

3D Design Overview

This chapter illustrates the five potential stages of an INOVATE project. Like most of the examples you've seen so far, the sample project uses simple geometric shapes to illustrate the features of INOVATE. Chapters 5 and 6 provide similar exercises with a realistic object.



In this chapter:

- Knowing the Process
- Starting the Project
- Building a Part
- Assembling Parts
- Rendering a Part
- Animating a Part
- Communicating a Part

Knowing the Process

As you read in Chapter 1 of this **Getting Started Guide**, an INOVATE project has the following potential stages:

- Building a part
- Assembling parts
- Rendering a part
- Animating a part
- Communicating a part

At times you may alternate between these stages or eliminate some of them, but the concepts and techniques at each stage remain the same.

Throughout the 3D design process, INOVATE has two general methods for performing many functions:

- **The visual method.** Use the mouse and instant visual feedback to size, position, and assemble parts; apply colors and textures to parts; and animate parts.
- **The precision method.** You can use a number of measuring tools and properties sheets to achieve extreme precision in your 3D designs.

You may want to use visual methods for quick results at the beginning of a project in the conceptual phase and precision methods later in the detail design phase when precision is required. Or, you may choose to use precision methods throughout the project.

Starting the Project

To create a new scene:

1. If necessary, start INOVATE.

The INOVATE opening screen is displayed, with a blue-grid default scene open. You can begin with this scene or you can proceed with the following.

2. Choose **Create a new Scene** to begin a new project.
3. On the **New Scene** dialog box, choose the scene tab that best fits the type of work you do, then select one of the scene templates and click **OK**.

If you're not sure which template type or scene template to choose, select the **Blank Scene** template from the **Workspace (English)** tab.

INOVATE displays a blank 3D scene. Now you're ready to work in INOVATE.

Building a Part

You can begin a part with a single IntelliShape. This shape could be one of INOVATE's standard IntelliShapes or a custom shape of your own design. Shapes and parts are initially generated by the specified default modeling kernel -- either ACIS or Parasolid. However, INOVATE offers the option of switching between the two kernels, on a part-by-part basis, by selecting the part in the scene and then pressing Ctrl+K. ACIS kernel support is indicated by a gray surface color on the selected part, Parasolid by beige. To change the default kernel, select **Options** from the **Tools** menu, select the **Parts** tab, and at the bottom left of the dialog box, select the desired option under **Default kernel type for new parts**.

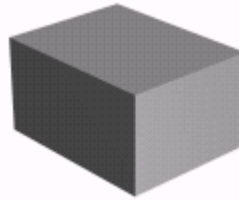
Note

*If INOVATE is already running, choose the **New** option from the **File** menu and then select **Scene** and click **OK**.*

Note

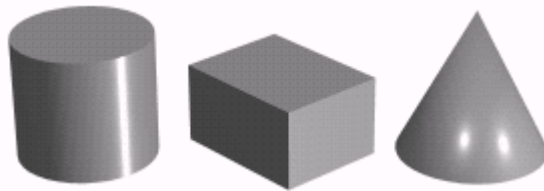
Use the visual drag-and-drop method to work with IntelliShapes from INOVATE catalogs.

The INOVATE catalogs contain many generic and special-purpose IntelliShapes. When you work with predefined shapes, you drag them from the catalog and drop them in the 3D scene. For example, to use a block as the foundation for a new part, you would drag it out of the **Shapes** catalog and drop it in the scene.



