

NX for Simulation: Product capabilities in NX 8

NX 8.0 for Simulation capability chart																			
Legend - Included in module - Part of prerequisite for this package - Additional product required	NX CAE																NX Nastran 8.0		
	NX Advanced FEM	NX Advanced Simulation	Add-on products to NX Advanced FEM or Advanced Simulation													NX Design Simulation	NX Motion Simulation	NX Nastran Basic	NX Nastran Advanced
			NX Topology Optimization	NX Thermal	NX Advanced Thermal	NX Flow	NX Advanced Flow	NX Electronic Systems Cooling	NX Space Systems Thermal	NX Laminate Composites	NX Response Simulation	NX Durability Wizard	NX Advanced Durability	NX FE Model Correlation	NX FE Model Updating				
Preprocessing																			
Geometry import																			
Neutral geometry transfer (IGES, STEP, JT™, Parasolid)	•	•	#	#	#	#	#	#	#	#	#	#	#			#	#		
Direct geometry transfer (CATIA V4, CATIA V5, Pro/E)	+	+	+	+	+	+	+	+	+	+	+	+	+			+	+		
Geometry modeling																			
Parasolid® geometry kernel	•	•	#	#	#	#	#	#	#	#	#	#	#			#	#		
Parametric solid and surface modeling	•	•	#	#	#	#	#	#	#	#	#	#	#			#	#		
Direct modeling with synchronous technology	•	•	#	#	#	#	#	#	#	#	#	#	#			#	#		
Feature modeling	•	•	#	#	#	#	#	#	#	#	#	#	#			#	#		
Assembly structure creation	•	•	#	#	#	#	#	#	#	#	#	#	#			#	#		
Interpart relationship	•	•	#	#	#	#	#	#	#	#	#	#	#			#	#		
Configurations	•	•	#	#	#	#	#	#	#	#	#	#	#			#	#		

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Preprocessing <i>(continued)</i>																			
Geometry editing prior to meshing																			
Direct editing with synchronous technology	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Defeature tools (geometry repair, feature suppression, stitch surface, remove hole/fillet, partitioning)	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Nonmanifold topology generation for volumes	•	•	#	#	#	#	#	#	#	#	#	#	#						
Mid-surfacing (constant and variable thickness)	•	•	#	#	#	#	#	#	#	#	#	#	#						
Automatic topology abstraction	•	•	#	#	#	#	#	#	#	#	#	#	#						
Manual topology modification tools	•	•	#	#	#	#	#	#	#	#	#	#	#						
Create surface from mesh face	•	•	#	#	#	#	#	#	#	#	#	#	#						
Meshing and modeling																			
Beam modeling	•	•	#	#	#	#	#	#	#	#	#	#	#						
Automated bolt connection meshing	•	•	#	#	#	#	#	#	#	#	#	#	#						
Automated shell meshing	•	•	#	#	#	#	#	#	#	#	#	#	#						
2D mapped meshing	•	•	#	#	#	#	#	#	#	#	#	#	#						
Automated tetrahedral meshing	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Swept hexahedral meshing	•	•	#	#	#	#	#	#	#	#	#	#	#						
Surface coating	•	•	#	#	#	#	#	#	#	#	#	#	#						
Transition meshing	•	•	#	#	#	#	#	#	#	#	#	#	#						
Axi-symmetric meshing	•	•	#	#	#	#	#	#	#	#	#	#	#						
Batch meshing	•	•	#	#	#	#	#	#	#	#	#	#	#						
Mesh quality checks	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Material property creation and management	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Mass property calculations	•	•	#	#	#	#	#	#	#	#	#	#	#						
Physical property creation and management	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Variable element thickness	•	•	#	#	#	#	#	#	#	#	#	#	#						
Grouping	•	•	#	#	#	#	#	#	#	#	#	#	#						
FE assembly management	•	•	#	#	#	#	#	#	#	#	#	#	#						

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Preprocessing <i>(continued)</i>																			
Boundary conditions	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Apply on geometry	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Apply to local coordinate system	•	•	#	#	#	#	#	#	#	#	#	#	#						
Apply on FE entities	•	•	#	#	#	#	#	#	#	#	#	#	#						
Apply on groups	•	•	#	#	#	#	#	#	#	#	#	#	#						
Axi-symmetric boundary conditions	•	•	#	#	#	#	#	#	#	#	#	#	#						
Automatic contact detection and setup	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Automated load transfer from motion analysis	•	•	#	#	#	#	#	#	#	#	#	#	#						
External solver data deck support (import and export)																			
Abaqus	+	+																	
ANSYS	+	+																	
LS-Dyna	+	+																	
MSC Nastran	+	•														•			
NX™ Nastran®	+	•														•			
NX I-deas™ (import only)	+	•																	
Analysis model-to-design associativity																			
Automatic analysis model update based on geometry change	•	•	#	#	#	#	#	#	#	#	#	#	#	#	#	•	•		
Postprocessing																			
Contour displays	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Beam cross-section contour displays	•	•	#	#	#	#	#	#	#	#	#	#	#						
Vector displays	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Isosurface displays	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Cutting planes	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Advanced lighting control	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Animations	•	•	#	#	#	#	#	#	#	#	#	#	#			•			
Complex dynamic response results	•	•	#	#	#	#	#	#	#	#	#	#	#						
Multiple viewports	•	•	#	#	#	#	#	#	#	#	#	#	#			•			

