Open CASCADE Technology and Products ver. 6.6.0 Minor Release

Release Notes

Overview

Open CASCADE Technology and Products version 6.6.0 is a minor release, which includes over **250** new features, improvements and bug fixes over maintenance release 6.5.5.

Version 6.6.0 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 6.6.0.

Highlights

- Official support of Mac OS X, Windows 8 and Visual Studio 2012

- On Mac OS X, visualization with native Cocoa API and XCode 4 project files

- Refactored Boolean operations algorithm. Possibility to enable automatic check of input parameters and results and generation of data for bug report

- Redesign of texture management

- Accelerated text visualization; use of FTGL library is dropped

- Removal of obsolete 2D viewer and plotter support libraries. 3D viewer libraries become the unified way to render both 2D and 3D graphics

- `TKOpenGl` is now linked at build time, not at run time

- Import / export made independent on current global locale

- Universal CMake build scripts

- New automated testing system

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Modifications

Foundation Classes

20523 23361	*Summary:* Bug in `gp_Trsf::Multiply` Method `gp_Trsf::Multiply` has been fixed to avoid incorrect result of multiplication in cases when both rotation and translation are involved.
22506	*Summary:* Wrong factor for elapsed time measured The factor value has been corrected in `OSD_Timer::GetTickCount()`.
22545	*Summary:* Improved exception handling The following improvements have been introduced in exception handling on Windows: ▪ Mutexes have been added to control multi-threading in exception handlers. ▪ `OSD::SetSignal()` now always sets signal handlers, exception handlers and structured exception (SE) translators. This is helpful if the code is compiled with `/EHs` or `/EHa`. Consequently redundant `UseSETranslation()` have been removed. ▪ `OSD::Setsignal()` has been documentation in full detail in `.cdl` file. ▪ Static variables have been removed wherever they were used to set signals only once to enable calling `::SetSignal()` for other threads or even within the same thread if the user has switched handlers.
22980	*Summary:* `Standard_Atomic.hxx` compilers compatibility issues Compatibility issues within different compilers and systems have been fixed. Support of MAC OS X has been added.
22808 22898 22933	*Summary:* IGES import fails in German environment The following improvements have been introduced to resolve localization issues: ▪ DRAW command `dlocale` has been added to set and query the current locale of C subsystem; ▪ Equivalents of C functions converting of strings to/from reals have been added in `Standard_CString.hxx`, providing locale-independent behavior (using always "C" locale); ▪ In DRAW packages, calls to `atof()` and `atoi()` have been replaced by direct calls to `Draw::Atof()` and `Draw::Atoi()`, instead of substituting by `#define`. ▪ `atof()`, `strtod()`, and `*scanf()` involving floating point conversions have been replaced by locale-independent `Atof()` and `Strtod()`. ▪ Calls to `sprintf()` involving floating point have been replaced by call to locale-independent `Sprintf()`, unless the converted strings are used immediately for display in the 3D viewer. ▪ Changes of global locale have been eliminated throughout the code. ▪ Class `OSD_Localizer` has been replaced with `Standard_CLocaleSentry`.

23237	*Summary:* `OSD_PerfMeter` reports wrong (zero) times The following modifications have been introduced in `OSD_PerfMeter` to provide correct work: ▪ Static functions of `OSD_Chronometer` class have been implemented in `OSD_PerfMeter` for time measurements to avoid incorrect results on CentOS caused by wrong value of `CLK_TCK`; ▪ `OSD_PerfMeter.h` has been fixed for building on Unix systems; ▪ Platform-specific `#defines` have been removed ▪ Duplicate package `DebugTools` has been removed.
23267	*Summary:* Using `memcpy` on class that contains a virtual method ▪ Obsolete internal class `_BaseElement` has been removed from `MMgt_StackManager.cxx`. ▪ Redundant warning has been removed from `_Element` class.
23284	*Summary:* Using `memcpy` on class that contains a virtual method `NCollection_BaseVector::MemBlock` has been converted to POD structure: `myAlloc` field, destructor and custom constructors have been removed.
23286	*Summary:* `Standard_Mutex` behavior depends on platform `Standard_Mutex` thread-based implementation has been corrected to create a recursive mutex object aiming to achieve the behavior similar to the WinAPI-based implementation
23310	*Summary:* No `IsEqual` function for Handles `IsEqual` function has been implemented for `Handle_Standard_Transient`. Workarounds caused by its absence have been removed from `TObj_Common` `AIS_NDataMapOfTransientIteratorOfListTransient` and `TopTools_MutexForShapeProvider`.
23329	*Summary:* Irrelevances in comments for methods and classes Comments for `Standard_Real::Epsilon` function have been corrected.
23415	*Summary:* OSD_FontMgr cannot identify aspect for fonts with names dependent on system locale. The following improvements have been introduced to improve font management: ▪ `XLib` connection is no more required to retrieve the list of fonts available locally. ▪ `FreeType` library used to identify the font file. ▪ Font aliases mechanism now supersedes the logic previously implemented in `OpenGl_FontMgr`. ▪ Several fixes have been introduced in fonts.dir parser ▪ Support for Mac OS X standard font paths has been added
23483	*Summary:* Use appropriate type for handling integer time New cdl-friendly `Standard_Time` alias to `time_t` type has been introduced.

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23498	*Summary:* Comparison always true in `Units_Lexicon::Creates()` Methods `Units_Lexicon::Creates()` and `Units_UnitsDictionary::Creates()` have been refactored.
23569	*Summary:* Add `NCollection_StdAllocator` New C++ standard compliant `NCollection_StdAllocator` wraps `NCollection_BaseAllocator` and its subclasses. The allocator can be used with standard containers (`std::vector`, `std::map`, `boost::unordered_set`, etc.) to take advantage, for instance, of `NCollection_IncAllocator`, which implements pool allocator, or central OCCT memory allocator interface `Standard::Allocate()`, `::Free()` via `NCollection_BaseAllocator`.
23592	*Summary:* Enabling TBB allocator by default for OCC built with -`HAVE_TBB` Default allocator for OCCT can now be chosen at build time through defining compiler macro OCCT_MMGT_OPT_DEFAULT, See documentation of MMGT_OPT environment variable for the list of possible values
23672	*Summary:* Eliminate obsolete functions in `OSD_WNT_1.cxx` `MsgBox()` and several other obsolete Windows-specific functions have been removed from `OSD_WNT`.
23684	*Summary:* `TCollection_HExtendedString::String()` returns a copy instead of const reference `TCollection_HExtendedString::String()` method now returns constant reference instead of object copy.
23818	*Summary:* Extend `OSD_MemInfo` to report C heap statistics The reporting of the C heap status (the current total amount of allocated memory) has been implemented in class `OSD_MemInfo` and DRAW command `meminfo` with option "`h`". This option is now used in automatic tests for memory leaks control instead of the obsolete option "`w`". A new counter `MemHeapUsage` has been added to `OSD_MemInfo` class to examine program heap size. `myCounters[MemHeapUsage]` is refilled whenever `OSD_MemInfo::Update()` function is called.
23852	*Summary:* `OSD_Path` interprets `unc` paths incorrectly Check for `unc` path on Windows has been added in `OSD_Path`.

Application Framework

23532	*Summary:* Mismatching allocation and deallocation '`delete`' has been replaced with '`delete []`' when an array is deallocated in `CDM_COutMessageDriver.cxx`.
23690	*Summary:* Miscellaneous minor enhancements in OCAF/XDE The following changes have been introduced in OCAF/XDE to improve the performance: ▪ Constructor in `TDF_Label` has become inline; ▪ `XCAFDoc_Color::GetColor()` returns `Quantity_Color`; ▪ Label returned by `XCAFDoc_ColorTool::GetColor()` has become static; ▪ `XCAFDoc_Location::Get()` returns `const&`.
23729	*Summary:* Statement has no effect for `BinMDataStd_NamedDataDriver` Method `BinMDataStd_NamedDataDriver::Paste() has been corrected to return Standard_False in case of wrong data`.
23799	*Summary:* Crash on copying a label Check on NULL has been added in `TDF_Tool.cxx` and `TDF_CopyLabel.cxx` to avoid crash if a topological naming attribute is located at the label and it refers to a deleted shape.
23819	*Summary:* Naming failures A regression with `DummyVertex` processing has been fixed in `TNaming_NamedShape.cxx`.

