SALOME Platform

SALOME version 9.9.0

Release Notes

June 2022

Table of Contents

❖ GENERAL INFORMATION

CEA/DEN, EDF R&D and OPEN CASCADE are pleased to announce SALOME version 9.9.0. It is a public minor release that contains the results of planned minor improvements and bug fixes against SALOME version 9.8.0 released in December 2021.

❖ PREREQUISITES

The table below lists pre-requisite products used with SALOME 9.9.0. The differences of 3rd-party product versions used for SALOME 9.8.0 and 9.9.0 are highlighted in bold.

Product	Linux		Windows	
	SALOME 9.8.0	SALOME 9.9.0	SALOME 9.8.0	SALOME 9.9.0
Alabaster	0.7.6	0.7.6	0.7.6	0.7.6
Babel	2.7.0	2.7.0	2.7.0	2.7.0
Boost	1.71.0	1.71.0	1.67.0	1.67.0
C3po	-	**2.0**	-	-
Certifi	2018.8.24	2018.8.24	2019.6.16	2019.6.16
Cgns	4.1.1	**4.2.0**	4.1.1	**4.2.0**
Chardet	3.0.4	3.0.4	3.0.4	3.0.4
Click	6.7	6.7	7.0	7.0
Cmake	3.12.1	3.12.1	3.12.1	3.12.1
Cminpack	1.3.6	1.3.6	-	-
Colorama	-	-	0.4.1	0.4.1
Cppunit	1.13.2	1.13.2	1.13.2	1.13.2
Cycler	0.10.0	0.10.0	0.10.0	0.10.0
Cython	0.29.12	0.29.12	0.29.12	0.29.12
Dill	-	-	-	**0.3.4**
Docutils	0.12	0.12	0.14	0.14
Doxygen	1.8.14	1.8.14	1.8.3.1	1.8.3.1
Eigen	3.3.4	3.3.4	3.3.4	3.3.4
Embree	3.12.2	3.12.2	3.12.2	3.12.2
Expat	-	-	2.0.1	2.0.1
F2C	-	-	1.0.0	1.0.0
FMILibrary	2.0.3	2.0.3	-	-
Freeimage	3.16.0	3.16.0	3.18.0	3.18.0
Freetype	2.9.0	**2.9.1**	2.9.1	2.9.1
Gdal	-	**2.4.0**		
Gmsh	4.8.4	4.8.4	4.8.4	4.8.4
Graphviz	2.38.0	2.38.0	2.44.1	2.44.1
Hdf5	1.10.3	1.10.3	1.10.3	1.10.3
Idna	2.7	2.7	2.8	2.8
Imagesize	1.0.0	1.0.0	1.1.0	1.1.0
Intel® Threading Building Blocks	2019 U8	2019 U8	2019 U8	2019 U8

Product	Linux		Windows	
	SALOME 9.8.0	SALOME 9.9.0	SALOME 9.8.0	SALOME 9.9.0
lspc	1.15.0	1.15.0	1.15.0	1.15.0
Jinja2	2.7.3	2.7.3	2.10.1	2.10.1
Kiwisolver	1.0.1	1.0.1	1.1.0	1.1.0
Lapack	3.8.0	3.8.0	3.8.0	3.8.0
Libbatch	2.4.5	2.4.5	2.4.5	2.4.5
Libjpeg	-	-	9c	9c
Libpng	-	-	1.5.10	1.5.10
Libxml2	2.9.1	2.9.1	2.9.1	2.9.1
Llvm	8.0.1	8.0.1	8.0.1	8.0.1
Markupsafe	0.23	0.23	1.1.1	1.1.1
Matplotlib	3.0.3	3.0.3	3.1.0	3.1.0
Med	4.1.1	4.1.1	4.1.1	4.1.1
Mesa	19.0.8	19.0.8	19.2.3	19.2.3
MeshGems suite[1]	2.13-1	**2.14-4**	2.13-1	**2.14-4**
Metis	5.1.0	5.1.0	5.1.0	5.1.0
Mpi4py	-	**3.0.3**	-	-
Netcdf	-	**4.6.2**	**-**	**-**
Netgen[2]	6.2.2101	**5.3.1**[3]	6.2.2101	**5.3.1**
Nlopt	2.5.0	2.5.0	2.5.0	2.5.0
Nose	-	**1.3.7**	-	-
Numpy	1.16.4	1.16.4	1.16.4	1.16.4
Numpydoc	-	**0.9.0**	-	-
Omniorb	4.2.2	4.2.2	4.2.3	4.2.3
Omniorbpy	4.2.2	4.2.2	4.2.3	4.2.3
Open CASCADE Technology	7.5.3p1[4]	**7.5.3p2**[5]	7.5.3p1	**7.5.3p2**
Opencv	3.2.0	3.2.0	3.2.0	3.2.0
Openmpi	-	**3.1.6**	**-**	**-**
Openturns	1.17	**1.18**	1.17	**1.18**
OpenVKL	0.11.0	0.11.0	0.11.0	0.11.0

[1] Commercial product by Dassault Systemes SE; requires license.

[2] Patched for SALOME.

[3] SALOME 9.9.0 reverts to usage of Netgen 5 since Netgen 6 shows degradation in mesh quality.

[4] SHA1 identifier of this version is b08cd044f97635a40cceb86769b2399527090001.

[5] SHA1 identifier of this version is 70af2be481e30947fa99a55cdc5d5c27360e7cec.

Product	Linux		Windows	
	SALOME 9.8.0	SALOME 9.9.0	SALOME 9.8.0	SALOME 9.9.0
Ospray	2.4.0	2.4.0	2.4.0	2.4.0
Packaging	17.1	17.1	19.0	19.0
Pandas	0.25.2	0.25.2	-	-
Patsy	0.5.2	0.5.2	-	-
Paraview	5.9.0	5.9.0	5.9.0	5.9.0
Persalys	-	**12.0**	-	-
Petsc	3.16.0	3.16.0	-	-
Pip	19.1.1	19.1.1	19.1.1	19.1.1
Pillow	7.1.1	7.1.1	7.1.1	7.1.1
Planegcs	0.18	0.18	0.18	0.18
Psutil	5.7.2	5.7.2	5.7.2	5.7.2
PyFMI	2.5	2.5	-	-
Pthreads	-	-	2.9.1	2.9.1
Pygments	2.0.2	2.0.2	2.4.2	2.4.2
Pyparsing	2.0.3	2.0.3	2.4.0	2.4.0
Pyqt	5.15.3	5.15.3	5.15.3	5.15.3
Pyreadline	2.0	2.0	2.1	2.1
Python	3.6.5	3.6.5	3.6.5	3.6.5
Python-dateutil	2.6.1	2.6.1	2.8.0	2.8.0
Pytz	2017.2	2017.2	2019.1	2019.1
Qt	5.12.10	5.12.10	5.12.10	5.12.10
Qwt	6.1.2	6.1.2	6.1.2	6.1.2
Requests	2.19.1	2.19.1	2.22.0	2.22.0
RkCommon	1.5.1	1.5.1	1.5.1	1.5.1
Root	6.22.02	6.22.02	6.24.0	6.24.0
Scipy	1.4.1	1.4.1	1.4.1	1.4.1
Scotch	6.0.4	**6.1.2**	-	-
Setuptools	38.4.0	38.4.0	41.0.1	41.0.1
Sip	5.5.0	5.5.0	5.5.0	5.5.0
Six	1.10.0	1.10.0	1.12.0	1.12.0
Snowballstemmer	1.2.1	1.2.1	1.9.0	1.9.0
Sphinx	1.7.6	1.7.6	2.1.2	2.1.2
Sphinxcontrib-applehelp	-	-	1.0.1	1.0.1
Sphinxcontrib-devhelp	-	-	1.0.1	1.0.1

