Autodesk® DirectConnect 2012

User's Guide

Autodesk®

Published by:
Autodesk, Inc.
111 McInnis Parkway
San Rafael, CA 94903, USA

Third-Party Software Credits and Attributions

Contents

What is Autodesk DirectConnect?

Autodesk® DirectConnect® is a family of data translators. Each of these translators imports a specific CAD file format into one or more of the following Autodesk software products.

- Autodesk® Alias®
- Autodesk® Maya®
- Autodesk® Showcase®
- Autodesk® Opticore® Studio

In addition, you can export some CAD file formats from some products with Autodesk DirectConnect.

Supported products and translators

The following tables provide a guide to the file formats and bit versions currently supported by DirectConnect in Autodesk products. Formats that require an additional license are noted.

Click any of the file formats to see more information about that specific format.

Autodesk Alias Import

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, Snow Leopard, 64 bit
SolidWorks (page 47) ®(1)		Not available
Pro/ENGINEER (page 45) ®		Not available
CATIA V5 (page 20) ®		Not available
CATIA V4 (page 23)		Not available
NX (page 53)	 Additional license required	Not available
Autodesk Inventor (page 26) ®		Not available

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, Snow Leopard, 64 bit
STEP (page 49)	✓	✓
DWG DXF (page 28) ™	✓	✓
IGES (page 35)	✓	✓
Open Inventor™ and Cosmo™_ (page 41)	✓	Not available
JT (page 43)	✓	Not available
STL (Stereo-lithography)	✓	✓
SPF (Studio Packet File) (.wire)	✓	✓

NOTE

(1) Before you can import SolidWorks files, you must purchase, install, and license SolidWorks® 2005, 2006, 2007, 2008, 2009, or 2010 on the same machine, and have it running.

Autodesk Alias Export

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, Snow Leopard, 64 bit
IGES (page 35)	✓	✓
NX (page 53)	✓ Additional license required	Not available
ZPR (page 33)™ (for Rapid Prototyping)	✓	Not available
DWG DXF (page 28)	✓	✓
STL (Stereo-lithography)	✓	✓
SPF (Studio Packet File) (.wire)	✓	✓

Autodesk Showcase

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit
SolidWorks (page 47) (1)	✓

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit
Pro/ENGINEER (page 45)	✓
CATIA V5 (page 20)	✓
CATIA V4 (page 23)	✓
NX (page 53)	✓ Additional license required
Autodesk Inventor (page 26)	✓
Open Inventor and Cosmo (page 41)	✓
STEP (page 49)	✓
STL (page 51)	✓
DWG DXF (page 28)	✓

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit
IGES (page 35)	✓
JT (page 43)	✓

NOTE

(1) Before you can import SolidWorks files, you must purchase, install, and license SolidWorks® 2005, 2006, 2007, 2008, 2009, or 2010 on the same machine, and have it running.

Autodesk Maya Import

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, Snow Leopard, 64 bit
SolidWorks (page 47) (1)	✓	Not available
NX (page 53)	✓ Additional license required	Not available
Pro/ENGINEER (page 45)	✓	Not available

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, Snow Leopard, 64 bit
Autodesk Inventor (page 26)	✓	Not available
Open Inventor and Cosmo (page 41)	✓	Not available
STEP (page 49)	✓	✓
STL (page 51)	✓	✓
DWG DXF (page 28)	✓	✓
IGES (page 35)	✓	✓
JT (page 43)	✓	Not available

NOTE

(1) Before you can import SolidWorks files, you must purchase, install, and license SolidWorks® 2005, 2006, 2007, 2008, 2009, or 2010 on the same machine, and have it running.

Autodesk Maya Export

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit	Apple® Mac OS® X® 10.6 or higher, Snow Leopard, 64 bit
NX (page 53)	✓ Additional license required	Not available
STL (page 51)	✓	✓
DWG DXF (page 28)	✓	✓
IGES (page 35)	✓	✓

Autodesk Opticore Studio

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit
SolidWorks (page 47) (1)	✓
Pro/ENGINEER (page 45)	✓
CATIA V5 (page 20)	✓

File Format	Microsoft®Windows® XP, Windows® 7, Windows Vista®, 32-bit and 64 bit
CATIA V4 (page 23)	✓
NX (page 53)	✓ Additional license required
Autodesk Inventor (page 26)	✓
Open Inventor and Cosmo (page 41)	✓
STEP (page 49)	✓
STL (page 51)	✓
DWG DXF (page 28)	✓
IGES (page 35)	✓
JT (page 43)	✓

NOTE

(1) Before you can import SolidWorks files, you must purchase, install, and license SolidWorks® 2005, 2006, 2007, 2008, 2009, or 2010 on the same machine, and have it running.

What's New in This Release

2

This section outlines the new features and improvements in Autodesk® DirectConnect® 2012.

New Features

The following are new features in this release:

- Autodesk Inventor assembly feature geometry is preserved.

- The analytic curve types line and circular arc in Alias Wire file are preserved when exported to IGES, NX, and DWG formats.
- Support is added for:
  - Recent file formats of CATIA V5 (R20), NX (7 and 7.5), Granite, JT, and STEP. Also recent update with DWG and Inventor formats.
  - OpenInventor and Cosmo Binary on 64 bit machines.
  - SolidWorks on 64 bit machines.

Improvements

The following are improvements to the software in this release.

- CATIA V5
  - CATIA V5 CGR files performance on import.
  - The accuracy of imported independent polynomial curves and edge polynomial curves from CATIA V5 is noticeably improved.
  - Some surface types, such as extrude surfaces and fillets, import more accurately under certain conditions.
- DWG mesh translation and color translation for layeers and block references.
- IGES quality and stabilization.
- JT mesh translation and support for JT polygonset.
- NX import and export. Layers and categories are preserved (especially during round trip).
- IGES import and export. Layers are preserved.

Installation and Licenses

3

Install Autodesk DirectConnect

Autodesk® DirectConnect® software installs automatically when the following Autodesk software is installed:

- Autodesk® Alias®
- Autodesk® Maya®
- Autodesk® Showcase®

For information about installing these software products, refer to their respective installation guides.

Autodesk DirectConnect software is provided on the media with Autodesk® Opticore® Studio software, in the Autodesk DirectConnect 2012 folder. It requires manual installation.

NOTE

- When installing DirectConnect, install the same version, such as 32-bit or 64-bit, as your Autodesk Opticore Studio.
- DirectConnect Help is supported only on Microsoft® Internet Explorer®. Performance on other browsers does not provide consistent results.

Support platforms

Autodesk DirectConnect runs on the same platform as the Autodesk product it installs with:

Autodesk Software	Microsoft® Windows® XP, Windows® 7, Windows Vista® , 32-bit and 64-bit	Apple® Mac OS® X® 10.6 or higher, Snow Leopard 64-bit
Autodesk Alias		
Autodesk Maya		
Autodesk Showcase		Not available
Autodesk Opticore Studio		Not available

System requirements

Autodesk DirectConnect requires the following amount of available disk space:

- Windows XP, Windows Vista, or Windows 7: 671 MB for 32-bit, and 838 MB for 64-bit.
- Mac OS X: 10.6 or greater. On Snow Leopard: 65 MB on an Apple Mac computer with 64-bit Intel processors. PowerPC (PPC) computers are no longer supported.

