Beckhoff Training - TwinCAT HMI Overview

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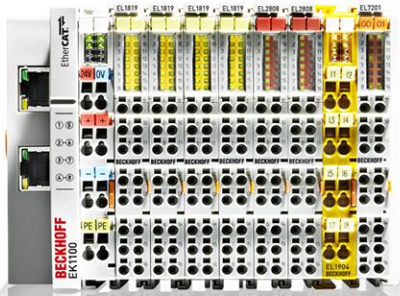

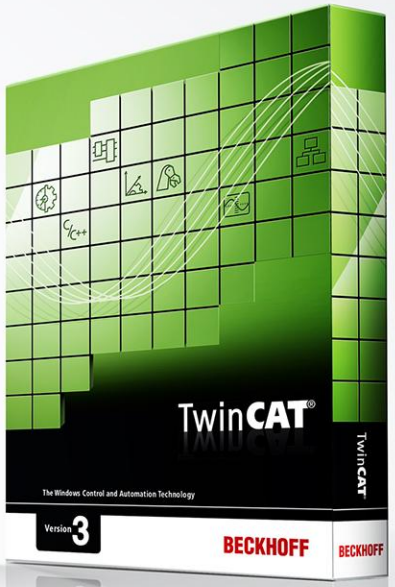

Agenda

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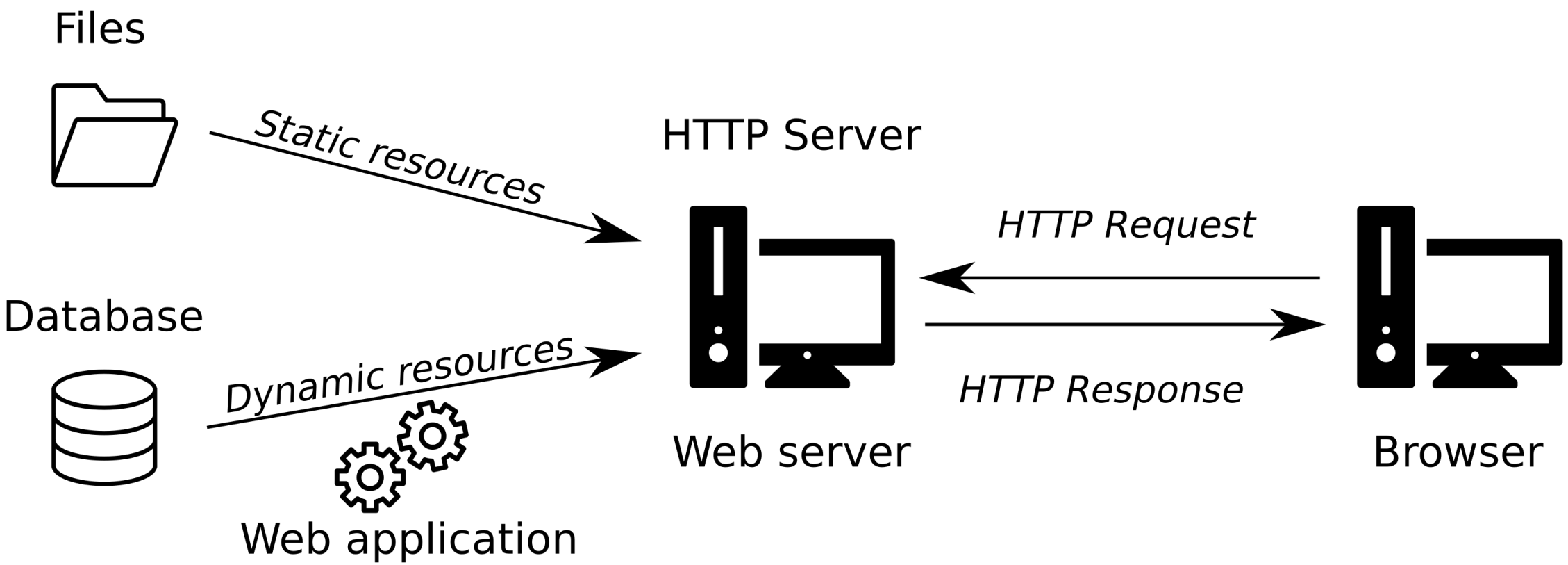
1. **Introduction**
2. Engineering
3. Architecture
4. Scenarios
5. Extensibility
6. Products
7. Features
8. Roadmap

Web Server - Client



HTTP(S) and WS(S)

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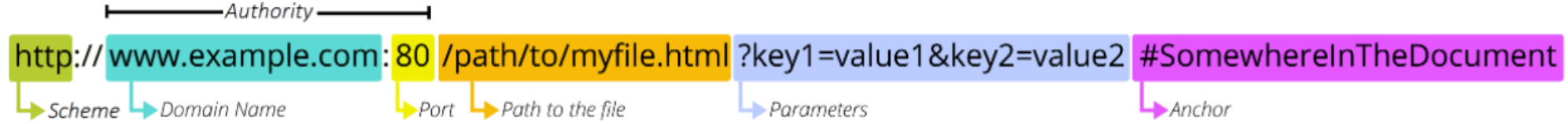
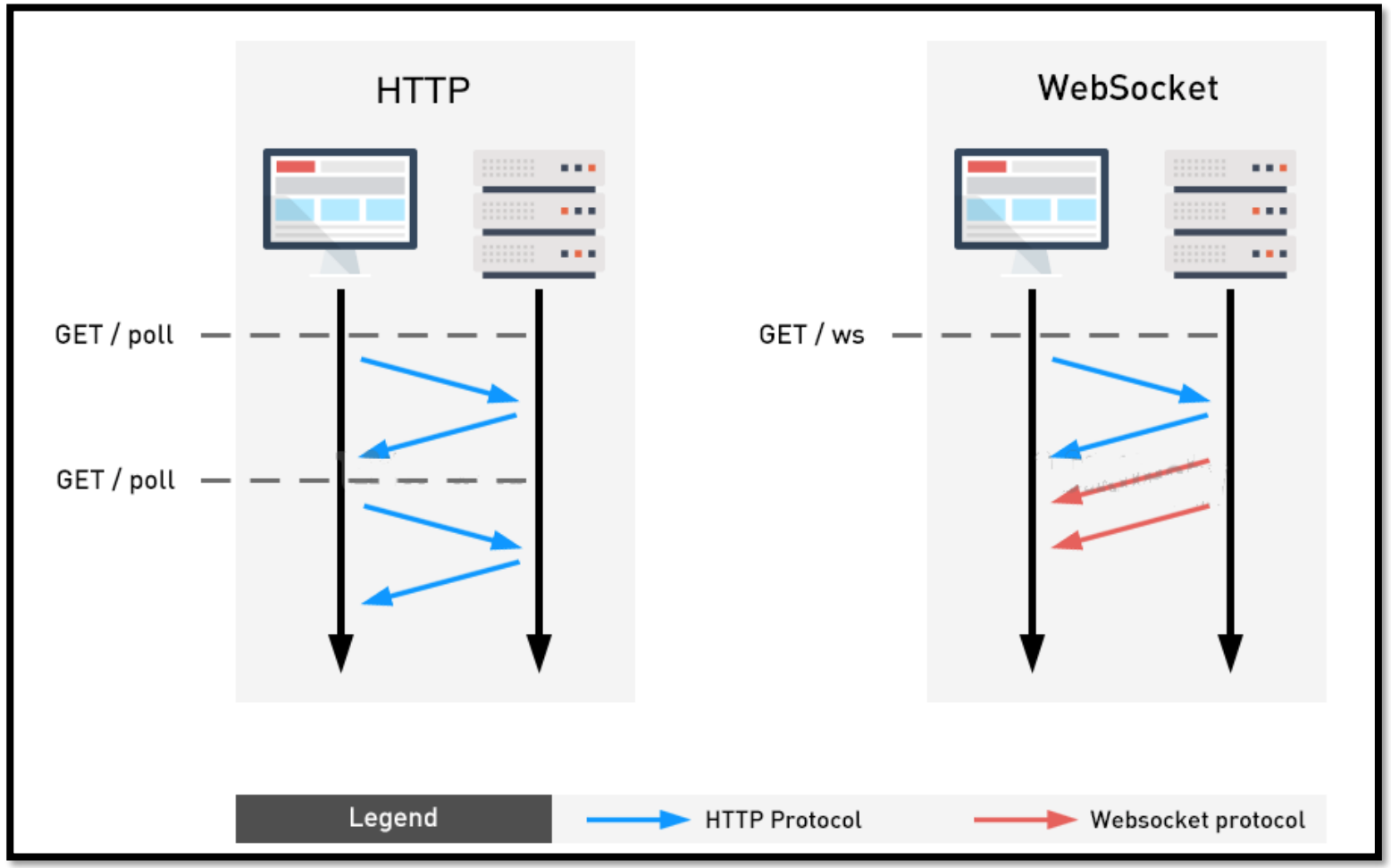
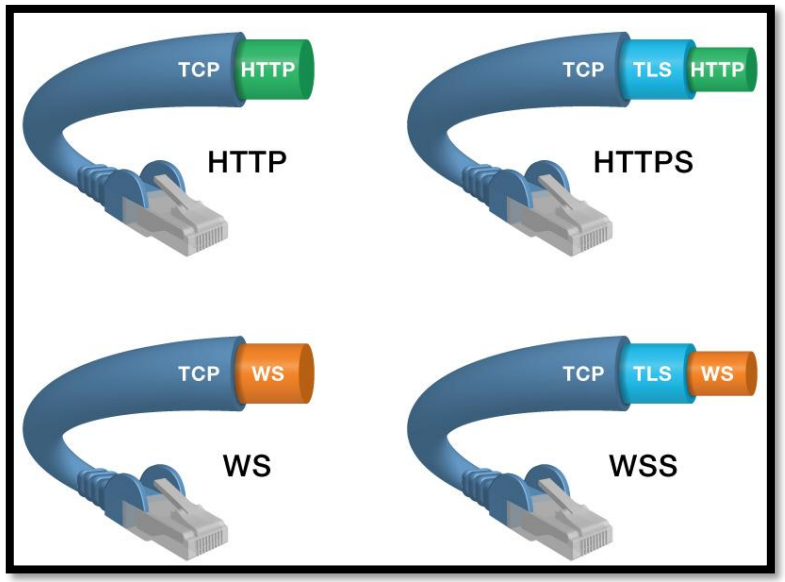
Structure of a URL:





Secure Connections:



- Platform independent
- Future-proof
- Responsive
- Performant

TwinCAT HMI Components

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- TwinCAT HMI Creator
  - WYSIWYG Editor

- TwinCAT HMI Framework
  - Control Library, API

- TwinCAT HMI Server
  - Web Server

- TwinCAT HMI Client
  - Any Supported HTML5 Browser

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TwinCAT HMI | Engineering

Visual Studio® Integration

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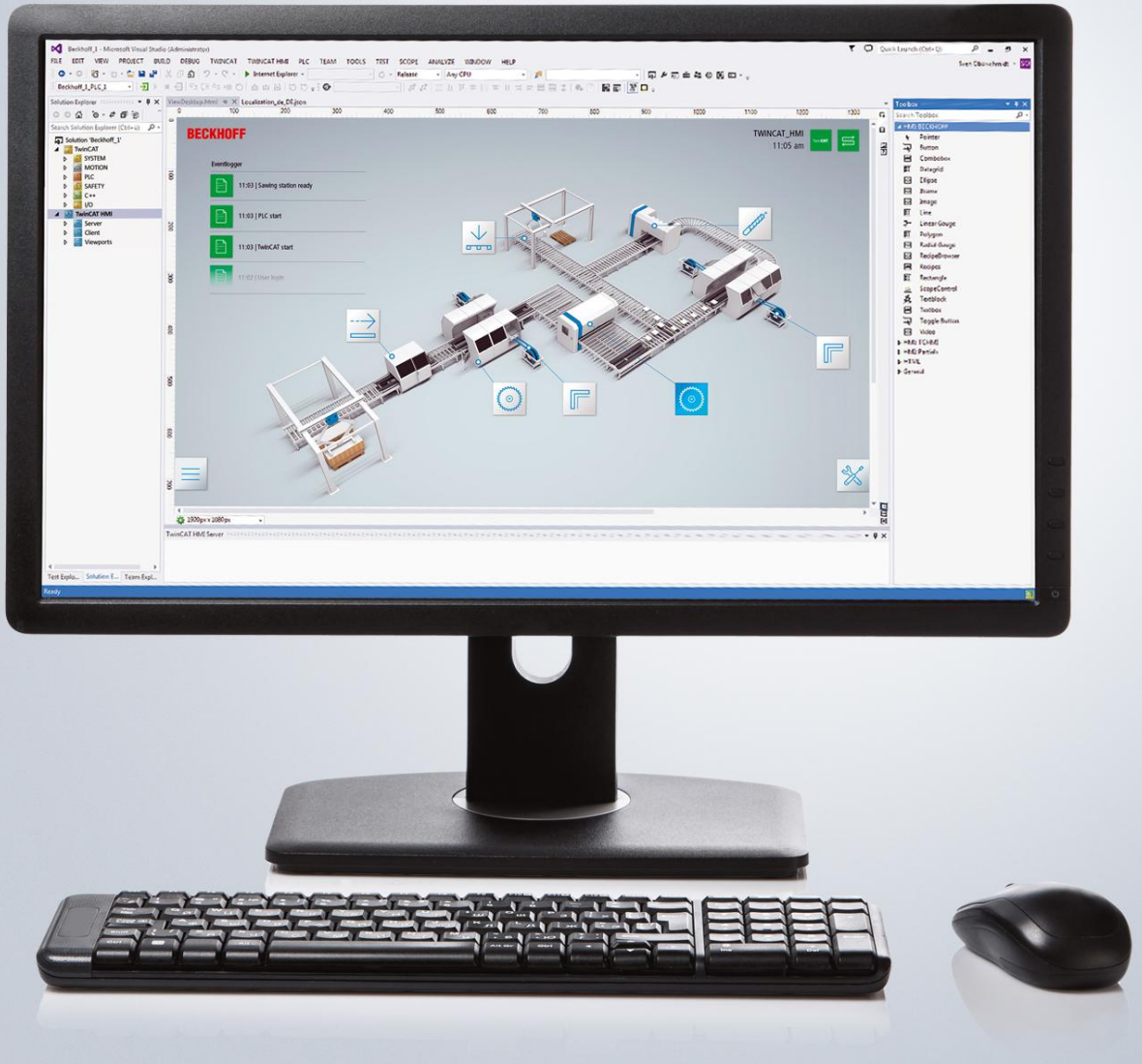

- One engineering tool
- Source code control
- Live engineering

TwinCAT HMI WYSIWYG Editor

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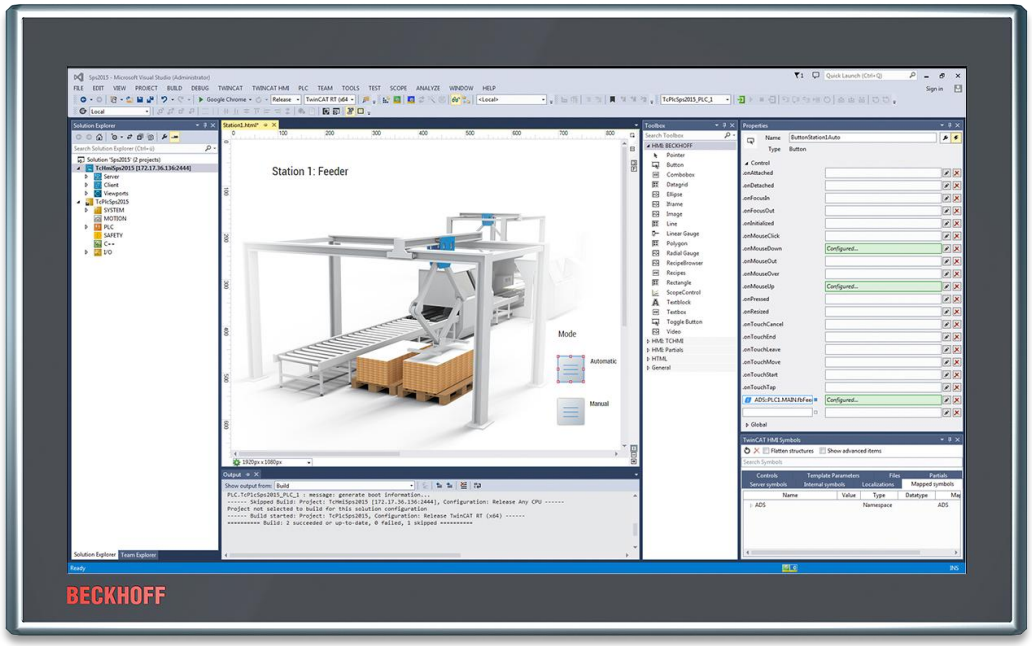

- Drag & Drop Interface
- Standard & User Controls
- Attribute Editor
- Actions & Events
- User & Security Management

TwinCAT HMI Extensibility

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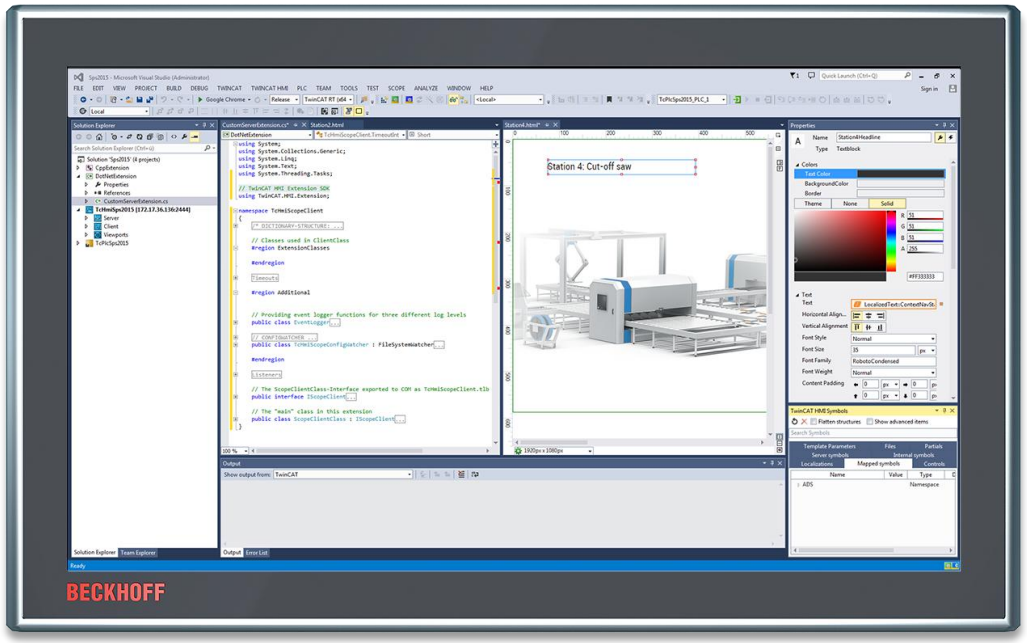

- Framework Controls
  - JavaScript
  - Use of 3rd party libraries
- Server Extensions
  - .NET
  - .NET Core (VS2017 only)
  - Use of 3rd party libraries
- Themes
  - Integration of Corporate Design

