

TUNING NX

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NX's Performance Factors

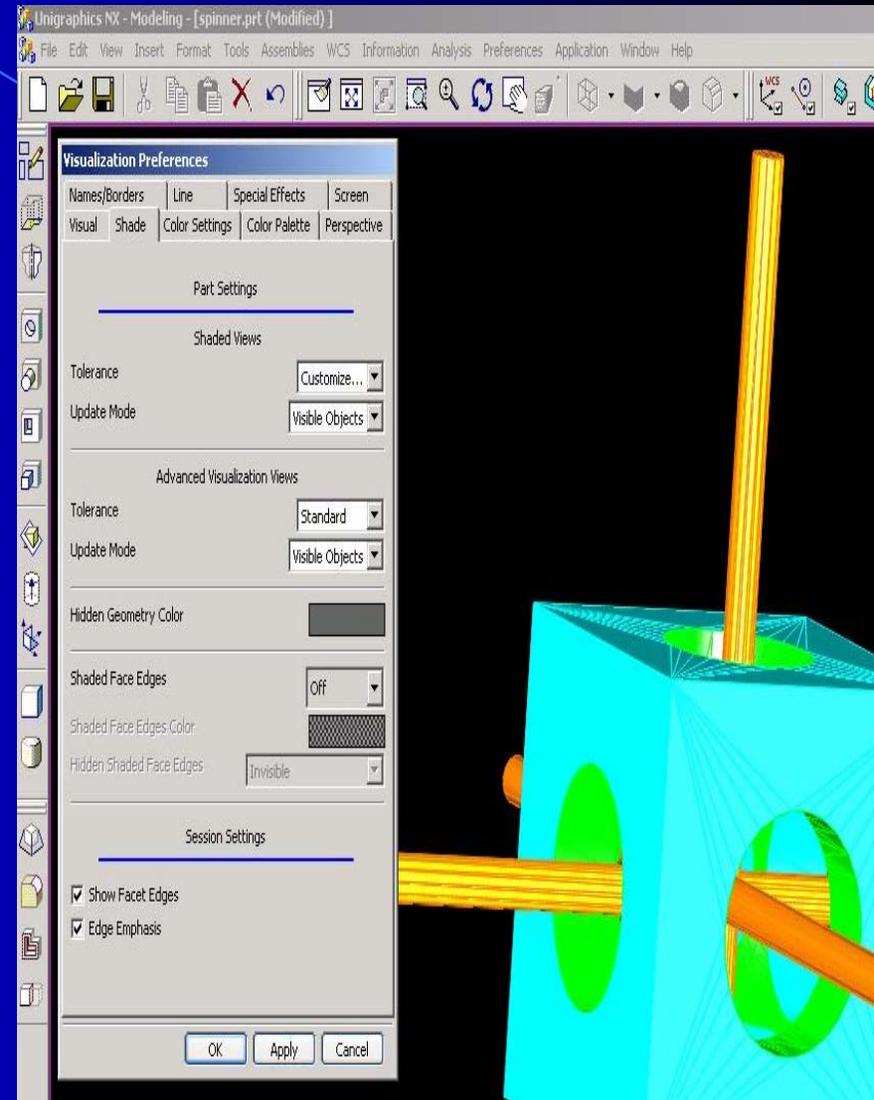
- ❑ OS and patches
- ❑ Firmware
- ❑ Graphics hardware and driver
- ❑ Resources (memory, disk space, networking)
- ❑ NX Configuration and Tuning

Graphics Subsystem

- ❑ Make sure you have a certified graphics board
- ❑ Make sure you have installed a certified driver
- ❑ Follow configuration instructions in the certification reports
- ❑ Certification reports and graphics drivers at:
http://support.ugs.com/online_library/certification
- ❑ Need a web key to get in
- ❑ Not a static page, is constantly updated with new drivers and notes
- ❑ Read the certification report for required patches

System Resources

- ❑ Follow NX's recommendations. There are important notes on patches required, as well as memory and swap configurations. (See NX docs for each release)
- ❑ Have enough RAM (physical memory) for your part size. RAM is fastest form of configurable memory.
- ❑ These NX operations take advantage of SMP: Silhouette lines, Faceting, Boolean operations, mass properties
- ❑ Have enough swap space. If possible spread the swap over more than one disk.



