. This command can be used in various automatic scripts, for example, in automatic release preparation tool.</p>
22148	<p><i>Summary:</i> Doxygen docs improvement: navigation</p> <p>The procedure <code>OCCTDoc_PostProcessor</code> has been included in the script <code>OCCTDocumentation.tcl</code>. The procedure adds navigation paths to the class pages in the OCCT documentation.</p>
22216	<p><i>Summary:</i> Revise way to specify necessary libraries on Windows / MS VC++ compiler</p> <p>The definition of dependencies on external libraries has been revised to make them easily configurable, especially under Windows (see full description in Highlights section).</p>

Binary Package

22212	<p><i>Summary:</i> Eliminate jcas, Java sample, and JRE binaries from OCCT distribution</p> <p>Wrappers module (Jcas component) has been removed to from OCCT distribution and placed in OCCT Products. Java sample and java redistributables have been completely eliminated from OCCT distribution.</p>
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22213	<p><i>Summary:</i> Revise contents of <code>data/images</code> folder</p> <p>The contents of OCCT distribution <code>data/images</code> folder have been revised to remove obsolete and add new Demo images.</p>
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Products

DXF

22035	<p><i>Summary:</i> Incorrect translation of INSERT with affine transformation</p> <p>Processing of attributes attached to the elements of an INSERT of a BLOCK with affine transformations has been improved in <code>DXFCAFControl_Reader</code> and <code>DxfData_TranslateInsert</code>. Associations between entities and their attributes (such as layers) defined within a BLOCK are now preserved within instances defined by an INSERT so that INSERTs with affine transformations could be translated correctly.</p>
22101	<p><i>Summary:</i> Infinite loop when reading a DXF file</p> <p>DXF interface has been corrected to avoid infinite loop when reading certain files.</p>

Collision Detection

22112	<p><i>Summary:</i> Draw commands for Collision Detection</p> <p>New package <code>ColDetectionTest</code> containing a set of Draw commands has been implemented to test Collision Detection product (see full description in Highlights section).</p>
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Surfaces from Scattered Points

22110	<p><i>Summary:</i> Cleaning and repackaging</p> <p>Surfaces from Scattered Points product has been cleaned from:</p> <ul style="list-style-type: none">▪ Unused code;▪ Embedded printouts;▪ Calls to <code>assert</code>, <code>abort</code>, <code>exit</code>. <p>The draw commands have been synchronously prefixed.</p>
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OMF

22118	<p><i>Summary:</i> Repackaging of the component</p> <p>OMF product has been repackaged. The following packages have been renamed:</p> <ul style="list-style-type: none">▪ SMDS -> OMFDS▪ SMDSAbs -> OMFabs▪ SMDSEdit -> OMFEdit▪ SMDSAIgo -> OMFAlgo▪ SMDSBool -> OMFBool▪ SMDSTools -> OMFTools (merged with the existing OMFTools)▪ SMDSControl -> OMFControl▪ SMDSCaf -> OMFCAF▪ SMDSMeshVS -> OMFVS▪ SMDSTest -> OMFTest <p>The following toolkits have been renamed:</p> <ul style="list-style-type: none">▪ TKSMDS -> TKOMFBase, TKOMF▪ TKSMDSCaf -> TKOMFCAF▪ TKSMDSMeshVS -> TKOMFVS▪ TKSMDSTest -> TKOMFTest <p>The package TKSMDS has been divided into two libraries - TKOMFBase and TKOMF. TKOMFBase contains packages delivered in Open Source (OMFabs and OMFDS).</p>
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Supported Platforms and Pre-requisites

Open CASCADE Technology is supported on Windows Intel and Linux Intel platforms.

Note: Since ver. 6.5 Open CASCADE Technology is not supported on SunOS platform.

The table below lists the product versions used by OCCT and its system requirements.

Linux Operating System	32/64-bit: Debian 4.0, Mandriva 2008*
Windows Operating System	32/64-bit: MS Windows SEVEN / VISTA SP2 /XP SP3
Minimum memory	512 Mb, 1 Gb recommended
Free disk space (complete installation)	650 Mb of disk space, or 1,4 Gb if installed with reference documentation
Minimum swap space	500 Mb
Video card	<p>GeForce The following versions of GeForce drivers are recommended:</p> <p><i>For Linux:</i> 64-bit Version: 100.14.19 or later 32-bit Version: 100.14.19 or later</p> <p><i>For Windows:</i> Version 266.58 WHQL or later is recommended: http://www.nvidia.com/Download/index.aspx</p>
Graphic library	OpenGL
C++	<p><i>For Linux:</i> GNU gcc 4.0. - 4.3.2.</p> <p><i>For Windows:</i> Microsoft Visual Studio .NET 2005 SP1** with all security updates Microsoft Visual Studio .NET 2008 SP1 Microsoft Visual Studio .NET 2010</p>
TCL (for testing tools)	<p><i>For Linux:</i> Tcltk 8.5 http://www.tcl.tk/software/tcltk/8.5.html</p> <p><i>For Windows:</i> ActiveTcl 8.5 http://www.activestate.com/activetcl/downloads</p>
Qt (for demonstration tools)	Qt 4.6.2 http://qt.nokia.com/downloads
Freetype (OCCT Text rendering)	freetype-2.3.7 http://sourceforge.net/projects/freetype/files/
Ftgl (OCCT Text rendering)	ftgl-2.1.2 http://sourceforge.net/projects/ftgl/files/
FreeImage *** (Support of common graphic formats)	FreeImage 3.14.1 http://sourceforge.net/projects/freeimage/files/Source%20Distribution/
gl2ps *** (Export of OCCT viewer contents to vector graphic file)	gl2ps-1.3.5 http://geuz.org/gl2ps/
TBB (optional tool for parallelized version of BRepMesh component)	tbb30_018oss http://www.threadingbuildingblocks.org/

- * Mandriva 2008 is a permanently tested platform.
- ** The official release of OCCT for Windows contains libraries built with VC++ 2005.
- *** This product is optional.