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Architecture - Engineering

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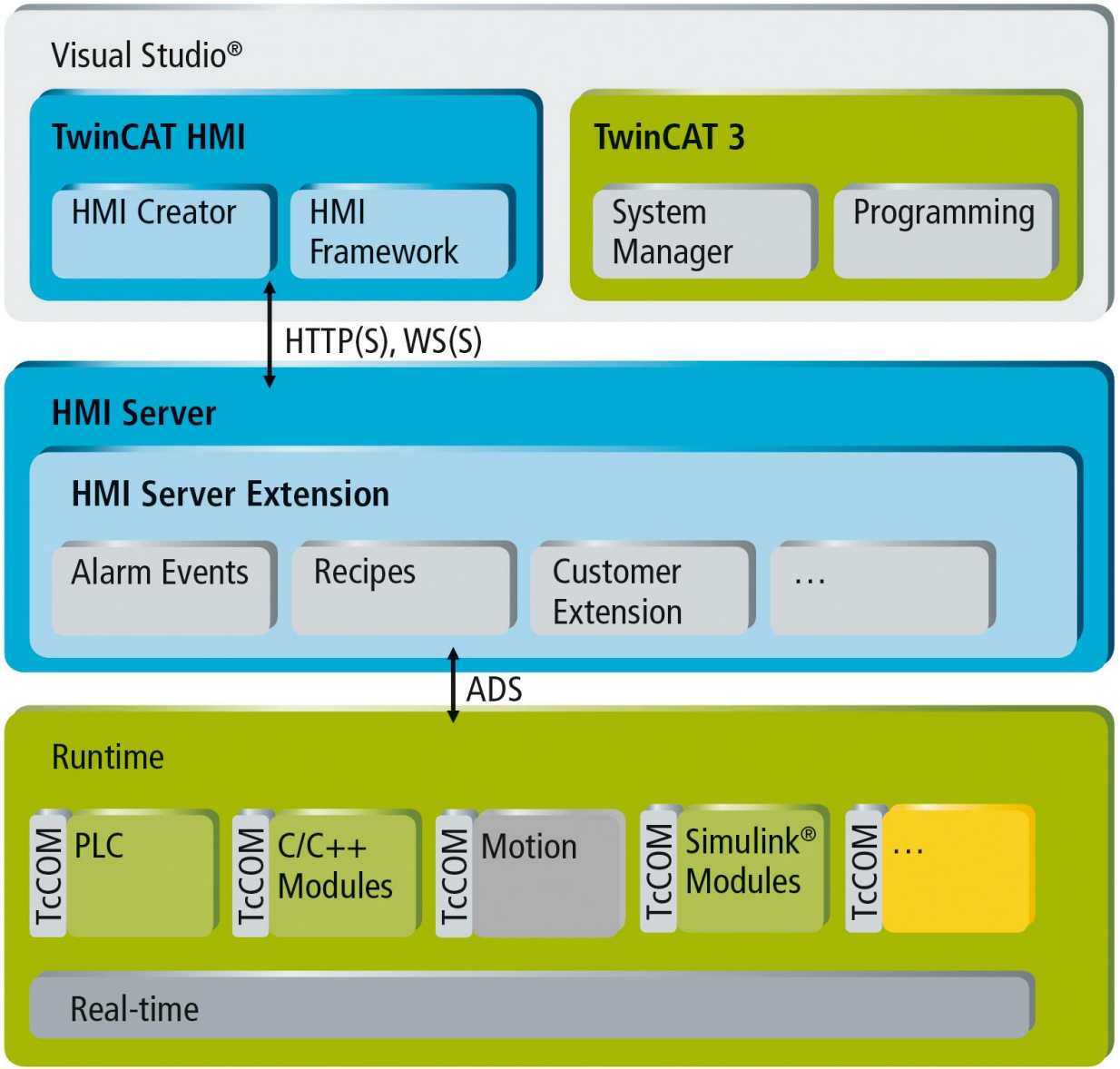

Architecture - Runtime

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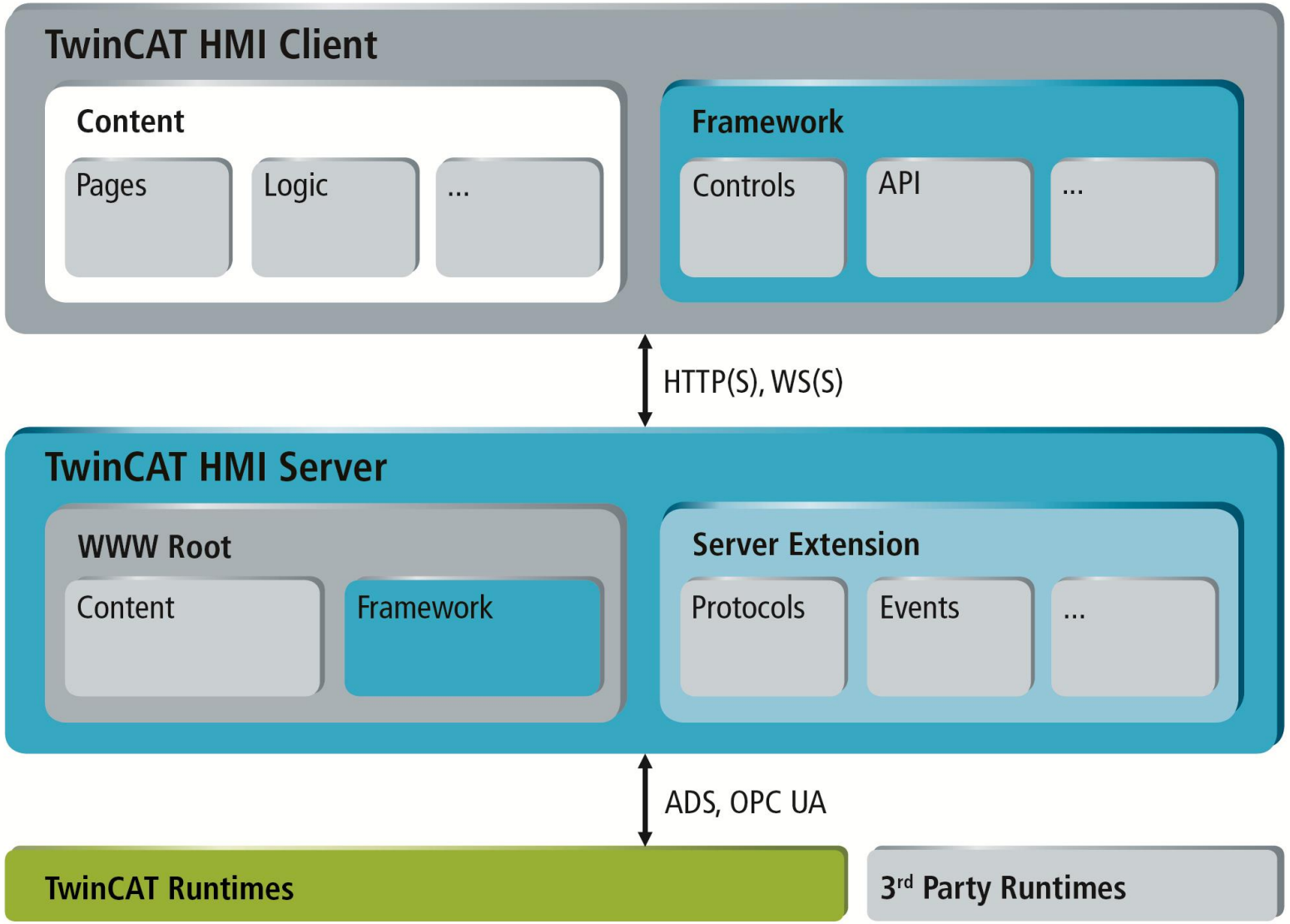