Symmetric Multi-Processor

- ❑ You need a multi processor OR dual core system:
- ❑ Available in UG versions V17 or later, V18, NX 1, improvements in NX2 and NX3
- ❑ Enable NX multi-threading by setting environment parameter `UGII_SMP_ENABLE=1`
- ❑ Look in NX syslog for “# Processors” for how many processors NX sees in your system
- ❑ Look in NX syslog for “Enabling SMP” to see if NX is enabling SMP
- ❑ Hyperthreading: Although able to speed up some multi-threaded applications, NX is not one of them.

Part Size

- ❑ One of the main reasons for slow performance in an application is running out of RAM and having to page, typified by excessive disk usage
- ❑ Reason: NX part too big to fit in RAM or operations too memory hungry
- ❑ A more severe problem is reaching the limit of 32 bit address spacing

Workaround

- ❑ Increase RAM and paging file size
- ❑ Use the 3GB option
- ❑ By default most 32 bit operating systems including Windows allow 2GB of address space per process
- ❑ Some Unix systems and Windows can be made to increase the limit to 3GB (per process)

3GB Option: Unix

- ❑ Older versions (V18 and previous) only.
V19 and later are 64bit and don't need this option.

3GB Option: Windows XP 32

1- Bring up Windows XP with the /3GB option by modifying boot.ini file (very carefully or your system may not boot!)

❑ Boot.ini file BEFORE modification:

- ❑ [boot loader]
- ❑ timeout=30
- ❑ default=multi(0)disk(0)rdisk(0)partition(2)\WINNT
- ❑ [operating systems]

- ❑ multi(0)disk(0)rdisk(0)partition(2)\WINNT="Microsoft Windows XP" /fastdetect

❑ Boot.ini file AFTER modification: [boot loader]

- ❑ timeout=30
- ❑ default=multi(0)disk(0)rdisk(0)partition(2)\WINNT
- ❑ [operating systems]

- ❑ multi(0)disk(0)rdisk(0)partition(2)\WINNT="Microsoft Windows XP" /fastdetect /3GB

3GB Option: Windows XP 32

2- Have 3 or more GB of virtual memory on your system

3- Use UG version 18 or later (the application must be enabled to take advantage of 3 GB of memory)

NOTE: Although the application may use 3GB, you may only see 2.4 – 2.7 GB of memory used.

Permanent Solution

□ Move to UG NX 1 to a 64-bit OS

* Today only HP, Sun and IBM have 64-bit solutions (HP-UX, Solaris, AIX).

