RE4DY

MANUFACTURING DATA NETWORKS

RE4DY TOOLKIT

Name of the Tool	Create MyVirtual Machine
Tool Owner	Industry Commons Foundation
Version	1.0
Date	Nov 2025
Version	V1.0

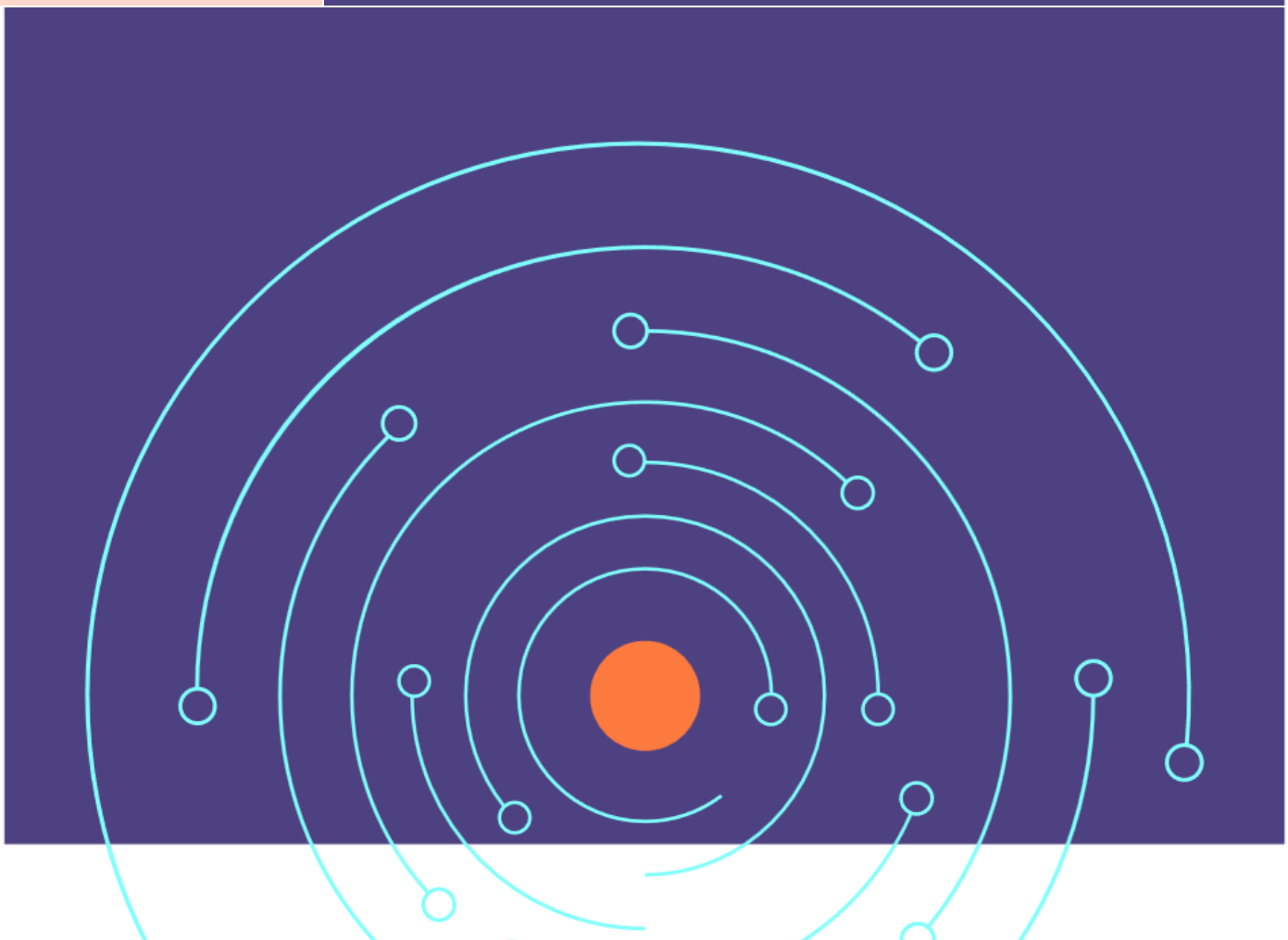

Table of contents

1. Component Description

Create MyVirtual Machine is a virtual CNC system that simulates a SINUMERIK ONE on a user PC. The hardware components of the control are modeled as software components and represent a complete image of a real CNC. With Create MyVirtual Machine, a user can develop and test the next control generation in the development phase of a CNC machine, or NCK, PLC and HMI software without requiring any hardware. Parts of the machine commissioning are preconfigured on the virtual model. It is possible to shorten the commissioning time of the real machine by configuring the system using the virtual model. Furthermore, the created machine projects can be made available by Create MyVirtual Machine for processing in Run MyVirtual Machine for work preparation. Create MyVirtual Machine includes Create MyVirtual Machine /Operate, Create MyVirtual Machine /Open and Create MyVirtual Machine /3D.