Initial shape for new part

The following are a few other IntelliShapes that are included in the **Shapes** and **Advanced Shapes** catalogs:

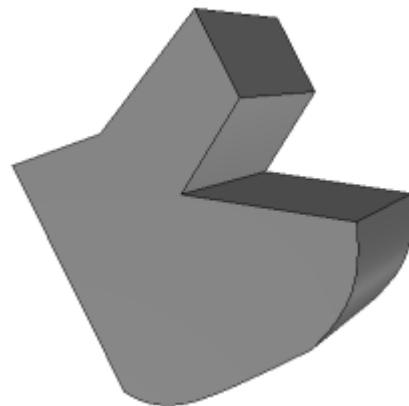
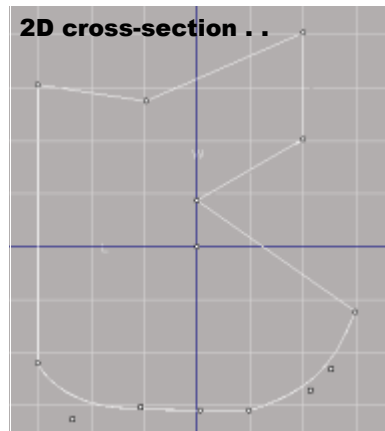


Sample shapes

When you drag a shape from a catalog and drop it in the scene, you're practicing the visual method of part design. Much of your part design can be accomplished using the drag-and-drop technique with shapes, colors, textures, lights, and other items.

At other times, however, you may require precise results that are beyond the capability of visual, drag-and-drop part design methods. For example, if none of the predefined IntelliShapes meet your requirements, you can create a custom shape using one of the available **IntelliShape Creation** tools.

To create a custom shape, use the **2D Technical Drawing** tools to create the desired cross-section, as shown on the left below:



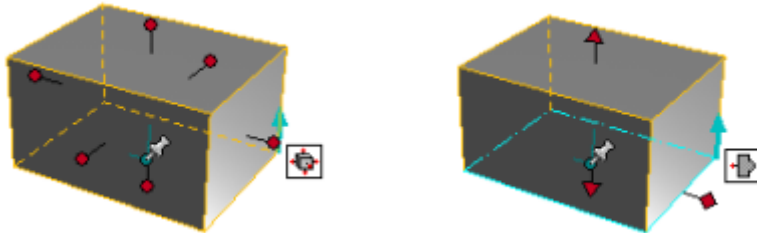
... extruded into a 3D shape

Note

For precise part design, you can use the 2D Technical Drawing tools to create a cross-section and then extend it into 3D.

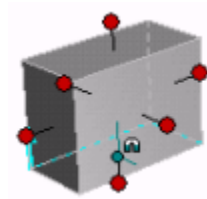
Once you've created the cross-section, INOVATE can extend it into 3D using a variety of techniques that includes extrusion, spinning, sweeping and lofting. For example, the shape on the right above displays the result of **extruding** a 2D cross-section.

Regardless of how you create the initial shape of a part, you may need to resize it. INOVATE offers visual and precision methods for resizing shapes and parts. For instance, you can display either IntelliShape sizebox or shape handles with the **Handle Toggle** to resize a shape using the drag-and-drop technique.



IntelliShape with sizebox/shape handles and Handle Toggle displayed

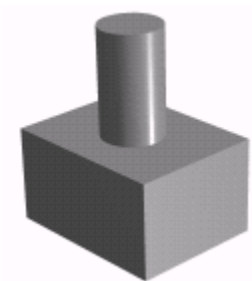
Using the mouse, you can drag a handle to edit the shape's size. Here's the result of dragging one of the sizebox handles on the block shape:



Resized IntelliShape

Naturally, this method assumes that you can visually judge the correct size. However, you may require a precisely sized block. INOVATE offers a number of tools for precision sizing.

Once the initial shape has been created, you can add additional shapes to build your 3D part. You might drag a second shape from a catalog and drop it on the first one.



Part with two shapes

One of the "intelligent" properties of IntelliShapes is that they instinctively interact with one another. When you drop a new shape on an existing one, the new shape lands in the same way as a physical object would land.

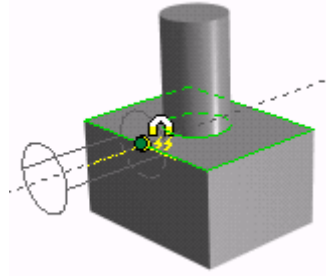
Note

You can use visual or precision methods to resize a shape.