Product	Linux		Windows	
	SALOME 9.8.0	SALOME 9.9.0	SALOME 9.8.0	SALOME 9.9.0
Sphinxcontrib-htmlhelp	-	-	1.0.2	1.0.2
Sphinxcontrib-jsmath	-	-	1.0.1	1.0.1
Sphinxcontrib-qthelp	-	-	1.0.2	1.0.2
Sphinxcontrib-serializinghtml	-	-	1.1.3	1.1.3
Sphinxcontrib-websupport	1.1.0	1.1.0	1.1.2	1.1.2
Sphinx-intl	0.9.10	0.9.10	2.0.0	2.0.0
Sphinx-rtd-theme	0.4.3	0.4.3	0.4.3	0.4.3
StaticMeshPlugin	-	**5.8.0**	-	**5.8.0**
Statsmodels	0.8.0	0.8.0	-	-
Swig	3.0.12	3.0.12	3.0.12	3.0.12
Tcl	8.6.0	8.6.0	8.6.9	8.6.9
Tk	8.6.0	8.6.0	8.6.9	8.6.9
Toml	-	-	0.10.2	0.10.2
Urllib3	1.23	1.23	1.25.3	1.25.3
URANIE	4.5.0	4.5.0	**-**	**-**
Zlib	-	-	1.2.5	1.2.5
Zeromq	-	**4.3.1**	-	-

*Note: the table above lists only most important pre-requisite products; some optional products are not shown. For additional information about pre-requisite products and SALOME modules dependencies refer to the paragraph "**Supported distributions and pre-requisites**" below.*

Note: listed versions of pre-requisites are considered as "base" ones; there can be minor differences in particular SALOME packages.

*Note: several prerequisites given in the above table are installed with **PIP** package manager. The installation folder for these PIP packages is SALOME-9.9.0-*-SRC/BINARIES-*/Python/lib/pythonX.Y/site-packages on Linux (where pythonX.Y corresponds to the version of Python being used - for example, python3.6) and SALOME-9.9.0\W64\Python\lib\site-packages on Windows.*

LICENSE RESTRICTIONS

Hereby we explicitly declare that PyQt and PyQtChart (by Riverbank Computing Ltd) are distributed under the terms of GNU GPL license; for more details, please refer to the PyQt site:

https://riverbankcomputing.com/commercial/license-faq

If you plan using SALOME for commercial purposes, please consider obtaining a commercial license for PyQt from Riverbank Computing Ltd.

❖ NEW FEATURES AND IMPROVEMENTS

KERNEL

- KERNEL services related to initialization of common resources including command line arguments, and reference to CORBA have been refactored.

GUI

- Elements selection in VTK viewer is now available with the fast visualization mode. There is no need to set `SALOME_ACTOR_DELEGATE_TO_VTK=0` anymore.

SHAPER

- Special resolver of some kind of conflicting constraints has been implemented. It can process the following conflicts:
  - between two tangent arcs, which have coincident centers and boundary points,
  - automatic horizontal/vertical constraint if it leads to over-constrained situation.

  Shaper's Preferences have been updated to interact with a user about the automatic resolving of conflicting constraints.
- Possibility to select sub-shapes from groups, visible in the 3D viewer even if no result is shown, has been implemented.
- Python method `FiltersAPI_Selection.select` has been implemented to process list of filters and convert them to the list of selected objects.
- Two options have been added into Shaper's Preferences, to define the behaviour of HDF document opening.

  First option relates to the activation of a part:
  - "Last part" – activate last part in the document (default value),
  - "All parts" – activate all parts within the document,
  - "No activation" – do not activate any part.

  Another option specifies what should be visualized:
  - "No visualization" – do not display a shape,
  - "Last item in each folder" – show only the last result in each folder of the part (Constructions, Results, Groups, Fields),
  - "All items" – show all shapes from each folder,
  - "As stored in HDF" – display only the shapes visible before the document was saved (default value).
- An option specifying what should be visualized when executing a Python script in the embedded console has been added into Shaper's Preferences. Its value could be one of the following:
  - "No visualization" – do not display a shape,
  - "Last item in each folder" – show only the last result in each folder of the part (Constructions, Results, Groups, Fields),
  - "All items" – show all shapes from each folder (default value).

- "Import image" feature now keeps an image as a binary object within the document instead of storing a link to an external file. Python dump has been extended to write image to the same directory with the dumped script.
- "Import results" feature has been extended to import from another part not only results, but all groups that refer the selected results.
- A validator for defeaturing arguments selection has been improved. Now it allows only solids, compsolids and compounds of solids and/or compsolids of any nesting depth to be the main shape.
- New mode for creating a box by a centre and dimensions.
- New mode for creating a sphere part (by two radiuses and two angles ranges)
- New Tube primitive (holed cylinder).

