![TLK-Thermo GmbH logo]

MoBA Automation

Software for the Automation of Individual Workflows

Obstacles of Workflow Automation

- **Workflows usually change significantly from project to project**

- **Too little programming knowledge**

- **Automatized, self-developed workflow tasks are not standardized**

  - Time consuming adaption of existing scripts

  - Poor interchangeability of scripts

- **Automatized workflows are designed to be executed**

  on one workstation

  - Loss of time due to missing parallelization

  - Limited capacities of fast workstations

$\Rightarrow$ **MoBA Automation addresses these obstacles**

Workflow Automation with MoBA Automation

MoBA Automation enables the automated development of individual workflows for the model- or data-based development, analysis and optimization of technical systems. Since many TLK products can be used, MoBA Automation is particularly suitable for tasks related to thermal systems and their components.
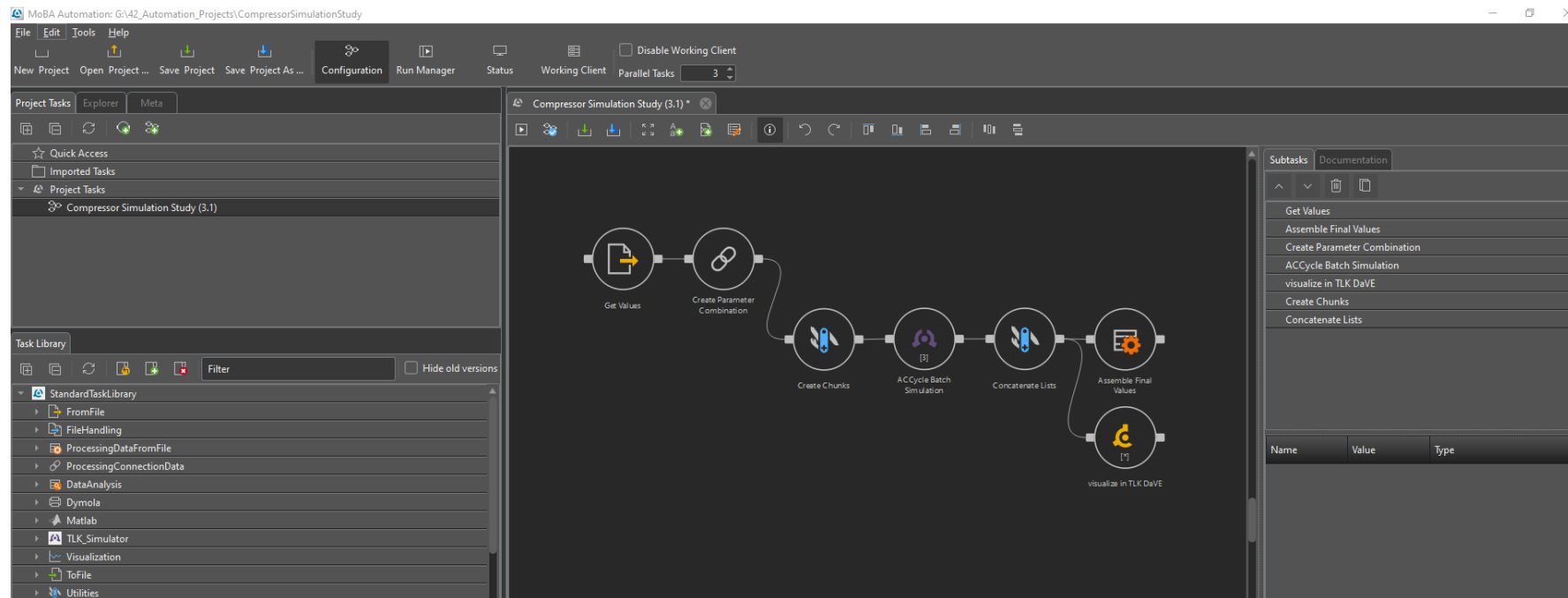