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Local client

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Panel

DVI/USB

TwinCAT HMI Client

TwinCAT HMI Server

TwinCAT Runtime

PC

HTML5 Browser

TF2000

Multi-client

BECKHOFF

HTML5 Browser

Panel PC

TwinCAT HMI Client 1

HTML5 Browser

Mobile Device

TwinCAT HMI Client 2

HTML5 Browser

Mobile Device

TwinCAT HMI Client 3

WebSockets

DVI/USB

Panel

TwinCAT HMI Client

TwinCAT HMI Server

TwinCAT Runtime

Panel PC

HTML5 Browser

TF2020

TF2000

Multi-runtime

BECKHOFF

HTML5 Browser

HTML5 Browser

Panel PC

TwinCAT HMI Client 1

Mobile Device

TwinCAT HMI Client 2

WebSockets

PC

TwinCAT HMI Server

TF2000

TF2055

TF2010

ADS

TwinCAT Runtime 1

PC

TwinCAT Runtime 2

PC

TwinCAT Runtime 3

PC

Multi-server

BECKHOFF

Panel PC

TwinCAT HMI Client 1

TwinCAT HMI Server

HTML5 Browser

TF2000

WebSockets

TwinCAT HMI Server 1

TwinCAT Runtime 1

PC

TF2000

TF2010

TwinCAT HMI Server 2

TwinCAT Runtime 2

PC

TF2000

TF2010

TwinCAT HMI Server n

TwinCAT Runtime n

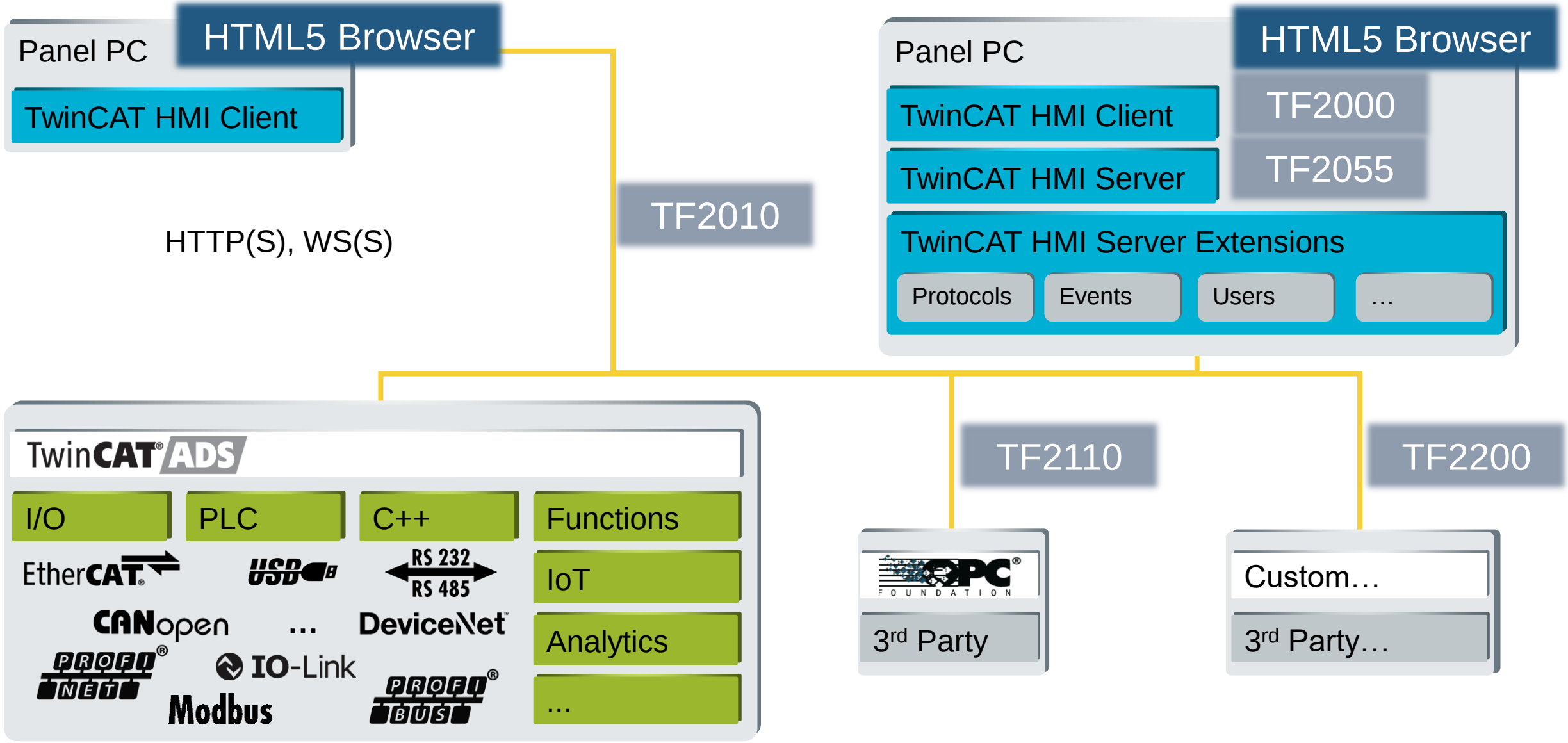
PC

TF2000

TF2010

Multi-protocol

BECKHOFF



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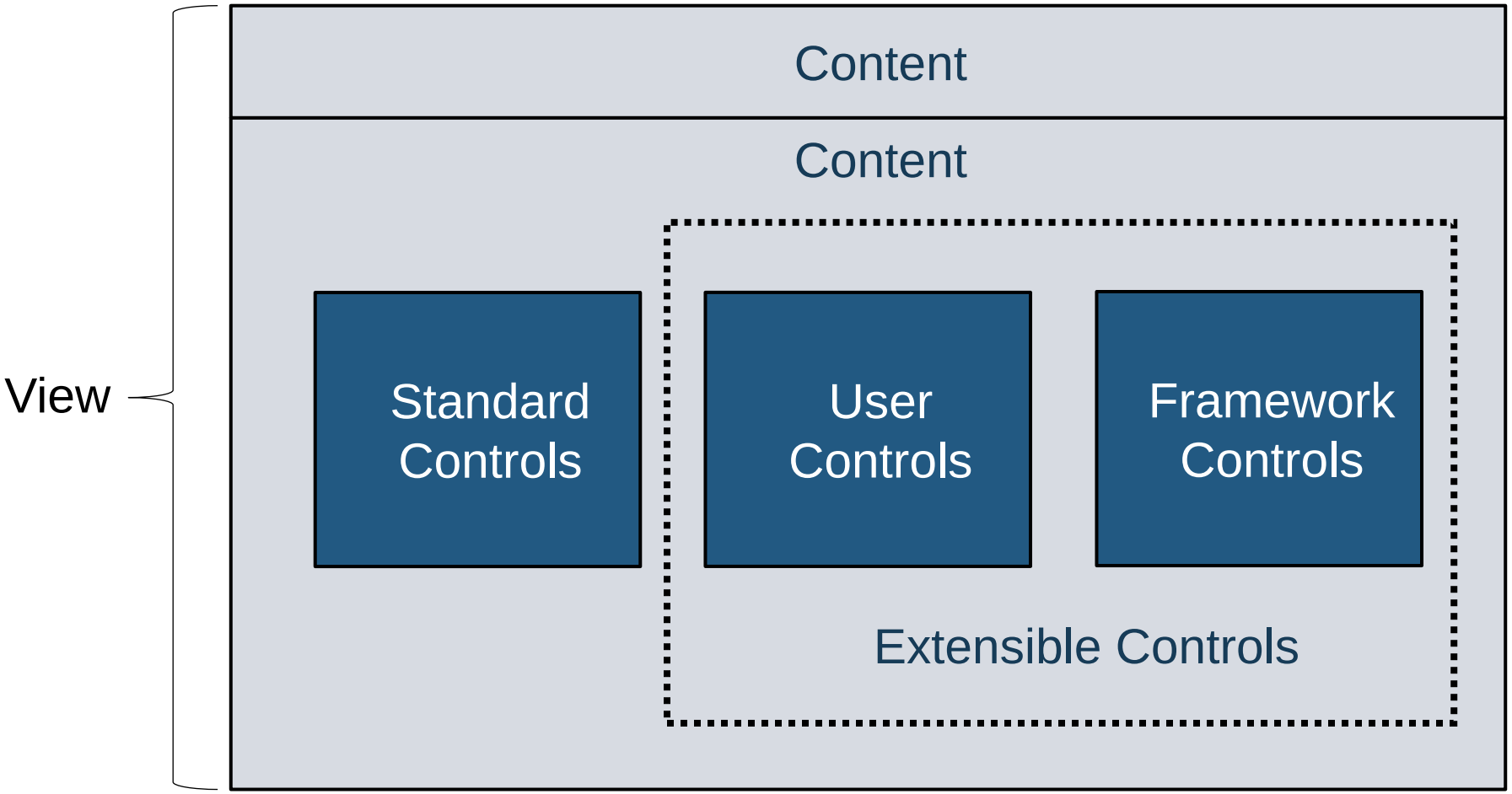
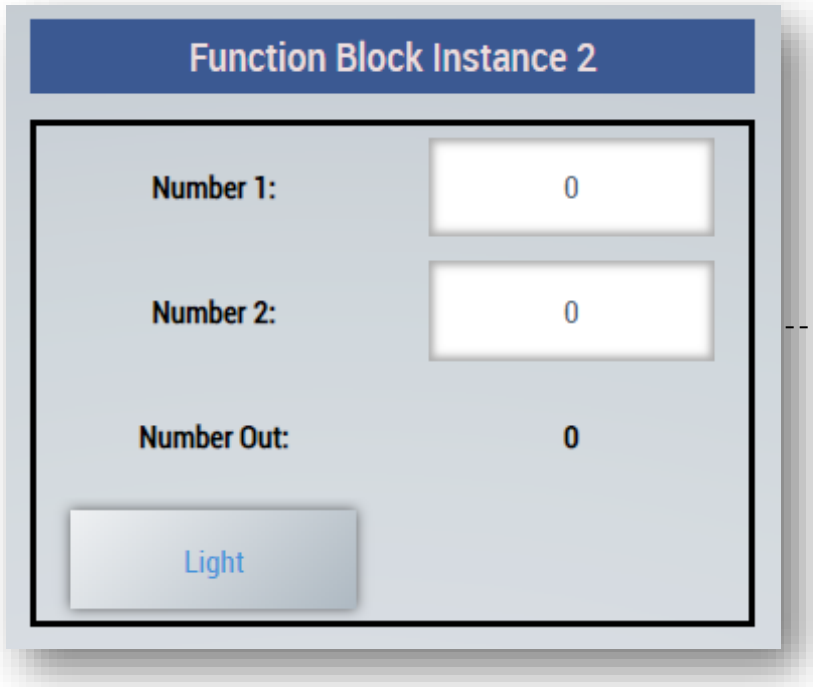
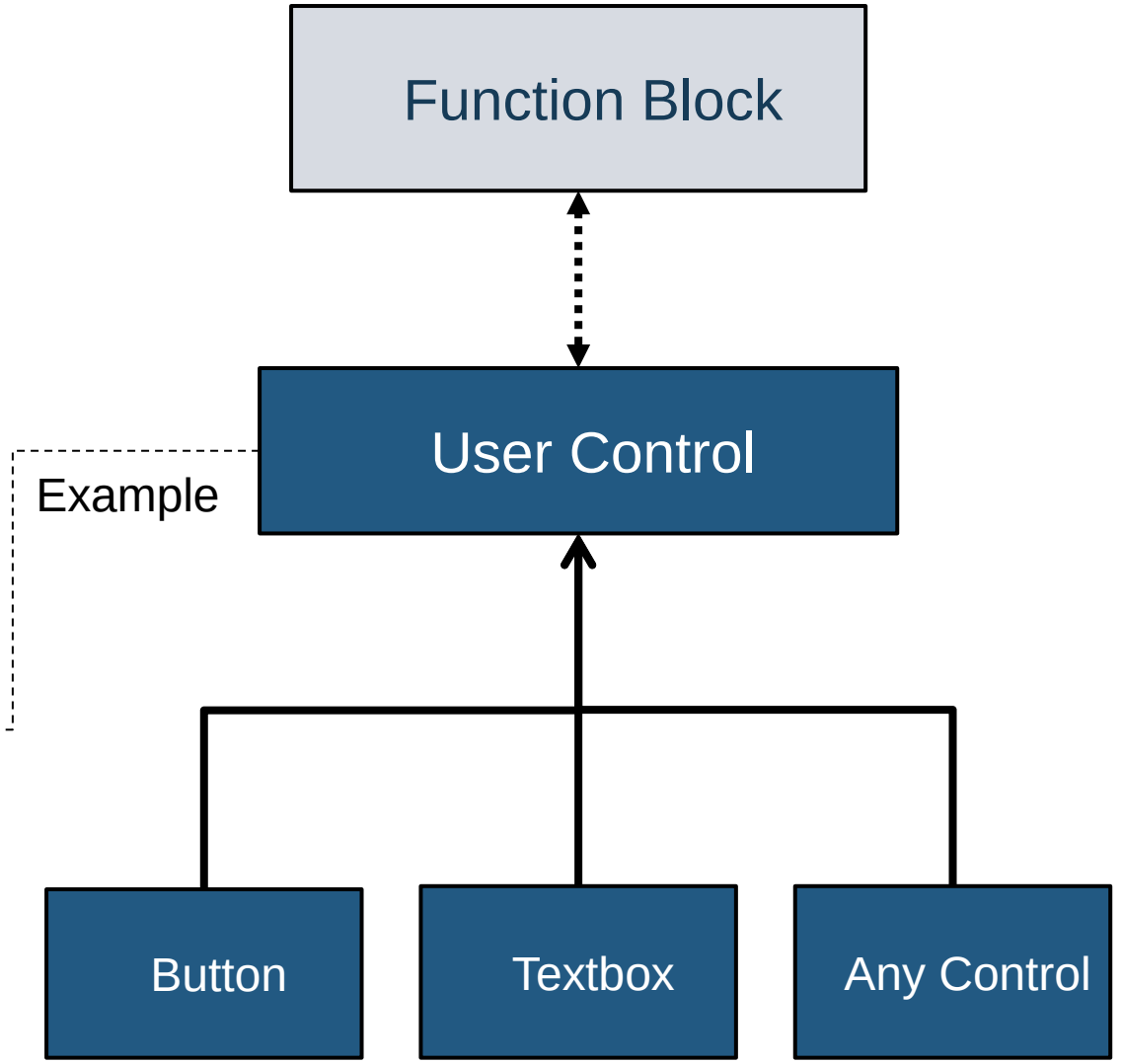