MESH

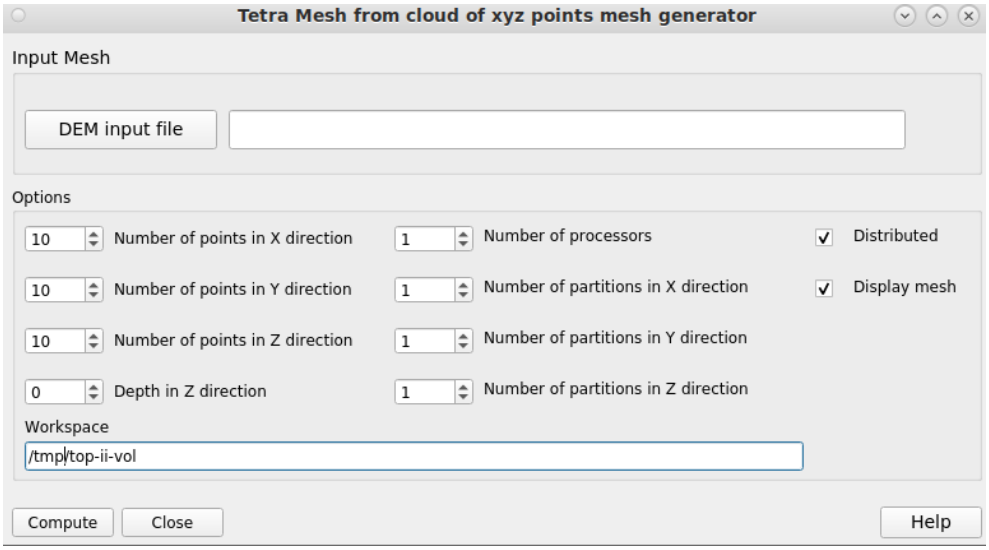
- "Reorient faces" operation has been improved by adding a possibility to reorient several groups at once with reference orientation given by several other groups. Reference groups can be omitted, then an arbitrary face to reorient is used as a reference one.
- Interactive mesh modification: a possibility to perform interactively (in the VTK 3D viewer) several operations has been implemented; the operations are:
  - Move node,
  - Add node to a segment,
  - Add node to a triangle.
- "Remove node and rebuild connectivity" functionality has been added. This feature allows automatically rebuilding mesh elements connected to the node being removed, thus without producing a hole.
- The possibility of refining a mesh uniformly by using HOMARD has been added to SALOME Mesh module. "Uniform refinement" command has been added to the "Adaptation" menu.
- A graphical user interface to CEA's **top-ii-vol** meshing tool is now available in Mesh module, and can be accessed via *Mesh > SMESH plugins > Run Topological Volumic mesher* menu.

  This tool targets the meshing requirements in computational geophysics, especially for earthquake, land-slide, or tsunami simulations. It runs a distributed-memory parallel meshing algorithm under-the-hood that allows creating volumetric tetrahedral meshes directly from a DEM (digital elevation model) topology or, in other words, a point cloud.

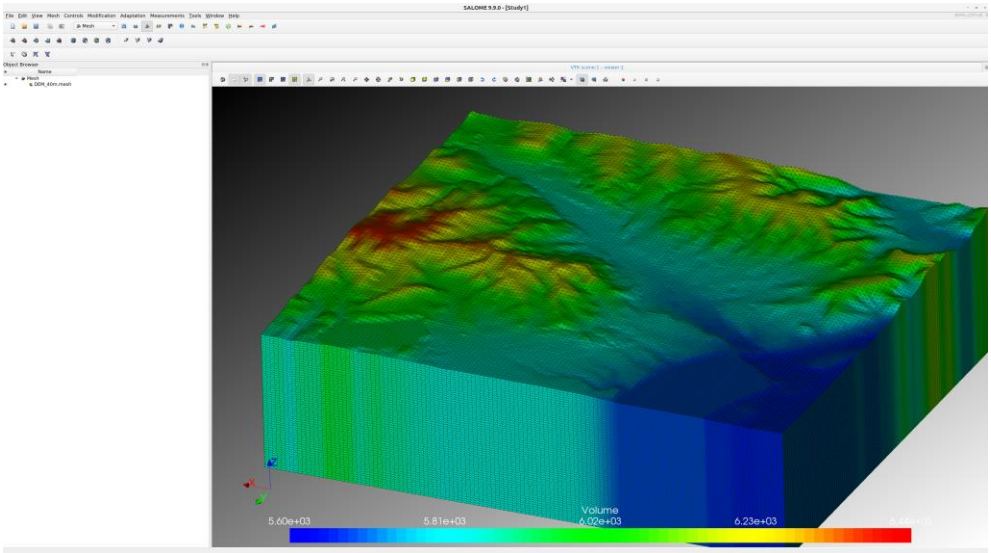
  During the meshing process, the mesh quality of the elements is assured by running a feedback element smoothing process via mesh-free Laplace solver. Users can choose via the GUI to save the unstructured mesh either entirely as a single mesh entity, or in its distributed form as `N` number of conformal mesh partitions (with `N` equal to the number of MPI processors used for meshing). In the latter case, such partitions of a mesh can be directly used to perform a domain-decomposition based geophysics simulation.

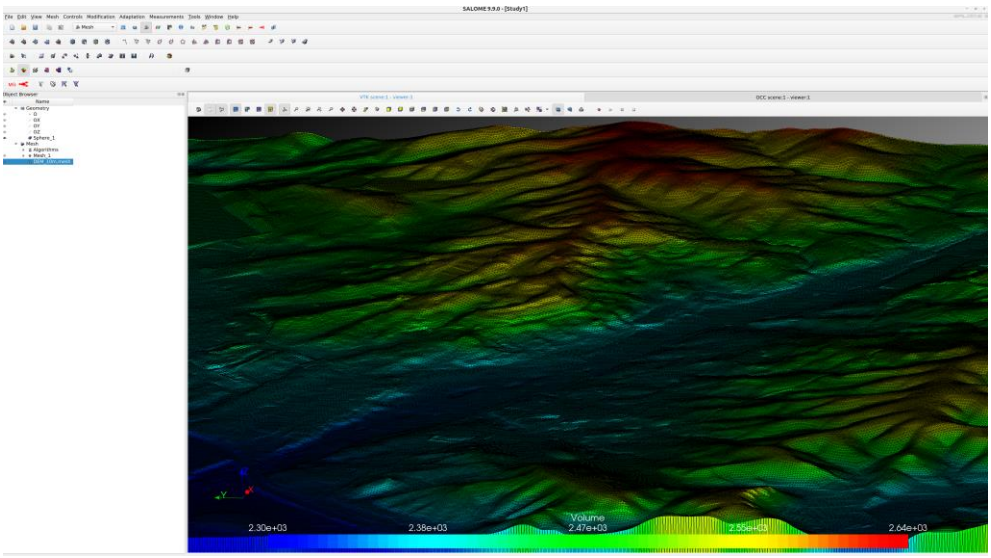
  The Top-ii-vol dialog window is shown in the Figure below. The options, described in the *Top-ii-vol* documentation are:

  - Number of points in X, Y and Z directions,
  - Depth in Z direction,
  - Number of MPI processors,
  - Checkbox to enable distributed calculation,
  - Number of partitions in X, Y and Z directions (if distributed calculation is enabled),
  - Workspace and directory in which output meshes are saved,
  - Output meshes can be displayed by checking the "Display mesh" checkbox.