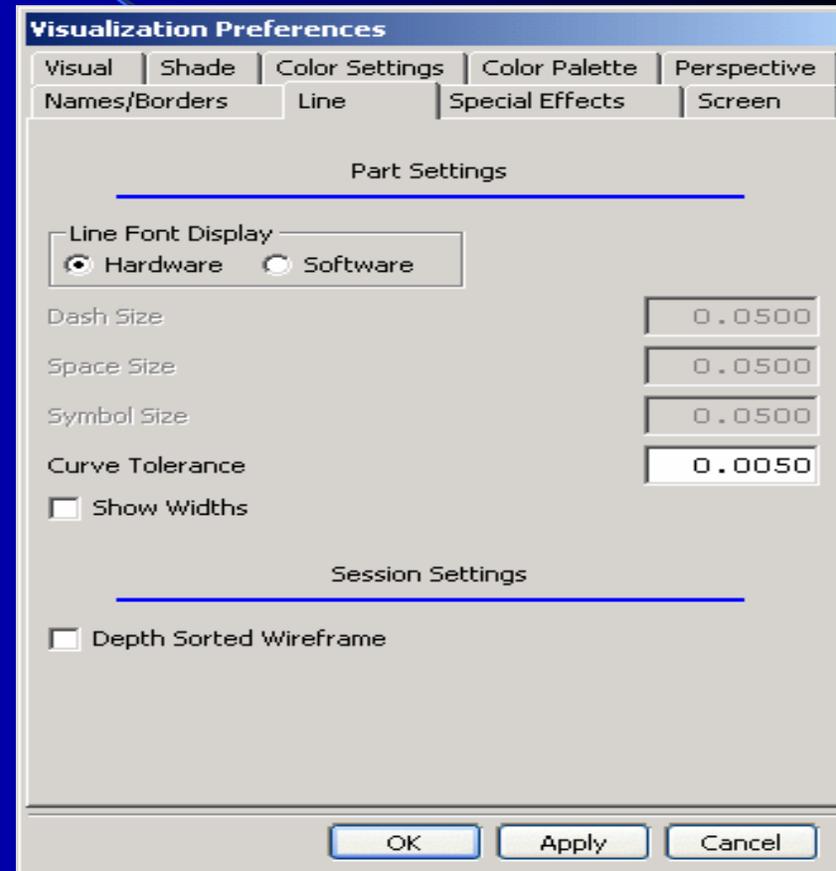
* 64-bit version available in NX4 for Windows XP 64.

NX Performance Factors

- ❑ Size of part
- ❑ Various shading tolerance components
- ❑ Type of NX operation (e.g. wireframe vs shading vs studio modes)
- ❑ Number of lights
- ❑ 2 sided lighting
- ❑ Back face culling
- ❑ Antialiasing
- ❑ Graphics tuning
- ❑ Large model optimizations
- ❑ Vertical Sync
- ❑ Face analysis
- ❑ Studio mode
- ❑ Software fonts

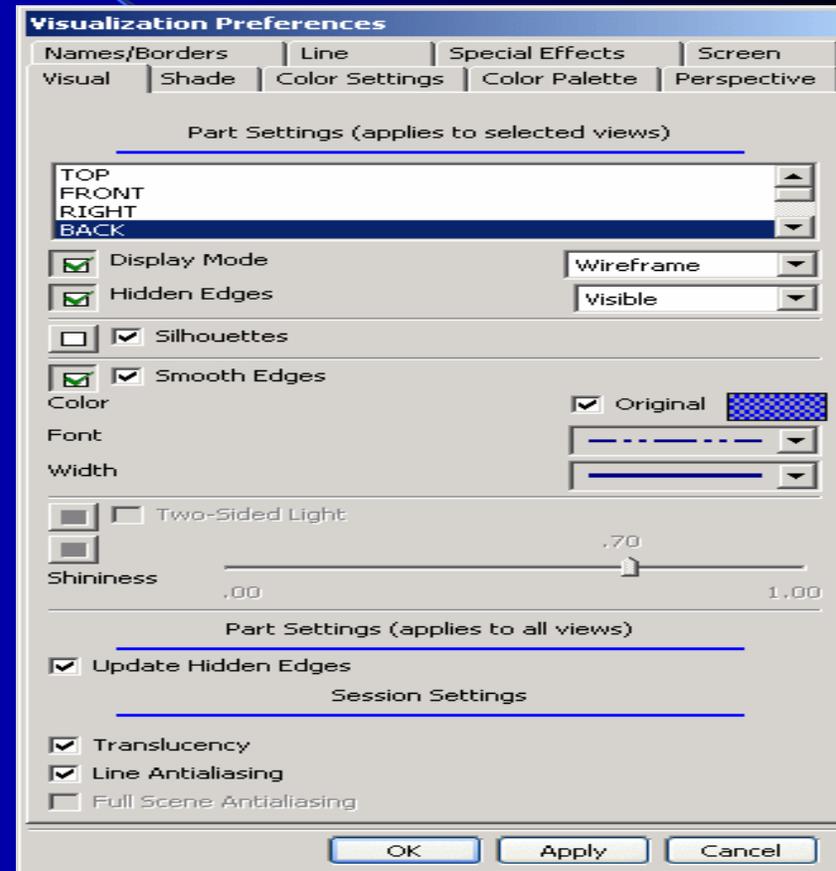
NX Performance Factors: Wireframe

- ❑ Line Font Display:
hardware vs software
- ❑ Curve Tolerance
- ❑ Show Width
- ❑ Depth Sorted Wireframe



