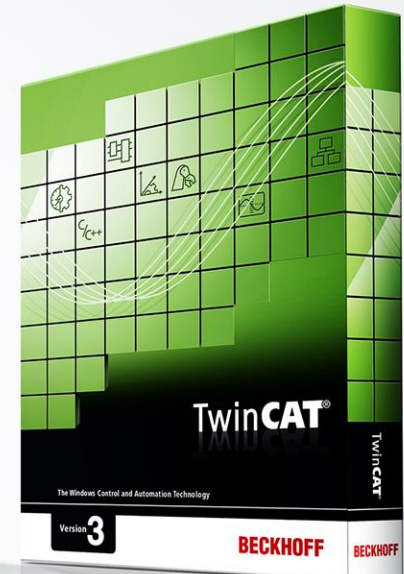
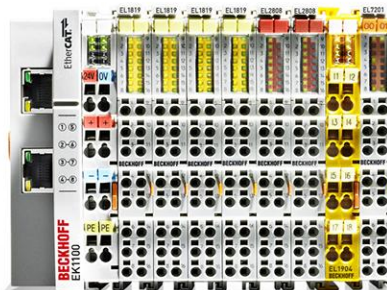


TwinCAT Overview

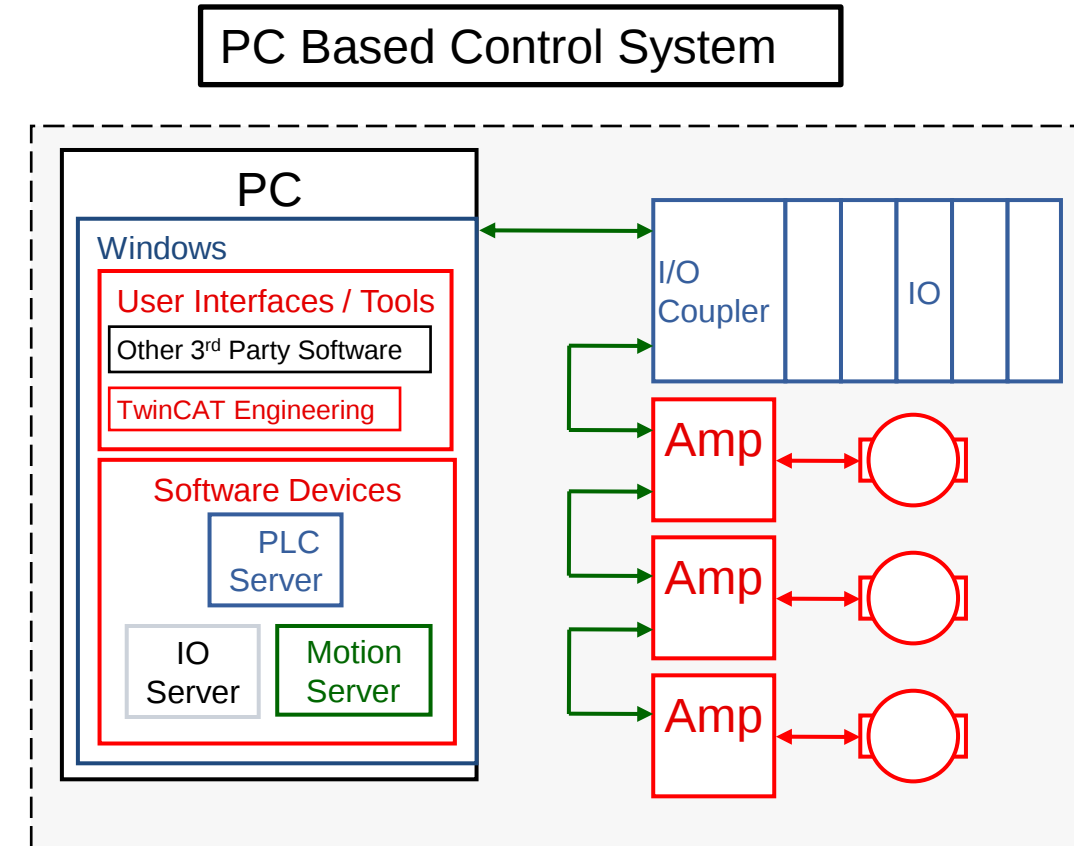
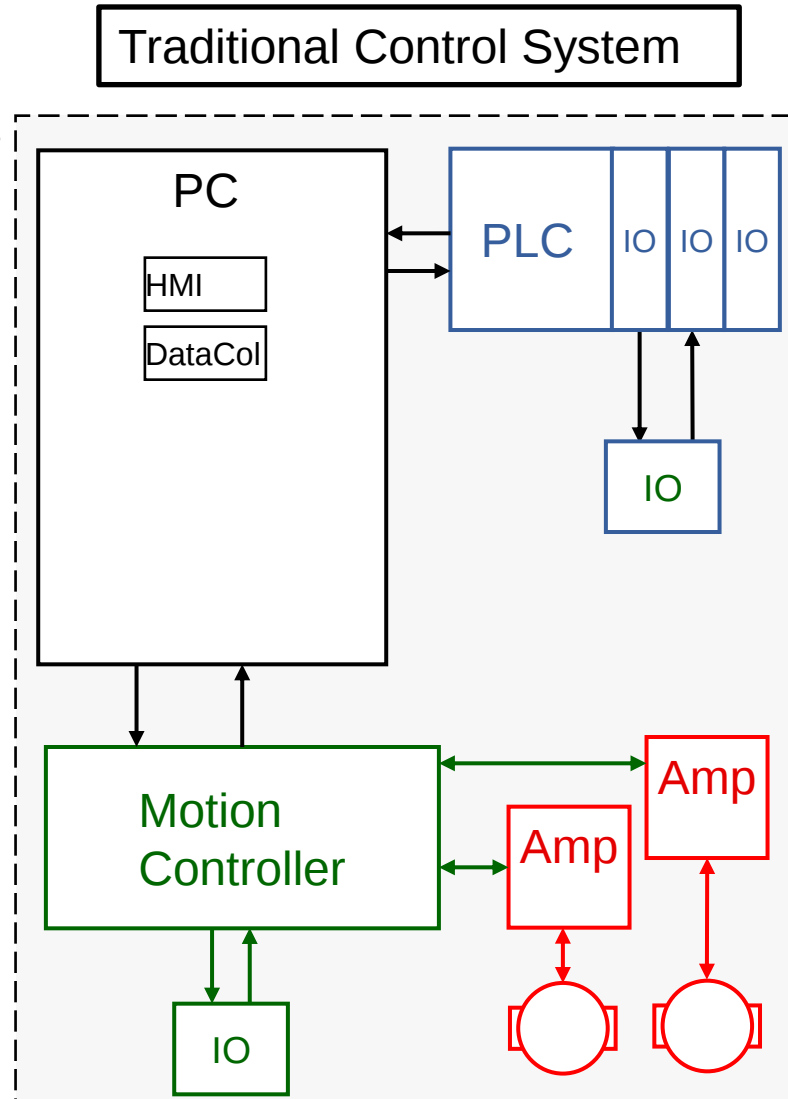
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Beckhoff Implements PC-Based Control