The two screenshots below showcase tetrahedral meshes that are generated via this plugin.





MG-CADSURF PLUGIN

- Now it is possible to enforce 1D mesh into MG-CADSurf mesh.

GMSH PLUGIN

- GMSH meshing plugin has been adapted for Windows platform. Now GMSH mesher can be used on Windows as well. GMSH was compiled with Visual C++ 2017 which only supports OpenMP 2.0. Hence, GMSH HXT algorithm which requires newer OpenMP versions is not active on Windows.

MEDCOUPLING

- Python code useful for debugging intersection of tetrahedra has been developed.
- For set of shuffled `seg2` representing a closed wire, a method `DataArrayInt.sortToHaveConsecutivePairs()` has been implemented to sort them.

YACS

- Possibility to use external PMML tool has been added into YACS.

FIELDS

- Developer documentation (which describes module architecture) has been implemented.

PARAVIS

- The filter "extract cell types" now works with any input source (before it worked only with med reader as input), and work well even if called from a pvsm state file. The cell types are now those from VTK instead of MED. This requires a change in your Python files if you use this filter. For instance: `'TRI3'` is now `'Triangle'`, `'QUAD4'` is now `'Quad'`.
- Global node IDs contained in a MED file is accessible and displayable through the MEDReader PARAVIS plugin.
- MEDReader is automatically configured to read in parallel a MED file when paraview server is launched in parallel.

SALOME SESSION-LESS MODE

SSL mode's implementation has been completed and is now the default mode for launching SALOME. That means that no CORBA session is launched at SALOME start-up.

Starting SALOME is faster and more robust (there should be no more network issues).

Python scripts can be launched directly with `python` (if `PYTHONPATH` has been extended with SALOME environment) for all the modules' python API.

The user does not need to "kill" the servers after using SALOME. Debugging and testing is also easier.

Please note that custom modules need to be adapted to work with SSL. If you have created a custom module, please contact the SALOME team to see how it can be adapted to work in SSL mode; you can ask questions related to SSL mode on our Community Forums at https://discourse.salome-platform.org/.

If you don't want to use SSL mode, you can use the `runSalomeOld.py` command.

INTEGRATION OF PERSALYS

Persalys product has been added into SALOME version 9.9.0. Persalys is a GUI dedicated to the treatment of uncertainty and the management of variabilities (https://persalys.fr/). Persalys is available as a SALOME module able to interact with JobManager and PARAVIS modules, or as a standalone executable.

❖ CHANGE LOG

This chapter does not provide the complete set of changes included into this version of SALOME; only the most important changes are listed.

KERNEL

26457	*Summary:* [EDF] (2021) KERNEL: factorization of ORB initialization KERNEL services related to initialization of common resources including command line arguments, and reference to CORBA have been refactored.
29865	*Summary:* [CEA 29586] `salome.myStudyName` returns `None` Setting `salome.myStudyName` attribute properly in SSL mode.

GUI

24180	*Summary:* [CEA] Integration of VTK display speed improvements Elements selection in VTK viewer is now available with the fast visualization mode. There is no need to set `SALOME_ACTOR_DELEGATE_TO_VTK=0` anymore.
28780	*Summary:* [EDF 24163] Warnings in terminal Correct Load Script procedure to avoid Python warnings about unclosed file objects.
29945	*Summary:* [CEA 29586] Missing module name Properly show module name in the About dialog / Version page.

SHAPER

24501	*Summary:* [EDF 23799] Problem of cutting Fixed two problems with sphere intersection in Boolean operations. Related OCCT issues: OCC32470 and OCC32502.
24513	*Summary:* [CEA] Dealing with conflicting constraints Special resolver of some kind of conflicting constraints has been implemented. It can process the following conflicts: ○ between two tangent arcs, which have coincident centers and boundary points, ○ automatic horizontal/vertical constraint if it leads to over-constrained situation. Shaper's Preferences have been updated to interact with a user about the automatic resolving of conflicting constraints.
24514	*Summary:* [CEA 28938] When creating a group, be able to select the sub-shapes of displayed groups (even if no result is displayed) Possibility to select sub-shapes from groups, visible in the 3D viewer even if no result is shown, has been implemented.

26374	*Summary:* [CEA] In Python, be able to use filters to select sub-shapes Python method `FiltersAPI_Selection.select` has been implemented to process list of filters and convert them to the list of selected objects.
26446	*Summary:* [EDF] (2021) SHAPER: customize study opening Two options have been added into Shaper's Preferences, to define the behaviour of HDF document opening. First option relates to the activation of a part: ○ "Last part" – activate last part in the document (default value), ○ "All parts" – activate all parts within the document, ○ "No activation" – do not activate any part. Another option specifies what should be visualized: ○ "No visualization" – do not display a shape, ○ "Last item in each folder" – show only the last result in each folder of the part (Constructions, Results, Groups, Fields), ○ "All items" – show all shapes from each folder. ○ "As stored in HDF" – display only the shapes visible before the document was saved (default value).
26447	*Summary:* [EDF] (2021) SHAPER: customize script execution An option specifying what should be visualized when executing a Python script in the embedded console has been added into Shaper's Preferences. Its value could be one of the following: ○ "No visualization" – do not display a shape, ○ "Last item in each folder" – show only the last result in each folder of the part (Constructions, Results, Groups, Fields), ○ "All items" – show all shapes from each folder (default value).
26449	*Summary:* [EDF] (2021) SHAPER: save imported images "Import image" feature now keeps an image as a binary object within the document instead of storing a link to an external file. Python dump has been extended to write image to the same directory with the dumped script.
26451	*Summary:* [EDF] (2021) SHAPER: import results with groups "Import results" feature has been extended to import from another part not only results, but all groups that refer the selected results.
26800	*Summary:* [EDF 24492] Pb with defeaturing A validator for defeaturing arguments selection has been improved. Now it allows only solids, compsolids and compounds of solids and/or compsolids of any nesting depth to be the main shape.
26891	*Summary:* [EDF 24517] Wrong pipe

	Fix a problem with path relocation in the Pipe algorithm.
29061	*Summary:* [EDF 24777] Angular / linear copy impossible on a subsolid User's Guide has been updated to describe the limitation of transforming single solid from a compsolid result.
29085	*Summary:* [EDF 24794] Problem of visibility of sketch plane Sketch creation improved. Sketch plane visibility checkbox synchronized with the actual plane's visibility status.
29403	*Summary:* [CEA 29363] Patch Integration Use cross cursor for sketcher operations.
29612	*Summary:* [EDF 25161] Dump with comments Dumping to python improved. Provided double quotes shielding in addition to existing shielding of single quotes.
29623	*Summary:* [CEA 29605] Backward compatibility broken Fix for dumping angle constraint in a correct way when the angle type is changed to "Direct".
29933	*Summary:* [CEA 29931] Redundant constraint in SHAPER SIGSEGV An error with redundant constraints handling in Sketcher, leading to SIGSEGV on Fedora 34, has been fixed.
29947	*Summary:* [CEA 29944] SIGSEGV using filet Fixed a SIGSEGV in Sketcher's Fillet functionality of Shaper module, which happened on the mouse move over one of the edges with not validated Fillet.