Create MyVirtual Machine /Operate contains the TIA Portal data file for configurating the PLC, HMI, and the Numeric Controller. All these components represent the physical components and provide all functionalities from the real products. With Create MyVirtual Machine /Open the user can connect further applications to Create MyVirtual Machine. Create MyVirtual Machine /3D demonstrates a visual simulation of the machine and workpiece where the user can test visually how the system will run in the operating system.

As part of the RE4DY project, Create MyVirtual Machine will be used in the GF and Fraisa pilot. With Create MyVirtual Machine, the physical machine (Mill P 800 U S) from GF will be virtually created. This includes the 3D simulation of the real machine, the implementation of the control code and the virtual numerical code. This setup is necessary to build the digital twin of the real machine.

2. Input

Create MyVirtual Machine /Operate

The operation of a Create MyVirtual Machine corresponds to that of a real control equipped with a SINUMERIK Operate user interface and machine control panel. Therefore, Create MyVirtual Machine simulates the peripherals through direct reading and writing in the PLC I/O image. Parts of the PLC I/O image are also used for internal communications. Create MyVirtual Machine /Operate allows the user to control the virtual machine like a real physical machine. To do this, the virtual machine must first be created using STL data and a TIA project data file.

Create MyVirtual Machine /Open

The Open Interface with Create MyVirtual Machine /Open allows external applications to control the Create MyVirtual Machine system and to communicate at runtime. The Create MyVirtual

Machine application can be started, operated, and stopped by other applications. To do this, the virtual machine must first be created using STL data and a TIA project data file.

Create MyVirtual Machine /3D

Create MyVirtual Machine visualizes the machining process and machine movements by means of a 3D simulation. A user can simulate the processing of NC programs in AUTOMATIC mode, for example, or manual traversing movements and tool changes in JOG mode. To do this, the virtual machine must first be created using STL data and a TIA project data file.

3. Output

Create MyVirtual Machine allows the user to develop and test the control in the development phase of a CNC machine or NCK, PLC and HMI software without the need for hardware. Create MyVirtual Machine simulates the virtual machine and tests the functionality of the hardware. This is used to analyze and optimize the engineering. On the one hand, while the virtual machine is running in Create MyVirtual Machine, the user gets transparency about the engineering, which he can use for optimization. On the other hand, data from the virtual controllers is available, which can be made available for other applications.

4. Information Flow

Installation and configuration

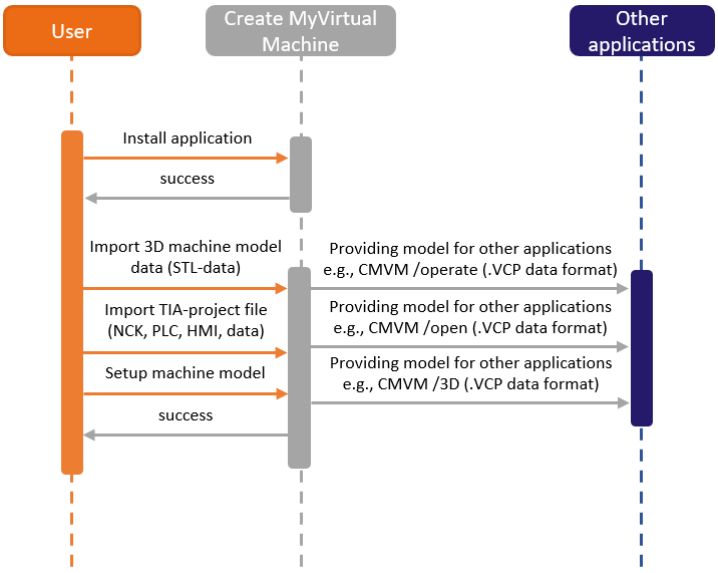

Figure 1 Installation and configuration

The installation of the Create MyVirtual Machine application is necessary to create and build the virtual machine of an existing real machine. To create the virtual machine, input files such as STL-

data for a 3D simulation are required. Also, a TIA project data file is needed, which contains information like numerical control code or control code. After successful creation of the virtual machine, the virtual machine can be exported as a .VCP file to be used in Run MyVirtual Machine.