NX Performance Factors: Wireframe (2)

- ❑ Visual tab: Hidden Edges
- ❑ Silhouettes
- ❑ Smooth Edges
- ❑ Font: non-solid lines
- ❑ Width: wide lines
- ❑ Update Hidden Edges
- ❑ Line Antialiasing



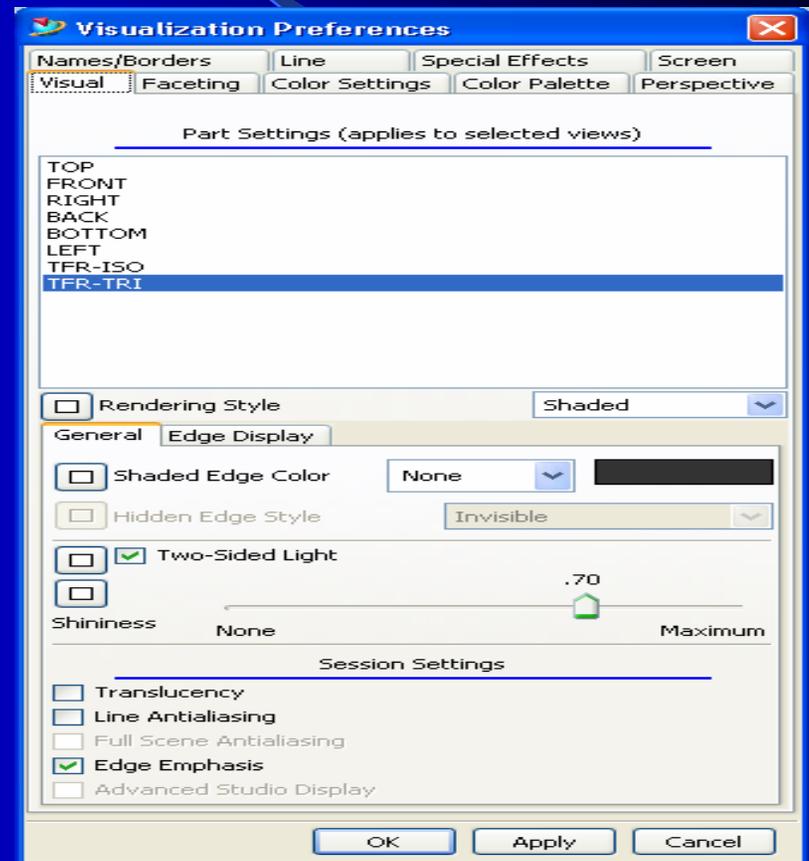
NX Performance Factors: Shaded Mode

- ❑ Number of lights
- ❑ Shading tolerance
- ❑ Fog
- ❑ Facet edges
- ❑ 2 sided lighting
- ❑ Back face culling
- ❑ Translucency
- ❑ Line antialiasing (for edges)
- ❑ Large model optimizations
- ❑ Graphics driver tuning

Shaded Performance Factors:

Visual Tab/General

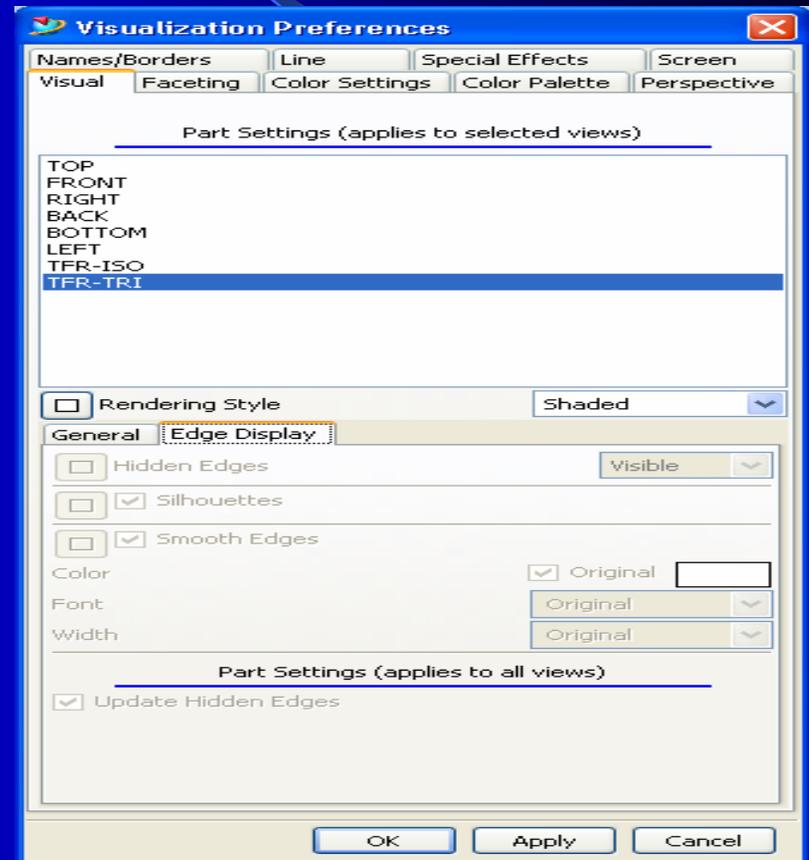
- Shaded Face Edges
- Two-Sided Light
- Translucency
- Line antialiasing (for edges in shaded display)
- Full Scene Antialiasing (all filled areas in shaded mode)
- Edge Emphasis



Shaded Performance Factors:

Visual Tab/Edge Display

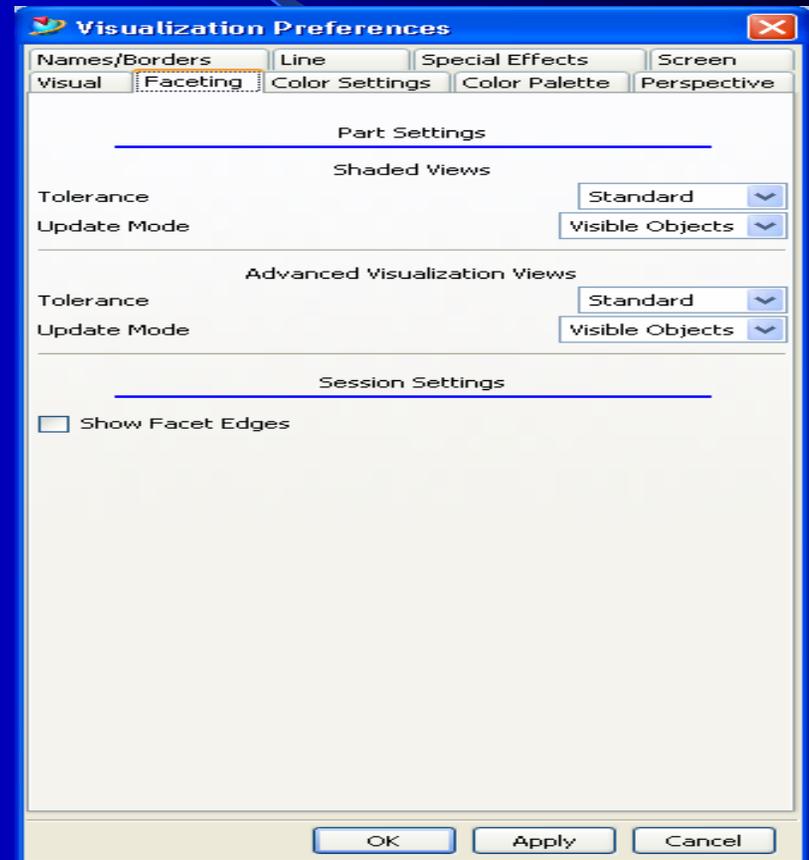
- Hidden Edges
- Silhouettes
- Smooth Edges