GEOMETRY

26723	*Summary:* [EDF 24464] Problem of extra edges `UnionFaces` functionality has been fixed in OCCT. Also, a value used as an angular tolerance when joining has been corrected.
26726	*Summary:* [EDF 24466] `CheckAndImprove` generates wrong result Fix a problem in OCCT class `ShapeUpgrade_UnifySameDomain`. Related OCCT issue: OCC32719.
28816	*Summary:* [EDF 24678] Tolerance with wires Fix a problem with `MakeWire` functionality of Geometry SALOME module. A closed wire is created now if all gaps are less than the required tolerance.
28855	*Summary:* [EDF 24963] Multi-explode

	Fi a bug in SALOME Geometry module with the sub-shapes handling in GUI.
29103	*Summary:* [EDF 24802] Limitation of tolerance `LimitTolerance` operation has been improved. Redundant geometry is removed from the shape before setting new tolerance, that allows reaching better results in some cases, especially on simple shapes.
29336	*Summary:* [CEA] Problem in inertia calculus Geometry documentation for Inertia calculation has been corrected. Also, the labels for the principal moments of inertia have been renamed from IX, IY and IZ to Ip1, Ip2 and Ip3.
29484	*Summary:* [EDF] (2022-T1) Improve testability of PANTHERE Interface `GEOM_ITestOperations` with `Tessellate()` method has been added, it is aimed to test performance of OCCT tessellation algorithm.

MESH

26398	*Summary:* [CEA] Convert cgns to HDF Invalid Data-Type Failure of `cgnsconvert` command has been fixed by migrating to CGNS v4.2.
26452	*Summary:* [EDF] (2021) SMESH: orientation of faces “Reorient faces” operation has been improved by adding a possibility to reorient several groups at once with reference orientation given by several other groups. Reference groups can be omitted, then an arbitrary face to reorient is used as a reference one.
26453	*Summary:* [EDF] (2021) SMESH: uniform refinement The possibility of refining a mesh uniformly by using HOMARD has been added to SALOME Mesh module. "Uniform refinement" command has been added to the "Adaptation" menu.
26454	*Summary:* [EDF] (2021) SMESH: interactive mesh modification Interactive mesh modification: a possibility to perform interactively (in the VTK 3D viewer) several operations has been implemented; the operations are: o Move node, o Add node to a segment, o Add node to a triangle. "Remove node and rebuild connectivity" functionality has been added. This feature allows to automatically rebuild mesh elements connected to the node being removed, thus without producing a hole.
29080	*Summary:* [CEA 19079] top-ii-vol mesher GUI interface integration GUI interface to CEA **top-ii-vol** meshing tool (which allows creating volumetric tetrahedral meshes from a given topology) has been implemented.

29104	*Summary:* [EDF 24805] Pb of displaying Clear “Points” representation mode for presentations being redisplayed in the VTK view.
29143	*Summary:* [CEA] Compute takes too much time in polyhedron per solid use case Meshing of multiple solids with Polyhedron per Solid algorithm has been sped up by 5 times.
29212	*Summary:* [CEA 29181] Body fitter on compounds incomplete mesh Incomplete mesh built by Body Fitting algorithm has been fixed.
29266	*Summary:* [EDF 24971] SALOME crashes NETGEN-3D failure due to intersecting pyramids has been fixed.
29332	*Summary:* [CEA 26899] `GroupOnGeom` returns `None` Regression that `Mesh.GroupOnGeom()` returns `None` instead of an empty group in the case where a geometry group is empty has been fixed.
29335	*Summary:* [CEA] Cannot graphically select geometry to create groups Problem with the usage of SHAPERSTUDY objects in Mesh module has been fixed.
29395	*Summary:* [EDF 25009] Import1D2D mesh fails Failure of Import 1D-2D algorithm has been fixed.
29435	*Summary:* [EDF 25081] Wrong prisms Incorrect work of Projection 2D algorithm has been fixed.
29540	*Summary:* [EDF 25009] Mesh fails Failure of Extrusion 3D algorithm when a base shape is meshed by Import 1D-2D algorithm has been fixed.
29611	*Summary:* [EDF] `cartesian_algo` test is KO with `valgrind` A memory usage error has been fixed in Body Fitting algorithm.
29764	*Summary:* [EDF] `SMESH_blocfissure*` fail Fixed a failure of `SMESH_blocfissure*` tests caused by changes in `StdMeshers_QuadToTriaAdaptor`.
29856	*Summary:* [CEA 29854] `FixQuadraticElements` crash Prevent SALOME crash caused by errors in `SMESH_MesherHelper::FixQuadraticElements()`
29939	*Summary:* [CEA 29936] Mesh is not updated if it's based on ShaperResults group Error of not updating a mesh based on ShaperResults group upon group modification has

	been fixed.
29941	*Summary:* [CEA 29940] Concatenate doesn't create node groups if mesh is empty Error that a compound mesh made of meshes containing nodes only misses groups has been fixed.

FIELDS

28928	*Summary:* [CEA] FIELDS : developer documentation for the simplified visualisation Developer documentation (which describes module architecture) has been implemented.

HOMARD

26750	*Summary:* [OCC] HOMARD tests fail in 32-bits IDs configuration Disable HOMARD tests if med file is built with 32-bits IDs (this is unsupported configuration).

YACS

28799	*Summary:* [CEA 18828] PMML Possibility to use external PMML tool has been added into YACS.
29403	*Summary:* [CEA 29363] Patch Integration Use the same component instance by default, when creating new SALOME service node.

MG-CADSURF PLUGIN

16292	*Summary:* [CEA 6719] MGCADSurf: option SetEnforced1D mesh Now it is possible to enforce 1D mesh into MG-CADSurf mesh.

