

# CuboNester – cutting and packing of cuboids

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## Software description

The CuboNester software optimizes the arrangement of cuboid or nearly **cuboid parts** in **three dimensions**. The algorithm can combine a variety of different parts in one arrangement.

The software is available in two variants: **CuboNester-C** is designed for **cutting** blocks of material. It can be used for metal, marble, graphite, and foam, among others. **CuboNester-P** optimizes **packing**, for example of disassembled furniture into packages. Other possible applications of CuboNester include packing boxes into shipping cartons for mixed orders in online retail, or pallet and container loading.

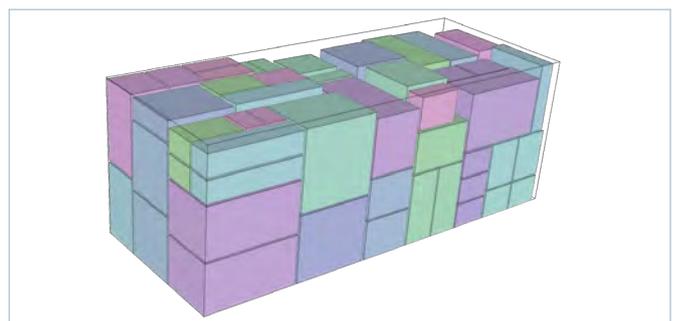
CuboNester is still a young product that is tailor-made to meet two customers' needs, for metal cutting and for furniture packaging, respectively. Other customers can license the product and use it with just a few adjustments for these applications. However, we are also looking forward to further developing CuboNester, learning from customers in other areas about the specifics relevant there, and expanding the implementation for these needs.

## CuboNester-C

CuboNester-C generates cutting plans that can be obtained by so-called **guillotine cuts**, i.e. straight end-to-end cuts. This corresponds to the capabilities of standard sawing technologies. The software optionally avoids cuts close to the edge ("dust cuts").

CuboNester-C can include reusable remnants in stock or remainders newly created during production in the optimization. Through an adjustable evaluation, the software can specifically prefer remnants over new input material, avoid the generation of new remnants as far as possible, and weigh these objectives against the material utilization rate.

The optimization can take account of marked defects in the material.



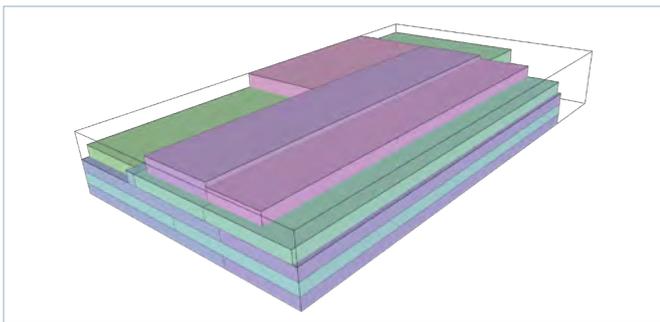
*Cutting a foam block into different types of smaller blocks.*

## CuboNester-P

CuboNester-P determines packing arrangements through a **configurable set of rules**. These rules consist of the parts to be packed together with possible types of packing. Rules can be either strict (must be met) or soft (should be met but may be broken if necessary).

CuboNester-P dynamically determines the size of the resulting packages. However, users can specify maximum dimensions.

CuboNester-P makes it possible to improve the packing process by increasing the degree of automation. Manual packing tests are no longer necessary, and the planning of both the packing and the subsequent logistics can occur at an early stage. These features make CuboNester-P perfect for online retail that involves ever varying parts to be shipped.



*Packing of a disassembled piece of furniture (with hardware package at the back).*

## Use of the software

CuboNester is distributed as a pure nesting engine and can easily be integrated into other applications, such as plant control systems, MES, or ERP systems. For this purpose, CuboNester has an XML interface that can be used via standard input/output, files, or network service. The software runs on all current Microsoft Windows operating systems.

CuboNester addresses two groups of customers,

- software solution providers who want to integrate an optimization into their application and
- companies that are willing to program a corresponding connection to their IT systems or ask their IT service provider to do so.

To give you an impression of the performance of our software before you integrate it into your systems, we offer a demo GUI.

This simple GUI is not suitable for daily productive use.

Based on the latest research results, Fraunhofer SCAI constantly improves and enhances CuboNester. CuboNester benefits from the expertise of the institute in optimization.

## Features

### Optimization

- Pure nesting engine
- XML interface
- Runtime and optimization level adjustable
- Configurable trade-off between different optimization goals

### Cutting

- Different sizes of stock material
- Different parts as well as larger numbers of identical parts
- Consideration of defects
- Guillotine cuts
- Avoidance of dust cuts
- Handling of remnants

### Packing

- Rule-based packing
- Input of both strict and soft rules possible
- Package dimensions adapted to contents

## Contact

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