Graphical user interface of MoBA Automation

Automate your Workflow by linking Tasks

The graphical user interface and ready-made parameter fields allow the automation of individual workflows even without programming knowledge.
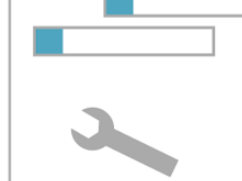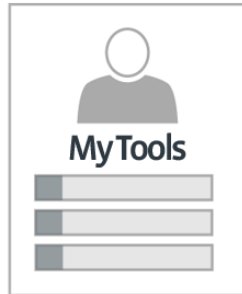
In order to automate a workflow with MoBA Automation, it must first be divided into tasks. Each task (Python script with inputs and outputs) is then defined and adjusted to be completed. The tasks are arranged and linked via the graphical user interface.
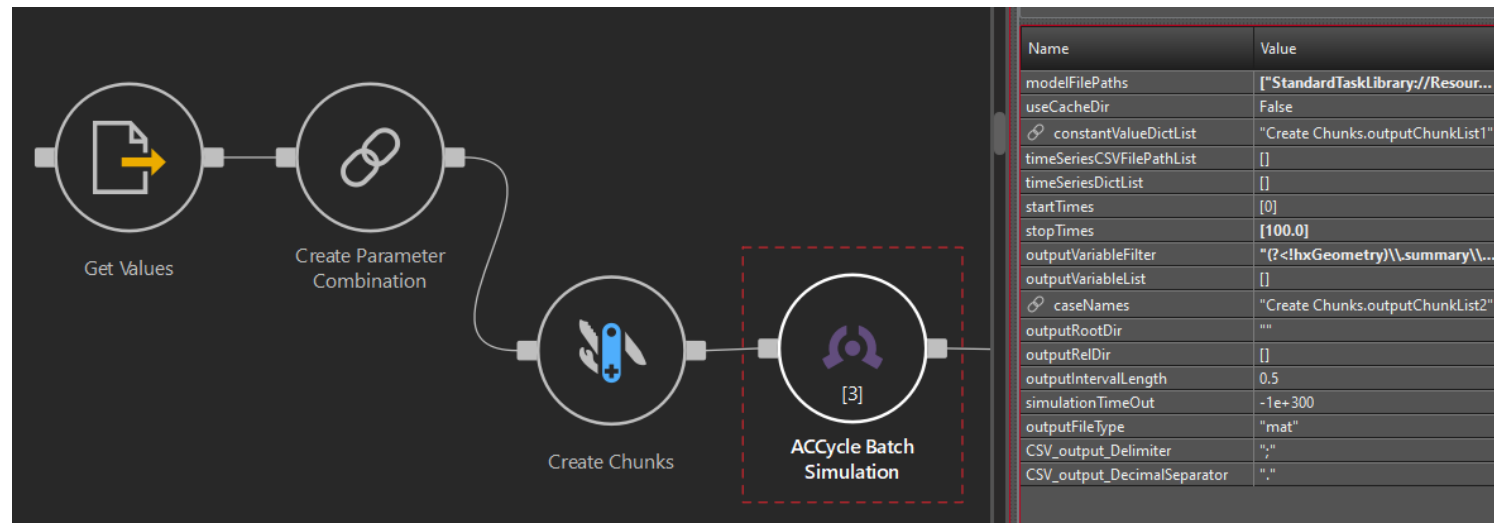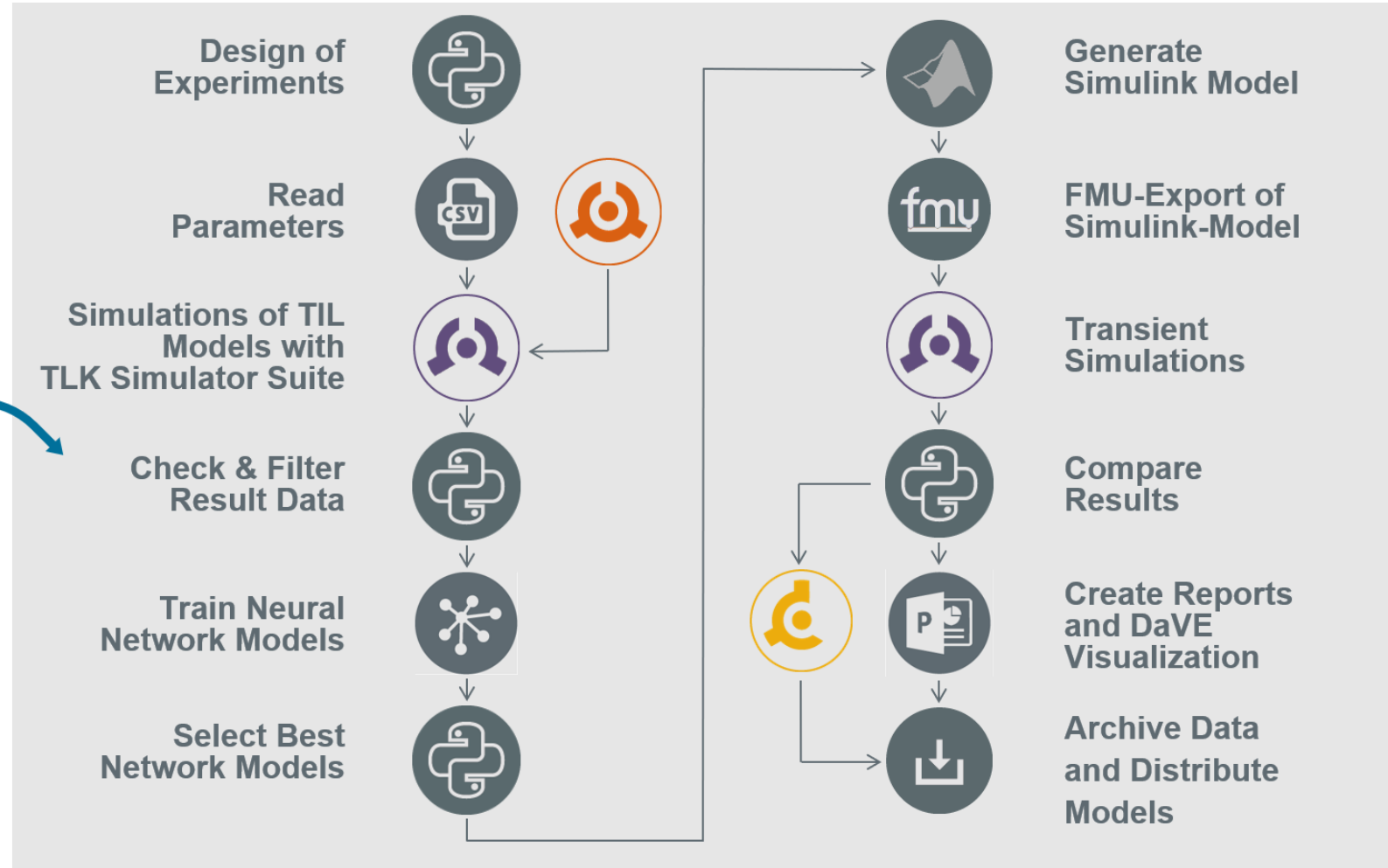