GMSH PLUGIN

18709	*Summary:* [CEA][Windows] Adding GMSH/GMSHPLUGIN to SALOME GMSH meshing plugin has been adapted for Windows platform. Now GMSH mesher can be used on Windows as well. GMSH was compiled with Visual C++ 2017 which only supports OpenMP 2.0. Hence, GMSH HXT algorithm which requires newer OpenMP versions is not active on Windows.

MEDCOUPLING

26461	*Summary:* [EDF] (2021) MedCoupling: debug tetra/tetra 3d intersector algorithm

	Python code useful for debugging intersection of tetrahedra has been developed.
29863	*Summary:* [CEA 29586] MEDCouplingBasicsTest failing Add compatibility with SWIG 4x.
30109	*Summary:* [CEA 30091] `buildInnerBoundaryAlongM1Group` bug fix Fix bug in `buildInnerBoundaryAlongM1Group()`. Fix a problem that some tetrahedral configurations were not handled properly. Rewrite algorithm for `findCellsToRenumber()`.

OTHER

24638	*Summary:* [CEA 24632] EFICAS_TOOLS - `QStringList` PyQt5 EFICAS has been clean up from PyQt4 code.
26460	*Summary:* [EDF] (2021) KERNEL: complete SSL mode for remaining modules Finalize implementation of SSL mode, fix remaining problems and inconsistencies.
26882	*Summary:* [CEA 26832] CONFIGURATION Debian 11 Configuration module has been updated to properly build SALOME on Debian 11 with native cmake and Qt packages.
26946	*Summary:* [OCC] SSL: inconsistency between C++ and Python components Finalize implementation of SSL mode, fix remaining problems and inconsistencies.
26947	*Summary:* [OCC] SSL: HDF persistence does not work after study reopening Finalize implementation of SSL mode, fix remaining problems and inconsistencies.
26948	*Summary:* [OCC] SSL: Dump study does not work after study reopening Finalize implementation of SSL mode, fix remaining problems and inconsistencies.
28734	*Summary:* [OCC] SSL: Cannot activate SMESH on study with GEOM data SMESH has been adapted for SSL mode.
28735	*Summary:* [OCC] SSL: `salome kill` does not work in SSL mode The scripts stopping running SALOME sessions have been adapted to work correctly in SSL mode.
29456	*Summary:* [EDF] (2022-T1) Finalization of SSL implementation Finalize implementation of SSL mode, fix remaining problems and inconsistencies.
29754	*Summary:* [CEA] CALCULATOR component does not work since SALOME 9.5

	CALCULATOR has been adapted for SSL mode.

❖ OCCT 7.5.3 BUG CORRECTIONS

This chapter lists bug corrections and improvements made for SALOME project in Open CASCADE Technology. Below listed bug corrections and improvements are included into OCCT version 7.5.3 patch #2 used by SALOME 9.9.0; complete list of bugs and improvements made in OCCT can be seen at https://dev.opencascade.org/forums/occt-releases.

32470	Modeling Algorithms - BOP wrong result on sphere and box
32502	Modeling Algorithms - BOP wrong result on sphere and cylinder.
32715	Modeling Algorithms - `UnifySameDomain` does incomplete union.
32810	Coding - missing `Standard_EXPORT` in `Standard_ErrorHandler`.
32719	Modeling Algorithms - `UnifySameDomain` result has incorrect triangulation.

❖ SUPPORTED DISTRIBUTIONS AND PRE-REQUISITES

SALOME is a cross-platform solution that supports Linux and Windows. It is distributed as open-source software under the terms of the GNU LGPL license.

The table below lists the versions of the pre-requisite products used by SALOME platform. Other versions of the products can also work but this is not guaranteed.

Product	KERNEL	GUI	GEOM	SHAPER	SMESH	FIELDS	YACS	PARAVIS	HOMARD	HEXABLOCK	JOBMANAGER	NETGENPLUGIN	GHS3DPLUGIN	GHS3DPRLPLUGIN	BLSURFPLUGIN	HexoticPLUGIN	HEXABLOCKPLUGIN	HYBRIDPLUGIN	GMSHPLUGIN	ADAO	EFICAS
Gcc[1]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GNU make[1]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Microsoft Visual Studio[2]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cmake	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Python	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Qt		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sip		X																			
Pyqt	X	X			X	X		X												X	X
Boost	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Swig	X	X	X	X	X	X	X		X	X											
OCCT		X	X	X	X				X	X		X	X	X	X	X	X	X	X		
Qwt		X			X																
Omniorb	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Omniorbpy	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hdf5	X	X			X																
Med					X	X		X	X												
Vtk[3]		X	X		X	X		X		X		X	X	X	X	X	X	X	X		
Numpy		X			X	X		X	X											X	
Scipy																				X	
Graphviz	X	X	X	X	X	X	X					X	X	X	X	X		X	X		
Doxygen	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X		
Netgen												X									
Metis						X															
Scotch						X															
Libxml2	X	X		X		X	X														
MeshGems													X	X	X	X		X			
Sphinx	X	X		X	X	X	X	X	X	X	X									X	X
Libbatch	X																				
Cgns					X																
Paraview		X				X		X													
Psutil	X																				
Gmsh																			X		
Planegcs				X																	
Pillow						X															
Nlopt																				X	
Eficas (tool)																				X	X

[1]) *Linux only*
[2]) *Windows only*
[3]) *Version included into ParaView is used*

The following products are not mandatory for SALOME directly; these products are either optional for SALOME or only required to build other pre-requisite products.

Product	Required by	Comment
Alabaster	Sphinx	Not used directly.
Babel	Sphinx	Not used directly.
C3po		Not used directly.
Certifi	Sphinx	Not used directly.
Chardet	Sphinx	Not used directly.
Click	Sphinx	Not used directly.
Colorama	SAT	Not used directly. Windows only.
Cppunit	KERNEL, FIELDS, GEOM, YACS, HEXABLOCK	Optional, for unitary tests.
Cycler	Matplotlib	Not used directly.
Cython	Mpi4py, Scipy	Not used directly.
Docutils	Sphinx	Not used directly.
Eigen	Planegcs	Not used directly.
Embree	ParaView	Optional. Not used directly.
Expat	Graphviz	Windows only.
F2c	SMESH	Compile FORTRAN code (converted to C).
Freeimage	OCCT	Optional. Not used directly.
Freetype	OCCT, ParaView	Optional. Not used directly.
Gdal	ParaView	Optional. Not used directly.
Idna	Sphinx	Not used directly.
Imagesize	Sphinx	Not used directly.
Intel TBB	OCCT, Ospray, SMESH	Optional.
Ispc	Ospray	Optional. Not used directly.
Jinja2	Sphinx	Not used directly.
Kiwisolver	Sphinx	Not used directly.
Lapack	Numpy	Not used directly.
Libjpeg	Graphviz	Not used directly. Windows only.
Libpng	Graphviz	Not used directly. Windows only.
Llvm	Ospray	Optional. Not used directly.
Markupsafe	Shinx	Not used directly.
Matplotlib	ParaView	Optional. Not used directly.
Mesa	Visualization subsystem.	Optional. Not used directly.
Mpi4py		Not used directly.
Netcdf	ParaView, Gdal	Optional. Not used directly.
Nose		Not used directly.
Numpydoc		Not used directly.
Opencv	GEOM	Optional.
Openmpi	ParaView, Hdf5, Med, KERNEL, FIELDS	Optional.
Openturns		Not used directly.
OpenVKL	Ospray	Not used directly.
Ospray	ParaView	Optional. Not used directly.
Packaging	Sphinx	Not used directly.
Persalys		Not used directly.
Petsc	Solverlab	Not used directly.
Pip	Python extra packages	Optional. Not used directly.

