



## NX Open Customization Services

### Leveraging open programming interfaces to support streamlined custom workflows that produce quality results faster and more easily

**Using Maya expertise and NX Open to analyze and automate key workflows that have critical time and quality requirements**

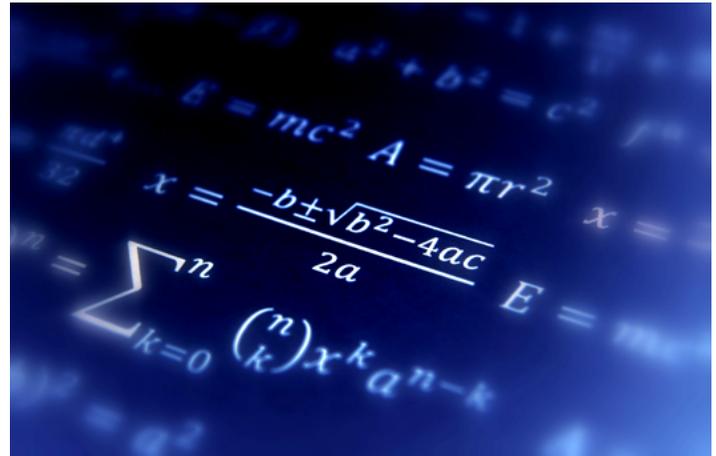
#### **Mechanical engineers with a taste for software**

Founded in 1982 by heat transfer experts, Maya Heat Transfer Technologies Ltd (Maya) offers a variety of engineering and software consulting services, and develops several advanced modules of NX, in the Advanced Simulation and Drafting applications. More than 80 engineers and developers combine the strengths of NX to innovative ideas in a wide range of industrial areas, including electronics, automotive, aerospace, shipbuilding, energy, machinery, and more.

Maya marries deep knowledge of CAD and CAE software with the tight demands of day-to-day engineering projects. Our NX programming experts regularly enhance core NX functionality to extend the NX toolset, while our consulting engineers apply that toolset to complex and demanding projects. By combining both types of expertise, Maya is in a unique position to leverage the NX Open programming interfaces and develop custom automation dialogs and algorithms that weave the regular NX tools into an overall custom solution that fits your specific workflows and challenges perfectly.

#### **NX automation and customization brings several benefits:**

- Custom dialogs guide users through well-defined workflows,
- Automation leverages the best practices and processes established by your in-house experts,
- Customized workflows supplement the regular NX toolset without hiding it, so that unusual or innovative designs can still benefit from both custom and standard functions.



Developing and deploying workflow automation to dozens of your engineers and designers requires careful planning and execution. Maya can help identify the software requirements, and will leverage its in-depth NX knowledge to propose and develop robust automation building blocks that embody your best practices. Along the way, we will cooperate with your in-house experts to embed yesterday's lessons in the custom solutions being rolled-out today and tomorrow.

Maya's long experience with established software engineering practices ensures that the resulting NX customizations are well documented, extensible and maintainable. Coupled to the long-term guarantees offered by Siemens PLM on the availability of published NX Open interfaces, this ensures that today's investments in automation will continue to bear fruit for a long time. All of this is backed by Maya support services, which will help you answer questions and problems, whether you need to plan future upgrades, require NX Open training, or have detailed NX programming questions.

#### **Business challenges**

Time-consuming, repetitive workflows that leverage company-specific knowledge and expertise are critical to quality and competitiveness objectives.



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## Keys to success

- Integrate design, analysis and quality-control processes in NX
- Leverage NX dialog designer and NX Open programming tools
- Automated workflows and processes expand the regular NX toolset seamlessly
- Maya analysis and development experts focus on key aspects of your operations

