

## NX Visualize and NX Render

Photo-realistic, high quality imaging for innovative product design

### fact sheet

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#### ► Summary

NX Visualize and NX Render enable you to create photo-realistic, high quality images suitable for industrial design, prototype evaluation, decision support, advertising and promotion in support of enterprise product development. Using NX Visualize, the designer can accurately represent surface colors, materials and textures in a pragmatic scene and produce realistic, high quality, static and dynamic images. NX Render augments NX Visualize tools by providing sophisticated image creation techniques such as shadow generation, transparency, anti-aliasing, light distribution and control of radiosity. Render produces realistic images that will satisfy even the most demanding scrutiny.

#### NX Visualize features

Dynamically render (via OpenGL) realistic materials and textures on surfaces

Import and position raster images into the model

Create special backgrounds, such as tiff images, clouds, graduated and mixed colors

Create cube shaped, showroom environment with ability to position, edit and transform walls, etc.

#### NX Render features

Provides robust set of complex shading algorithms

Can create photo-realistic images that contain materials, textures, shadows, reflections, light refraction, transparencies

Provides shading methods for varying levels of sophistication

Offers high-levels of control for image effect

The concept of building a product that is not only functional but aesthetically pleasing requires the merging of numerous disciplines, including artistic rendering and mechanical design. Designers need the ability to consider the product in a typical customer environment in order to make decisions regarding material types, textures, smoothness and finish. Marketing and sales personnel need early renderings of products to evaluate the appeal of the product and to begin early promotional efforts. Product management teams often find that rendered images facilitate easier decisions regarding styling and aesthetic considerations before, or even in place of, expensive prototypes.



NX Visualize and NX Render address all of these needs within the integrated NX computer-aided design environment. NX Visualize is used to set up the image environment, assign materials and textures, adjust the lighting and create high quality, dynamic displays. NX Render is then used to take these images to the next level of sophistication by providing additional image generation algorithms.

#### NX Visualize – major capabilities

NX Visualize provides the tools necessary to map images, materials and textures to products and create a realistic product scene. NX Visualize produces high quality images that can be used in a dynamic, real time interactive environment or saved in digital image format.

## Benefits

Provides a variety of methods and control options that allow for the creation of sophisticated images

Material and texture assignments, lighting effects and studio environment can be changed without changing the product definition – encouraging creativity without jeopardizing engineering efforts

Image creation scenarios from one environment can be easily transferred to other parts or products, encouraging consistency in product presentation and facilitating parallel design and product marketing/ evaluation efforts

## High quality imaging

The high quality image module within NX Visualize provides imaging capabilities beyond the standard NX Gateway Visualization module and is used to generate photo-realistic images.

NX Gateway Visualization includes 2D and 3D tools for real time rotation, assignment and control of multiple light sources, multiple display modes, fly-through and image and movie generation capabilities. Using NX Visualize, images include additional visual information such as patterns, translucency, color and texture and therefore, product results that more closely resemble a real part. High quality images can be used for product prototypes, marketing visuals, or simply as superior communications tools.



## Light settings

Light setting options are used to assign lights and control the intensity, position and color of each light. NX Visualize includes additional light source types: spot, point and eye position. The eye position light source stays fixed relative to the viewer as the scene is rotated. The spot and point lights can be positioned anywhere in the scene relative to the part or the viewer; or fixed in absolute space. The designer controls the intensity and drop-off of the luminescence from the spot and point lights. The target and illumination cone from the spot light can be adjusted.

## Material/textures

Options are available to apply materials, textures and finishes to solids and surfaces. A large variety of material categories are available from which to choose. Textures can be assigned to specific materials. These textures include patterns, bumps, wrapped images, grids, stencils and transparency controls. Material color, reflectance, specular highlight, ambient light effect, roughness and diffuse light effect can be controlled for each instantiation of a material.

## Environment

Using NX Visualize, you can create an environment around the part or assembly. The walls of the environment can contain user specified images that are either imported or selected from pre-defined images.

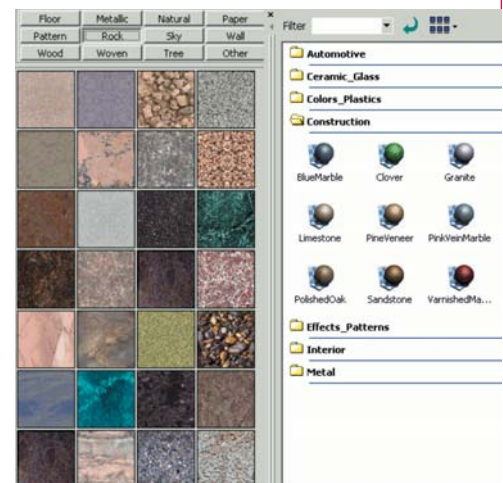
## Using showroom environment

The showroom environment allows the user to see how the model will look in various settings and at different angles. It should be used when designing home, office, or any industrial product that requires aesthetic engineering. It can be used as a very effective tool for dynamically analyzing the design using accurate environment reflections, or to evaluate the materials, textures and lighting conditions for the model prior to creating the final image. Capabilities include:

- Allows the user to dynamically edit the environment cube size, location and orientation and to try out different environment images and see the reflection of the environment on the model. Furthermore, it allows the user to easily view and navigate the model within the environment.



Environment





NX Render – Shading

- Provides several predefined environments (showroom, outdoor scene, etc.).
- Allows users to create their own environment by assigning a different tiff file to each wall and dynamically viewing the reflection of each wall on the model.
- Provides an easy interface to create turntable viewing within the environment cube.