Defining inputs and linking tasks in MoBA Automation

Example: Model reduction using neural networks

Task Library

My Tools

TLK Tools

External Tools

+

Example: Generate single reduced model of several system models with neural networks

Design of Experiments

Read Parameters

Simulations of TIL Models with TLK Simulator Suite

Check & Filter Result Data

Train Neural Network Models

Select Best Network Models

Generate Simulink Model

FMU-Export of Simulink-Model

Transient Simulations

Compare Results

Create Reports and DaVE Visualization

Archive Data and Distribute Models

MoBA Automation Tasks
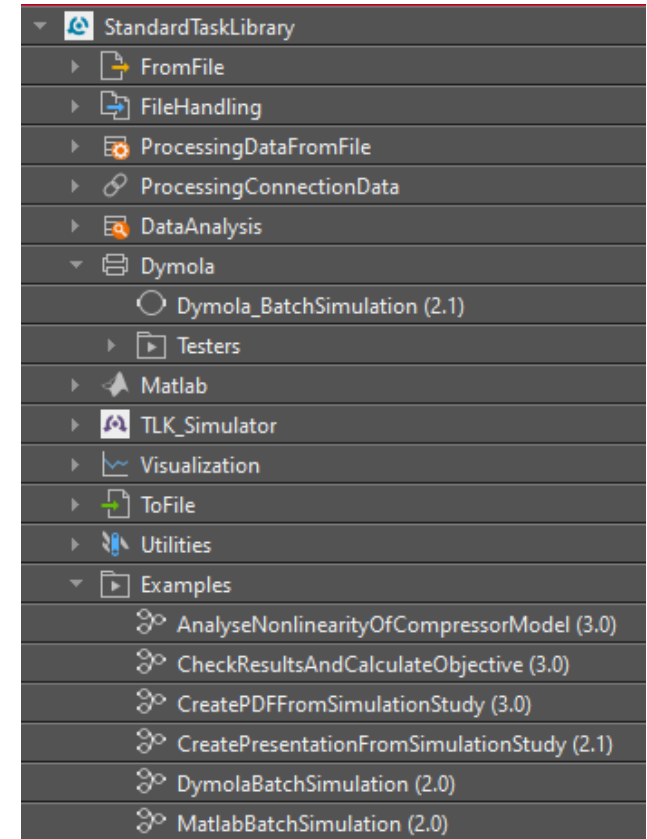
TLK Standard Task Library

MoBA Automation already contains a large number of ready-made Python based tasks, which can be adapted and used directly with a few simple steps. The Standard Task Library enables the fast and simple development of user specific workflows with tasks. No programming skills are required.