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- Automation vendors solutions often have multiple hardware controllers
- Beckhoff provides PCs which centrally do all machine functions within TwinCAT



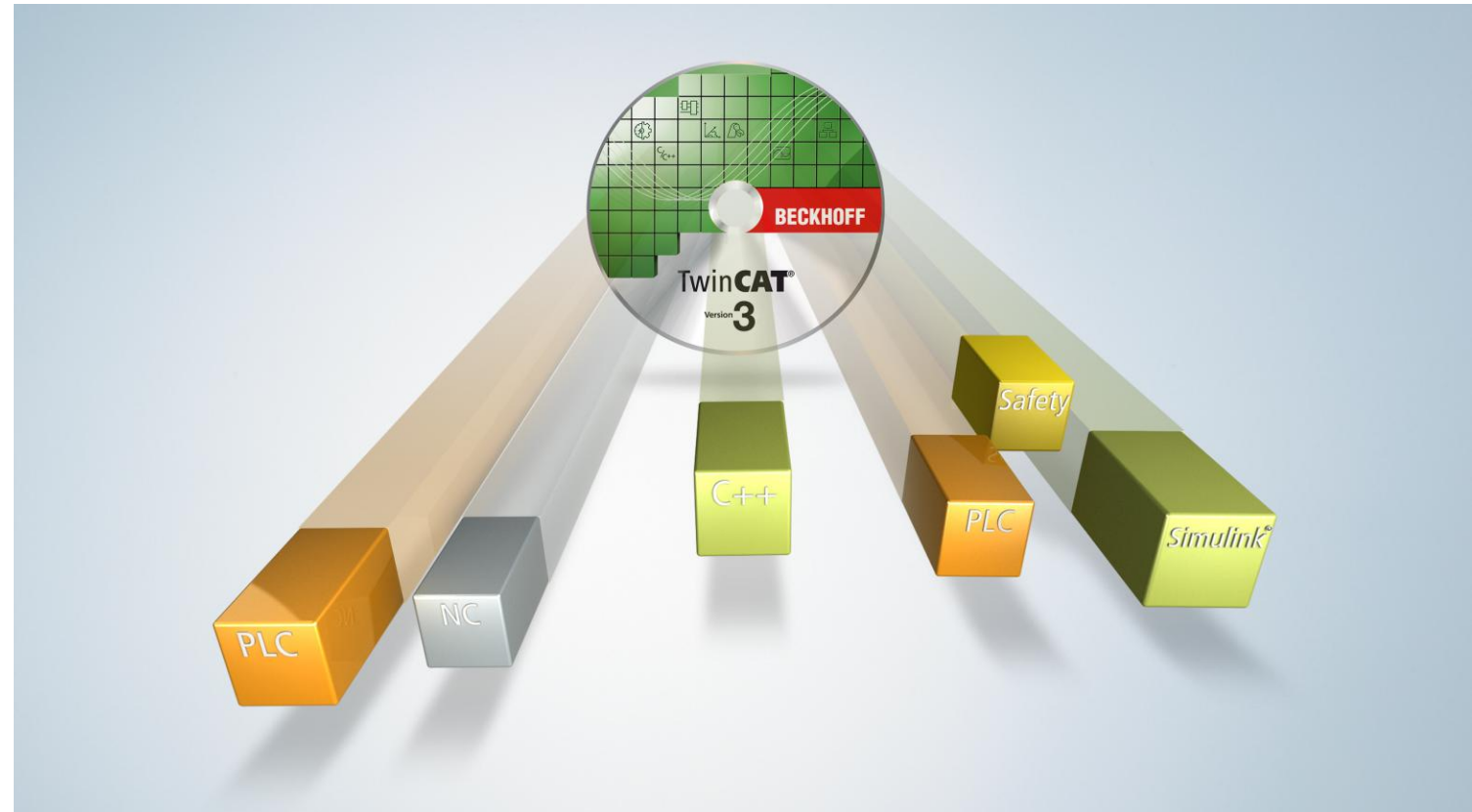
Benefits:

- Less Hardware to manage, troubleshoot
- Less Cables, Wires, Fieldbuses to know, fix
- Result:** Less time and money spent on overall control system

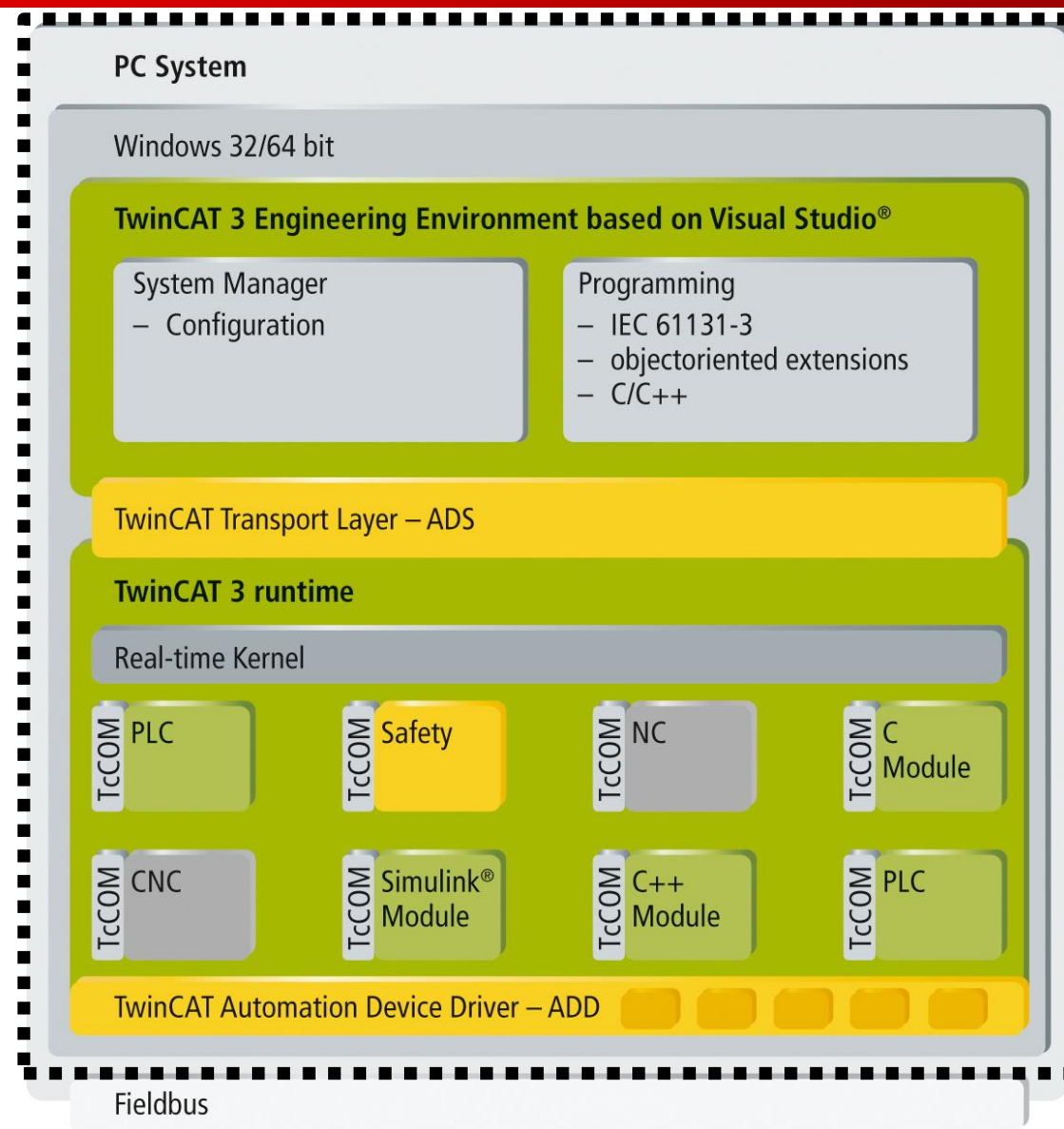
TwinCAT is a Software Suite

BECKHOFF