Note

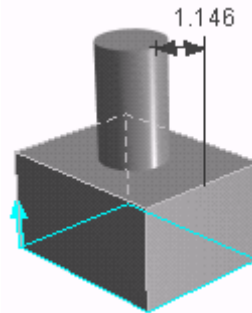
Add new shapes to build your part.

As with sizing, there are visual and precision methods for positioning the shape components of a part. You can drag one shape over another and use **SmartSnap** feedback to help locate centers, edges, and other key points.



Visual positioning using SmartSnap feedback

In more complex situations, you can use measuring and positioning tools, such as the **TriBall** and **SmartDimensions**, for accurate results.



Precise positioning using SmartDimensions

As you build your part, you continue to add, size, and position IntelliShapes. At any stage of the process, you can select and work with the part as a whole or any of the shapes within the part. To activate SmartSnap for an existing shape hold down the **Shift** key.

In the event that desired resizing cannot be accomplished with size handles or you want to effect a change on a face that spans across two or more shapes, INOVATE offers **Direct Face Modeling**. Direct face modeling allows the user to modify the faces of a part irrespective of the underlying shape structure. Several face/edge editing tools are available, providing powerful, easy-to-use technology not found in today's traditional CAD systems.

Once the features of a part are in place, you can go on to the second phase: assembly.

Assembling Parts

Some projects require multiple parts to complete the design. This is no problem for INOVATE. New parts can be created in the same scene as existing parts or, if desired, previously created parts can be linked into the current scene from the outside.

Assemblies are formed by simply selecting the desired parts and then choosing the **Assemble** option on the **Assembly** toolbar. Assembly structure can be maintained by repositioning parts and assemblies within the hierarchical display found in the **Scene Browser**.

Parts linked into an assembly from the outside are fully associative: any changes made to the linked file will automatically update in the current scene.

Rendering a Part

INOVATE has many features for adding realistic surfaces to your part in the next phase of design and offers OpenGL features, as supported by your graphics card. The easiest way to add a color or texture is to drag one of the **SmartPaints** from an INOVATE catalog and drop it on a shape or part. For example, if you drag the **Silver Gradient** texture from the Texture catalog and drop it on a part, the results are similar to that shown below:



Part with Silver Gradient surface texture

In addition to colors and textures, INOVATE allows you to create bumpy and transparent surfaces with realistic reflections. Experiment with different surfaces and textures. Try the default catalog set or use other catalogs available on the INOVATE CD.

Some INOVATE projects end after one or more of the first four phases. Other projects include animating parts and/or sharing them with the outside world.

Animating a Part

INOVATE includes a catalog of animation effects called SmartMotions. For example, if you want to make a gear spin around a shaft, drag the **Height Spin** SmartMotion from the **Animation** catalog and drop it on the gear.

As with all other aspects of the program, INOVATE has precision tools to complement simple drag-and-drop animation effects. You can use the SmartMotion Editor to create complex, multi-track animation for presentations, multimedia development, and other demanding applications. The **SmartMotions** tools offer even more flexibility and control in creating custom animation sequences.

Communicating a Part

The last phase of the part design process is sharing your creation with the outside world. This can take the form of a translated part file using one of the supplied translators or an OLE document container.

For instance, you might use Microsoft Word to write a report and illustrate it with a 3D part. Just drag a scene from INOVATE and drop it into a Word document.

In addition to drag-and-drop OLE support, INOVATE offers a suite of tools for communicating your parts with other applications and users. INOVATE supports high-resolution printing for top-quality output.

This concludes your introduction to 3D design with INOVATE. Continue on to the next chapter to create an actual part.

Be sure to access **On-line Help** as a ready reference for details on INOVATE functions and tasks, as well as for detailed reference information and “how to” and “Show-Me” topics to quickly learn the application.

Note

Use SmartMotions for drag-and-drop animation.