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Structural analysis <i>(continued)</i>																			
Structural linear dynamics <i>(continued)</i>																			
Shock spectrum																			
Random vibration																			
Rotor dynamics																			
Structural nonlinear																			
Basic implicit nonlinear analysis																			
Transient																			
Geometric																			
Elastic/plastic material																			
Hyperelastic material																			
Gasket material																			
Nonlinear buckling																			
Implicit solver																			
Explicit solver																			
Structural contact and connections																			
Surface-to-surface contact																			
Node-to-node contact																			
Spot welds																			
Rigid elements																			
Constraint elements																			
Glue connection																			
Advanced structural analysis capabilities																			
Dynamic response analysis																			
Superelements analysis module																			
Direct matrix abstraction programming (DMAP)																			
Design optimization module																			
Aeroelasticity analysis module																			

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Structural analysis <i>(continued)</i>																			
Parallel processing																			
Shared memory parallel (SMP)		•															•	•	
Distributed memory parallel (DMP)																	+	•	
Optimization																			
Topology optimization		+	•															+	+
Size and shape optimization		•																+	+
Laminate composites																			
Zone-based modeling		•									•							•	•
Ply-based modeling		•									•							•	•
Import ply orientations from FiberSIM											•								
3D layup extrusion											•								
Draping											•								
Ply materials		•									•							•	•
Laminate validation											•								
Optimization		•									•							•	•
Solver support for composites on Nastran, Abaqus, ANSYS, LS-Dyna											•								
View shell stress resultants, ply stresses, ply strains, ply failure indices (ply and bond) and ply strength ratios (ply and bond)		•									•							•	•
Enveloping, filtering and sorting tools											•								
Durability																			
Static events													•	•					
Transient events														•					
Strain gage durability														•					
Stress life													•	•					
Strain life													•	•					
Smith-Watson-Topper													•	•					
Weld life														•					

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Fluid dynamics <i>(continued)</i>																			
Fluid modeling <i>(continued)</i>																			
Multiple enclosures																			
Multiple fluids																			
Internal or external flows																			
Porous media modeling																			
Nonlinear fluid properties																			
Humidity																			
Automatic fluid domain and boundary layer meshing																			
Automated connection of disjoint fluid meshes																			
Fan models																			
Embedded 2D/3D flow blockages																			
Condensation																			
Motion-induced flow																			
General scalars and particle tracking																			
Non-Newtonian fluids																			
Multiple rotating frames-of-reference																			
Two-phase flow																			
Head loss inlets and openings (fixed or velocity dependent)																			
Fluid swirl at inlet and internal fans																			
Fluid recirculation loop models																			
Parallel processing																			
Up to 8 cores on one machine																			
Distributed memory parallel (DMP) – unlimited cores																			

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Coupled analysis																		
Thermal-fluid				•	•	•	•	•										
Thermal-structural		•		•	•												•	•
Motion-structural		+														+	•	•
Motion-controls																+		
Correlation																		
Modal analysis to physical modal test correlation														•				
Modal analysis to modal analysis correlation														•				
Analysis normal mode solution access and results viewing														•				
Pretest planning														•				
Geometry mapping														•				
Modal assurance criteria (MAC)														•				
Coordinate modal assurance criteria (COMAC)														•				
Cross-orthogonality														•				
Mode pairing														•				
Visual comparison														•				
Interactive design variable definition															•			
Dedicated DESOPT 200 – Model Update solution															•			
Design variable sensitivities															•			
Filtering of design variables															•			
Frequency and mode shape															•			
Embedded eigenvalue solver															•			
Multiple optimization algorithms															•			
Accommodation of FEM changes															•			
FEM and SIM update capability															•			

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Additional notes

Characteristics of NX CAE

NX Advanced Simulation is a bundle that includes NX Advanced FEM and NX Nastran Desktop-Basic.

NX CAE add-on products require NX Advanced FEM or NX Advanced Simulation as a prerequisite.

Platforms supported – Windows (32 and 64-bit), Linux 64-bit.

Model and solution size is limited only by amount of memory available and hardware platform/OS.

Characteristics of NX Nastran Desktop

Solution initialized from CAE preprocessing environment (NX or Femap™ software) on the same system.

All solution definitions are performed in the preprocessing tool (either the preprocessor or as part of the Bulk Data Deck creation).

Solver execution is restricted to use with the same CPU as the FE preprocessing solution.

Model and solution size are limited only by amount of memory available and hardware platform/OS.

Platforms supported for NX Nastran Desktop – Windows (32 and 64-bit), Linux 64-bit.

The NX Nastran Basic bundle is a prerequisite for all add-on NX Nastran modules and the NX Nastran Advanced bundle.

The NX Nastran Advanced bundle is not available with Femap software.

DMP is not available in the NX Nastran Desktop version.

Characteristics of NX Nastran Enterprise

Solves any valid Nastran deck from any source (NX, Femap, MSC Patran, Altair HyperMesh and others).

Solver can be located on a different CPU from the preprocessing system, such as on a separate server or cluster.

Model and solution size is limited only by amount of memory available and hardware platform/OS.

Platforms supported for NX Nastran Enterprise – Windows (32 and 64-bit), Linux 64-bit, Unix.

The NX Nastran Basic bundle is a prerequisite for all add-on NX Nastran modules and the NX Nastran Advanced bundle.

The NX Nastran Advanced bundle is not available with Femap™ software.

One license of NX Nastran DMP can be used to spawn a solve over as many processors as wanted.