Shaded Performance Factors:

Faceting Tab

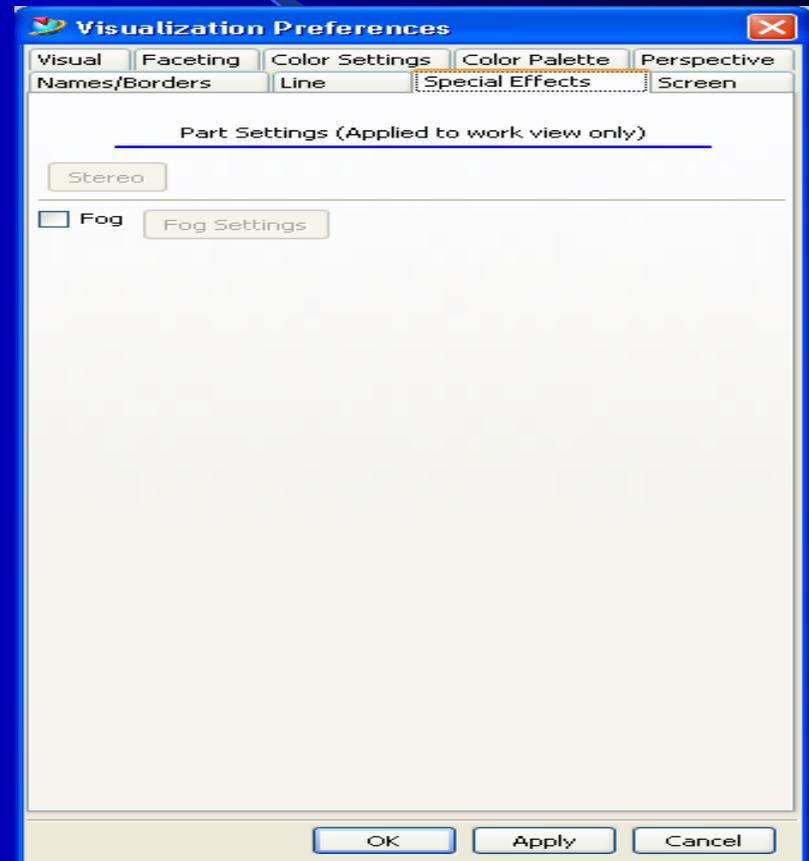
- ❑ Tolerance (default is .005, bigger numbers = better performance)
- ❑ Update Mode
- ❑ Show Facet Edges



Shaded Performance Factors:

Special Effects tab

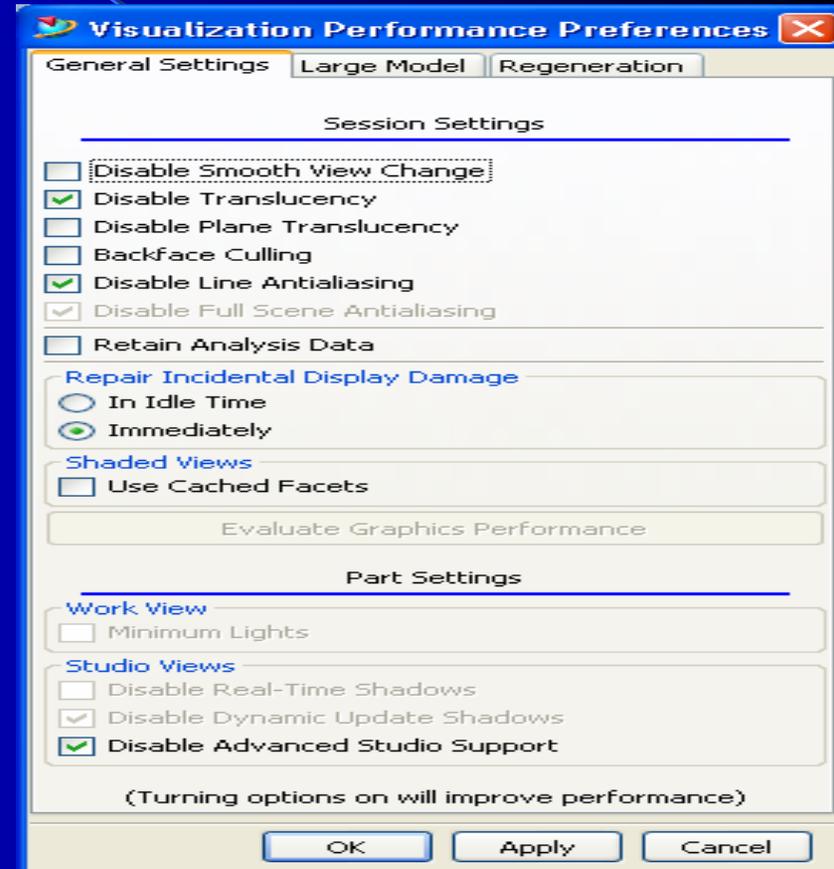
- ❑ Stereo (only for configurations supporting stereo)
- ❑ Fog