Modeling Data

23487	*Summary:* Remove obsolete `BRepTools::OuterShell()` function All calls to obsolete `BRepTools::OuterShell()` function have been replaced by calls to function `BRepClass3d::OuterShell()`.
23560	*Summary:* Redundant copying in the constructor Redundant copying of 'C' parameter has been removed from `Geom_OffsetCurve::Geom_OffsetCurve` constructor.
23601	*Summary:* Protected member fields of `BRepTools_ReShape` Member fields of `BRepTools_ReShape` have been made protected.

Modeling Algorithms

21762 22027 23366	*Summary:* Integration new Boolean Operation algorithm to OCC The BO algorithm previously implemented in packages `BOP`, `BooleanOperations` and `BOPTools` has been completely refactored to provide a more stable performance and set the basis for future improvements. The API has not been affected.
22323	*Summary:* `MakeThickSolid` raises Construction exception on cylinder Obsolete class `BRepTest_ShellCommands` has been removed from OCCT.
22927	*Summary:* DRAWEXE crashes during `offsetcomshape`. Check of intersection has been introduced in method `BRepOffset_Tool::ExtentFace` to avoid crash.
22981 23436	*Summary:* `BRepOffsetAPI_ThruSections` crashes when creating a surface from identical profiles New method `BRepOffsetAPI_ThruSections::PreciseUpar` pins the u-parameter of a surface close to U-knot to this U-knot. This method is used by method `BRepOffsetAPI_ThruSections::CreateSmoothed()` to avoid crash during surface creation.
23132 23141 23142 23143 23144 23290 23291 23293 23312	*Summary:* Suspicious operators The following cases of wrong or redundant use of operators and conditions have been fixed throughout the OCCT code: ▪ `If` conditions in methods `BRepFill_TrimEdgeTool::IntersectWith` and `IntPatch_ImpImpIntersection::IntCoCo`. ▪ `Else` operator in `GccAna_Circ2d2TanRad.cxx`. ▪ Duplicate condition in method `IntPatch_ImpPrmIntersection::ForcedPurgePoints`. ▪ Redundant condition in method `IntCurve_IntPolyPolyGen::Perform`. ▪ Duplicate conditions in `GccAna_Circ2d3Tan_8.cxx`. ▪ Suspicious `for` loop in Method `BiTgte_Blend::ComputeShape()`
23292	*Summary:* Variable 'k' is used for two different loops A loop variable has been renamed in `GccAna_Circ2d3Tan_2.cxx` to avoid confusion.
23309	*Summary:* 'then' statement is equivalent to 'else' statement A redundant statement has been removed from method `TopOpeBRep_EdgesFiller::SetShapeTransition`.
23375	*Summary:* `BRepBuilderAPI_Sewing` returns a wrong result The edges selection algorithm has been improved in `BRepBuilderAPI_Sewing.cxx`.

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23471	*Summary:* Intersection algorithm produces overlapping intersection curves New static function `IntPatch_PrmPrmIntersection::AddWLine` adds a newly created line into a sequence of lines and removes all curves that are inside the added line from that sequence. The filtering criterion is the same as in `IsPointOnLine` function. Previously a new line was simply added to the sequence.
23533 23534 23537	*Summary:* Uninitialized variables Variables are now properly initialized in classes `IntTools_TopolTool`, `ShapeAnalysis_TransferParameters` and `MaxUserColor`.
23558	*Summary:* Projection algorithm failed for trimmed surface The new algorithm of initial point search has been implemented in class `Extrema_GenExtPS`. The old algorithm creates a 2D grid of points on surface and computes square distances from the projection point to each point of this grid. If the square distance to a point lower (or greater) than the distances to all its neighbours, this point is used as the initial one. The new algorithm uses this grid to build a virtual mesh with the following elements: ▪ `Node(i, j)` is a grid point `(i, j)` ▪ `UIsoEdge(i, j)` is a segment: `Node(i, j) -> Node(i + 1, j)` ▪ `VIsoEdge(i, j)` is a segment: `Node(i, j) -> Node(i, j + 1)` ▪ `Face(i, j)` is an area: `Node(i, j) -> Node(i + 1, j) -> Node(i + 1, j + 1) -> Node(i, j + 1)` The projection point is projected on this virtual mesh. Each obtained projection on virtual mesh is used as initial point for minimum computation.
23558	The following methods have been updated: ▪ The code that performs precised initial point computation has been removed from method `Extrema_GenExtPS::FindSolution` as it is not required now because the computation of the initial point has been improved. ▪ Method `Extrema_GenExtPS::BuildGrid` computes grid and searches for the maximum. If a search for the minimum is required it computes virtual mesh and projection points on each mesh element. ▪ Method `Extrema_GenExtPS::Perform` searches for the minimum among the projections on the whole virtual mesh and uses the obtained points as initial ones for computation of the minimum.
23589	*Summary:* Performance improvement in curve-curve intersection The value of the last computed derivative is cached in the instance of `Extrema_FuncExtCC`, which allows reducing the number of computations.
23613	*Summary:* Diagnostic tool for BOP New static public function `BRepAlgoAPI::BoolDump()` has been implemented for saving the initial and the resulting shapes of a Boolean operation if the arguments of the resulting shape are not valid shapes in terms of `BRepAlgoAPI_Check`. This feature is activated by environment variable `CSF_DEBUG_BOP`, which should specify the path to generated scripts and save location for the shapes.

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23615	*Summary:* Wrong parameter value calculating in `ShapeAnalysis_Curve` Obsolete `ShapeAnalysis_Curve::CurveNewton()` method has been replaced with `Extrema_LocateExtPC` object. The code protecting against null-length b-splines has also been removed.
23627	*Summary:* `Standard_OutOfRange` in `TopOpeBRep_FacesIntersector` The number of iterations has been corrected in static function `TopOpeBRep_FacesIntersector::GetArc()`.
23648	*Summary:* New tool checking validity of shapes for Boolean operations A new tool provided by class `BRepAlgoAPI_Check` allows checking for topological validity, small edges and self-interference of a single shape or a couple of shapes. It is also possible to check if a couple of shapes are valid for a given Boolean operation.
23651	*Summary:* Exception on fillet construction between NURBS and surface of revolution The maximum number of segments has been increased in method `ChFi3d_Builder::CompleteData` to avoid exception.
23664	*Summary:* Eliminate linker warnings on import of local symbol `Standard_IMPORT` declarations applied to a symbol defined in the same toolkit have been removed or replaced by `EXPORT` to avoid warnings on import of locally defined symbols reported by MSVC linker.
23678	*Summary:* Compiler warning in `BRepFill_Pipe::ShareFaces()` Compiler warnings have been eliminated in method `BrepFill_Pipe::ShareFaces()`.
23686	*Summary:* Call to `Precision::Angular()` is pointless in the Release build Call to `Precision::Angular()` has been corrected in `TopOpeBRepDS_EXPORT.cxx`.
23749	*Summary:* Test case does not work with new Boolean Operation Algorithm. Tolerance parameter has been modified in methods `BOPInt_ShrunkRange::Perform` and `BOPAlgo_Builder::PostTreat` to provide correct test running.
23751	*Summary:* Test case does not work with new Boolean Operation Algorithm. The condition to perform the given Boolean operation only if map `myShapes` (containing tool parts that should be in the resulting shape) is NOT filled has been added in `BrepFeat_Builder`.
23774	*Summary:* Incorrect conversion from `gp_Trsf2d` to `gp_Trsf` A conversion error has been fixed in `gp_Trsf` constructor.