Specialization

Users with little programming experience have the possibility to change the visible program code. This allows even more freedom when configuring their own tasks. Existing scripts can be easily adapted for the use in MoBA Automation.
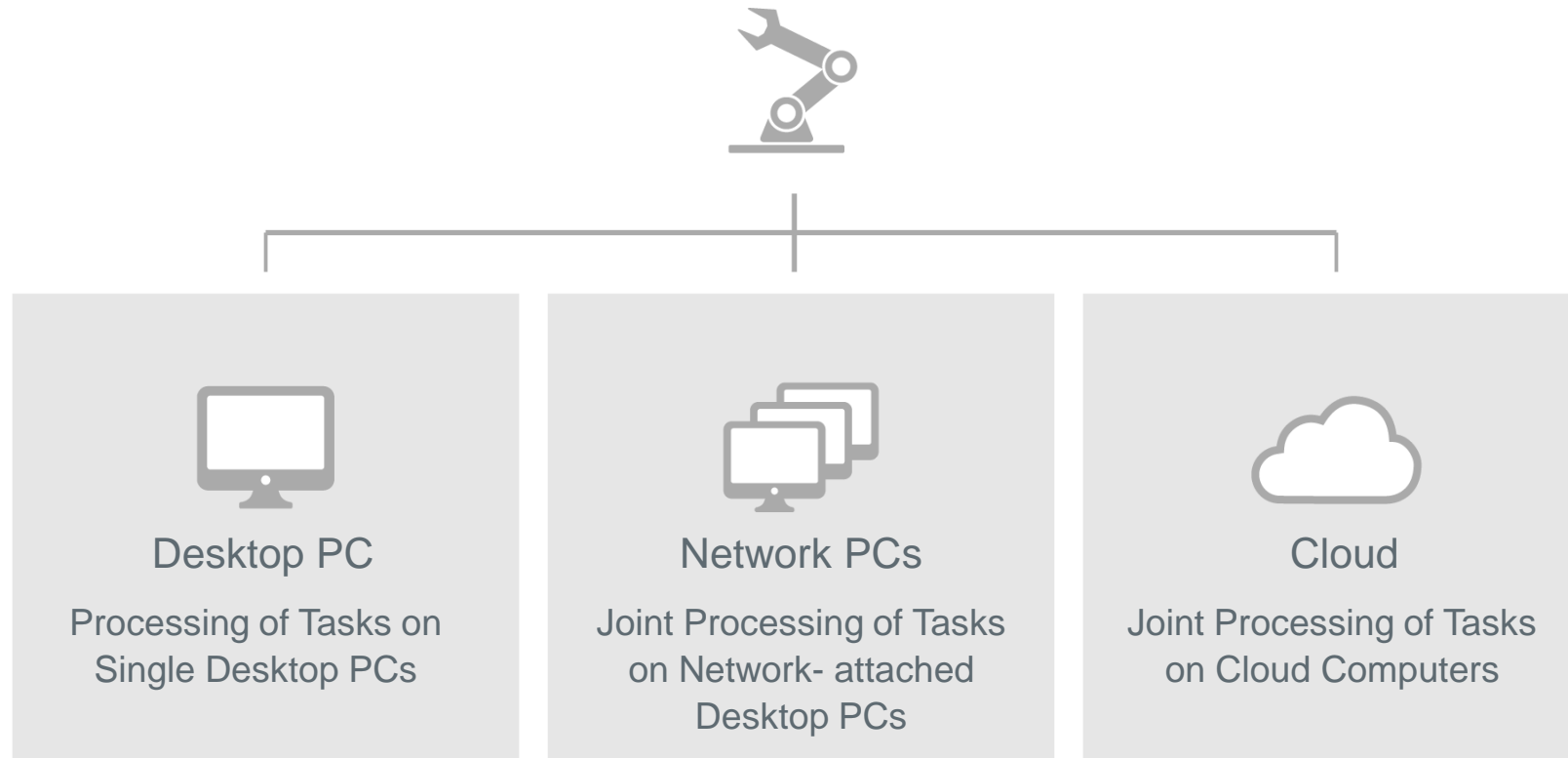
Flexibility