DirectConnect installs with other products, so your system must also accommodate the host product requirements. (For the system requirements of the host product, consult the appropriate installation guide.)

NOTE For the most up-to-date information about hardware qualifications, see Qualified Hardware.

Deploy software with group policies for Windows

Microsoft® Active Directory® technology provides the capability for software to be remotely installed from a server distribution point to client computers. The client computers must be members of an organizational unit (OU) in the Active Directory. Software deployment is controlled by configuring the software installation policy of the group policy object (GPO) associated with that OU. The software installation occurs automatically at boot time; no user intervention is required.

Disclaimer

The description of methods presented here is provided to aid those looking for a straight forward, Microsoft supported means for deployment of software over a Local Area Network. If the Microsoft Group Policy based mechanism does not provide sufficient control or features for the size or complexity of your network environment, we recommend that you consider more advanced Microsoft solutions, or other third party solutions.

Prerequisites

- Active Directory must be installed and configured.
- Client computers must have Microsoft Installer (MSI) version 3.0 or newer installed.

Configure for group policies

1. Create a Distribution Point.
2. Assign the application to client computers.
3. Verify the installation.

   NOTE

   Consult Microsoft Knowledge Base Article #816102 for more details, including information on how to redeploy or remove a package.

Create a distribution point

A distribution point is a shared network location containing the package(s) to install.

To create a distribution list

1. Log on to the appointed server as Administrator.
2. Create a shared network folder.
3. Grant permissions as appropriate. Permission to modify the contents of this folder is typically granted to an administrator or select group of users. All other users are restricted to read access.
4. Copy the .msi files for the package(s) to be deployed into this folder.

Assign a package to client computers

The Software Installation section of the group policy object specifies the software packages to be deployed.

To assign a package for deployment

1. On the Windows **Start** menu on the server, click **All Programs (or Programs) > Administrative Tools > Active Directory Users and Computers**.
2. Browse to the organizational unit (OU) in the Active Directory tree, right-click, and click **Properties**. The Properties dialog box for the OU selected displays.

   NOTE

   For the Group Policy Object to take effect, the client computer objects must be members of the OU selected.

3. On the Group Policy tab, click **New**. Enter a name for the GPO (for example, Alias Computer Assigned Installation). The GPO is created and added to the Group Policy Object Links list.
4. In the Group Policy Object Links list, click the GPO you created, then click **Edit**.
5. In the Group Policy Object Editor, left pane, under computer Configuration, click the plus sign (+) next to the Software Settings folder to expand it.
6. Under Software Settings, right-click Software Installation, then click **New > Package**.
7. Enter the UNC path to the desired package located in the distribution point created in the previous section, then click **Open**. For example, `\\server\share\Alias.msi`

NOTE

Do not browse to the network location. Enter the UNC path into the File name box.

8 Select **Assigned**, and click **OK**. Wait until an entry for the package displays in the right pane of the Group Policy window.

9 Repeat steps 7 and 8 for all packages to be deployed.

10 Close the Group Policy window and any other open Active Directory windows.

The package is now assigned to all computers that are members of the OU for which the GPO was created. The next time a computer in the OU restarts, the program installs and is available for all users of the computer.

NOTE

Windows® XP is shipped with Fast Logon Optimization enabled. Due to this feature, two reboots are required before the software is installed. Microsoft Knowledge Base Article #305293 describes the Fast Logon Optimization feature, along with instructions on how to disable it.

Test and verify the deployment

When a computer restarts, the operating system displays messages about group policy, usually before or after the Windows Login dialog box displays. These messages include the following:

- Windows starting up.
- Applying computer settings.
- Installing managed software.
- Applying software installation settings.
- Loading your personal settings.
- Applying your personal settings.

To verify that the package is correctly assigned to a computer, restart a computer that is in the OU for which the GPO was created. The program installs during the boot sequence, before the login prompt displays. After login, the application is located in the Programs menu in the same location as if it was installed locally.

NOTE

If problems arise, an entry is logged in the system Event Viewer, under Applications.

References

- Microsoft Knowledge Base Article #816102: How to use Group Policy to Remotely Install Software in Windows Server 2003.
- Microsoft Knowledge Base Article #305293: Description of Windows XP Professional Fast Logon Optimization Feature.

Import files

Import CAD files into Autodesk® software.

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

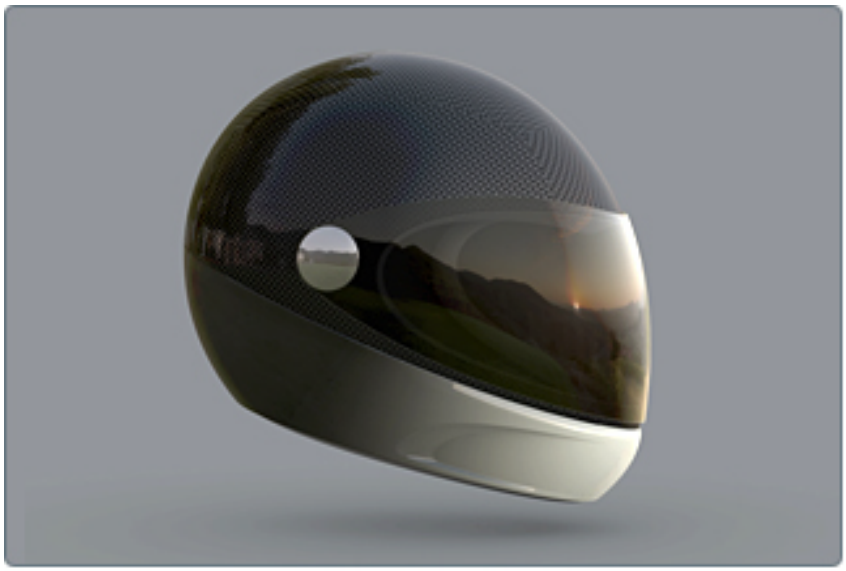
1. In your Autodesk software, choose the appropriate menu item.
2. In the browser, select the file to import. If you cannot see the file, it is not supported, or its translator is not licensed.

   For Maya, select the import type, such as DWG_DC.
3. Click **OK**.

   The translator automatically launches and the file imports into the scene.

Translator Details

4



CATIA V5

CATIA® is computer-aided design software from Dassault Systèmes.

For information about the Autodesk® products that support this format, see Supported products and translators (page 2).

Software prerequisites

Install the Autodesk product where you plan to import files using this format. The Autodesk DirectConnect software installs at the same time.

Import CATIA V5 files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**

To import a CAD file into...	Choose...
Autodesk Showcase	**File** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. In the browser, select a CATIA V5 (`*.CATProduct` ,`*.CATPart`, or `*.cgr`) file.
3. Click **OK**.

   The translator launches automatically, and the file imports into the scene.