Virtual operate

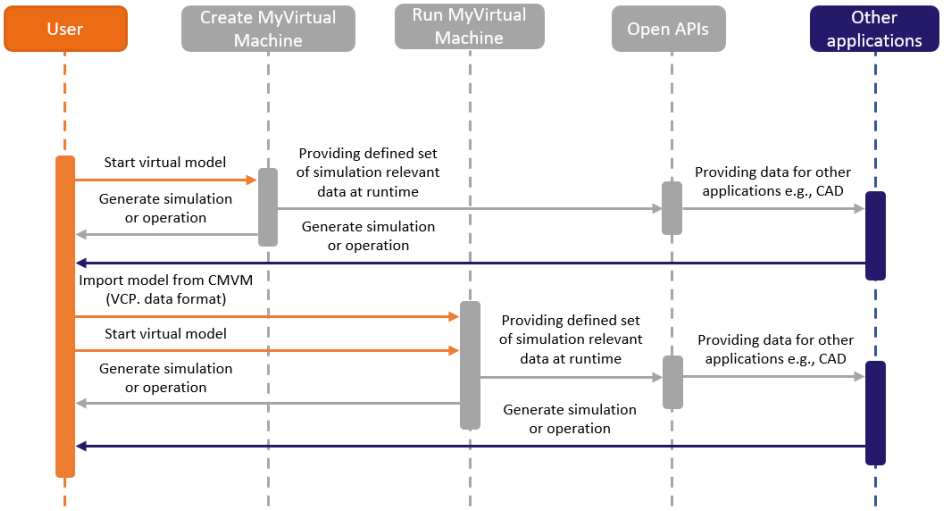

Figure 2 Virtual operate

The virtual machine can be run within Create MyVirtual Machine. A user can run, simulate, configure, and analyze the virtual machine within the application. To do this, the user must import or run the. VCP data file from Create MyVirtual Machine. Simulation-related data is generated during runtime. This data can be used for analysis and optimization and can also be made available for other applications for analysis and optimization.

5. Internal Architecture

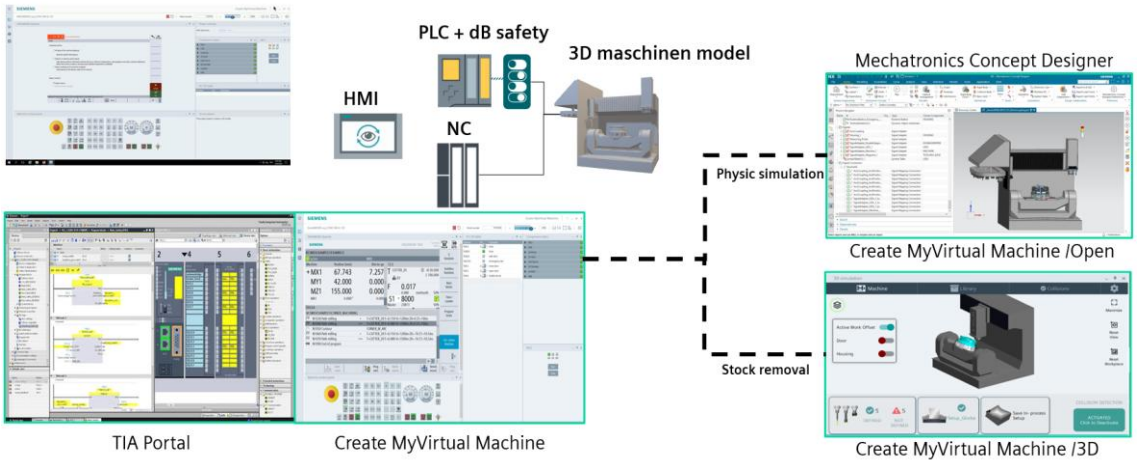

Figure 3 Internal Architecture

To create a virtual machine the application, Create MyVirtual Machine must be installed. Out of the TIA Portal a .VCP file can be exported, which contains the configurating of the controller code,

Human Machine Interface, and the Numeric Controller. All these components represent the physical components and provide all functionalities from the real products.

Create MyVirtual Machine/3D is a license that allows the user to visualize the movement of the machine. Create MyVirtual Machine /Open is a license that allows users to connect further applications to Create MyVirtual Machine.

6. API

The open interface allows an external application to control the SINUMERIK ONE system and to communicate with SINUMERIK ONE Application during runtime. The task scope of the open interface addresses various use cases (selection):

- Remote control of the SINUMERIK ONE application for example, in automatic inspection and test units
- Cyclic exchange of runtime information, for example, to connect external simulation systems (I/Os, virtual machine applications etc.)

Create MyVirtual Machine or Run MyVirtual Machine provides a defined set of simulation relevant data at runtime.

Further information:

https://support.industry.siemens.com/cs/attachments/109817568/AppNote_Run_MyVirtual_Machine_Open_en.pdf

7. Implementation Technology

Licenses:

Create MyVirtual Machine /Operate

Create MyVirtual Machine /Open

Create MyVirtual Machine /3D

Operating system:

Microsoft Windows 10 Professional/Enterprise/IoT Enterprise/Home (64 Bit)

8. Comments

None.