Even if no explicit Python interface is available, any software can be called or controlled out of MoBA Automation.
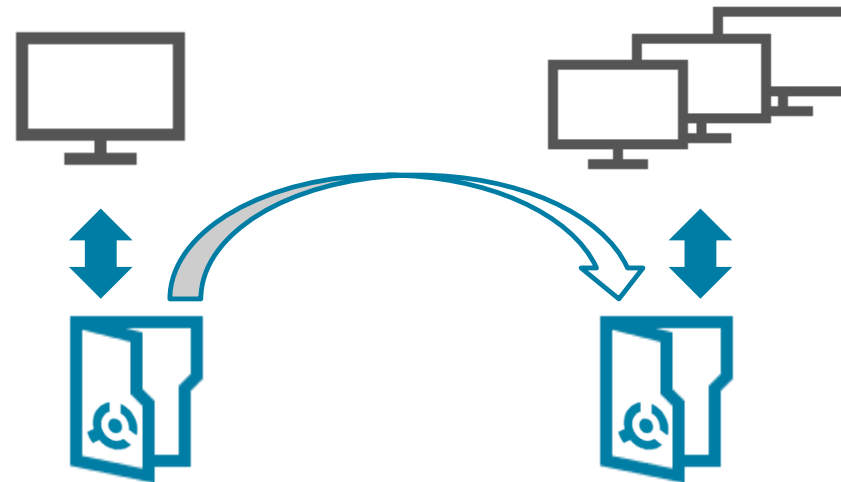

TLK Standard Task Library

Joint Processing of Workflow Tasks

The execution of the automated workflow can be performed on your own computer, an existing computer network or in the cloud. The parallelized calculation of the processes allows results to be achieved quickly and efficiently. For joint processing, an additional license is required.

Desktop PC	Network PCs	Cloud
Processing of Tasks on Single Desktop PCs	Joint Processing of Tasks on Network- attached Desktop PCs	Joint Processing of Tasks on Cloud Computers

Project and Data Management

Workflows, individual tasks, resources and results are organized within a single MoBA Automation Project. The project folder can be moved to other workstations without the need to adjust paths. This simplifies for instance the post-processing, as the results of workflows can also be handled more efficiently for further processing.

Key Features at a glance

Extensive TLK Standard Task Library

The tasks can be taken from the extensive TLK Standard Task Library and modified for individual requirements. Programming experience is not required.

Use of own scripts
Your own Python scripts can be easily adapted or newly developed for use as tasks in MoBA Automation. In this context the integration of all possible Python modules is possible. The organization in the form of libraries guarantees the reusability of all tasks.

Maximum flexibility
Any external programs, such as Dymola or Matlab, can be controlled by MoBA Automation. The extensive and powerful modules available free of charge for Python enable the convenient implementation of any project requirement.

Computer network and cloud computing*
Work assignments can be processed with little effort via connected computers in the network or in the cloud. This enables significant time savings for parallel workflows such as extensive parameter studies.

Portability
The automation projects can be easily transferred to other computers. This enables documentation and archiving of the project's workflows, making them traceable and repeatable.

* additional license required

Application Examples

Simulation studies
Execution of large parameter studies consisting of complex system models created with the TIL Suite and result visualization. Models exported as FMU are calculated with our Simulator Suite.

Model reduction
Development of fast neural network models based on simulation study results of complex models and validation in transient simulations.

Measurement data processing
Preparation of measurement data, e.g. by segmenting, cutting out the desired time ranges, aligning and merging different measurement data or reducing the data resolution.

Data analysis
Statistical analyses and identification of stationary measuring ranges.

Regression test
Performing predefined tests for error checking during model changes

Model analysis
Implementation of various analysis methods, including linearization, regression, and relative gain array analysis.

Data visualization
Generate image files from a variety of diagram types, from Excel evaluations, and from configurations of our visualization software DaVE.

Reporting
Create PDF or PowerPoint reports that take into account study constraints and include automatically generated graphs.

Parameter estimations
Fitting of model parameters using our ModelFitter and measurement data.

Topology optimization
Time-saving identification of optimal topologies in the computer network using our Optimization Suite.

Optimal control
Derivation-based operating strategy optimization with parallel calculation of the Jacobi matrix.

Thank you

TLK-Thermo GmbH

If you have any questions,
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