Types of data imported

We support the import of files from CATIA V5 releases R20 and earlier, and the following types of data:

- Point
- Line
- Arc
- Ellipse
- Parabola
- Hyperbola
- BSpline curve
- Polynomial curve
- Plane
- Cylindrical surface
- Conical surface
- Spherical surface
- Toroidal surface
- BSpline surface
- Revolve surface
- Ruled surface
- Open body

- Solid body
- Layer
- Geometric set
- Part (from CATIA V5 release 6 and higher)
- Product (from CATIA V5 release 6 and higher)
- Attributes (RGB color, layer, name, visibility, and materials)
- Per face color assignments
- Cloud mesh data
- Tessellated data
- Weld data

NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 61).
- In Autodesk Alias, look for options for specifying data importation. See the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help
- For definitions about these data types, consult your CATIA documentation.

File formats referenced

The following are some of the file formats that can be referenced by CATIA V5 assembly files:

- .CATProduct
- .CATPart
- .model
- .cgr
- .stl

CATIA V4

CATIA is computer-aided design software from Dassault Systèmes.

Autodesk DirectConnect for CATIA V4 supports the import of CATIA V4 geometric sets, attributes, such as names, layers, RGB colors, and visibility, and the following CATIA file types:

- `.model`
- `.mdl`
- `.session`
- `.exp`
- `.dlv`
- `.dlv3`
- `.dlv4`

NOTE For information about the Autodesk® products that support this format, see Supported products and translators (page 2).

Software prerequisites

Install the Autodesk product where you plan to import files, using this format. The Autodesk DirectConnect software installs at the same time.

Import CATIA V4 files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. In the browser, select a CATIA V4 (`*.model`, `*.mdl`, `*.session`, `*.exp`, `*.dlv`, or `*.dlv3`) file.
3. Click **OK**.

   The translator launches automatically and the file imports into the scene.

Types of entities imported

DirectConnect supports CATIA model and export files produced with CATIA V4.xx and earlier V3RX Levels.

We support the import of the following SPACE (SP) entities:

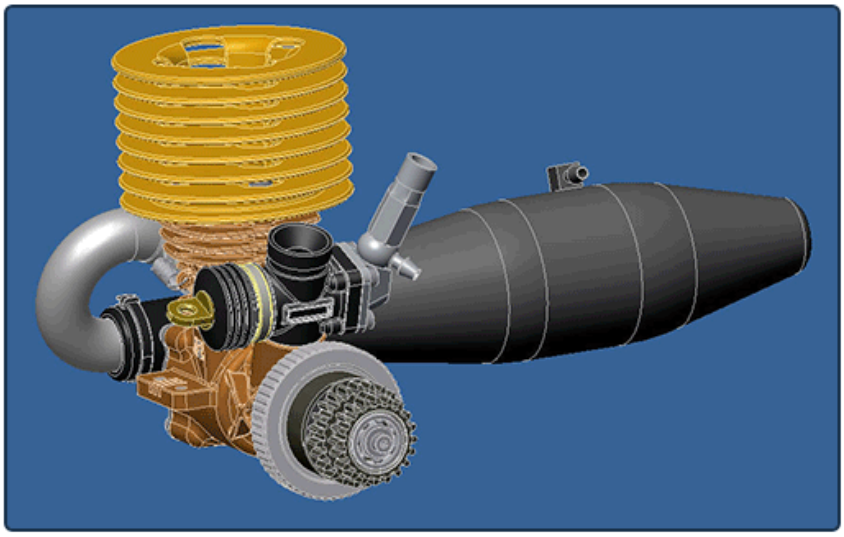
- Point (Type 1)
- Line (Type 2)
- Parametric curve (Type 3)
- Plane (Type 4)
- Parametric surface (Type 5)
- Face (Type 6)
- Volume (Type 7)
- Transformation (Type 9)

- Edge (Type 12)
- Circle (Type 20)
- Ellipse (Type 21)
- Parabola (Type 22)
- Hyperbola (Type 23)
- Polyhedral surface (Type 16)
- Composite curve (Type 24)
- Solids - Mockup (Type 17, secondary type 1)
- Exact solid (Type 17, secondary type 2)
- Space ditto (Type 28)
- Parametric skin (Type 35)
- NURB curve (Type 46)
- NURB surface (Type 47)

NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 61).
- In Autodesk Alias, look for options for specifying data importation. See the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.
- For definitions on these data types, consult your CATIA documentation.

Autodesk Inventor



Autodesk Inventor® is a 3D mechanical design, product simulation, tooling creation, and design communication software.

Autodesk DirectConnect supports the import of Autodesk Inventor part (`*.ipt`) and assembly (`*.iam`) files into supported Autodesk software.

Software Prerequisite

Install the Autodesk product where you plan to import files using this format. The Autodesk DirectConnect software installs at the same time)

Import Autodesk Inventor files

1. In your Autodesk software, choose the appropriate menu item. For example:
2. Browse to, and select an Autodesk Inventor part or assembly file (`*.ipt` or `*.iam`).
3. Click **OK**.

   The translator automatically launches and imports the file.

NOTE To maintain the original positioning and orientation of part files in your scene, import the assembly file. Importing part files before the assembly file positions all of them at the origin (0,0,0), and removes the original positioning.

Types of data imported

NURBS are imported, and the following additional information is maintained on import:

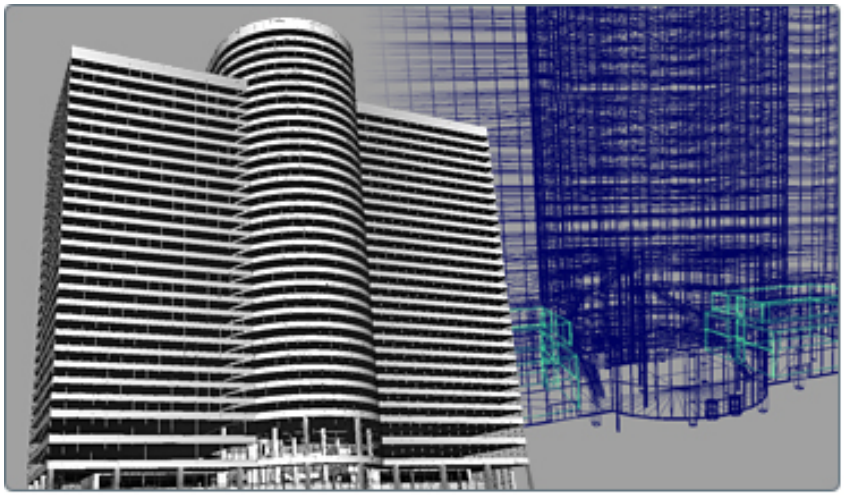
- BREP bodies
- Data organization
- Tolerances and units
- Material colors and simple transparency
- Weld maps (beads only)
- Thread maps
- Decals

NOTE For information about locating this data in your Autodesk software, see Locations of Imported Data (page 61).

Limitations

- Work sources, display meshes, and some 2D/3D sketches are automatically excluded when importing an Autodesk Inventor file.
- Some cylindrical surfaces (pipes) do not trim properly.