View
Content
Content
Standard Controls
User Controls
Framework Controls
Extensible Controls

User Controls

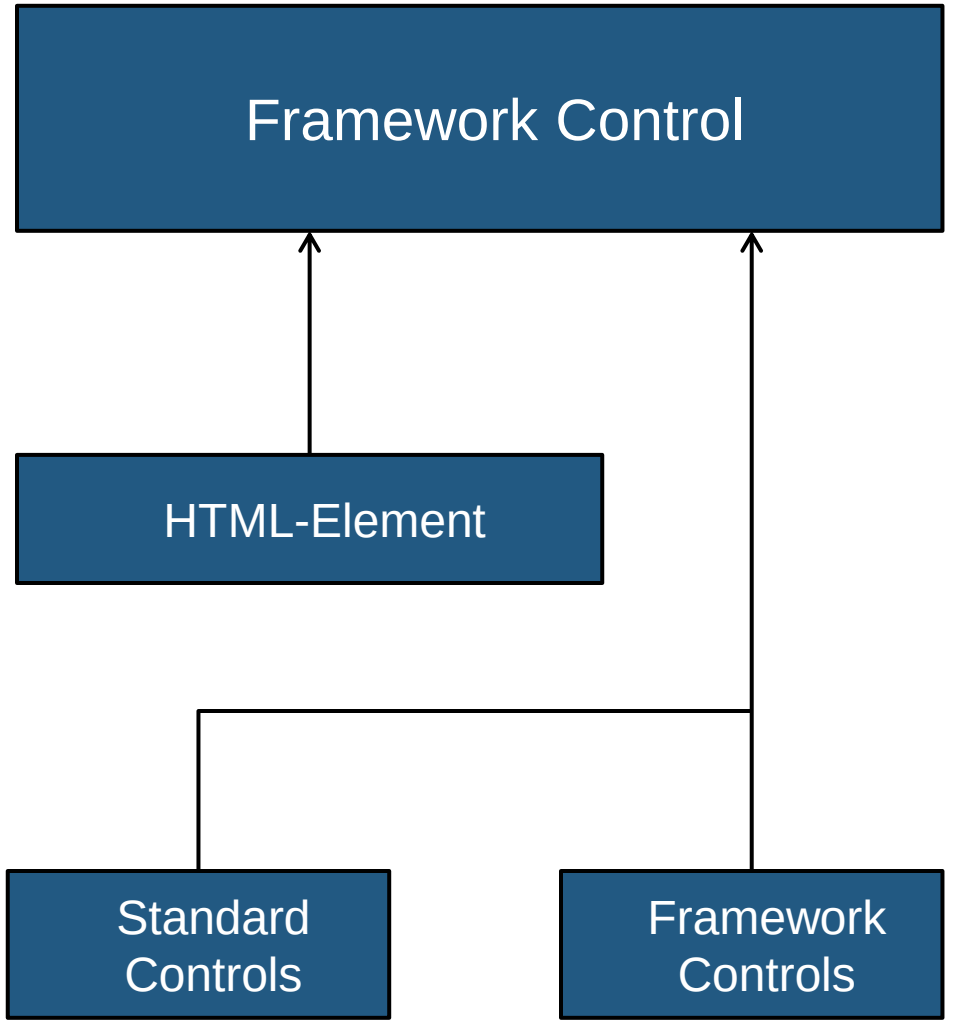
- Reusability
- Creating from Standard Controls
- Use in HMI toolbox
- Reflection of a function block





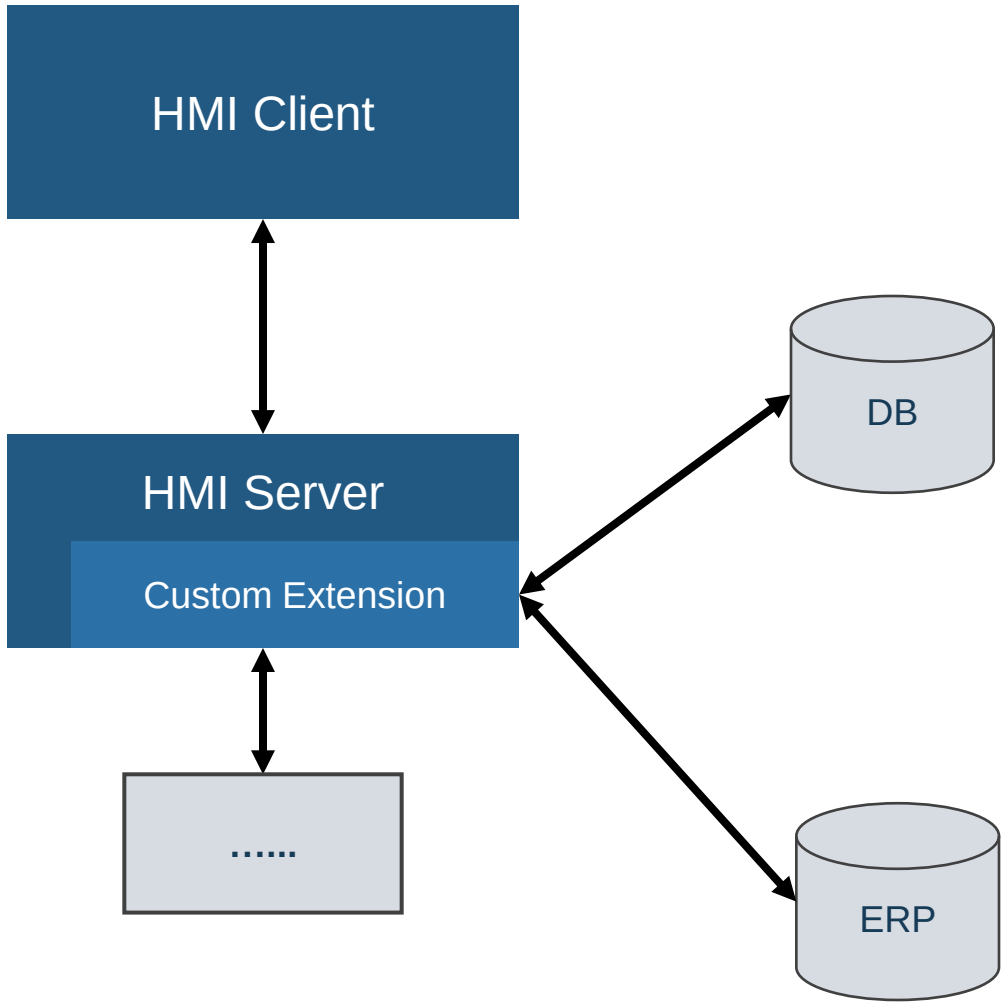
Framework Controls

- User-specific logic
- HTML, JavaScript and CSS
- Reuse of:
  - Standard Controls
  - Framework Controls
- Use of external libraries
- Communication with the server