Pthreads	OmniORB, and other	Not used directly.
Pygments	Sphinx	Not used directly.
Pyparsing	Matplotlib	Not used directly.
Pyreadline	SAT	Not used directly. Windows only.
Python-dateutil	Matplotlib	Not used directly.
Pytz	Matplotlib, Sphinx	Not used directly.
Requests	Sphinx	Not used directly.
RkCommon	Ospray	Not used directly.
Root		Not used directly.
Setuptools	Sphinx, Matplotlib, Numpy, Scipy, …	Not used directly.
Six	Matplotlib	Not used directly.
Snowballstemmer	Sphinx	Not used directly.
Sphinx-inlt	GUI, GEOM, SMESH, MEDCOUPLING	Optional.
Sphinxcontrib-applehelp	Sphinx	Not used directly. Windows only.
Sphinxcontrib-devhelp	Sphinx	Not used directly. Windows only.
Sphinxcontrib-htmlhelp	Sphinx	Not used directly. Windows only.
Sphinxcontrib-jsmath	Sphinx	Not used directly. Windows only.
Sphinxcontrib-qthelp	Sphinx	Not used directly. Windows only.
Sphinxcontrib-serializing	Sphinx	Not used directly. Windows only.
Sphinxcontrib-websupport	Sphinx	Not used directly.
Sphinx-rtd-theme	Sphinx	Not used directly.
Tcl	OCCT, Python	Optional. Not used directly.
Tk	OCCT, Python	Optional. Not used directly.
Toml	Sip	Not used directly.
Tclx	OCCT, Python	Optional. Not used directly.
Urllib3	Sphinx	Not used directly.
Zeromq		Not used directly.
Zlib	Hdf5	Not used directly.
FMILibrary	OpenTurns	Optional.
Pandas	OpenTurns	Optional.
Patsy	OpenTurns	Optional.
PyFMI	OpenTurns	Optional.
Statsmodels	OpenTurns	Optional.

SALOME depends on a number of products for run time execution, others are necessary only for compilation or generation of development documentation (like doxygen for example). Below there is a list of mandatory and optional products[6].

Software Requirements

Product	Compilation and Development		Execution		Remarks
	Mandatory	Optional	Mandatory	Optional	
Gcc	X		X		C++17 support is needed to build Gmsh 4.8 + plugin
GNU make	X				
Microsoft Visual C++	X		X		For execution, runtime libraries are only required
Boost	X		X		
Cgns		X		X	For SMESH only

[6] Some optional pre-requisite products are not listed.

					Required only if used at compilation step
Cmake	X				
Cppunit		X			For testing only.
MeshGems	X	X	X	X	Compilation: depending on build optioned used, can be mandatory for BLSURFPLUGIN, GHS3DPLUGIN, GHS3DPRLPLUGIN, HexoticPLUGIN, HYBRIDPLUGIN. Runtime: mandatory for BLSURFPLUGIN, GHS3DPLUGIN, GHS3DPRLPLUGIN, HexoticPLUGIN, HYBRIDPLUGIN.
Doxygen		X			Needed only for documentation generation
Eficas (tool)	X		X		For ADAO, EFICAS
Freetype	X		X		
Freeimage		X		X	Required only if used when building OCCT
Gmsh	X		X		For GMSHPLUGIN only
Graphviz	X		X		In run-time required for YACS only
Hdf5	X		X		
Homard			X		For HOMARD module only
Intel TBB		X		X	Required if used when building OCCT and/or if used to build SMESH
Libbatch		X		X	Required only if used at compilation step for KERNEL
Libxml2	X		X		
Matplotib				X	Required only if used when building ParaView. Used by ADAO.
Med	X		X		
Metis		X		X	Required only if used at compilation step for FIELDS
Netgen	X		X		For NETGENPLUGIN only
Nlopt				X	Required by ADAO.
Numpy (+ Lapack)	X		X		Required by FIELDS, ADAO
Omniorb	X		X		
Omniorbpy	X				
OCCT	X		X		
Opencv		X		X	Required only if used at compilation step for GEOM
Openmpi		X		X	Required only if used when building SALOME and/or pre-requisites
ParaView	X		X		Mandatory for PARAVIS module; optional for GUI module
Pillow				X	Optionally required by FIELDS.
Planegcs	X		X		Required by SHAPER
Psutil	X		X		Required by KERNEL to simplify management of SALOME processes and services.
Pyqt	X		X		
Python	X		X		
Qt	X		X		
Qwt	X		X		
Scipy			X		Required by ADAO
Scotch		X		X	Required only if used at compilation step for FIELDS
Sip	X				
Sphinx		X			Needed only for documentation generation
Swig	X				
Vtk	X		X		

Note: additional pre-requisites may be required on some platforms. For example, to build SALOME on Linux CentOS 7, it is necessary to install devtoolset-8 package.

❖ HOW TO GET THE VERSION AND PRE-REQUISITES

Sources of SALOME 9.9.0 can be retrieved from the Git repositories using V9_9_0 tag; the complete list of repositories can be found at https://git.salome-platform.org/gitweb/.

All pre-requisites can be obtained either from the Linux distribution (please be sure to use a compatible version) in form of native package or from the distributors of these pre-requisites.

Note: SALOME version 9.9.0 patches some third-party pre-requisite products, such as ParaView, Netgen, Open CASCADE Technology and other. These patches solve different problems and introduce some specific features needed for SALOME project.

❖ LICENSE

SALOME platform is distributed under terms of the GNU Lesser General Public License (LGPL) license version 2.1. All used pre-requisites use similar or compatible licenses (with minor exceptions). Detail information about licenses used by SALOME and its pre-requisites can be found on the following page: http://www.salome-platform.org/downloads/license/.