DWG DXF



Autodesk DirectConnect supports the import of AutoCAD® drawing files (DWG) and Drawing eXchange File (DXF™) files into supporting Autodesk products.

For information about Audodesk products that support these formats, see Supported products and translators (page 2).

Software prerequisites

Install the Autodesk product on the machine where you want to import files using this format. (The Autodesk DirectConnect software installs at the same time.)

Import DWG/DXF files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**

To import a CAD file into...	Choose...
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. Browse to, and select a DWG (.dwg) or DXF (.dxf) file.
3. Click **OK**.
   The translator automatically launches and imports the file.

Types of data imported

We support the import of the following types of DWG and DXF data:

- Colors
- Materials
- Lines, arcs, and splines
- Extruded curves
- Extrusions
- Layers
- Meshes
- Surfaces
- Text
- 3D solids

IMPORTANT

- Showcase does not support the AutoCAD material attribute **Illumination**. Alias supports the AutoCAD material attribute **Illumination**; however, it is called **Incandescence**.
- Showcase supports only 3D hierarchical data. It does not support 2D drawings.

NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 61).
- In Autodesk Alias, look for options for specifying data importation. See the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.
- DWG and DXF both support curves and round trip data export when **want curves** is set to ON. If they are not coming in, check to ensure that **want curves** is enabled.

Export DWG/DXF files (Autodesk Alias)

1. In your Autodesk software, choose **File > Save As**.
2. For details on the available options, see the Autodesk Alias Help.

DWF

Design Web Format (DWF™) is a file format developed by Autodesk for web viewing and printing.

Autodesk DirectConnect supports the export of Alias® tessellated model data to DWF format files (*.dwf) to view in Autodesk Design Review and Project Freewheel.

For information about the Autodesk products that support this format, see Supported products and translators (page 2).

Software prerequisites

Install Autodesk Alias. The Autodesk DirectConnect software installs at the same time.

NOTE For information about additional software setup for Autodesk Alias, please see the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.

Exporting DWF files

1. In Alias, select a file to be exported as a DWF, and choose **File > Export > Active As** or **File > Save As**.
2. On the **File Format** menu, select **DWF** (`.dwf`).
3. Set export options, and then click Save.

Option	Function
Export Curves	When turned ON, exports curves.
Export Symmetry	If an Alias layer has symmetry turned **ON**, this information and the geometric objects resulting from symmetry can be merged and converted, or left intact (unmerged) and converted. When turned **OFF**, layer symmetry is not exported.
Tessellator	When set to **Fast**, models triangulate quickly and less accurately. When set to **Accurate**, models triangulate slowly and more accurately. ■ **Tolerance** – The amount a polygonal surface can deviate from the original NURBS surface. The default value is 0.01. ■ **Limit Edge Length** – If checked, a Max edge length slider controls maximum size of the triangles. If unchecked, there is no limit to the size of the triangles. ■ **Max Edge Length** – The maximum length of any triangle edge (in current linear units).

Option	Function

Types of data exported

The DirectConnect translator for DWF exports only meshes. The Alias scene dag hierarchy is preserved. Associated color information is also exported.

NOTE Check the options in Alias to specify data importation. See the *Autodesk Alias Data Transfer* reference book and the Alias online help.

ZPR

ZPrint CAD format (ZPR™) is a proprietary file format developed by Z Corporation® and used with ZPrint and ZEdit for printing on high definition color 3D printers.

Autodesk DirectConnect supports the export of ZPR format files (`*.zpr`) to use in the Autodesk® Rapid Prototyping solution.

For information about the Autodesk products that support this format, see Supported products and translators (page 2).

Software prerequisites

- Install any of the following Autodesk products. The Autodesk DirectConnect software installs at the same time.
  - Autodesk Alias
  - Autodesk Showcase
  - Autodesk Maya
  - Autodesk Opticore Studio

NOTE For information about additional software setup for Autodesk Alias, see the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.

Exporting ZPR files using the output command

1. In Alias, select a file to be exported as a ZPR file and choose **File > Export > Rapid Prototype...**
2. On the **File Format** menu, click **ZPR** (`.zpr`).
3. Depending on the entity selected for export, such as a shell, additional setup can be required. For information about additional setup options, see the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.
4. Click **Save**.

Types of data exported

The DirectConnect translator for ZPR exports triangle meshes with simple colors and textures for use with ZEdit and Zprint software for rapid prototyping.

IGES

Initial Graphics Exchange Specification (IGES) is a file format for transferring graphics data between CAD/CAM systems.

Autodesk DirectConnect supports the import and export of the neutral IGES format files (`*.iges` or `*.igs`) from various CAD or modeling packages.

For information about the Autodesk products that support this format, see Supported products and translators (page 2).

Software prerequisites

Install any of the following Autodesk products. The Autodesk DirectConnect software installs at the same time.

- Autodesk Alias

  For information about additional software setup for Autodesk Alias, please see the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.
- Autodesk Showcase
- Autodesk Maya

Import IGES files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**

To import a CAD file into...	Choose...
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. In the browser, select a native IGES (`*.iges` or `.igs`) file.
3. Click **OK** .
   The translator launches, and imports the file into the scene.

Export IGES files

To export a CAD file into...	Choose...
Autodesk Alias	**File** > **Export** >
Autodesk Maya	**File** > **Export All** or **File** > **Export Selected**
Autodesk Showcase	**File** > **Export Models**
Autodesk Opticore Studio	**File** > **Export**

1. In your Autodesk software, choose the appropriate menu item.
2. Select a native IGES (`*.iges` or `.igs`) file from the file browser.
3. Click **OK** .
   The translator automatically launches and imports the file into the scene.

Troubleshoot (Autodesk Alias)

If the files you import contain unsatisfactory data, change the following import options in Autodesk Alias:

Default Trim Curves Specifies the trim curves that the processor uses. You can select parameter space curves, model space curves, or use the flag that is present in the IGES file. By default, the preference flag in the IGES files is used.

Shrink Surface When turned ON, Alias detects trimmed surfaces with trim boundaries that are the same as, or isoparametric to, the natural boundaries of the untrimmed surface. It then converts these surfaces into Alias surfaces by shrinking the untrimmed surface to the trim boundaries.

When turned OFF, Alias converts all trimmed surfaces of this type to Alias trimmed surfaces.

Types of data imported

The DirectConnect for IGES translator imports ASCII format IGES files with or without linefeed characters at the end of each record. The software does not support Binary IGES files.

The software imports NURBS for this file format and maintains the following information on import:

- Surfaces and curves
- Data organization (groups, layers, visibility, and instances)
- Units
- Colors

NOTE

- For information about this data in your Autodesk software, see Locations of Imported Data (page 1).
- Check the options in Alias to specify data importation. See the *Alias Data Transfer* reference book and the Alias Help.

Identify IGES supported entities in log files

The following table shows IGES entities supported on import by DirectConnect for IGES.

NOTE The input translator ignores any entities with an entity use flag value 02 (Definition), except for entity use flag value with IGES Subfigure Definition entity (Type 308).

