Table of Contents
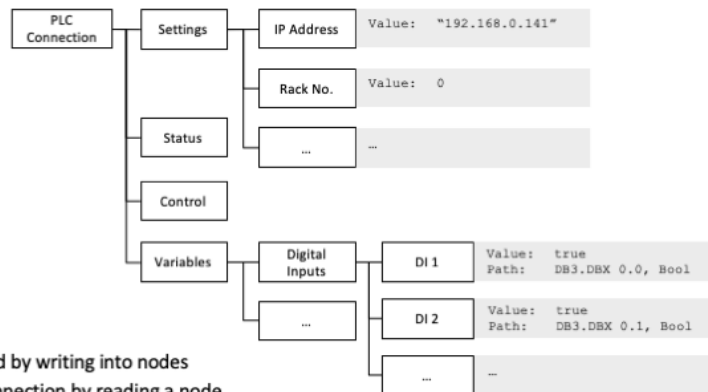
CoDaBix® - Middleware for Industry 4.0

The industrial Middleware for any type of connection.

Unified architecture over all interfaces

- Everything is a node
  - Only thing to handle is a node
  - Interface will not change
  - Completely mappable to **OPC UA**

- Examples
  - Controlling a connection
    - Settings are stored in nodes
      - Addresses
      - Timeouts
      - ...
    - Starting and stopping is performed by writing into nodes
    - Getting the current status of a connection by reading a node
  - Accessing process data
    - A PLC variable is represented by a node
  - Remote-Procedure-Call on the server
    - A Method node is called

PLC Connection			
	Settings	IP Address	Value: "192.168.0.141"
		Rack No.	Value: 0
		...	...
	Status		
	Control		
	Variables	Digital Inputs	DI 1 — Value: true / Path: DB3.DBX 0.0, Bool
		...	DI 2 — Value: true / Path: DB3.DBX 0.1, Bool
			... — ...

System architecture
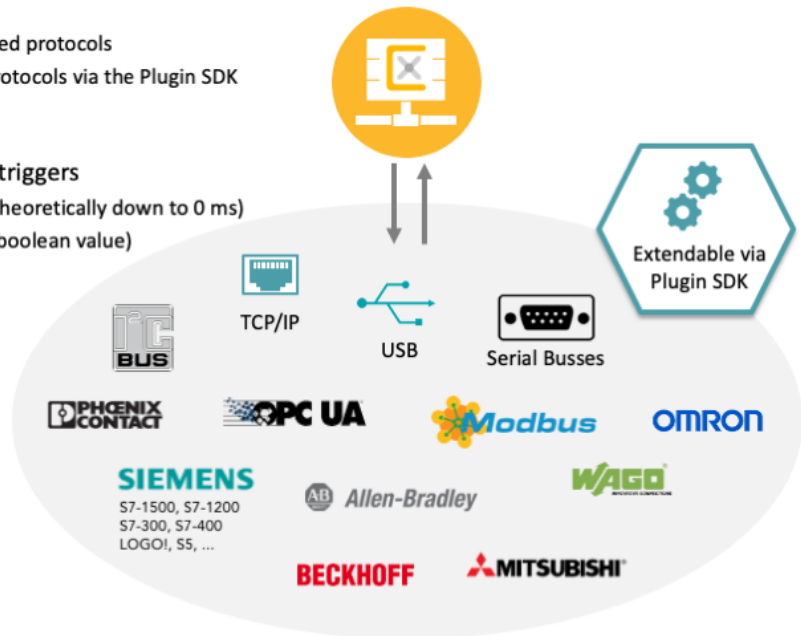
- Modular plugin system
    - Easily extendable
    - No need to restart the system
    - Resource saving

- Integrated web server
    - Remote configuration via web technology
    - Deployment of web apps
    - Serving static files

- Database backend
    - Configuration storage
    - Historical data

- Process automation & customization
   - Online scripting engine
    - User-defined node structure
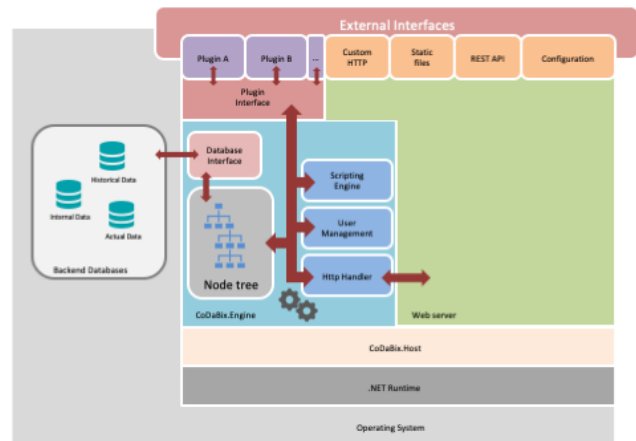
Connect to production machines and sensors