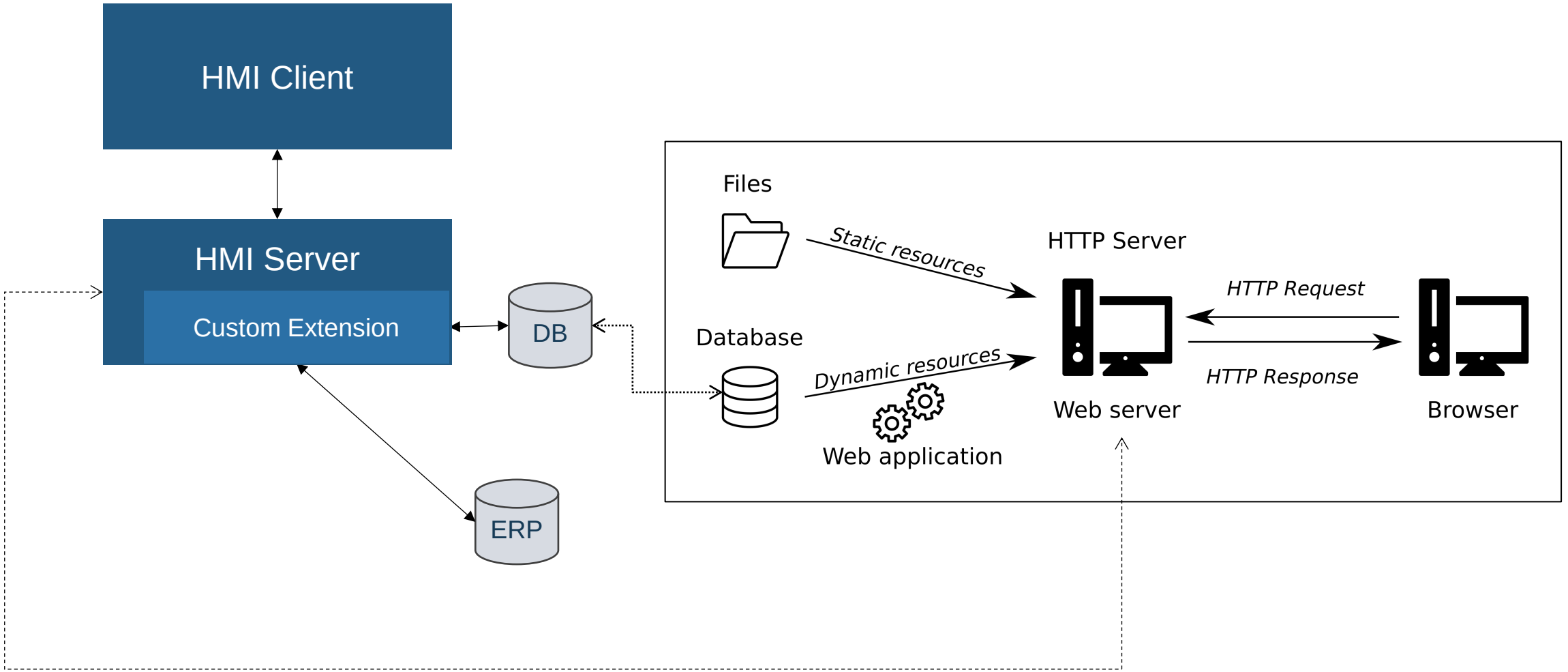


Back-End

- Extend the server with user-specific logic
  - Database access
  - 3rd Party protocols
  - etc.
- Development in .NET and .NET Core
- Communication with client over symbols
- Configuration over the server



Server Extensions



Agenda

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- Licensing is **not** based on the number of tags!

- HMI Engineering is free of charge
  - Including updates and support

- TwinCAT HMI Licensing is based on
  - Platform Level of TwinCAT HMI Server
  - Additional Clients + Targets + Extensions

TF2000 HMI Server
Includes:
- 1 Client (Browser)
- 1 Target (NetId)

+

Optional

TF20x0 Clients Pack
1 / 2 / 3 / 5 / 10 / 20 / 25 / 100

TF20x0 Targets Pack
1 / 2 / 3 / 5 / 10 / 20 / 25 / 100

+

HMI Extensions
Scope, OPC UA, …

=

TwinCAT 3 HMI License

Products - General

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- TE2000 - TC3 HMI Engineering
  - HMI Engineering environment integrated in Visual Studio

- TF2000 - TC3 HMI Server
  - 1x Client (Browser) and 1x Target (ADS) connection included and 1x server

- TF20xx - TC3 HMI Clients Pack (TF2010..TF2045 – 1..100 clients)
  - Extension of the number of concurrent client connections

- TF20xx - TC3 HMI Targets Pack (TF2050..TF2090 – 1..100 targets)
  - Extension of the number of concurrent target connections

Products – Additional Functions

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- TF2110 - TC3 HMI OPC UA
  - Vendor-independent communication protocol

- TF2200 - TC3 HMI Extension SDK
  - Integration of custom .NET logic

- TF2300 - TC3 HMI Scope
  - Lossless scope in the HMI – built on the embedded Scope in TwinCAT 3

Products – Industry specific Needs

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Food and Pharma

- TF2400 - TwinCAT 3 Audit Trail
  - Electronic signature traceability and reporting
    - realized via PostgreSQL© The PostgreSQL Development Group
  - For compliance with FDA 21 CFR Part 11, GAMP and GMP
  - Up to 250 audit trail symbols
    - expandable with additional Symbol Packs up to 2000

Agenda

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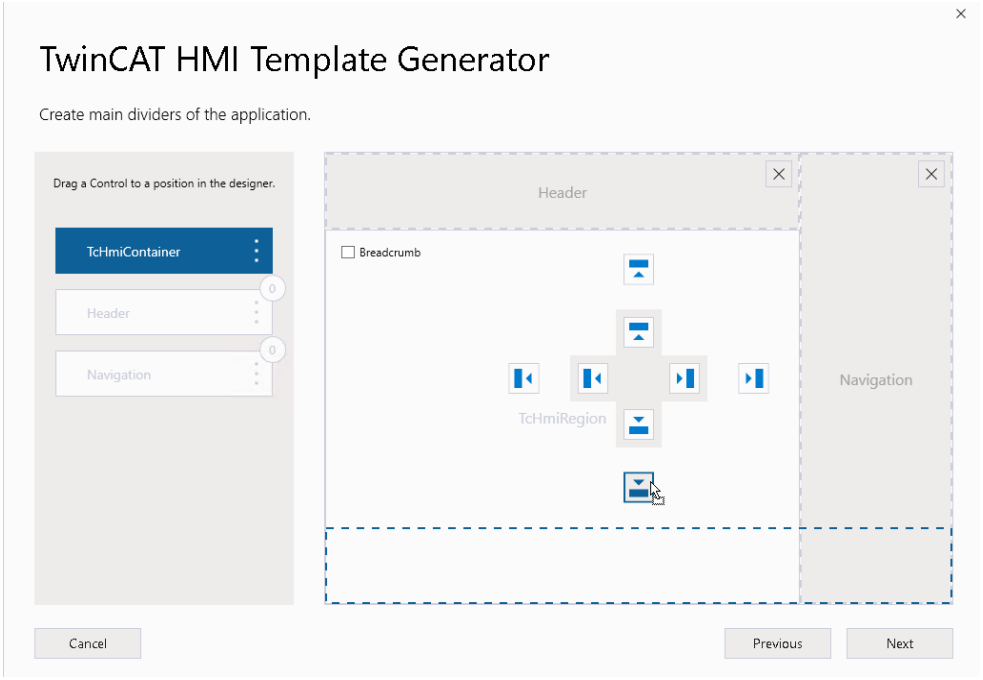
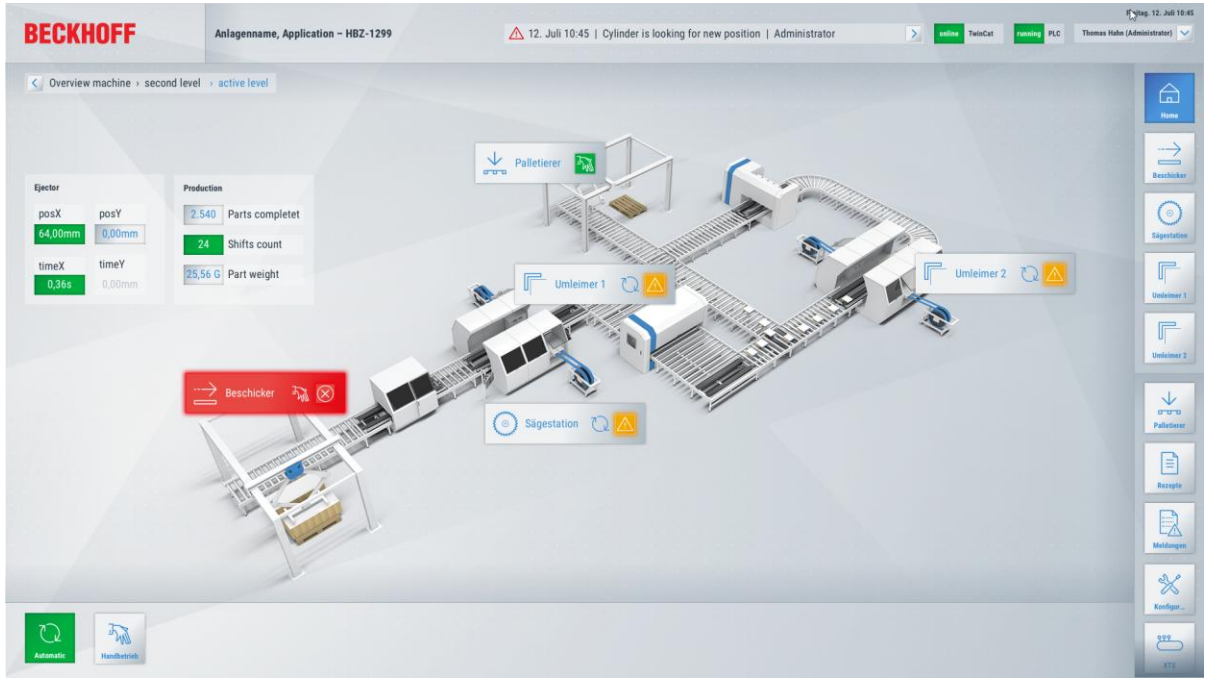
Recent Features