Type	Form	IGES Entity
100	0	circular arc
102	0	composite curve
104	0-3	conic arc, ellipse, parabola, hyperbola
106	1	copious data
106	2	copious data
106	11	copious data
106	12	copious data
106	63	closed area
108	0	plane
108	+/- 1	bounded plane
110	0	line
112	0	parametric curve
114	0	parametric surface
116	0	point
118	0 - 1	ruled surface

Type	Form	IGES Entity
120	0	surface of revolution
122	0	tabulated cylinder
123	0	direction
124	0	transformation matrix
126	0-5	rational B-spline curve
128	0-9	rational B-spline surface
130	0	offset curve
140	0	offset surface
141	0	boundary entity
142	0	curve on surface
143	0	boundary surface
144	0	trimmed surface
186	-1,0,1	Manifold Solid BRep Object (MSBO)
190	0,1	plane surface
192	0,1	right circular cylindrical surface
194	0,1	right circular conical surface
196	0,1	spherical surface

Type	Form	IGES Entity
198	0,1	toroidal surface
308	0	subfigure definition
402	7, 9	associativity instance
408	0	singular subfigure instance
502	1	vertex list
504	1	edge list
508	0,1	loop
510	1	face
514	1,2	shell

IGES levels

The system adds all supported geometric IGES entities that are associated with IGES level <n> to an Alias layer called LEVEL<n>.

For example, if a 126 B-spline entity directory entry indicates that it is on level 42, then it is added as Layer LEVEL42.

Open Inventor and Cosmo

Open Inventor is a 3D file format from Silicon Graphics Inc., with no relation to Autodesk Inventor software.

Autodesk DirectConnect supports the import of Open Inventor™ ASCII or binary files (*.iv), or Cosmo 3D™scene binary files (*.csb) into supported Autodesk software.

For information about the Autodesk products that support these formats, see Supported products and translators (page 2).

Software prerequisites

Install the Autodesk product where you plan to import files using these formats. The Autodesk DirectConnect software installs at the same time.

Import Open Inventor or Cosmo files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**

To import a CAD file into...	Choose...
Autodesk Opticore Studio	**File** > **Import**

1. Choose the appropriate menu choice.
2. Browse to and select an Open Inventor (`*.iv`) or Cosmo (`.csb`) file.
3. Click **OK**.

   The translator launches and imports the file.

Type of data imported

The software imports polygons and NURBS for these file formats, and maintains the following information on import:

- Data organization (parent, child, and groups)
- Units
- Materials
- Textures
- Polygonal Shapes
- Transformation nodes

NOTE For information on locating this data in your Autodesk software, see Locations of Imported Data (page 1).

Limitations

When importing Open Inventor files, the system automatically excludes lines, cameras, lights, manipulators, tolerances, and animation.

JT

The JT Open Program develops and supports the DirectModel format JT for the visualization of 3D models.

For information about the Autodesk products that support this format, see Supported products and translators (page 2).

Software prerequisites

Install the Autodesk product where you plan to import files using these formats. The Autodesk DirectConnect software installs at the same time.

Import JT files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**

To import a CAD file into...	Choose...
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. In the browser, select a (`*.jt`) file.
3. Click **OK**.

   The translator launches, and imports the file into the scene.

Type of data imported

The software maintains the following information when importing JT files:

- Precise geometric data conversion
- Data organization (parent and child hierarchal data, visibility, and instances)
- Units
- Levels of detail (degrees of tessellation)
- Materials (brightness (shininess), ambient color, specular color, diffuse color, and emission color)
- Textures (embedded image files)
- XT BRep and JT BRep topology

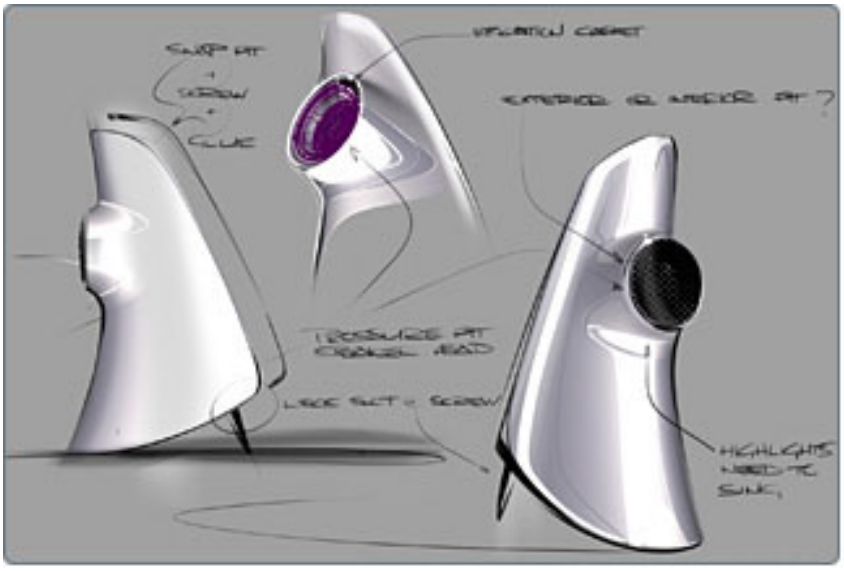
NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 1).
- In Autodesk Alias, look for options for specifying data importation. See the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.

Limitations

- Import options are not available.
- The software automatically excludes curve geometry and animation when importing a JT file.

Pro/ENGINEER



Autodesk DirectConnect supports the import of Pro/ENGINEER® part, assembly, or PTC® Granite® files (*.prt, *.asm, or *.g) into supported Autodesk software.

For information about the Autodesk products that support this format, see Supported products and translators (page 2).

Software prerequisites

- Install the Autodesk product where you plan to import files using these formats. The Autodesk DirectConnect software installs at the same time.
- Pro/ENGINEER files from your CAD software using Wildfire™ Release 5 (or lower) or PTC Granite Release 6 (or lower) specifications.

NOTE For information about additional software setup for Autodesk® Alias®, see the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.

Import Pro/ENGINEER files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. Select a Pro/ENGINEER part, assembly, or Granite file (`*.prt`, `.asm`, or `*.g`).
3. Click **OK**.

   The translator launches and imports the file.

   NOTE To maintain the original positioning and orientation of part files in your scene, import the assembly file. Importing part files before the assembly file positions all of them at the origin (0,0,0) and removes the original positioning.

Type of data imported

The software imports NURBS for this file format and maintains the following data on import:

- Precise geometric surface and topology information
- Data organization
- Tolerances and units.