See also "*License restrictions*" paragraph above.

❖ KNOWN PROBLEMS AND LIMITATIONS

- Application crash might occur on the data publication in the study if both data server and CPP container are running in the standalone mode.
- Sometimes regression test bases give unstable results; in this case the testing should be restarted.
- SALOME in general supports reading of documents from earlier versions but the documents created in the new version may not open in earlier ones. However, some studies may work incorrectly in SALOME 9x; mainly it concerns studies with Post-Pro data in which med v2.1 files have been imported. Due to removal of med v2.1 support and deprecation of Post-Pro module in SALOME series 9x, there can be problems with opening of such studies in SALOME.
- Compilation of OCCT by Makefiles on a station with NVIDIA video card can cause problems because the installation procedure of NVIDIA video driver removes library `libGL.so` included in package `libMesaGL` from directory `/usr/X11R6/lib` and places this library `libGL.so` in directory `/usr/lib`. However, `libtool` expects to find the library in directory `/usr/X11R6/lib`, which causes compilation failure (See `/usr/X11R6/lib/libGLU.la`). We suggest making symbolic links in that case using the following commands (*Note: you need root permission to do this*):

```
$ ln -s /usr/lib/libGL.so /usr/X11R6/lib/libGL.so
$ ln -s /usr/lib/libGL.la /usr/X11R6/lib/libGL.la
```

- MEFISTO algorithm sometimes produces different results on different platforms.
- In some cases the number of triangles generated by MEFISTO may be different at each attempt of building the mesh.
- When generating a 2D mesh with “Maximum Area” hypothesis used, MEFISTO algorithm can produce cells with maximum area larger than specified by the hypothesis.
- ParaVis and Mesh modules work unstably using a remote connection. You can use VirtualGL to benefit from the remote graphic card (launch `vglrun salome`), or use `mesa_salome` to bypass the graphic card (but it is slower). For ParaVis, you can also launch `pvserver` in the remote desktop and connect to it from your local computer. Finally, clusters often provide their own solution to access visualization nodes for remote post-processing. Ask the cluster's support for dedicated information.
- For the current moment, because of the ParaView application architecture limitations, ParaVis module has the following known limitations:
  - ParaVis module works unstably using a remote connection; when SALOME is running on a remote computer, activation of ParaVis module can sometimes lead to the application hang-up.
  - Different visual artifacts may take place in ParaView or VTK viewer when using a remote connection; this is a limitation of indirect rendering: ParaView uses OpenGL 2.0 backend which some features are not supported by indirect rendering.
  - ParaVis module compilation can fail on 64-bit platforms when building `ParaMEDCorba` plugin (due to crash of `kwProcessXML` tool during generation of the plugin documentation). In such case it is necessary to unset `VTK_AUTOLOAD_PATH` environment variable and restart the compilation, for example:

    ```
    $ unset VTK_AUTOLOAD_PATH
    ```

  - Loading big files in ParaVis might render SALOME instable. This problem is expected to be fixed in one of the next releases; it can be temporarily avoided in the current version by applying one of the two solutions below:

  - In ParaVis settings (ParaView tab → RenderView tab), increase the amount of memory under "Remote/Parallel rendering options" to something bigger than the default 20 MB (for example 200 MB).

- ParaView application may crash during start-up on Linux because of graphics card driver's limitations. The following workaround may help solving this issue:

```
$ export VTK_DISABLE_VISRTX=1
$ export VTK_DISABLE_OSPRAY=1
```

- Med library (`medfichier`) can read only MED files of version 2.2 and newer.
- Users can experience OpenGL issues when running SALOME on virtual machines or with Intel graphic chipset. If such issue occurs, use `run_mesa_salome.bat` to launch SALOME.
- For Windows 10 operating system, the Microsoft Visual C++ Redistributable for Visual Studio 2017 is required. It can be downloaded from the official Microsoft site:

  https://support.microsoft.com/en-us/help/2977003/the-latest-supported-visual-c-downloads

  For convenience, the distributable is included into the SALOME archive as well.
- Because of the known 8192 character command line limit, On Windows, the installation directory should be as short as possible, e.g. C:\SALOME-9.9.0.
- On Linux and Windows, the installation folder should not contain spaces or special characters.
- There are known issues about behavior of the automatic link between Shaper and Mesh. The behavior will not be optimal if several iterations between the two modules are done by the user.
- When invoking context help from dialogs of Shaper module, an error message can be observed in the case of using old versions of Firefox as the default browser:

```
PCOMGlueLoad error for file /usr/lib64/firefox/libxul.so:
/usr/lib64/firefox/libxul.so: undefined symbol: FT_Palette_Select
Couldn't load XPCOM.
```

  This error message happens, for instance, with Firefox v75. The problem is caused by incompatibility of freetype library, shipped with SALOME, with old versions of Firefox.

  The problem is not reproduced with newer versions of Firefox (e.g. v89). To solve mentioned problem, we suggest installing latest version of Firefox, or using other browser (e.g. Chrome) as the default one.
- Users can experience problem with launching SALOME because of absence of Python 3. For SALOME, Python 3 is a mandatory pre-requisite. It is available as a native package on most of Linux distributions, so if you experience this problem, just install the corresponding package. For example, on Debian or Ubuntu:

```
$ apt install python3
$ update-alternatives --install /usr/bin/python python /usr/bin/python3 1
```

  If you aren't able to install Linux packages (e.g. because of lack of permissions), you can use one of the following workarounds:

  a) Source environment file supplied with SALOME distribution:

```
$ . env_launch.sh
$ salome
```

  b) Generate bash script and use it as a launcher instead of default one:

```
$ ./install_bin.sh
$ sat launcher SALOME-9.9.0 --exe runSalome.py -n salome.sh
$ salome.sh
```

- There is a known problem with saving / loading big studies. The problem is caused by SALOME architecture and CORBA used as the transport between components. CORBA has 2 GB data transfer limit, so one may experience a problem with saving / loading big studies in default mode. This problem can be partially bypassed by using “multi-file” save-mode.
- SALOME version 9.7 introduced a “Session Less” mode allowed using SALOME API without launching CORBA servers. There is a known limitation that “session less” and “standard” modes cannot be mixed in the same session as this may cause various artifacts.
- On Fedora 32 and 34 platforms, users can experience issue displaying SALOME icons. The issue can be resolved as follows:

```
$ dnf install qt5ct
$ export QT_QPA_PLATFORMTHEME=qt5ct
$ qt5ct
```

Then, in qt5ct interface, choose "Fusion" instead of "Adwaita" or "Breeze" that are causing some issues.