Other Performance Factors:

Visualization Performance preferences

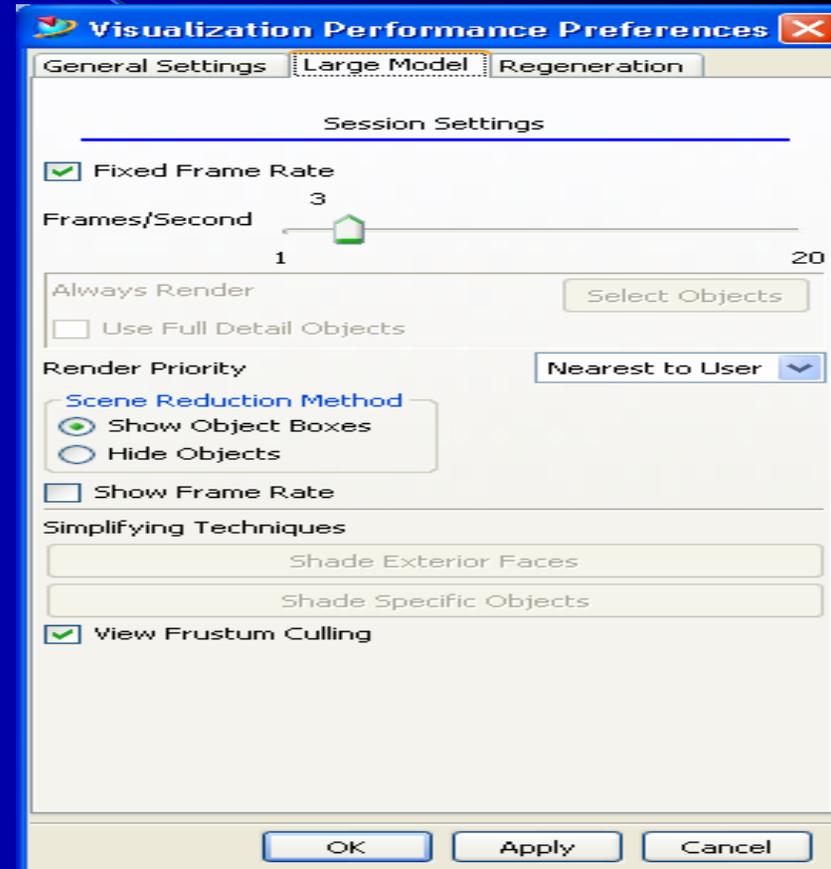
- ❑ General Settings tab contains settings which when turned on improve general performance
- ❑ Disabling Translucency and Line Antialiasing toggles corresponding settings in the Visual tab
- ❑ Minimum lights button



Other Performance Factors:

Visualization Performance preferences

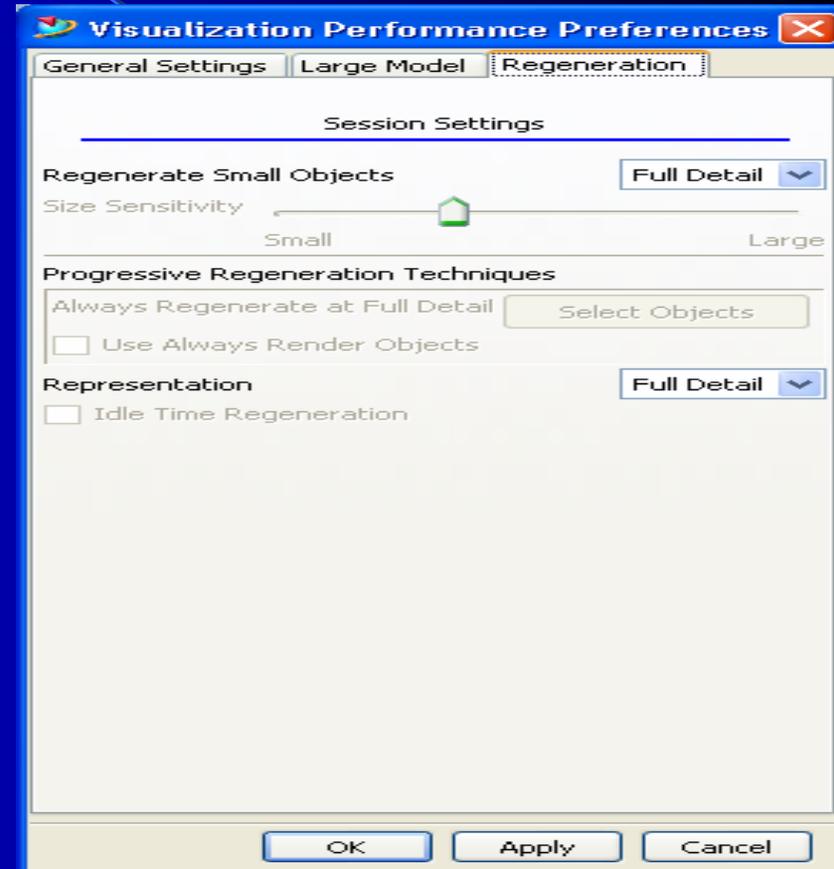
- ❑ Large Model tab contains simplification methods to improve performance
- ❑ Enabling Fixed Frame Rate allows simplifying objects into boxes or just making them invisible to meet the frame rate indicated by Frames/Second slider
- ❑ Enabling View Frustum Culling forgoes rendering objects outside of view frustum
- ❑ Most settings (except VFC) apply to dynamic operations only.



Other Performance Factors:

Visualization Performance preferences

- ❑ Regeneration tab contains simplification methods to regenerate objects as boxes (or invisible) all the time, not just during dynamic operations
- ❑ Use with care as very detailed designs can look overly simplified and Lego-like



□ Tuning NX

□ Examples

Problem Walk-Through

- ❑ Examine your problem for certain problems
- ❑ Refer to release notes
- ❑ Check the certification reports
- ❑ On Windows use the troubleshooting slider
- ❑ Test on other configurations to see if global or not
- ❑ Check to see if problem is part specific
- ❑ Report to GTAC (if suspecting NX) or the vendor's Response Center (if suspecting system)

Problem Walk-Through

- ❑ Reporting Problem to GTAC
- ❑ Have all system specific information ready
- ❑ Have part files and syslogs
- ❑ Have the exact set of instructions to reproduce the problem
- ❑ Have a good description of the problem

Reporting Problems

Reporting to UGS

GTAC: International: 714-952-5444

GTAC: U.S.: 800-955-0000

<http://support.ugs.com/>

Certification Process

- ❑ Graphics Certifications= Board + Driver
- ❑ System Certification= Workstation + OS
- ❑ Precertification
- ❑ Product Availability At NX
- ❑ Graphics Testing By Vendor
- ❑ System Testing By UGS
- ❑ On-site support provided by Premier vendors