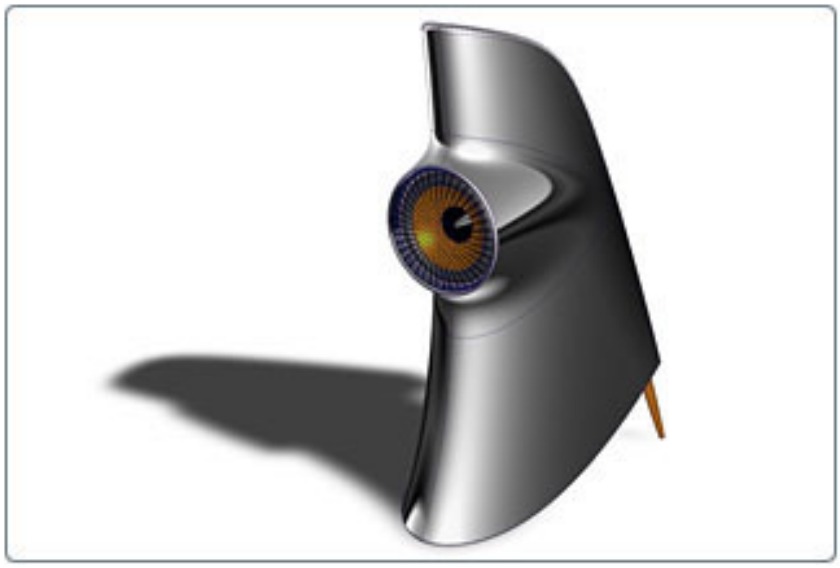
NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 61).
- In Autodesk Alias, look for options for specifying data importation. See the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.

Limitations

- The software changes node names based on geometry, assembly, or part names.
- When importing a Pro/ENGINEER file, the software automatically excludes construction history, lines, and animation.
- Granite does not support layers or curves.

SolidWorks



Autodesk DirectConnect supports the import of SolidWorks® part and assembly files (`*.sldprt` and `*.sldasm`) into supported Autodesk software, provided you have SolidWorks installed, licensed on your machine, and running.

For information about the Autodesk products that support this format, see Supported products and translators (page 2).

Software prerequisites

- Install the Autodesk product where you plan to import files using these formats. The Autodesk DirectConnect software installs at the same time.

- Install and license SolidWorks Versions 2005, 2006, 2007, 2008, 2009, or 2010 on the same machine.

NOTE For information about additional software setup for Autodesk Alias, please see the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.

Import SolidWorks files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. Select a SolidWorks part or assembly file (`*.sldprt` or `*.sldasm`). (If you cannot see the files, start the SolidWorks software, minimize its window, and then try again to open the files.)
3. Click **OK**.

   The translator launches and imports the file into the scene.

   NOTE To maintain the original positioning and orientation of part files in your scene, import the assembly file. Importing part files before the assembly file positions all of them at the origin (0,0,0) and removes the original positioning.

Type of data imported

The software imports NURBS for this file format and maintains the following information on import:

- Precise geometric surface and topology information
- Data organization
- Tolerances and unit
- Colors

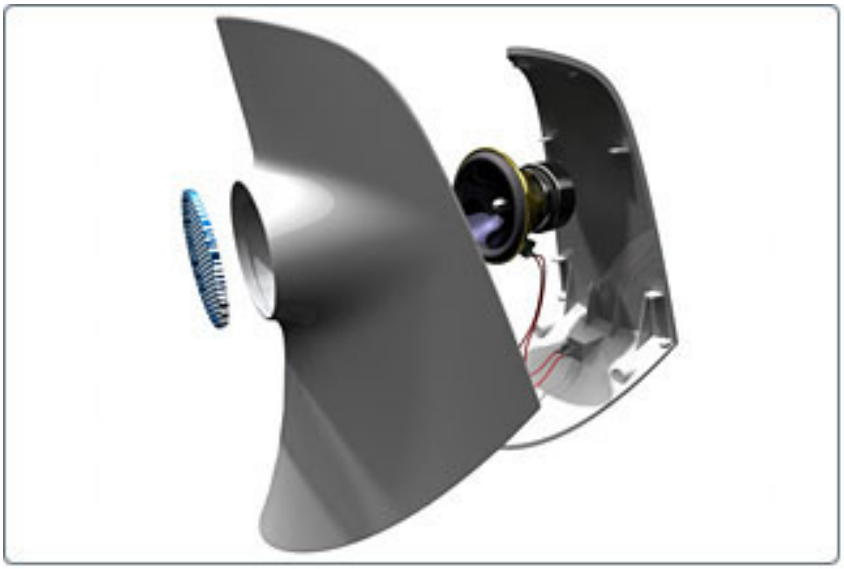
NOTE

- For information about locating this data in your Autodesk software, see Locations of Imported Data (page 61).
- In Autodesk Alias, look for options for specifying data importation. See the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias online help.

Limitations

When importing SolidWorks files, the software automatically excludes construction history, lines, and animation.

STEP



Autodesk DirectConnect supports the import of STEP files (*.stp or *.step).

For information about the Autodesk products that support this format, see Supported products and translators (page 2).

Software prerequisites

- Install the Autodesk product where you plan to import files using these formats. The Autodesk DirectConnect software installs at the same time.
- Export STEP files from the CAD software using AP203 or AP214 specifications.

Import STEP files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. In the browser, select a native STEP (*.stp or *.step) file.
3. Click **OK**.

   The translator automatically launches and imports the file into the scene.

Type of data imported

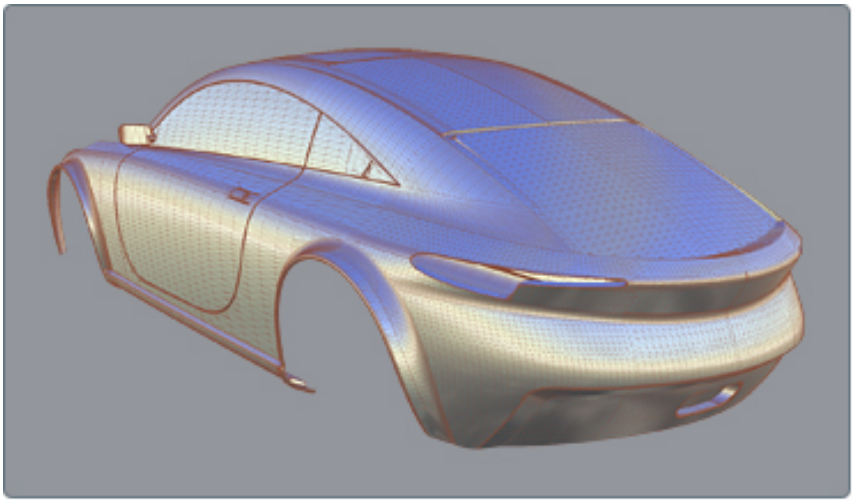
The software imports NURBS for this file format and maintains the following information on import:

- Precise geometric surface and topology information (ISO 10303:42)
- Data organization (layers)
- Tolerances and units
- Colors

NOTE

- To locate this data in your Autodesk software, see Locations of Imported Data (page 61).
- In Autodesk Alias, look for options for specifying data importation. See the *Autodesk Alias Data Transfer* reference book and the Autodesk Alias Help.

STL



Autodesk DirectConnect supports the import and export of STL files.

For information about the Autodesk products that support this format, see Supported products and translators (page 2).

For information about the Autodesk products that support this format and whether a license is required, see Supported products and translators (page 2).

Software prerequisites

Install the Autodesk product where you plan to import files using these formats. The Autodesk DirectConnect software installs at the same time.

Import STL files

To import a CAD file into...	Choose...
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk software, choose the appropriate menu item.
2. In the browser, select a native STL (Stereolithography) filer.
3. Click **OK**.
   The translator automatically launches and imports the file into the scene.