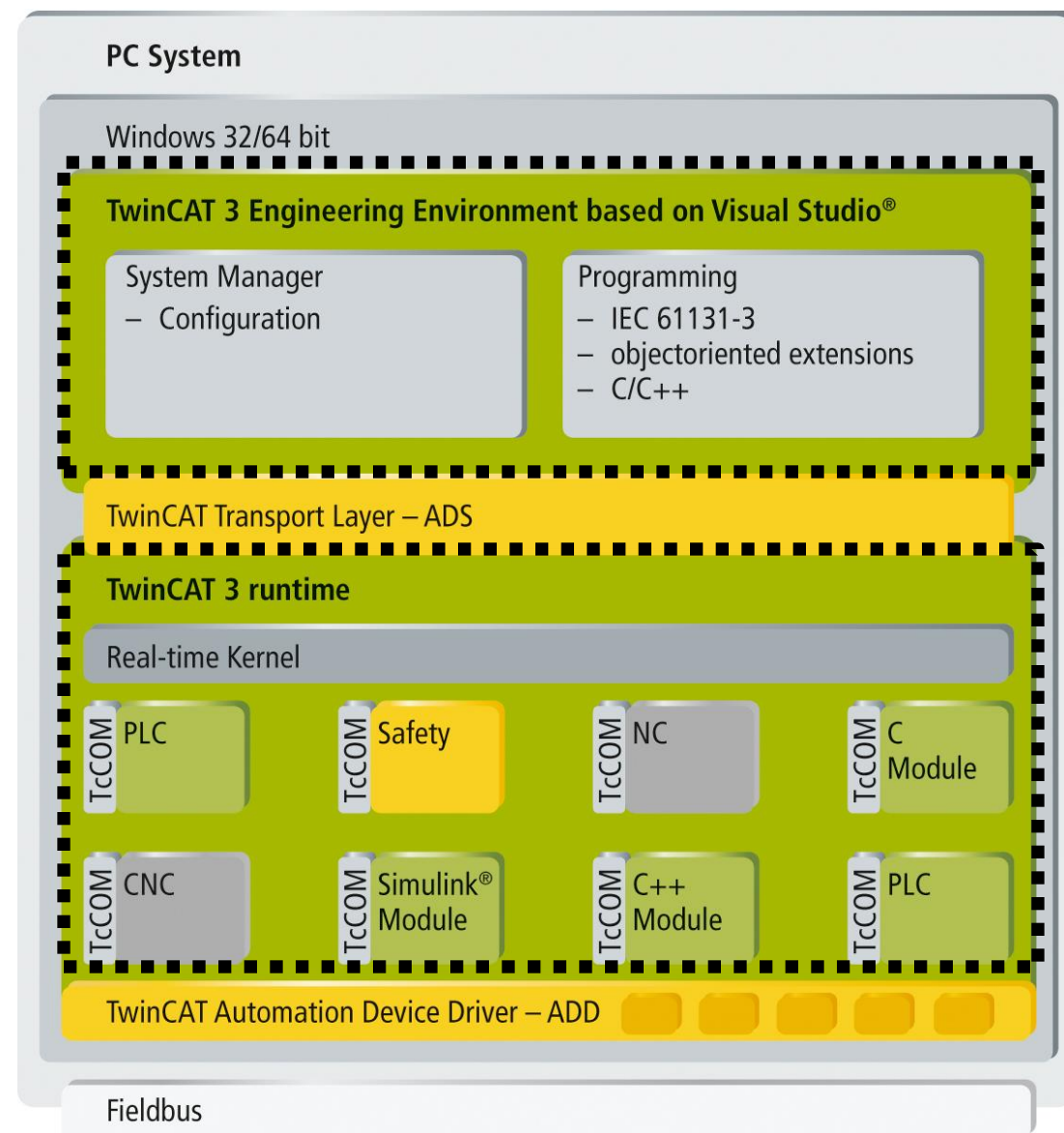
- TwinCAT installs to a PC and provides a software-based solution for machine control functions of:
 - PLC (Programmable Logic Control)
 - Motion Control
 - Fieldbus Master
 - C++
 - Safety