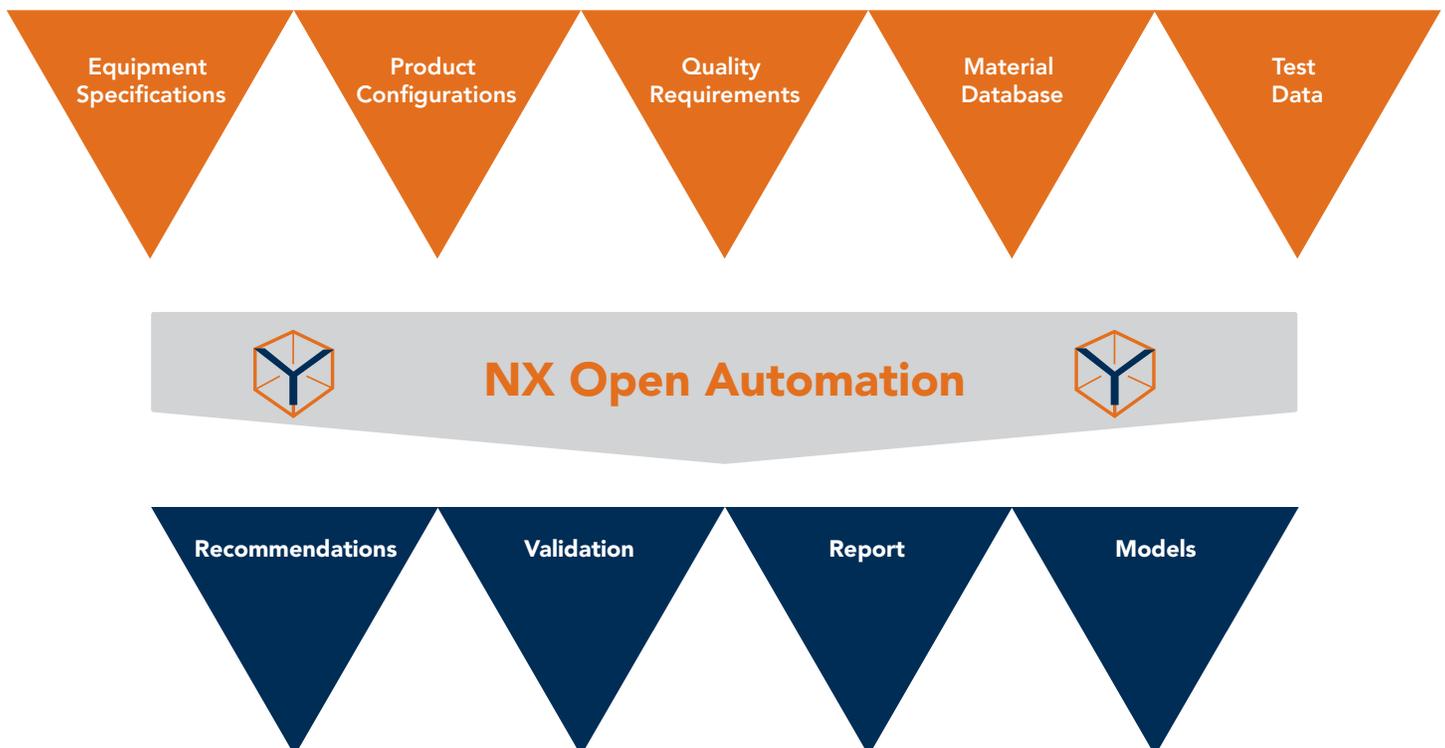
## Results

- Typical process improvements allow repetitive workflows to be executed 5 to 20 times faster with automation
- Leverage the know-how and expertise of your best in-house experts
- Empower your engineering organization to tackle designs systematically

- Ramp-up the knowledge level of your programming staff
- Free your most creative minds to look at process improvements and new designs
- Interior design and floor plan drawings

Scores of architects and interior designers at world headquarters of a large retail chain must prepare floor plan layouts for hundreds of stores every year, first for approvals, and later for release to construction crews. When considering replacement options for their desktop drafting package, they realized that NX would offer improved functionality due to integration with their in-house furniture design department (already using NX) and their centralized Teamcenter backbone.

To simplify the highly-repetitive process of wall placement inside the exterior shell of the building, a well-defined assembly structure is adopted, and automation is used to generate complete designs from simplified user inputs.

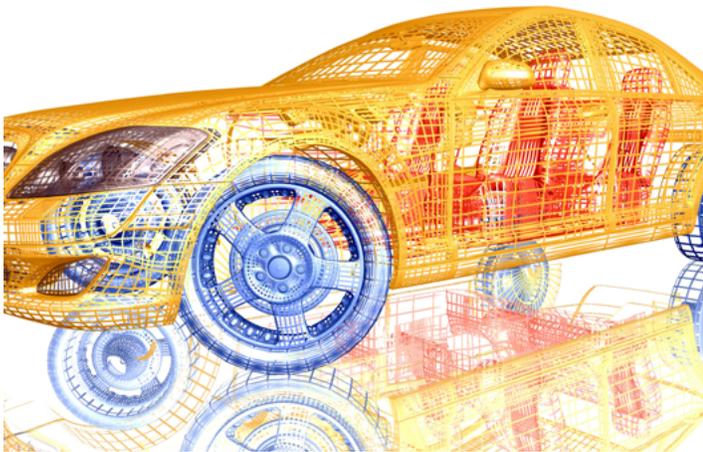




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By allowing the users to think in terms of walls, junctions, doors and walkways, the customized dialogs move creativity to a higher conceptual level and handle mundane tasks such as creating constrained sketches, building underlying 3D solid features, and generating associative drawings with specific custom annotations.

Starting from prototypes and detailed requirements defined hand-in-hand with the customer's team, Maya developed the NX automation tools that halve the time and effort required to design a new store. Object-oriented C++ source code has been developed and maintained by Maya for this purpose. Tight cooperation with other development and integration teams allowed the automation solution to roll-out on schedule, and with positive feedback from architects and interior designers.



### Rotating equipment analysis

A large aerospace manufacturer typically need to qualify new designs by applying specialized analysis processes that combine commercial solvers and in-house correlations and computations using proprietary data and know-how deriving from decades of experience. When engineering staff must apply such processes to prospective new

designs using off-the-shelf CAD tools, the resulting work involves innumerable steps that require importing and exporting data, transcribing values in spreadsheets, executing arcane command-line custom programs, and verification of results by long-time expert analysts.