23777 23849	*Summary:* Classifier algorithm produces wrong results for a point and face. 2D tolerance value has been refined in method `BRepClass_Intersector::Perform` to avoid taking the classification point by boundary edge of the face.
23778	*Summary:* New Boolean Operation algorithm does not work with same arguments `BOPAlgo_BOP::CheckData()` has been adapted for two same arguments.
23779	*Summary:* New Boolean Operation algorithm produces incorrect result of CUT operation with the attached shapes Processing of the case when faces have shared bounds has been added in `BOPAlgo_Builder::FillSameDomainFaces()`.
23783	*Summary:* New Boolean Operation algorithm produces incorrect result of SECTION operation for the attached shapes. Building of a SECTION operation result in method `BOPAlgo_BOP::BuildSection()` now bases on Face/Face intersections to prevent building a result of such operation between the shapes that have no faces.
23785	*Summary:* Crash on make face from wire Changes have been introduced in class `BRepLib_FindSurface` to avoid problems with the temporary face (`theFace`) created by `BRepLib_MakeFace` algorithm.
23796	*Summary:* Command **bhaspc** was removed Command **bhaspc** has been restored in `BOPTest_LowCommands.cxx`.
23809	*Summary:* Compiler warnings in new BOP `Standard_Size` data types have been replaced by `Standard_Integer` in some classes to avoid warnings.
23824	*Summary:* Bad results of sweep operation when the path curve has an unpredictable torsion along its way New class `GeomFill_DiscreteTrihedron` allows building swept surfaces along path curves with sudden changes of high-order derivatives. The following changes have been introduced in connection with this new feature: • Option `-DT`, which sets the mode of Discrete Trihedron, has been added in `setsweep` command. • New methods `BRepOffsetAPI_MakePipeShell::SetDiscreteMode()` and `BRepFill_PipeShell::SetDiscrete()` set a Discrete trihedron to perform the sweeping • New output argument Delta has been added in methods `DoSingular()`, `SingularD0()`, `SingularD1()` and `SingularD2()` of `GeomFill_Frenet` class. Computation in singular points where all derivatives are null has been changed in these methods. • C1-approximation of a surface, which is not C1-continuous in V-direction has been added in method `GeomFill_Sweep::BuildAll()`.

23845	*Summary:* New method concatenating a wire into an edge based on C0-continuous *curve.* New auxiliary method `BRepAlgo::ConcatenateWireC0` concatenates a wire into an edge based on C0-continuous curve. This method is useful for building a face between two wires by through-section algorithm as the wire edges may be connected sharply.
23853	*Summary:* Improvements in `BOPTools_AlgoTools` The algorithm finding the angle between faces has been modified in class `BOPTools_AlgoTools`. New static functions have been added: ▪ `::GetFaceDir` - builds direction for the face; ▪ `::FindPointInFace` - finds the point in the face in bi-normal direction.
23870	*Summary:* New options of sweeping in `BRepOffsetAPI_MakePipe` algorithm. New sweeping modes `GeomFill_IsFrenet` and `GeomFill_IsDiscreteTrihedron` as well as the option `ForceApproxC1` are now available in `BRepOffsetAPI_MakePipe` algorithm. ▪ The mode `GeomFill_IsDiscreteTrihedron` allows building swept surfaces along path curves with sudden changes of high-order derivatives. ▪ The mode `GeomFill_IsFrenet` allows building a more regular pipe in some cases when the path curve has a big and nearly constant torsion (e.g. helix) and the profile is not a circle (i.e. the profile is not absolutely symmetrical). ▪ If `ForceApproxC1` option is `TRUE` and the surface resulting from sweeping is C0, the algorithm attempts to approximate it to a C1-continuous surface.
23876	*Summary:* New Boolean Operation algorithm does not work correctly with a cylinder made by revolution and torus. Processing of surfaces periodic in V parametric direction has been added in method `BOPTools_AlgoTools3D::DoSplitSEAMOnFace`.
23881	*Summary:* `BRepAlgoAPI_Section::HasAncestorFaceOn1` returned `FALSE` on the boundary ▪ Methods `BRepAlgo_Section::HasAncestorFaceOn1()` and `BRepAlgoAPI_Section::HasAncestorFaceOn1()` now return `TRUE` only if their first argument is the new edge built from intersection curve and not an existing common edge. ▪ Methods `::PCurveOn1()` and `::PCurveOn2()` have been removed from classes `BRepAlgo_Section` and `BRepAlgoAPI_Section`, as the Pcurve can be obtained from the ancestor face by methods of `BRep_Tool` class.
23891	*Summary:* Function `SameParameter` throws an exception. `Precision::PConfusion()` has been added in method `BRepLib::SameParameter` to avoid exception.

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Visualization

21357	*Summary:* Transform persistence bug Effect of `PrsMgr_PresentableObject::SetTransformPersistence()` method call has been changed. Now the object with active transform persistence flags is drawn with respect to the global coordinate system origin and then translated to the required anchor point with help of the second argument of `SetTransformPersistence()`. `Graphic3d_TMF_RelativeRotatePers` and `Graphic3d_TMF_RelativeZoomPers` transform persistence flags have been removed for consistency reasons.
22103 23661 23662 23663 23665 23735	*Summary:* Remove 2D viewer library Obsolete 2D viewer and plotter support have been removed from the OCCT libraries: Packages from `TKV2d toolkit` (`AIS2d`, `GGraphic2d`, `Graphic2d`, `Prs2d`, `Select2d`, `V2d`), 2D test cases (`QAViewer2dTest` and `Viewer2dTest`), as well as packages `CGM`, `MFT`, `PlotMgt`, `PS`, and `FontMFT` have been completely removed. Dependencies on them have been removed from `AIS`, `Aspect`, `PrsMgr`, `StdSelect`, `WNT`, `V3d`, `ViewerTest` and `Xw` packages. 2D viewer commands have also been removed from test cases.
22591 23118 23281 23544 23630 23632	*Summary:* Redesign of texture management in `TKOpenGl` Texture management in OpenGl has been redesigned with the following objectives: • Improve design issues (disconnect texture aspect from the graphics driver); • Optimize memory usage (eliminate extra resident and temporary texture copies in CPU memory); • Improve texture loading performance (eliminate extra copying, use hardware accelerated mipmap levels generation when available on hardware); • Upload NPOT (not-power-of-two) textures without scaling when this is supported by hardware; • Migration to `FreeImage` library services. The following modifications have been introduced: • The algorithms based on `AlienImage` API have been replaced with the ones based on `Image_Pixmap` in class `Graphic3d_TextureRoot` and method `OpenGl_View::CreateBackgroundTexture()`. • Structures `Graphic3d_Cview`, `Graphic3d_Cstructure` and `Graphic3d_Cgroup` have become classes and their definitions have been moved from `InterfaceGraphic` to `Graphic3d`. • New class `OpenGl_Texture` has been introduced instead of `OpenGl_ResourceTexture` class and static functions in `OpenGl_TextureBox`. • `Graphic3d_TextureRoot` returns image through `GetImage()` virtual method as `Image_Pixmap` instance. • The algorithm uploading NPOT (not-power-of-two) textures without scaling has been introduced in `OpenGl_Texture` class.