Export STL files

To export an STL file into...	Choose...
Autodesk Maya	**File** > **Export All** or **File** > **Export Selection**
Autodesk Alias	**File** > **Export** > **Fast Prototype...**

1. In your Autodesk software, choose the appropriate menu item.
2. In Maya, you can specify:
   - The file format, (f bool) either ASCII or binary.
   - The scaling factor (s float), which is set to 1 by default.
   - Whether to process the colors for the STL file (w bool).
   - Click **OK**.

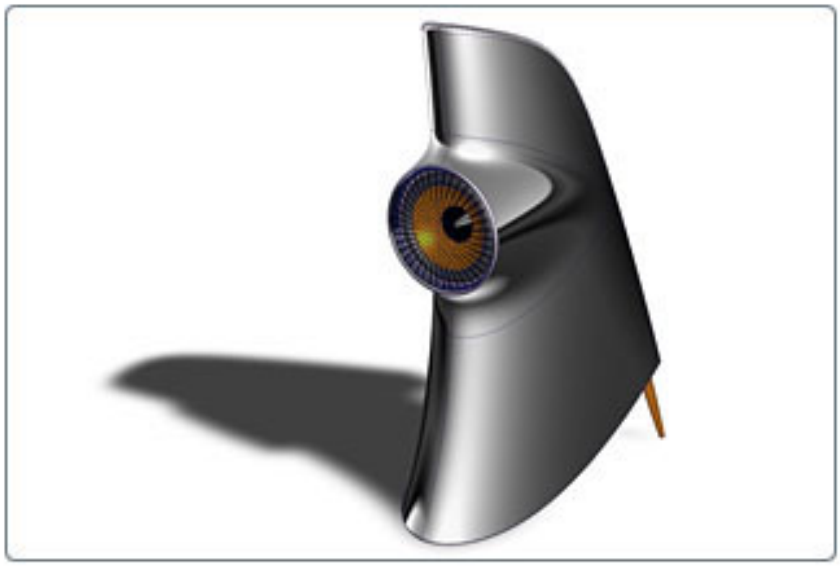
   In Alias, you can specify the:
   - File format
   - Tolerance levels used in the export of the file
3. Pick the meshes or shell to export, then click **Accept**.

Type of files imported

ASCII and binary STL (color STL) files are supported.

NOTE To locate this data in your Autodesk software, see Locations of Imported Data (page 61).

NX



Autodesk DirectConnect supports the import of NX files (Version 7.5 and earlier) into supported Autodesk software.

For information about the Autodesk products that support this format, and license requirements, see Supported products and translators (page 2).

Software prerequisites

- Install the Autodesk product where you plan to import files using these formats. The Autodesk DirectConnect software installs at the same time.
- For more information on how to purchase a license, go to the DirectConnect Web site. (See Installation and Licenses (page 1).) To install

a license, refer to the *Install_DirectConnect.pdf* document found on the installation CD.

Import UGS NX files

To import a CAD file into...	Choose...
Autodesk Alias	**File** > **Open** or **File** > **Import** > **File**
Autodesk Maya	**File** > **Open Scene** or **File** > **Import**
Autodesk Showcase	**File** > **Import Models**
Autodesk Opticore Studio	**File** > **Import**

1. In your Autodesk import files, choose the appropriate menu item.
2. In the browser, select a (`*.prt`) file. (The software supports NX part and assembly (`.prt`) files version V13.0 to NX 7.5).

   For details, about import options in Alias, see the *Alias Data Transfer* reference book and the Alias Help.
3. Click **OK**.

   The translator automatically launches and imports the file into the scene.

Export NX files (Autodesk Alias)

To export a CAD file from...	Choose...
Autodesk Alias	**File** > **Save As**
Autodesk Maya	**File** > **Export all** or **File** > **Export selected**

To export NX files from Autodesk Alias:

1. In your Autodesk software, choose the appropriate menu:
2. See the Alias documentation for details about how to build a model for maximum compatibility between NX and Alias.

NX proprietary format

NX is a solid modeling package based on the Parasolid kernel. The package contains many (mostly optional) modules, for example CAD, CAM, CAE, sheet metal applications, knowledge bases, quality control, and rapid prototyping. The file structure is binary.

Supported NX geometry and data mapping

The following sections describe the mapping process used for geometry types and non-geometric data transfers between Alias and NX.

Supported Alias geometry types

You can export the following Alias geometry to NX. Non-geometry entities, such as lights, cameras, textures, windows, and animations are not supported by the translator. The numbers in the table entries refer to *Notes for NX entities* following the table.

Alias Entity	NX Entity
Conic (ellipse/hyperbola/parabola)	Bcurve
Conic	Curve
Circle	Circle
Line	Line
Curve	BCurve
Surface	BSurface (1), (2)
Trimmed Surface	Face (1), (2)
Plane	Bsurface (1), (2)
Shader	Colour Attribute (3)

Alias Entity	NX Entity
Shell (Open)	Sheet Body
Shell (Closed)	Solid Body
Layer	Layer (4)
Category	Category

Notes for NX entities

(1) NX cannot have free-standing surfaces, so it maps all surfaces to faces which must be attached to a sheet body.

(2) Splits appear in surfaces that have internal discontinuities at the discontinuities.

(3) Mapped as a Display Attribute of the mapped surface or shell.

(4) Layer name is not mapped.

Supported NX entity objects geometry types (Alias)

Alias imports the following NX geometry types. The letters and numbers in parentheses refer to *Notes for NX entities* following the table.

NX Entity Objects	Alias Entity
BSurface	Surface
Bounded Plane	Surface
Cylindrical Surface	Surface
Conical Surface	Surface
Tabulated Cylinder	Surface
Rules Surface	Surface

NX Entity Objects	Alias Entity
Blended Face Surface	Surface
Surface of Revolution	Surface
Offset Surface	Surface
Sculptured Surface	Surface
BCurve	Curve
Line	Line (Curve)
Bcurve	Curve
Point	Point (Curve) (1)
Sheet Body	Shell (Open) (2)
Assembly	Groups/Instance (3)
Layer	Layer
Category	Category

Notes for Alias NX (object) entities

(1) An NX point converts to a degree 1 curve composed of two coincident points. On export to NX, this construction converts back to an NX point.

(2) If the sheet body only points to one face, then Alias converts the face to a trimmed surface.

(3) This is a one-way mapping. Assemblies cannot be exported.

(4) Added as blind data. Can be re-exported.

Types of data imported

Autodesk DirectConnect supports the following NX geometry types. (It supports attributes such as name, color, layer, and visibility.)