BECKHOFF

- Project Generator Templates
- Integrated into TwinCAT HMI Engineering as VS project template
- Developed by the Beckhoff design professionals
- Preconfigured by a wizard

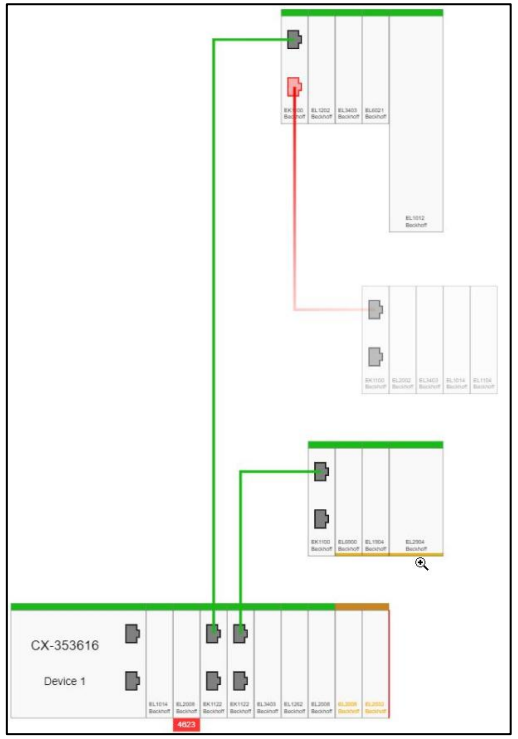


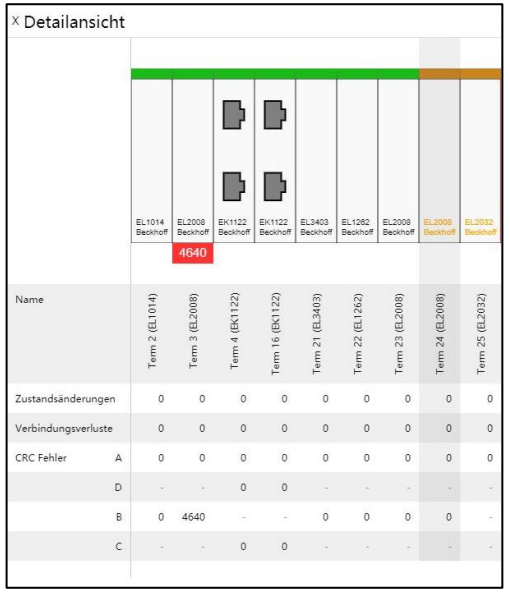


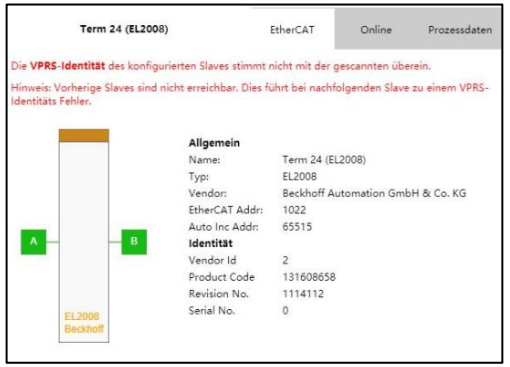
Recent Features

BECKHOFF

- EtherCAT Diagnostics Tool
  - Auto generated EtherCAT topology view for TwinCAT HMI
- Provides detailed information of masters and slaves
- Highly useful front-end tool in service cases
- Support features:
  - Hot Connect
  - Redundancy
  - Forcing and writing values
- Included in TwinCAT HMI license







Recent Features

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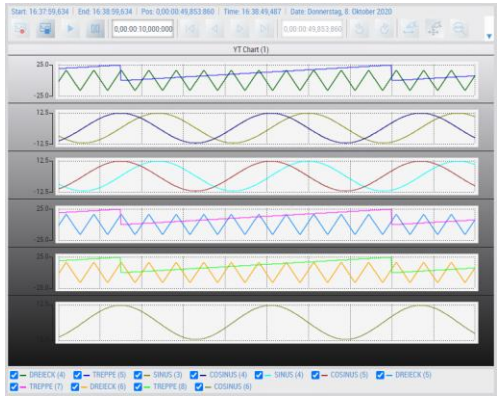
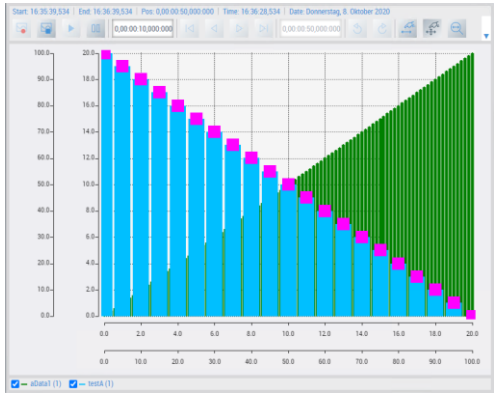
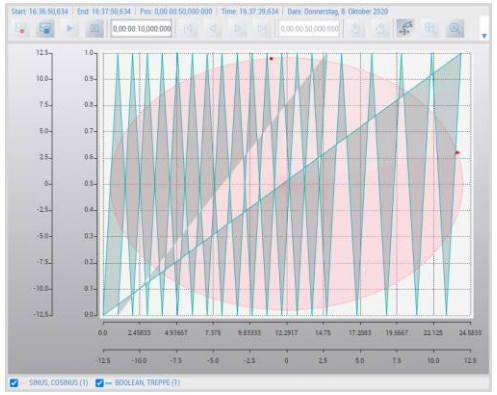
- Display of TwinCAT Scope Charts in HMI Client
- Recording settings (start/stop)
- Data analysis (zoom, move)
- Available chart types: y(t), x(y), Bar, Array Bar
- Import of existing Scope configurations
- No TF2300 needed if already using TwinCAT Scope license (TF3300)







Recent Features

- HMI Alarm Extension
  - Available as a server extension
  - Configure alarms in TcHmi engineering
  - Independent from the TwinCAT Eventlogger
  - Use case: Systems without TC Eventlogger, OPC UA, …
  - Ex: Raise an alarm, if a numeric value is higher than 42
  - Alarms can be displayed in the TcHmiEventGrid

Recent Features

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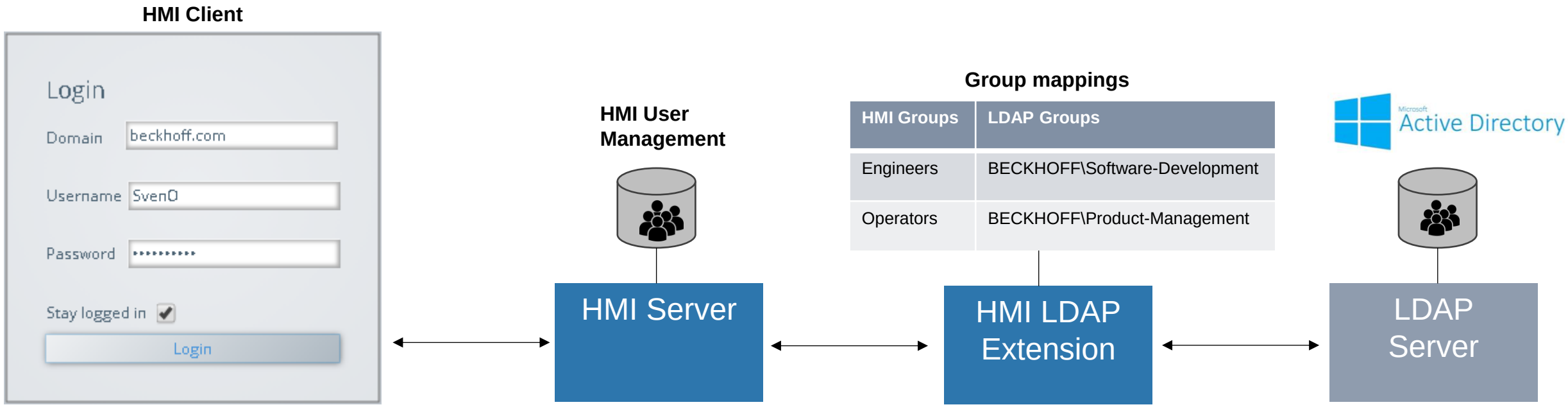
- LDAP-Extension
  - Implementation of Lightweight Directory Access Protocol
  - Connection to Microsoft Active Directory
  - Use the users from the Active Directory in TcHmi