22832	*Summary:* Not documented limitation of `Graphic3d_StructureManager` Information about viewers count limitation has been added in CDL documentation.
22970	*Summary:* Incorrect array use in `Graphic3d_StructureManager.cxx` Bounds of loops and initialization error message have been corrected in method `Graphic3d_StructureManager::Limit`.
23120	*Summary:* Transform persistence is not restored Method `OpenGl_View::BeginTransformPersistence()` has been corrected to reset transform persistence parameters after drawing a presentation with enabled transform persistence. This ensures that other presentations are not affected by transform persistence logic.
23209	*Summary:* Potentially unmatched calls in some OCCT packages Display connection management has been corrected in `Draw_Window` class.
23243 23629 23682 23701 23841	*Summary:* Adapt OpenGL viewer for Cocoa applications on Mac OS X New class `Cocoa_Window` has been implemented for drawing windows on Mac OS with Cocoa framework. The following changes have been correspondingly introduced: ▪ OpenGL viewer has been adapted for use in Cocoa applications on Mac OS X ▪ The corresponding event manager in `TKViewTest` provides an event loop to use the new window class. ▪ Qt samples have been adapted for building on Mac OS X with Cocoa ▪ Support for Cocoa framework dependencies `CSF_objc`, `CSF_Appkit` and `CSF_IOKit` as well as `*.mm` extension for `C++/ObjectiveC` files is provided in `EXTERNLIB`. ▪ `Draw_Window` functions have been implemented within Cocoa framework.
23323	*Summary:* Duplicate if-clause in `Visual3d_View.cxx` The following improvements have been introduced in Visual3d_View class: ▪ Flags `MyMatOfOriIsModified`, `MyMatOfMapIsModified` and all modification flags from `ViewOrientationReset()` and SetViewOrientation() functions have been removed. ▪ `CustomIsModified` flag was replaced by `ScaleIsModified` flag in modification checking. ▪ Flag `'IsInitialized'` has been added to check if the orientation matrix is set.
23432	*Summary:* Connected Interactive Objects computed without Interactive Context Interactive context for reference(s) has been implemented in methods `AIS_ConnectedInteractive::Compute()` and `AIS_MultipleConnectedInteractive::Compute()`. Additionally, iteration bounds have been corrected in method `ViewerTest::GetColorFromName()`

23457 23747	*Summary:* Slow text rendering The following improvements have been introduced to accelerate text visualization: ▪ Text rendering now caches vertices arrays between draw calls. ▪ Usage of VBO has been introduced for text rendering. Additionally, the following changes have been made: ▪ `Font_FTFont` wrapper for FreeType face has been added. ▪ `Upper`, `Lower`, `First`, `Last`, `ChangeFirst` and `ChangeLast` methods have been added for `Ncollection_Array1`, `Ncollection_Sequence` and `Ncollection_Vector` collections to provide common interface. ▪ Method `Ncollection_DataMap::Find()` with check key is bound + retrieve value within single call interface. ▪ Method `OpenGl_Context::ReleaseResource()` now supports lazy release of shared resources. ▪ Class `OpenGl_Font` has been added to implement support of textured fonts. ▪ Class `OpenGl_TextFormatter` has been added for text formatting using `OpenGl_Font`. ▪ `OpenGl_Text` has been redesigned to use `OpenGl_FontFormatter`. ▪ `OpenGl_FontMgr` class has been removed. ▪ All methods related to text rendering have been removed from `OpenGl_Display` class. ▪ Classes `OpenGl_Trihedron` and `OpenGl_GraduatedTrihedron` have been redesigned to use `OpenGl_Text`. ▪ `OpenGl_PrinterContext` instance has been moved to `OpenGl_GraphicDriver` fields (usage of global instance eliminated). ▪ Draw command `vtextureenv` has been added to enable or disable texture mapping.
23525	*Summary*: Disappearing of highlight in screenshot The following changes have been introduced to improve highlighting: ▪ Display list creation in immediate mode has been removed from `OpenGl_Workspace`. ▪ Unused methods to draw primitives in immediate mode have been removed `Visual3d_TransientManager` and `Graphic3d_GraphicDriver`. ▪ Method `OpenGl_Workspace::RedrawImmediatMode` has been implemented to render immediate mode directly to FBO when assigned. ▪ Method `V3d_View::ToPixMap` has been implemented to temporarily switch immediate mode to draw into back buffer. ▪ New Draw command `vimmediatefront` has been added to switch rendering mode in immediate mode.
23529	*Summary:* Uninitialized variable A variable has been correctly initialized in method `AIS_DiameterDimension::ComputeOneFaceDiameter`.
23538	*Summary:* Memory leak: `cdata` A potential cause of memory leak has been fixed in `Xw_open_image.cxx`.

23634	*Summary:* Eliminate `Polyline` and `Polygon` usage in drawers Visualization algorithms using polyline and polygon primitives (`Graphic3d_GraphicDriver::Polyline` and `Graphic3d_GraphicDriver::Polygon`) have been replaced with algorithms using primitive arrays defined in `Graphic3d_Group::PrimitiveArray()`. The code clean-up concerned a number of classes in `AIS`, `DsgPrs`, `Graphic3d`, `StdSelect`, `StdPrs`, `Prs3d`, `V3d`, `Visual3d` and other packages.
23652	*Summary:* Non zoomable text with alignment slides away when zooming view Method `OpenGl_Display::RenderText` has been modified so that the translation could take into account the results of zooming transformation as it is done now after the scaling.
23673	*Summary:* Static method `Image_PixMap::SizePixelBytes` is not exported Static method `Standard_Size SizePixelBytes` has been exported under Windows to prevent link error in the user code.
23712	*Summary:* Remove dependency on `Aspect_GraphicDevice` from `Aspect_Window` Dependency on the `Aspect_GraphicDevice` has been eliminated from `Aspect_Window` and its derived classes `WNT_Window`, `Xw_Window` and `Cocoa_Window`. `Aspect_GraphicDevice` and derived classes `WNT_GraphicDevice`, `Xw_GraphicDevice`, `Graphic3D_WNTGraphicDevice` and `Graphic3d_GraphicDevice` have been removed. New class `Aspect_DisplayConnection` provides connection with X11 lib. On Windows and Mac OS X (when Cocoa used) this class does nothing. New method `Graphic3D::InitGraphicDriver()` initializes `Graphic3d_GraphicDriver`. `Graphic3d_GraphicDriver` now stores `DisplayConnection` as a class field and can return it with method `GetDisplayConnection()`. `Graphic3d_StructureManager` and `Viewer_Viewer` now store and provide `Graphic3d_GraphicDriver` instead of removed `GraphicDevice`. Methods that used `GraphicDevice` as a parameter now take `Graphic3d_GraphicDriver` instead. Obsolete classes have been removed from `WNT` and `Xw` packages.
23720	*Summary:* Call of `malloc.h` include in `Image_PixMap.cxx` Call of `malloc.h` include has been added in `Image_PixMap.cxx`.
23725	*Summary:* C++11 compatibility issues in `Image_Color.hxx` Definition `ComponentType_t` has been added in `Image_Color.hxx`.

23727	*Summary:* Variable 'A' set but not used Unused variable has been removed from `Graphic3d_ArrayOfPrimitives::VertexColor`.
23728	*Summary:* Remove unused variables `Tolu` and `Tolv` from `Select3D` Unused variables `Tolu` and `Tolv` have been removed from several classes of Select3D package.
23743	*Summary:* `AIS_Triangulation` crashes if `Poly_Triangulation` has no normals Method `AIS_Triangulation::Compute()` has been improved, so that now it works much faster and does not fail in case of absent normals in `Poly_Triangulation`.
23761	*Summary:* Remove FTGL defines from `OpenGl_CMPLRS.edl` FTGL defines have been removed from `OpenGl_CMPLRS.edl`.
23791	*Summary:* Remove animation mode and degeneration presentation mode Animation mode and degeneration presentation mode (simplified presentation to speed up animation) that have become outdated and useless since migration to VBO rendering have been removed. The corresponding methods `SetAnimationModeOn`, `SetAnimationModeOff`, `AnimationModeIsOn`, `AnimationMode`, `Tumble`, `SetDegenerateModeOn`, `SetDegenerateModeOff` and `DegenerateModeIsOn` have been removed from classes `V3d_View` and `Visual3d_View`.
23842	*Summary:* Variable `thePsFont` is used as parameter and destination in `sprintf()` A variable has been corrected in `OpenGl_Text.cxx`.
23844	*Summary:* A Boolean value is compared to 0. The type of value has been corrected in `AIS_InteractiveObject.lxx`.
23872	*Summary:* Remove outdated classes `OpenGl_Polygon` and `OpenGl_Polyline` Classes `OpenGl_Polygon` and `OpenGl_Polyline`, which provided backward compatibility during `TKOpenGl` redesign (from C to C++), are now superseded by `OpenGl_PrimitiveArray` and thus have been removed.
23883	*Summary:* Bound color in the primitive array does not work when displayed using VBO Method `OpenGl_PrimitiveArray::DrawArray` has been modified to provide correct display.
23885	*Summary:* Inclusion of X11 header should be protected with macro OCCT can be built on Mac OS X without X11 support, but is still includes X11 headers, which for this case have been protected with macro `MACOSX_USE_GLX`.