- TwinCAT is The Windows Control and Automation Technology
- TwinCAT installs to a Windows operating system and turns the PC into a real-time controller
- A ***real time*** system allows for the configuration of its timing behavior



- TwinCAT has two main parts:
 - The **Engineering (XAE)** is the user interface for machine:
 - Configuration, Development
 - Troubleshooting
 - The **Runtime (XAR)** executes the machine control as configured by the engineering environment
- **Engineering alone** cannot run a machine
- **Runtime alone** can not configure, troubleshoot a machine



- TwinCAT development allows for machine configuration of:

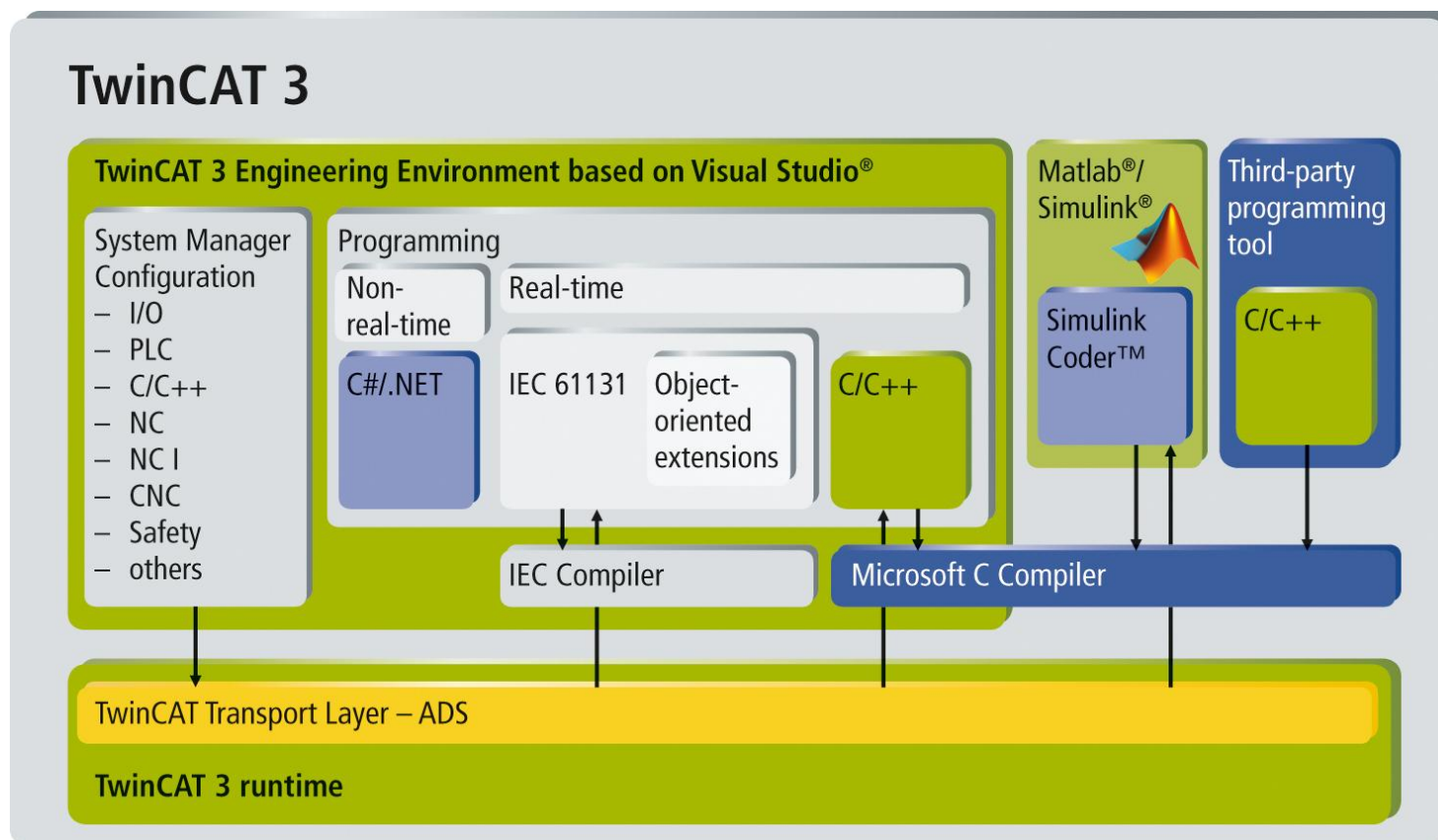
- **Real-Time** logic:

- PLC languages
 - Graphical (Ladder)
 - Text-based (Structured Text)

- C++ Logic

- **Non Real-Time** logic:

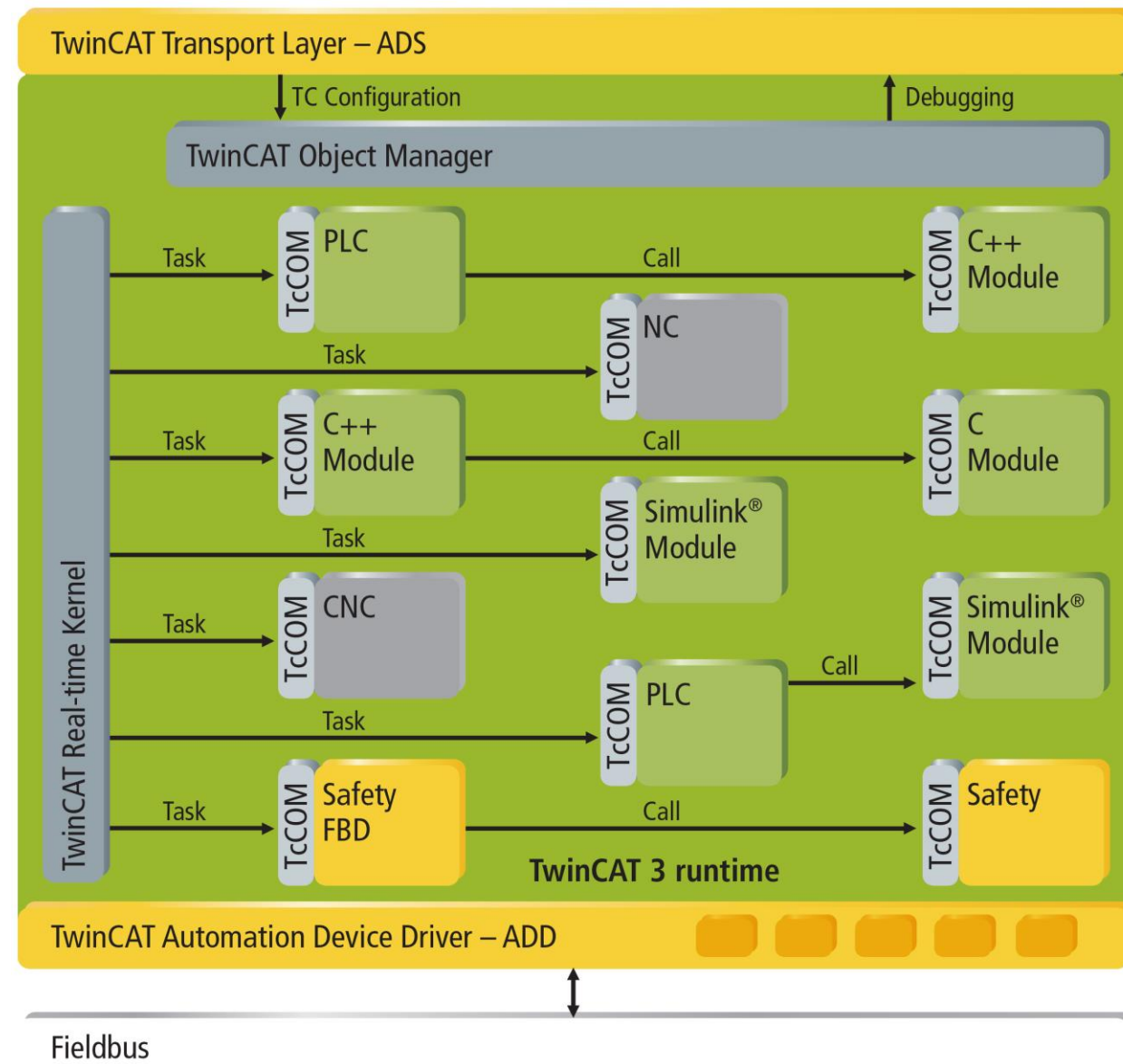
- C++, C#, Java
- **Fieldbuses**
- **Safety**
- **Motion Controller**