Package Management

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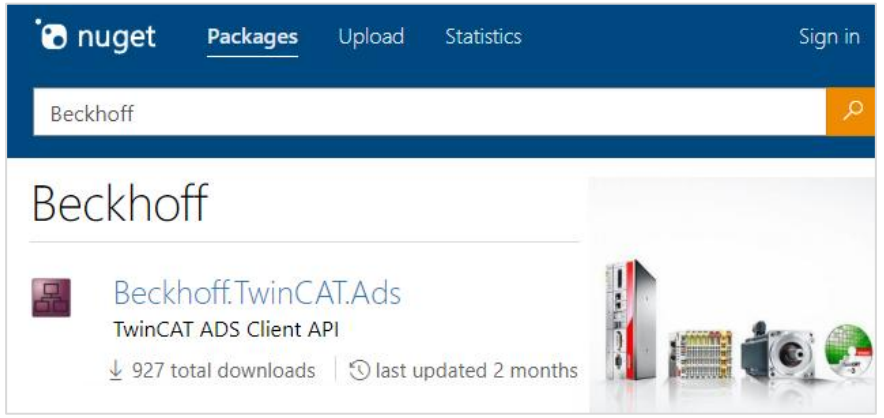
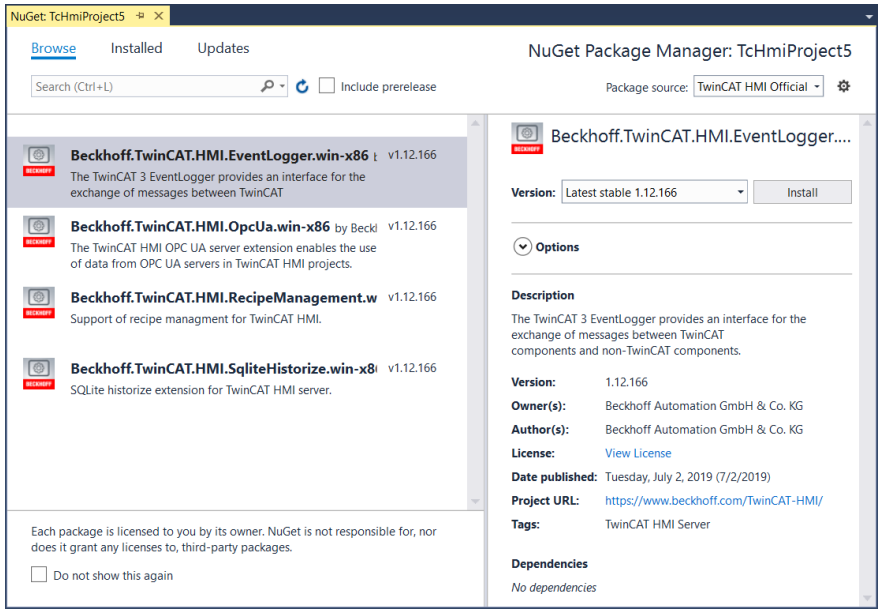
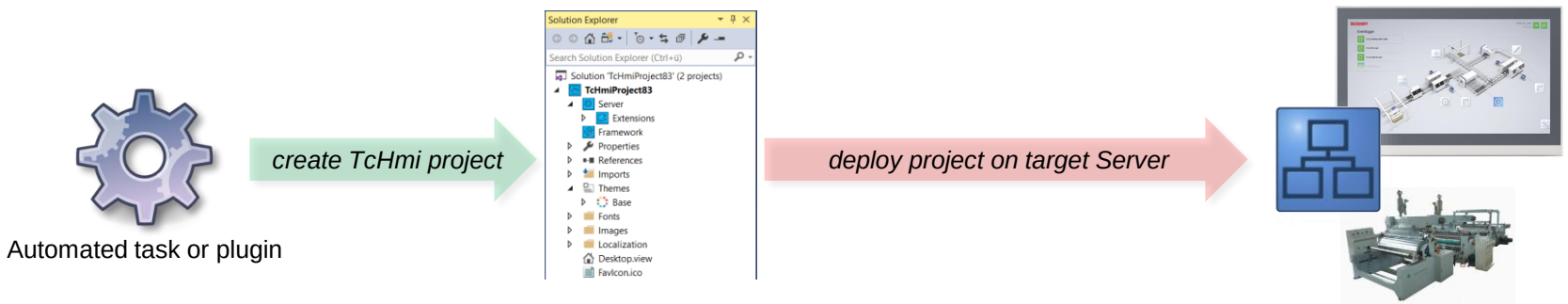
- Based on Microsoft NuGet
- Create libraries for
  - Controls
  - Extensions
- Create dependencies between packages
- Share packages internal or external
- Easier Update Management
  - Distribution of updates over NuGet
  - Version dependencies can be specified
- Industry sectors can upload industry specific packages





Automation Interface

- Automatic generation of TcHmi projects
- Comparable to TwinCAT Automation Interface
- API to access most the engineering functions
- Program language independent – based on COM
- Use Cases:
  - Automatic HMI deployment
  - Series machine builders
  - Project generation based on PLC code
  - …



Project Deployment

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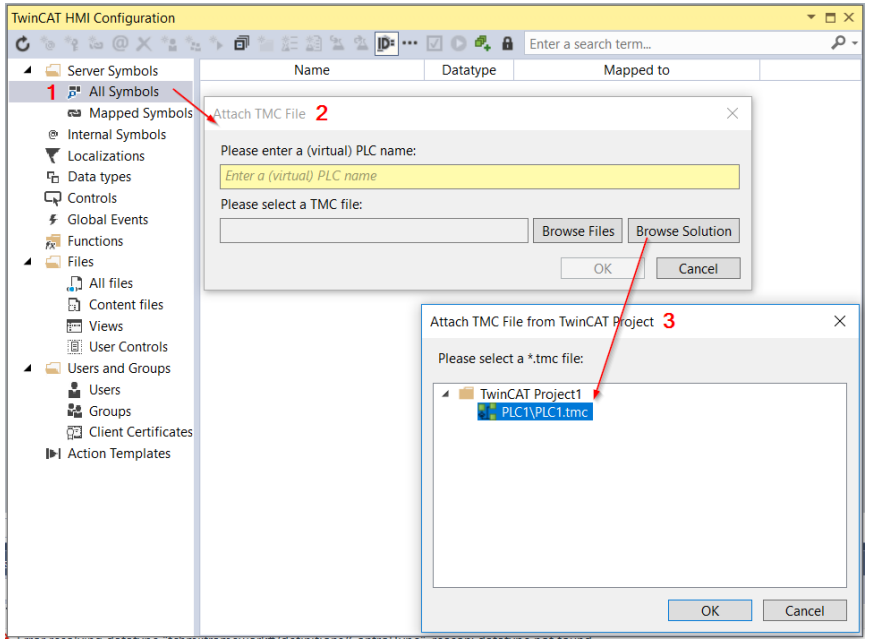
- Offline Engineering
  - TMC-Support for engineering without PLC connection
  - Load TMC-files and map variables offline
  - Switch to real PLC if connection is available
- Automatic server update
- Server for Windows CE7 and TC/BSD



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Roadmap

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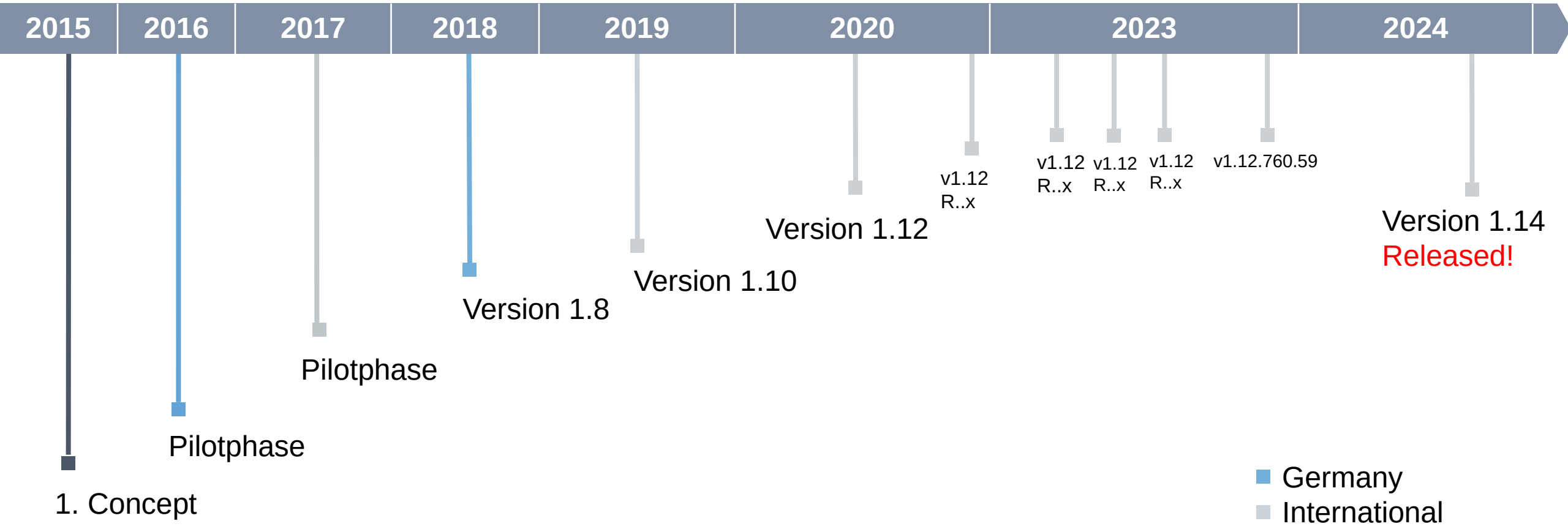
New Features



Highlights

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- Efficient engineering
- Web-based
- HTML5, JavaScript, TypeScript
- Platform independence
- Flexible architecture
- Modular extensibility

- Cloud Machine Interface

Contact

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