Data Exchange

22570 23596	*Summary*: Extend XCAFPrs_AISObject to enable customization of a default color New virtual method XCAFPrs_AISObject::DefaultStyle() can be redefined in subclasses to provide a custom default style. The default style object has not been made a data member of a base class XCAFPrs_AISObject to avoid memory consumption, it is returned via an output parameter. Compute() method has become protected to enable sub-classing.
22715 23018	*Summary:* Incorrect faces of a filleted cube after import from IGES file Parameterization of Tabulated Cylinders (type 122) has been changed in accordance with IGES standard.
22820	*Summary:* OCCT IGES writer loses plane information New parameter write.iges.plane.mode allows choosing if the planes should be saved as Bsplines or Planes (type 108). Writing p-curves on planes is disabled.
23203	*Summary:* STEP import produces wrong surface of revolution on ellipse Method StepToGeom_MakeSurfaceOfRevolution::Convert now checks if the axis of revolution passes through the ellipse location and lies in its plane when a surface of revolution is created.
23376	*Summary:* Exception during reading STEP file in Test Harness Checking for null name and null id has been added in STEPCAFControl_Reader::ReadNames function.
23379	*Summary:* Exporting single point into STEP produces a compound with two points Duplication of vertex compound has been corrected in STEPControl_GeometricCurveSet.
23556	*Summary:* Identical sub-expressions to the left and to the right of the '||' operator Conditions have been corrected in IGESGraph_TextFontDef.cxx
23590	*Summary:* IGESCAFControl_Writer extended to accept TDF_LabelSequence New method IGESCAFControl_Writer::Transfer() has been implemented to accept TDF_LabelSequence. Methods WriteAttributes(), WriteLayers() and WriteNames() now accept TDF_LabelSequences instead of TdocStd_Document. This improvement makes IGESCAFControl_Writer more consistent with STEPCAFControl_Writer and allows partial export of the XDE document (e.g. only root shapes belonging to one layer).

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23591	*Summary*: IGES Boundary Entity containing Composite Curve fails to translate. `ShapeFix_Wire::FixConnected()` is called to process wires produced from curves composed of two or more segments to provide correct translation.
23593	*Summary:* `XCAFDoc_DocumentTool` label must be removed from internal map upon closing the XDE document A global map `RootLDocLMap` is now stored as a simple tree node attribute hosted on a root label and pointing to a label holding `XCAFDoc_DocumentTool`.
23594	*Summary:* `XCAFDoc_LayerTool` work with a layer defined by its label, not a string New methods `IsSet()`, `UnSetOneLayer()` and `GetLayers()` from class `XCAFDoc_LayerTool` provide better performance as they avoid searching for the layer label using its string. They accept `TDF_Label` or `TDF_LabelSequence` in addition to `Tcollection_ExtendedString` or `TcolStd_HsequenceOfExtendedString`.
23595	*Summary:* `XCAFDoc_ShapeTool` extended with `SetAutoNaming()` and `AutoNaming()` Auto-naming is used to auto-generate names for shapes and subshapes. Previously it was controlled by a macro `#define AUTONAMING` defined in `XCAFDoc_ShapeTool.cxx`. Thus, the XDE document was contaminated with names not present in the original imported files. New method `XCAFDoc_ShapeTool::SetAutoNaming()` has been added to set auto-naming mode as a run-time parameter. This parameter is on by default, preserving previous behavior.
23597	*Summary:* Failed to export ellipse into STEP with units other than mm Methods `UnitsMethods::DegreeToRadian` and `UnitsMethods::RadianToDegree` have been corrected to avoid problems with data export.
23622	*Summary:* IGES import produces invalid shape with parameter `read.iges.bspline.continuity=0` Method `IGESToBRep_BasicSurface::TransferBSplineSurface` has been modified to avoid problems at import.
23687	*Summary:* Two opposite conditions. The second condition is always false. An if-condition that was always false has been removed from `IFSelect_ShareOut.cxx`.
23722	*Summary:* Stack overflow during reading IGES in Test Harness Stack overflow if a wire has same edges with different entities has been fixed in method `ShapeFix_IntersectionTool::FixSelfIntersectWire` by creation of a new vertex before replace.
23794	*Summary:* Too small precision leads to instability Precision value has been reduced in `ShapeConstruct_ProjectCurveOnSurface::PerformAdvanced`.

23822	*Summary:* SIGSEGV 'segmentation violation' during writing IGES Check for infinite coordinates has been added in `IGESControl_Writer::AddShape`.
23895	*Summary:* XCAF document does not store names for subfigures from IGES files Names for subfigures have been fixed in `IGESCAFControl_Reader.cxx`.

Draw

22327 23775	*Summary:* Compatibility with Tcl/Tk 8.6 `Draw_Window` class has been modified to provide compatibility with Tcl/Tk 8.6.
22522	*Summary:* Small bug in `DRAWEXE` – `vtrihedron` command Condition has been added in `ViewerTest_ObjectCommands.cxx` to check if the shape name is already bound.
23062	*Summary:* Incorrect edge display in Draw axonometric viewer First and last parameters of intervals are now more precisely defined in the algorithm in `GeomAdaptor_Curve::Intervals` method.
23087 23210 23426 23434 23438 23586 23628 23668 23793 23879	*Summary:* Upgrade of the OCCT test system The tools and test scripts used for OCCT non-regression testing have been refactored and integrated to OCCT sources. Now they are available directly within DRAW Test Harness. See the OCCT Automated testing system User's Guide for details.
23130	*Summary:* Command `maxtol` doesn't work on Windows Command `maxtol` has been modified to return correct values of variables `nbFaces`, `nbEdges` and `nbVtx`.
23241	*Summary:* `DRAWEXE` crashes on start-up on Mac OS X `Draw_WindowDisplay` now uses `XopenDisplay(NULL)` instead of `Tk_Display(mainWindow)` to avoid crash at Draw start on Mac OS X.
23523 23554	*Summary:* In session DRAW it is impossible to close document having name already once closed document. New method `TdocStd_Document::Destroy` performs document destruction in logical order to avoid exception when `Undo` and `Redo` fields are destructed after `TDF_Data` field. The name of a closed document is now removed from `tcl` variables in DRAW to avoid exception if the same name is used for a new document.

23526 23536 23539 23721	*Summary:* QASelect and QAShiftSelect commands Commands QASelect and QAShiftSelect have been replaced with command vselect x y [shift_selection=(1/0)]. This command can also be used for rectangle selection instead of QASelectRectangle and QAShiftSelectRectangle with syntax vselect x1 y1 x2 y2 [shift_selection=(1/0)] or for polygon selection with syntax vselect x1 y1 x2 y2 … xn yn [shift_selection=(1/0)]. Additional Select method for polygon selection has been added in ViewerTest_ViewerManager. Command vzclipping has been extended and is now able to get Zclipping mode, width and depth. The following obsolete commands have also been replaced with the commands already existing or added in ViewerTest_ViewerCommands: ▪ Qawzoom and QASetZoomV3dView with vzoom. This command now allows setting zoom coordinates as command parameters. ▪ QAMoveTo with vmoveto x y; ▪ QASetChoiceMode, VcloseLocalContext(), VindexOfCurrentLocal(), and VcloseAllContexts() with vselmode mode [object] mode_number 0|1, where mode_number is a non-negative integer having a different meaning for different interactive object classes; ▪ Qaxwd_3d with vdump; ▪ QASetAntialiasing with vantialiasing; ▪ Qavzfit with vzfit; ▪ QASetViewCharac and QAGetViewCharac with vviewparams; ▪ QAAddOrRemoveSelected with vchangeselected; ▪ QAGetZClippingMode and QASetZClippingMode with vzclipping; ▪ QANbSelected with vnbselected; ▪ QAPurgeDisplay with vpurgedisplay; ▪ QACloseLocalContext with vcloselocalcontext; ▪ QACloseAllContexts with vcloseallcontexts; ▪ QAIndexOfCurrentLocal with vcurrentlocal; ▪ QARotateV3dView with vrotate; ▪ QAMoveV3dView with vmoveview; ▪ QATranslateV3dView with vtranslateview; ▪ QATurnV3dView with vturnview; ▪ QAPanningV3dView with vpan; ▪ QASetSizeV3dView with vsetviewsize. Commands Qaxwd, QAUpdateLights, QAGetCoordinatesWzoom and QADisplayedObjects have been completely removed from QADraw.
23557	*Summary:* Expression 'as1.ToCString() != ""' is always true Check of empty string has been corrected in QABugs_3.cxx.
23562	*Summary:* Command nbshapes works incorrectly with the attached shapes Option '-t' has been added to command nbshapes. This option allows seeing the number of sub-shapes counting the same sub-shapes with different location as different sub-shapes.