- Point
- Line
- BCurve
- Circle
- Ellipse
- Parabola
- Hyperbola
- Surface Parameter Curve
- Trimmed Curve
- Intersection Curve
- BSurface
- Planar Surface
- Spherical Surface
- Cylindrical Surface
- Conical Surface
- Surface of Revolution
- Spun Surface
- Offset Surface
- Ruled Surface
- Swept Surface
- Toroidal Surface
- Blended Edge Surface
- Blended Bound Surface
- Facet
- Sheet Body
- Solid Body
- Part
- Instance
- Assembly

- Category

Locations of Imported Data

5

Autodesk Alias Data

Data Organization	Tolerances and Units	Colors (Shaders)
Parts and assembly information displays in the **Windows** > **Information** > **Layer Categories** window.	View unit settings at **Preferences** > **Construction Options**.	Colors are visible in the **Render** > **Multi-lister** > **Shaders** window.

For information about these settings, menu items, and options, see the *Autodesk Alias Data Transfer* reference book and the Autodesk® Alias® Help.

Autodesk Maya Data

Data Organization	Tolerances and Units	Colors (Shaders)
View Layer information on the **Display** > **UI Elements** > **Channel Box/Layer Editor** menu and the	View unit settings from **Window** > **Settings/Preferences** > **Preferences**.	Colors are imported as shaders and are visible for either the **Window** > **Rendering Editors** > **Hyper-**

Data Organization	Tolerances and Units	Colors (Shaders)
Window > **Relationship Editors** > **Display Layers** menu. View part and assembly information is visible on the **Window** > **Outliner** menu or the **Window** > **Hypergraph** menu.	Change the **Working Units** and **Tolerances** on the **Categories** tab in **Settings**.	**shade** or **Window** > **Rendering Editors** > **Multilister** window.

For more information about these settings and menu items, see the Autodesk® Maya® Help.

Autodesk Showcase Data

Data Organization	Tolerances and Units	Colors (Shaders)
View Layers, parts, and assembly hierarchies in the Organizer window (**Scene** > **Organizer**). This window shows the original file hierarchy. You can create your own arrangements of objects. You can view and change the state of objects to visible, hidden, or deleted.	Change unit settings in the **Import Status** window (**File** > **Show Status**). See the Showcase documentation for more information. Change tessellation quality in the **Import Status** window. See the Showcase documentation for more information. To adjust the Level of Detail (LOD) for models imported into Showcase, select **Options** > **Performance and Quality**. Then click the **Lock display quality to** button, and adjust the slider to see the different LODs.	Colors are imported as materials and are visible from **Material** > **Material Properties**.

For more information about these settings and menu items, see the Autodesk® Showcase® Help.

Autodesk Opticore Studio Data

Data Organization	Tolerances and Units	Colors (Shaders)
View the node structure in the **Scene Graph Editor**, in the **Window > Scene Graph Editor** menu. It opens by default.	There are no units in Studio. All imported data is considered the same unit. Set tolerances for tessellation in the **File > Preferences** dialog box, **GeomX** tab. **NOTE** GeomX is not available until you load the GeomX module in the **Modules** tab (in the same dialog box) and restart Studio. Set tessellation tolerances on the **GeomX** tab, **Import tessellation** section. To retessellate, use the **Window > GeomX > Tessellate** dialog box, and enter new settings.	Colors can be shaders or appearances. In the **Scene Graph Editor,** in **scenegraph**, all colors are visible in the **appearance** field of a **shape node**. Appearances are visible only in the Scene Graph Editor. Shaders are visible in both the Scene Graph Editor and through the **Windows > Shader List** dialog box.

For information about these settings, menu items, and options, see the Autodesk® Opticore® Studio Help.

Glossary

6

assembly

An organizational file that fits together a collection of manufactured parts into a complete model.

CATIA® V4

CATIA V4 is computer-aided design software from Dassault Systèmes. Autodesk DirectConnect allows the exchange of 3D model data from CATIA V4, using `.model`, `.session`, `.exp`, `.dlv`, and `.dlv3` files.

CATIA® V5

CATIA V5 is computer-aided design software from Dassault Systèmes. Autodesk DirectConnect allows the exchange of 3D model data from CATIA V5, using the native CATIA part (`.CATPart`), product (`.CATProduct`), and (.cgr) files.

CGR ® (.cgr)

CATIA Graphical Representation (.cgr) is the triangulated format used by CATIA V5.

Cosmo™

A legacy 3D file format from Silicon Graphics Inc. using efficient binary compression and `*.csb` (Cosmo Scene Binary) files.

DRAW (DR)

A two-dimensional entity defined in the drafting and detailing world.

DWG™

AutoCAD drawing file) A file format used by Autodesk AutoCAD software that contains lines, curves, and 3D data.

DXF™

(Drawing eXchange File) A file exchange format containing ASCII code and binary representations of the objects in a DWG file.

Granite®

A CAD technology platform for design collaboration using solid models.

IGES

(Initial Graphics Exchange Specification) A file format for transferring graphics data between CAD/CAM systems. A neutral file format that can be imported into any number of CAD or modeling packages.

Inventor (Open Inventor™)

Open Inventor is a legacy 3D file format from Silicon Graphics, Inc. With no relation to Autodesk Inventor software, Open Inventor is an object-oriented 3D toolkit that describes complete 3D scenes, which can be made interactive and that are optimized for OpenGL. It is an ASCII or binary file format.

JT file

The DirectModel format JT is developed and supported by the JT Open Program for the visualization of 3D models.

parts

Parts are organized into a collection of groups, which then form a project hierarchy.

Pro/ENGINEER®

A solid modeling CAD/CAM/CAE software product from Parametric Technology Corporation that requires positional construction tolerances.

SolidWorks®

A solid modeling CAD/CAM/CAE software product from Solidworks Corporation that requires positional construction tolerances.

SPACE (SP)

A three-dimensional entity defined in the 3D modeling world.

SPF

Alias SPF (Studo Packet File) is a native file format used by Autodesk Alias software, with the extension .wire.

STEP

An international standard for the exchange of geometric product definitions. STEP formats that are relevant to Autodesk products are AP203 (general mechanical CAD) and AP214 (automotive CAD).

STL

An STL (StereoLithography) file is a triangular representation of 3D surface geometry. The surface is tessellated, or broken down logically into a series of small triangles (facets). Each facet is described by a perpendicular direction and three points representing the vertices (corners) of the triangle.

V3Rx

A file format generated by a version of CATIA that is older than V4.

ZPR

ZPrint CAD format (ZPR) is a proprietary file format developed by Z Corporation. It is used with ZPrint and ZEdit for printing on high definition color 3D printers. Autodesk Direct lets you export files in ZPR (*.zpr) format to use in the Autodesk Rapid Prototyping solution.

PCRE and BSD Licenses

7

PCRE License

PCRE (Perl-compatible regular expressions) is a library of functions to support regular expressions whose syntax and semantics are as close as possible to those of the Perl 5 language.

Release 7 of PCRE is distributed under the terms of the BSD license, as specified below. The documentation for PCRE, supplied in the doc directory, is distributed under the same terms as the software.

The basic library functions are written in C and are freestanding. Also included in the distribution is a set of C++ wrapper functions.

The Basic library functions

Written by: Philip Hazel

Email local part: ph10

Email domain: cam.ac.uk

University of Cambridge Computing Service, Cambridge, England.

The C++ wrapper functions

Contributed by: Google Inc.

The BSD (Berkeley Software Distribution) license

Index

U

V

W

Z