### Raster image

This capability allows the user to import raster images in tiff format into NX. These images can be used to create curves and sketches that serve as the basis for a new design; and they can also be used to create a scene. The user can dynamically modify the raster image size, location, orientation and translucency.



NX Render – Refraction effect

### Visual effects

This feature is used to specify the foreground and background for the image. Foreground effects include fog, snow, depth cueing and a user specified tiff image. Background options include clouds, plain or graduated colors, or a user specified tiff image. Additional lens flare and depth of field options are available.

### NX Render – major capabilities

NX Render provides a robust set of complex shading algorithms needed to create photo realistic images that contain materials, textures, shadows, reflections, light refraction and transparencies. Images can be imported and used as environment walls, foregrounds, backgrounds, decals and transparency patterns. There are many shading methods from which to choose. Each of these shading methods offers increasing levels of sophistication.

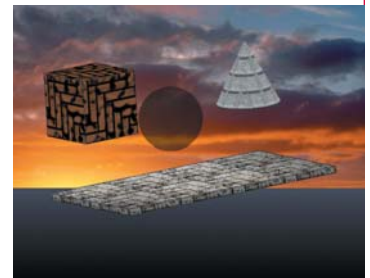
With Render, the user can control numerous images effects including:

- Transparent or semi-transparent material shadows
- Anti-aliasing
- Radiosity quality, which controls the effect of indirect lighting
- Depth cue fade
- Lens flare
- Light scattering and intensity drop off
- Mid-point sampling to eliminate bright or dark areas

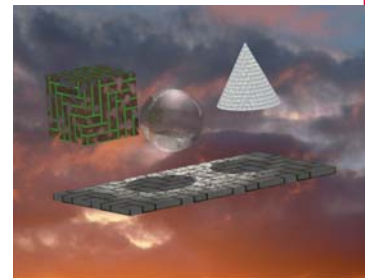
The dynamic displays generated by other NX visualization tools are high quality, dynamic images. They are intended for real time viewing and movement (rotation, zoom, fly-through, etc.). However, these images may not have the same level of refinement offered by NX Render. NX visualization tools should be used to create the scene, place the lighting, assign materials and determine the proper perspective. Once these factors have been considered, Render can be used to create photo-realistic images. You can use Render to more accurately portray material textures – such as reflections, refraction, transparency, roughness and patterns – and image features, such as shadows and light distribution.



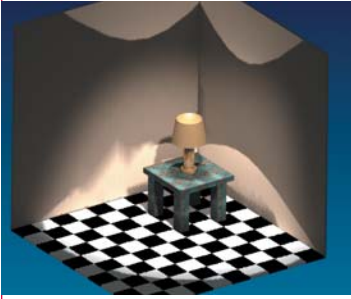
NX Render – Lens flare effect



Using NX visualization tools



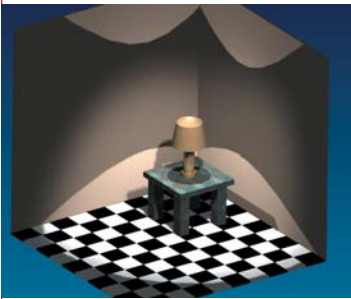
Employing NX Render



### Radiosity

Radiosity is the effect of indirect lighting on a scene, for example light that reflects off of a wall or a surface, as illustrated by the top left-hand image. With NX Render, the effect of indirect lighting can be controlled when creating images.

As indicated by the bottom image shown on the left, the effect of an off-scene spot light reflecting off the floor and table onto the walls is apparent using Render radiosity shading methods.



### Animation

Often the best way to present a product idea is to use an animated video. NX Render allows you to create gif or mpeg animation files either by moving around the part following a series of frame positions or a curve established by the designer or by rotating the part within an environment. Parametric changes to objects or components within the part can be set to occur with individual frames. These changes can be used to produce a movie that simulates product motion or shape changes.

### Artistic image

In addition to high quality images, NX Render can generate artistic, non-photo realistic renderings that look like a pencil sketch, ink drawing or painting. These capabilities are used when a designer wants to convey the shape of the design without conveying the finished appearance.

#### Artistic images include:

- Cartoon effect, where silhouette and boundary edges are displayed with bold lines and simplified and stylized colors
- Color wash, which is similar to the cartoon effect with more subtle colors and better line control
- Shaded pencil with strokes and swirls of colors which represent the orientation of the geometry
- Hand drawn style where lines are made up of individual strokes whose smoothness and stroke are controlled by the designer
- Single color ink print, which is similar to photographic negative
- Line and shadow mode which combines simple line representation with monochrome shading for areas in shadow
- Rough pencil style, which looks like a quick sketch of a tentative design
- Stipple effect, where the image is rendered as a series of irregular dots



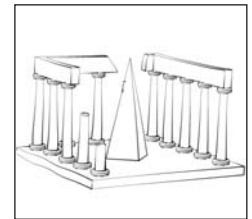
Cartoon



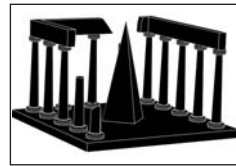
Color wash



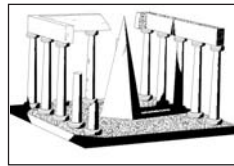
Shaded pencil



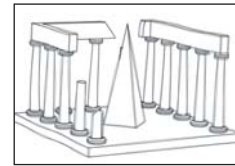
Hand drawn



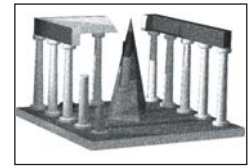
Ink print



Lines and shadows



Rough pencil



Stipple

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