23694	*Summary:* Uninitialized Variable `pBuff` pBuff variable is now correctly initialized in `OSD_Environment.cxx`.
23709	*Summary:* Redesign of `HLRTest` command `ViewerTest` command `HLRTest`, which applies hidden lines removal algorithm, based on obsolete `V2D` class has been replaced by command `VHLR` adapted to 3D viewer classes (`AIS_Shape`, `AIS_Drawer` and `Prs3d_Drawer`). New `VHLRType` command allows changing the used type of HLR algorithm from polygonal (default) to exact.
23730	*Summary:* Statement has no effect in `DNaming_RevolutionDriver.cxx` Pointless statement has been removed from `Dnaming_RevolutionDriver.cxx`.
23792	*Summary:* 3D viewer window content is blended with Linux desktop `Xw_def_colormap` has been modified to prefer 24-bit visualization to 32-bit one, which avoids problems on some Linux configurations.

Mesh

22818 23282	*Summary:* Wrong triangulation of Revolution surface with slice angle <= 180 degrees The standard OCCT triangulation algorithm has been fixed to correctly take into account the angular diameter of a conical sector, which is less than 180 degrees during the triangulation of its face.
23184	*Summary*: Bad face tessellation result Method `BRepMesh_FastDiscret::Add` has been improved to take into account edges based on C0 curves with knuckles.

Shape Healing

23195	*Summary:* Method is not implemented The absent method `ShapeFix_Face::FixPeriodicDegeneratedMode()` has been implemented.
23257	*Summary:* Missing `return` statement Missing `return` statement has been added in class `ShapeFix_Face::IsPeriodicConicalLoop`.

WOK

22612	*Summary:* Strange warnings on compilation with recent Platform SDKs Flag showIncludes for cl.exe is now used to generate dependencies file instead of acpp.exe to avoid pointless warnings on Windows.
23395	*Summary:* Generate project files for Xcode WOK is now able to generate Xcode 4 project files. Note that the Xcode 3 is not fully supported. The generated project files for toolkits are fully compatible with Xcode 3 and Xcode 4 versions, but workspace files for modules and OCCT are supported only by Xcode 4.
23481	*Summary:* WOK cannot be launched if variable "LIB" or "INCLUDE" is not set Definition of variables "LIB" and "INCLUDE" has been corrected in file wok_tclshrc.tcl.
23485 23574 23715 23723	*Summary:* Enable WOK to generate cmake metafiles of OCCT It has become possible to generate cmake metafiles of OCCT using WOK. Cmake lists are required to create project files for Makefile, Visual Studio and Xcode. Command wgenproj with argument –target=cmake generates cmake meta-projects: a single meta-project CmakeListx.txt for the entire OCCT and one meta-project for each toolkit in a separate folder. The created files are located in <occt home>/adm/cmake folder. Additionally, command wgenproj with argument –h outputs synopsis and some help on available options. Command wgenproj with argument –no_wprocess generates project files only (without execution of wprocess method). Links to obsolete libraries and unused variable SYSTEM have been removed from WOK procedures.
23505	*Summary*: Remove unused function Unused function OS:MKMAK, which allowed generating .mak files, has been removed.
23545	*Summary*: Variable env.bat:CASROOT is not correctly calculated Method relativePath has been refactored in wok_tclshrc.tcl.
23571	*Summary*: Source file paths from CodeBlocks project generated in WOK are incorrect for Windows Prefix lib has been removed from the toolkit library name for the version on Windows.
23702	*Summary:* Option for building OCCT with X11 on Mac OS X The switcher to WOKConfig has been added on Mac OS X. Generated custom.sh contains option MACOSX_USE_GLX GLX, which indicates whether OCCT should use X11 or Cocoa.

23724	*Summary:* Add option –MP to generated VS project files New option –MP enables multiple cl.exe processes to be used within a single project to improve the compilation time. This may conflict with other options, such as incremental rebuild and show includes. It is less efficient (in terms of Build time/CPU time) than parallel builds (enabled by default), but it allows to take advantage of multiple cores for a single project.

23740	*Summary*: WOK doesn't generate make files correctly
	
	The following modifications have been introduced to provide correct generation of make files:
	   ▪ env.sh has been refactored.
	   ▪ -fexceptions have been moved in CSF_C_Option of CSF_MAC.edl.

23750 23758 23761 23798	*Summary*: Support of FTGL product in WOK The obsolete FTGL product is not used in the latest OCCT version; however, WOK still supports the compilation of older OCCT versions that use it.
23764	*Summary*: WOK crashes using automake Procedure osutils.tcl has been modified to provide correct OCCT building using automake files that were generated by WOK.
23769	*Summary*: Eliminate the dependence on X11 libraries in Mac OS X Unused package ImageUtility has been removed from OCCT. Package Xw has been excluded from build process on Mac OS X, when Cocoa used.
23781	*Summary*: WOK does not generate VC project files correctly Postfix .lib has been added to each toolkit name in additional dependencies.
23784	*Summary*: Fix project files generation for Code::Blocks File osutils.tcl has been modified to provide correct parsing of option –framework * during project files generation on Mac OS X
23786	*Summary*: Empty CASROOT environment variable in generated env.sh The template for env.sh has been corrected to correspond to env.bat logic.
23801	*Summary*: Search for 3rd-party libraries with release name for any build type (debug or release) cmake configuration process has been modified to search for 3rd-party libraries with their release names and starting from the specified locations, no matter what build type has been chosen.
23810	*Summary*: Cyclic dependency between several OCCT units Package Viewer has been removed. Methods and classes from Viewer_View and Viewer_Viewer have been moved to V3d_View and V3d_Viewer accordingly.

23834	*Summary*: env.bat generation does not replace __CASROOT__ variable by path to OCCT

MS Visual Studio project files are now properly generated on Linux system. |
| 23848 | *Summary*: CMake configuration process does not search for FreeType includes correctly in some cases

CMake configuration process has been corrected :
- ft2build.h located in freetype-2.4.10/include has been added in the query;
- Additional path freetype-2.4.10/include/freetype2 is created to connect ft2build.h with freetype2 folder. |
| 23851 | *Summary*: CMake meta-projects generated by WOK should use relative path to OCCT

Absolute paths to OCCT have been replaced by relative in CMake meta-projects assuming that CMake folder location is <OCCT dir>/adm/cmake. |
| 23858 | *Summary:* Remove obsolete AM_C_PROTOTYPES macro

AM_C_PROTOTYPES macro, which was used on Linux in the configure.ac template to deANSIfy C source files, has been removed as deANSIfication is not supported by Automake since version 1.12. |
| 23859 | *Summary:* Generated env.sh script contains an absolute path to CASROOT folder

The script env.sh has been made usable both by Code::Blocks and Xcode. |
| 23887 | *Summary:* wgenproj -target=amk command generates incorrect dependencies in *.am files for OCCT products

Generation of toolkit dependencies has been improved to properly handle the hierarchy of WOK workbenches (OCCT -> VAS -> Product). |

Development Environment

23563	*Summary:* Support of MS Visual Studio 2012

OCCT now supports compilation using MS Visual Studio 2012. Samples of OCCT and Products repositories have also been ported to this version. |
| 23564 | *Summary:* Support of MS Windows 8