- Connect to any device
  - Plenty of already implemented protocols
  - Extendable by proprietary protocols via the Plugin SDK (upcoming feature)

- Read real time data based on triggers
  - Timer trigger (sample rates theoretically down to 0 ms)
  - Event trigger (e.g. edge of a boolean value)
  - Conditional trigger

- Create historical data
  - Integrated database
  - Snapshot a set of values
  - On value change or trigger based

TCP/IP

USB

Serial Busses

Extendable via Plugin SDK

BUS

PHŒNIX CONTACT

OPC UA

Modbus

OMRON

SIEMENS
S7-1500, S7-1200
S7-300, S7-400
LOGO!, S5, …

Allen-Bradley

WAGO

BECKHOFF

MITSUBISHI

Synchronize, exchange and monitor data

- Horizontal data exchange for e.g.
  - Synchronizing workstations
  - Sharing data between MES and machines

- Export to and import from
  - Existing database
  - Structured file

- Monitor and control data in real time
  - CoDaBix® Dashboard
 - Custom HMI based on REST JSON API
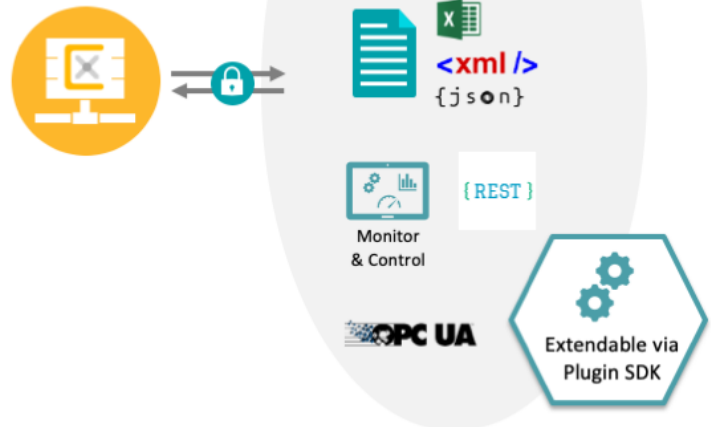
Access cloud services

- Publish your data
  - Convert data into required format
  - Execute on triggers

- Remote monitoring
  - Interpret data in real time and publish results

- Remote control
  - Fetch and validate data from cloud
  - Execute user-defined function (Remote Procedure Call)

Automate and customize with built-in Scripting Engine

- TypeScript programming language
  - Standard JavaScript libraries available
  - Interface for node access
  - Compiles to .NET Intermediate Language at runtime

- Online editor
  - IntelliSense
    - Syntax highlighting
    - Tooltips
    - Autocompletion
  - Diff view

- Use cases
  - Create conditional triggers
  - Process data
  - Automate the control of machines and processes
  - Export data to files
  - Add custom functionality
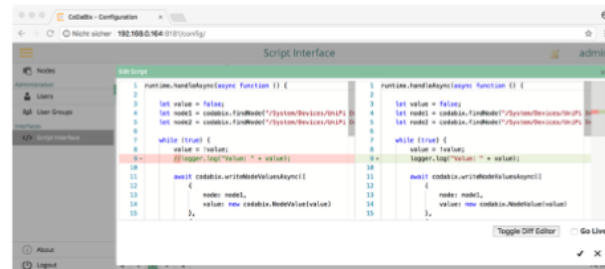
Configuration and administration

- **Configuration via web interface**
  - Remote access
  - Browser based
  - No compatibility issues

- **Node management**
  - Create node links
  - User defined node structure
  - Import and export configuration as XML

- **Access control**
  - User groups management
  - Configurable for every subtree