In a world where iterative design cycles need to accelerate, NX automation allows design engineers to identify key geometric features that have special meaning in downstream analyses. Tightly constrained geometry simplification and decomposition guides NX meshing tools to generate fine-element models that respect in-house guidelines. NX Open programming leverages these models, drives in-house analysis tools, prepares structural analysis data in NX, and brings the results back within NX and Teamcenter.

Developed by Maya in close cooperation with the customer's in-house Methods group, the NX automation solution improved the productivity of dozen of design engineers. The C-sharp source code and documentation has been transferred back to the customer's Methods group for long-term maintenance and support.

### Composites design and analysis for complex surfaces

At a large equipment manufacturer with years of experience building big composite structures, engineering design and analysis has traditionally been performed using many custom-built programs and small text files. This generates lots of data files without any revision control, and a complex product development workflow that cannot easily adapt to innovative geometries or production technologies. By moving these workflows to automation modules inside NX, the data can be rigorously attached to version-controlled parts and the engineering rules and computations are applied consistently.

Starting from externally defined curved surfac-

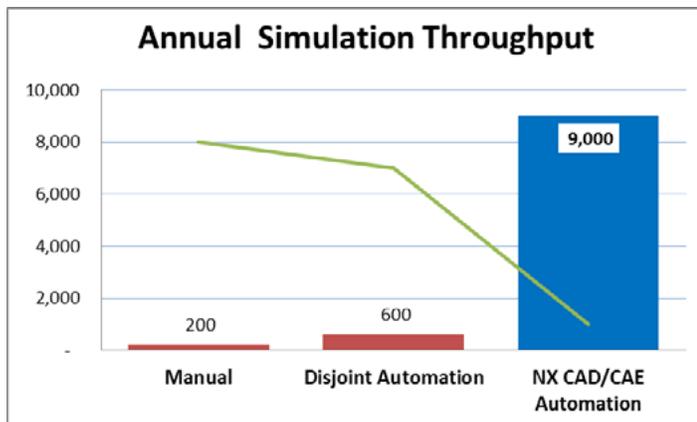


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es, customized dialogs allow the user to attach laminate layup recipes to various surfaces in NX. Automation algorithms then use this information to generate two different finite-element models of the composite structure for analysis purposes: one is a simple stick model with complex cross-section properties used for in-house dynamic loading computations, whereas the other is a complete laminate composites representation on the surface mesh, leveraging the advanced laminates module and boundary conditions of the NX Advanced Simulation application.

Developing the requirements and algorithms for the customer allowed Maya to leverage its considerable expertise in meshing, laminates and structural analysis. The resulting system allows the customer to produce new designs with more flexibility and speed.

## CASE STUDY #1

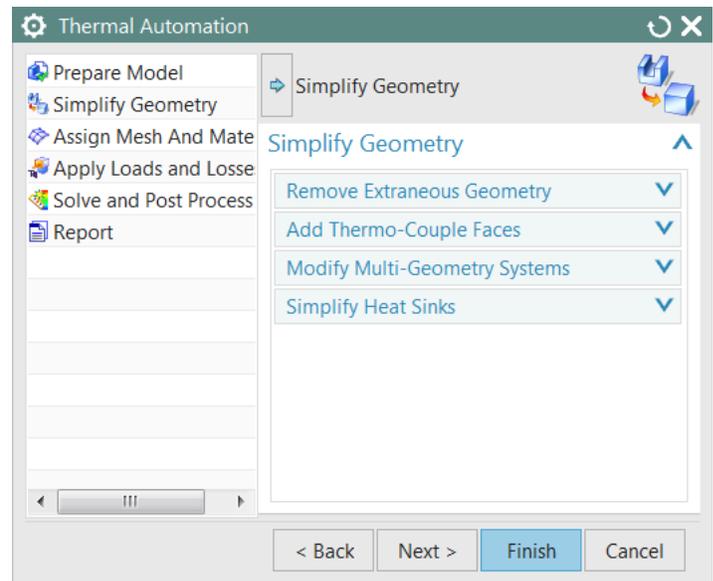


### Business Background:

- Supplier of complex assemblies of mechatronic equipment
- 3 continents / 5 locations / 4,000 people world-wide
- Growing demand for validation (4000 new design/year)
- Products consist hundreds of parts, with geometries made of hundreds of contact surfaces

### Automation Solution:

- Enabling Designer to run reliable simulation
- Metadata re-use and sharing (Design, Analysis, Mfg)
- Integration of external material databases
- Rules based simulation



### Results:

- Savings of over 20,000 hours/Year vs best industry standards
- Increased Simulation throughput by 15X
- Achieved quality metrics

For more information about our NX Open Services contact MAYA at [info@mayahtt.com](mailto:info@mayahtt.com), call +1.800.343.6292 or visit [www.mayahtt.com](http://www.mayahtt.com)

Maya HTT is a Siemens PLM foundation partner and a leading software simulation developer with in-depth engineering expertise, author of a variety of CAE solutions within the Siemens CAE portfolio including NX CAE and Femap.

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