OCCT now supports compilation on Windows 8. No specific behavior compared to other Windows versions has been found in the build. |
| 23572 | *Summary:* Wrong line endings in *.yacc files on Linux

The problem with wrong line endings in *.yacc and *.lex files has been solved by adding *.yacc eol=lf and *.lex eol=lf to .gitattributes. |

23742	*Summary:* Fix `msvc` script for Visual Studio 2012 The scripts have been updated with the new name of executable for Visual Studio 2012 Express for Windows Desktop (`WDExpress.exe` instead of `VCExpress.exe`).
23787	*Summary:* Eliminate trivial type conversion warnings in MSVC The following changes have been introduced to eliminate compiler warnings reported by MSVC++ 9.0: ▪ Explicit type cast has been added in conversions from double to float in `PrsMgr`, `Select3D`, `StdPrs`, `Visual3d` and `Voxel` classes. ▪ In method `Visual3d_ViewManager::ConvertCoord...()`, output is initialized by zeros instead of `RealLast()` in case of failure. ▪ In `XmlMXCAFDoc`, material density is correctly converted to string when writing to `Xml`.
23789	*Summary:* Missing EOL in header files End-of-Line symbol has been restored in `TopTools_MutexForShapeProvider.hxx` and `Font_NlistOfSystemFont.hxx` to avoid problems with compilation using –`Werror` option in SALOME.

Build

23636	*Summary:* Problems initializing `errorStream` `OSD_Error.cxx` has been protected against `NULL errorStream`.
23541	*Summary:* On Linux OCC links to release mode TBB leading to unspecified behavior `configure.ac` has been modified to properly link to debug mode TBB.
23608	*Summary:* Configure scripts report about failed `multibuf.h` Copying of files without extensions placed in templates folder has been implemented. Corresponding -`fexceptions` options have been added in `make`.

Samples

21985	*Summary:* Vista/Windows 7 compatibility issues The following improvements have been introduced to resolve Vista/Windows 7 compatibility issues: ▪ `WNT_Window::Dump` calls have been replaced with `V3dView::Dump` calls. ▪ Type casts have been removed. ▪ Supported image formats have been added in file filters of Export methods. ▪ The filter of supported image formats for 2D Sample has been extended.
23599	*Summary:* Some MFC samples crash during launch Compiler warnings in MFC samples have been fixed. `.gitignore` has been modified to ignore files generated by VS 2012.

23776	*Summary:* Redesign of MFC samples after **V2d** viewer removal **V3d** viewer has been implemented for 2D visualization in MFC samples instead of **V2d** viewer functionality.
23821	*Summary:* Improve **qmake** project files for Qt samples The following improvements have been introduced in Qt samples (IESample and Tutorial) for compliance with VS 2010/2012 and MAC OS X: ▪ Project file extensions have been corrected; ▪ Sources and resource files from Common and Interface sub-folders have been added to qmake project files; ▪ **RES_DIR** environment variable has been redirected to the binary directory, all resource files copied there to keep the source tree intact; ▪ **mkdir** and **cp** command options from makefile generation procedure have been corrected.
23829	*Summary:* Remove **Graphic3dDemo** sample as obsolete Obsolete **Graphic3dDemo** sample application has been removed.
23831	*Summary:* Ghosts appears in 2D viewer of HLR MFC sample The algorithm updating 2D view has been corrected in HLR MFC sample.
23861	*Summary:* Draw cannot start if OCCT is installed in a path containing spaces Executable **.bat** files of Draw samples have been modified to provide correct work.
23877	*Summary:* Errors in MFC HLR sample Obsolete degenerated mode has been replaced by HLR mode in the corresponding MFC sample.

Installation

23816	*Summary:* Remove unnecessary menu level In OCCT installation for Windows, program menu sub-folder "Test Harness" has been removed as it contained only one link to "Draw Test Harness", which has been promoted to the upper menu level.

Documentation

21949	*Summary:* Improvements in reference documentation Graphical representation of dependencies between modules and toolkits has been provided in reference documentation. New WOK command **wgendoc** has been added to generate documentation using Doxygen and Graphviz. Use option **–h** to get help on the options supported by the command.

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Products

DXF Import

23583	*Summary:* Parameter `read.dxf.insunits.scale` should be ON by default Parameter `INSUNITS` has become active by default (`read.dxf.insunits.scale=1`) to obtain correct dimensions of the shape.

ACIS Import

23714	*Summary:* SAT Import / Export interface improvement. The following changes have been made in SAT Import / Export interface to improve the performance: ▪ Static parameter "`read.sat.parallel.mode`" (On/Off) has been introduced to control parallel mode of reading SAT data; ▪ Class `AcisEnt_DataConv` has become the root class for `AcisEnt_Reader` and `AcisEnt_Writer`. Class `AcisEnt_Reader` is passed as a parameter to `SetData` method of all ACIS objects, class `AcisEnt_Writer` is passed as a parameter to `GetData` method of all ACIS objects. ▪ Packages `AcisAttr`, `AcisGeom`, `AcisLaw`, `AcisLawGeom`, `AcisTop` have been converted to no-CDL packages, with consequent removal of all CDL files and creation of new header files. ▪ Methods `SetData` and `GetData` are introduced for the class `AcisEnt_SaveFileInfo`. ▪ Parallel reading has been implemented in method `AcisData_AcisModel::SetData`.
23835	*Summary:* WOK fails to build `TKACIS` with TBB 3.0 on Mac OS X Handles have been replaced by pointers in `AcisData_AcisModel` class to allow building on Mac.
23867	*Summary:* Reading performance improvement Reading performance improvement has been introduced in method `TCollection_AsciiString::Search`.

Express Mesh

22812	*Summary:* Bad performance meshing a face based on extrusion of huge b-spline curve Some transformations are now avoided in `CPnts_AbscissaPoint.cxx` for performance reasons.
23759	*Summary:* Express Mesh takes forever to mesh The following changes have been made in `QMShape_Tesselator` class: ▪ If the tolerance of an edge exceeds the initial deflection, the edge is now discretized with deflection equal to the tolerance. ▪ The method `SetCompStatus()` has been added to track processing errors.

Advanced Samples

23502	*Summary:* XDE sample improvements The following changes have been made in XDE sample: ▪ XDE sample is now built with Unicode support by default, which provided correct work on workstations with localized Windows; ▪ `NCollection` maps have been implemented; ▪ 3d and tree views are now synchronized; ▪ Command line arguments, Drag and Drop and progress indication features are now supported.
23763	*Summary:* Samples update for patch 23712 Advanced samples have been updated to take into account that `Aspect_Window` and derived classes have become independent from `Aspect_GraphicDevice` and other corresponding changes.

Surfaces from scattered points

23531	*Summary:* The colored presentation of a surface displays black triangle boundaries The display of triangle boundaries has been disabled in the sample.

New features

Automatic check of BOP arguments and result

A new tool provided by class $BRepAlgoAPI\_Check$ allows checking for topological validity, small edges and self-interference of a single shape or a couple of shapes. It is also possible to check if a couple of shapes are valid for a given Boolean operation.

It has also become possible to save the initial and the resulting shapes of a Boolean operation if the arguments or the resulting shape are not valid shapes in terms of $BRepAlgoAPI\_Check$ using the new public function $BRepAlgoAPI::BoolDump()$.
This feature is activated by environment variable CSF_DEBUG_BOP, which should specify the path to generated scripts and save location for the shapes.

Use of OCCT on Mac OS X with Cocoa

Version 6.6.0 is the first OCCT release, which officially supports Mac OS X platform.
OCCT now uses Cocoa framework to manage 3D viewer on Mac OS X. See "Porting from previous versions of OCCT" section for using OCCT on Mac OS X with XLib.
OCCT is now shipped with XCode 4 project files. $Code::Blocks$ project files and CMake (allows to generate XCode 3 project files), which can be generated by WOK extractor for Mac OS X as well.

Building of OCCT with CMake

It has become possible to build OCCT using CMake. CMake is free software that can create GNU Makefiles, KDevelop, XCode and Visual Studio project files.
The User's Guide about Building OCCT with CMake has been added to the overview documentation.