Runtime Executes Software Devices from Task List

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- TwinCAT execution is **task based**
 - Tasks trigger pieces of the runtime at given intervals, or cycles
 - A task list determines the priority and frequency of the working parts of the software.
- Real-time **Kernel** manages access to PC hardware for timely execution of TwinCAT software



TwinCAT Icon Shows in Windows System Tray

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- With TwinCAT installed, icon present in system tray
 - Icon represents state of TwinCAT *runtime*
- **Stop** Mode
 - **No** runtime functionality present, No ADS service

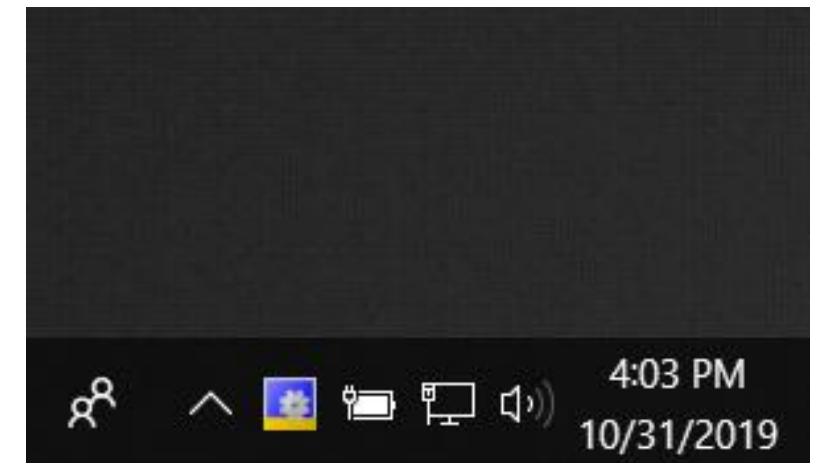
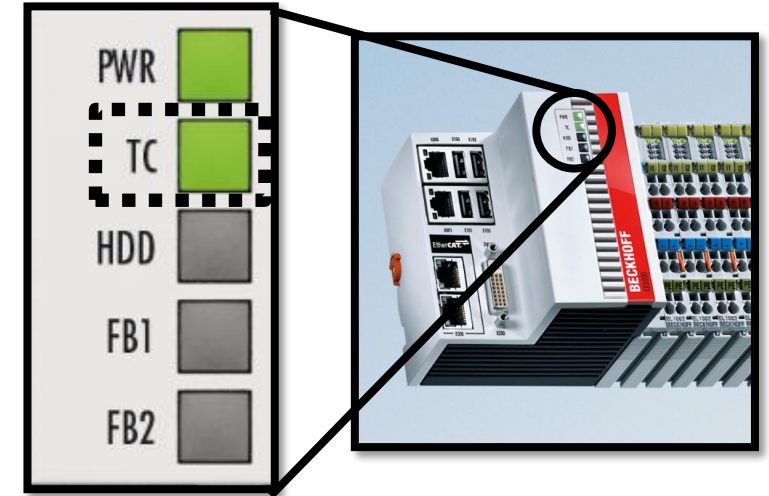


- **Config** Mode (Configuration)
 - **Partial** runtime functionality with fieldbus testing/scanning



- **Run** Mode
 - **Full** runtime functionality
 - ***Machine operation only possible in run mode***