New automated testing system

The refactored automated testing system is now integrated with OCCT sources and available for regular use by developers. See the corresponding User's Guide in OCCT documentation for details.

Porting to version 6.6.0

Porting of user applications from the previous 6.5.5 OCCT version to version 6.6.0 requires the following issues to be taken into account:

- Due to the changes in the implementation of Boolean Operations, the order of sub-shapes resulting from the same operation performed with OCCT 6.5.x and OCCT 6.6.0 can be different.
  It is necessary to introduce the corresponding changes in the applications for which the order of sub-shapes resulting from a Boolean operation is important. It is strongly recommended to use identification methods not relying on the order of subshapes (e.g. `OCAF naming`).

- If you need to use OCCT on Mac OS X with X11 (without Cocoa), build OCCT with defined pre-processor macro `CSF_MAC_USE_GLX11`.
  `XLib` front-end (previously the only way for unofficial OCCT builds on Mac OS X) is now disabled by default on this platform.
  If your application has no support for Cocoa framework you may build OCCT with `XLib` front-end adding `MACOSX_USE_GLX` macro to compiler options (you may check the appropriate option in WOK configuration GUI and in CMake configuration).
  Notice that XQuartz (XLib implementation for Mac OS X) now is an optional component and does not provide a sufficient level of integrity with native (Cocoa-based) applications in the system.
  It is not possible to build OCCT with both XLib and Cocoa at-once due to symbols conflict in `OpenGL` functions.

- Animation mode and degeneration presentation mode (simplified presentation for animation) and associated methods have been removed from 3D viewer functionality.
  Corre4spondingly, the code using methods `SetAnimationModeOn()`, `SetAnimationModeOff()`, `AnimationModeIsOn()`, `AnimationMode()`, `Tumble()`, `SetDegenerateModeOn()`, `SetDegenerateModeOff()` and `DegenerateModeIsOn()` of classes `V3d_View` and `Visual3d_View` will need to be removed or redesigned.

  Please, notice that Hidden Line Removal presentation was not affected; however, the old code that used methods `V3d_View::SetDegenerateModeOn` or `V3d_View::SetDegenerateModeOff` to control HLR presentation should be updated to use `V3d_View::SetComputedMode` method instead.

- Calls of `Graphic3d_Group::BeginPrimitives()` and `Graphic3d_Group::EndPrimitives()` should be removed from application code.

- Application functionality for drawing 2D graphics that was formerly based on `TKV2d` API should be migrated to `TKV3d` API. The following changes are recommended for this migration:
  - A 2D view can be implemented as a `V3d_View` instance belonging to `V3d_Viewer` managed by `AIS_InteractiveContext` instance. To turn `V3d_View` into a 2D view, the necessary view orientation should be set up at the view initialization stage using `V3d_View::SetProj()` method, and view rotation methods simply should not be called.
  - Any 2D graphic entity (formerly represented with `AIS2D_InteractiveObject`) should become a class derived from `AIS_InteractiveObject` base. These entities should be manipulated in a view using `AIS_InteractiveContext` class API.
  - All drawing code should be put into `Compute()` virtual method of a custom interactive object class and use API of `Graphic3d` package. In particular, all geometry should be drawn using class hierarchy derived from `Graphic3d_ArrayOfPrimitives`. Normally, the Z coordinate for 2D geometry should be constant, unless the application implements some advanced 2D drawing techniques like e.g. multiple "Z layers" of drawings.
  - Interactive selection of 2D presentations should be set up inside `ComputeSelection()` virtual method of a custom interactive object class, using standard sensitive entities from

`Select3D` package and standard or custom entity owners derived from `SelectMgr_EntityOwner` base.

Please refer to the Visualization User's Guide for further details concerning OCCT 3D visualization and selection classes. See also `Viewer2D` OCCT sample application, which shows how 2D drawing can be implemented using TKV3d API.

- Run-time graphic driver library loading mechanism based on **CSF_GraphicShr** environment variable usage has been replaced by explicit linking against **TKOpenGl** library. The code sample below shows how the graphic driver should be created and initialized in the application code:

```
// initialize a new viewer with OpenGl graphic driver
Handle(Graphic3d_GraphicDriver) aGraphicDriver =
new OpenGl_GraphicDriver ("TKOpenGl");
  aGraphicDriver->Begin (new Aspect_DisplayConnection());
  TCollection_ExtendedString aNameOfViewer ("Visu3D");
  Handle(V3d_Viewer) aViewer
= new V3d_Viewer (aGraphicDriver, aNameOfViewer.ToExtString());
  aViewer->Init();

// create a new window or a wrapper over the existing window,
// provided by a 3rd-party framework (Qt, MFC, C# or Cocoa)
#if defined(_WIN32) || defined(__WIN32__)
  Aspect_Handle aWindowHandle = (Aspect_Handle )winId();
  Handle(WNT_Window) aWindow = new WNT_Window (winId());
#elif defined(__APPLE__) && !defined(MACOSX_USE_GLX)
  NSView* aViewHandle = (NSView* )winId();
  Handle(Cocoa_Window) aWindow = new Cocoa_Window (aViewHandle);
#else
 Aspect_Handle aWindowHandle = (Aspect_Handle )winId();
  Handle(Xw_Window) aWindow =
     new Xw_Window (aGraphicDriver->GetDisplayConnection(),
aWindowHandle);
#endif // WNT

// setup the window for a new view
  Handle(V3d_View) aView = aViewer->CreateView();
  aView->SetWindow (aWindow);
```

- The following changes should be made in the application-specific implementations of texture aspect:
  - `Graphic3d_TextureRoot` inheritors now should return texture image by overloading of `Graphic3d_TextureRoot::GetImage()` method instead of the old logic.
  - Now you can decide if the application should store the image copy as a field of property or re-load it dynamically each time (to optimize the memory usage). The default implementation (which loads the image content from the provided file path) does not hold an extra copy since it will be uploaded to the graphic memory when first used.
  - Notice that the image itself should be created within **Image_PixMap** class from **AlienImage** package, while **Image_Image** class is no more supported and will be removed in the next OCCT release.

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O p e n   C A S C A D E   T e c h n o l o g y   &   P r o d u c t s *(left margin, vertical)*

Supported Platforms and Pre-requisites

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

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

Linux Operating System	Debian 4.0, Mandriva 2010*
Windows Operating System	MS Windows 8/ 7 SP1 / VISTA SP2 /XP SP3
Mac OS X Operating System	Mac OS X 10.6.8 Snow Leopard / 10.7 Lion
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	**GeForce** The following drivers versions are recommended: *For Linux:* 64-bit Version: 100.14.19 or later 32-bit Version: 100.14.19 or later *For Windows:* Version 266.58 WHQL or later is recommended: http://www.nvidia.com/Download/index.aspx
Graphic library	OpenGL 1.1+ (OpenGL 1.5+ is recommended)
C++	*For Linux:* GNU gcc 4.0. - 4.3.2. *For Windows:* Microsoft Visual Studio .NET 2005 SP1 with all security updates Microsoft Visual Studio .NET 2008 SP1** Microsoft Visual Studio .NET 2010 Microsoft Visual Studio .NET 2012 *For Mac OS X:* XCode 3.2 or newer (4.x is recommended)
TCL (for testing tools)	*For Linux:* Tcltk 8.5 or 8.6 http://www.tcl.tk/software/tcltk/8.6.html *For Windows:* ActiveTcl 8.5 or 8.6 http://www.activestate.com/activetcl/downloads
Qt (for demonstration tools)	Qt 4.6.2 http://qt.nokia.com/downloads
Freetype (OCCT Text rendering)	freetype-2.4.10 http://sourceforge.net/projects/freetype/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*** (Tool for parallelized version of BRepMesh component)	TBB 3.x or 4.x http://www.threadingbuildingblocks.org/

- * Mandriva 2010 is a permanently tested platform.
- ** The official release of OCCT for Windows contains libraries built with VC++ 2008.
- *** This product is optional.

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