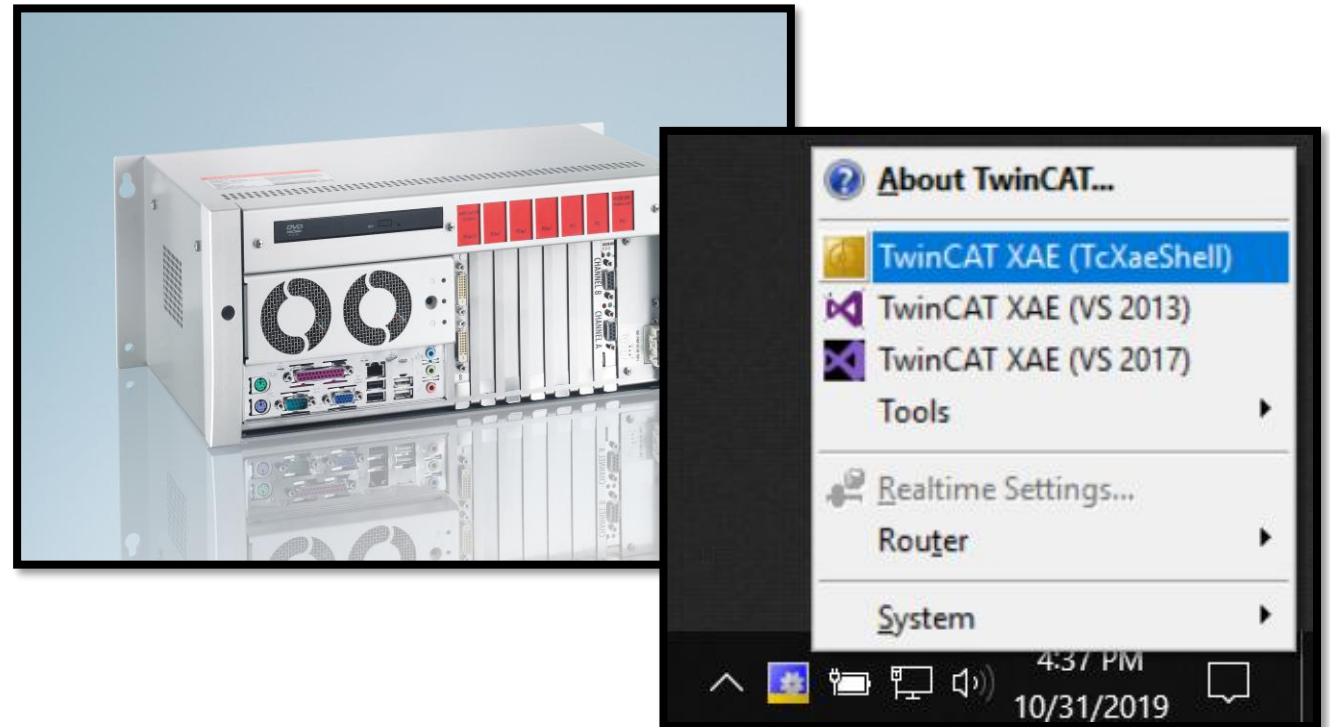
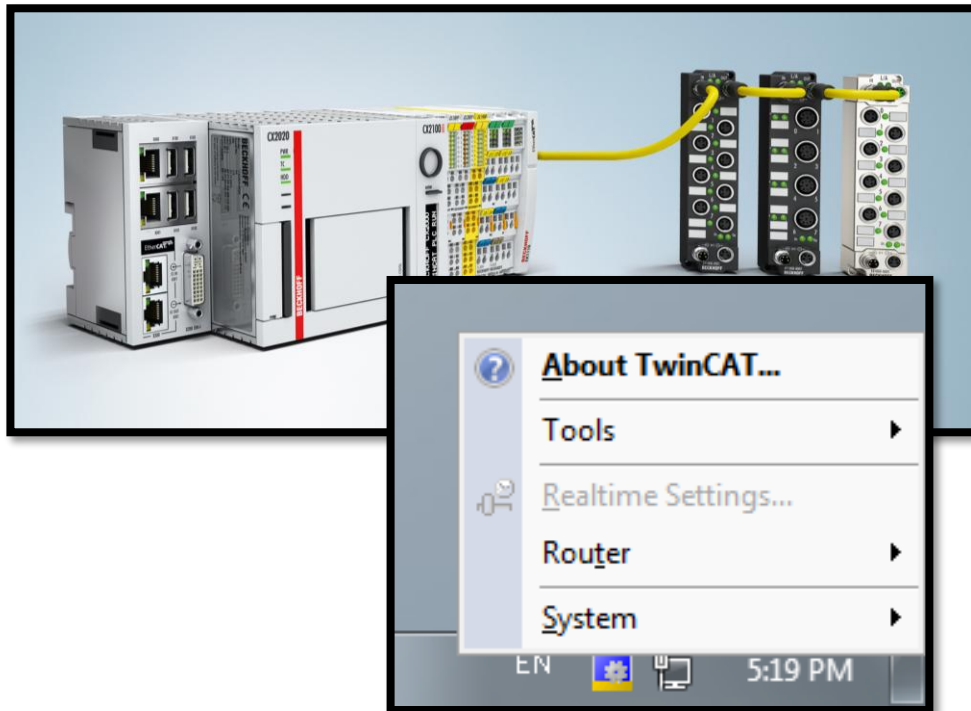
- Beckhoff PCs often have 'TC' light showing runtime state



TwinCAT Installation Available

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- TwinCAT Icon contains **XAE** options when **Engineering** installed
 - XAE stands for **eXtended Automation Engineering**
 - Select XAE option to launch TwinCAT Engineering within Visual Studio or TwinCAT Shell
- Menu without XAE option indicates **only** Runtime (**XAR**) installed



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