- **Operation of CoDaBix®**
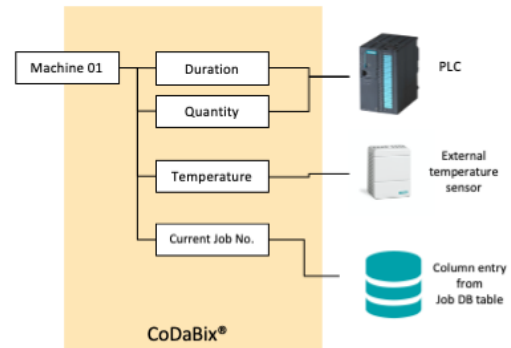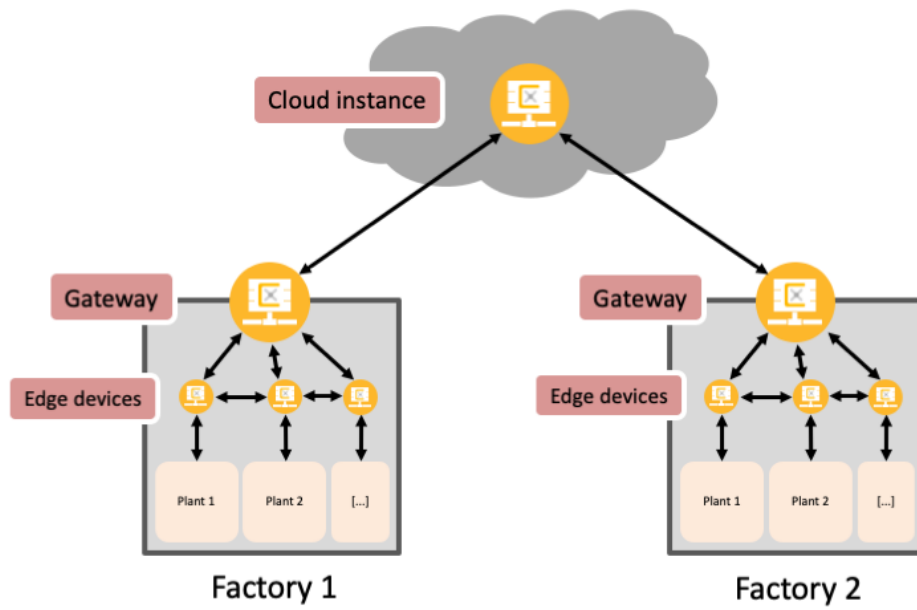 - Execution as system service
  - Backup functionality

Unify, harmonize and extend interfaces

- Node structuring and linking
    - Design interfaces according to requirements
    - Restructure machine data
    - Aggregate data from various sources
    - Decouple interface from underlying data source

- Custom node action handler
    - Implement virtual machine nodes
    - Handle data conversion and scaling on the fly
   - Create notifications on definable conditions

Uniform infrastructure

Cloud instance

Gateway

Edge devices

Plant 1 Plant 2 [...]

Factory 1

Gateway

Edge devices

Plant 1 Plant 2 [...]

Factory 2

Cascade multiple CoDaBix instances

- Data collection
  - Collect and buffer data locally
  - Bundle and publish data
  - By-pass connection breakdowns

- Remote Management
  - Configure and manage plugins
  - Roll out updates
  - Configure Operating System properties

- Private Cloud
  - Keep your data local
  - Integrated historical database
  - Access data via interfaces
    - REST JSON API
    - OPC UA Server
    - MQTT

Supported systems

- Operating Systems
    - Windows 7 SP1, Windows 8.1, Windows 10 (with .NET Framework 4.7.2)
    - Windows Server 2008 R2 and upwards
    - Every OS supported by the .NET Core Runtime
        - Linux
            - Red Hat Enterprise Linux
            - CentOS
            - Oracle
            - Fedora
            - Debian
            - Ubuntu
            - Mint
            - openSUSE
            - Alpine Linux
        - Mac OS 10.13 and upwards
        - Docker Container
- Hardware
    - Recommended: Dual-Core CPU, 4 GB RAM
    - Runs on Raspberry Pi 2, 3 and 4
    - ARM32, ARM64, x86, x64 platforms
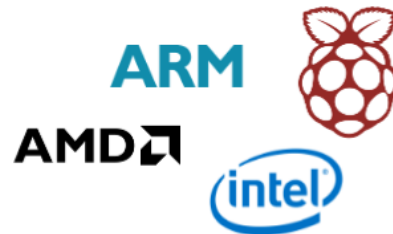
Previous Next

See product presentation

CoDaBix® is a bidirectional universal 'Communication Data Bridge'

CoDaBix® is the key element in Industry 4.0 - used in projects for factory automation, building control and much more.
The System is used as:

- **Middleware**
  - connection to MES/PPS
  - realizing Industry 4.0 networks (e.g. cloud of your organisiation in intranet or internet)
- **Edge Device**
  - CoDaBix® runs on tiny systems too (MiniPC, Raspberry Pi). The networking property provide excellent requirements to be used as a Industry 4.0 Edge Device.

CoDaBix® is fully developed under C# (.NET Standard bzw. .NET Core).
So CoDaBix® runs an any platform which is supported by .NET Core / .NET Standard.
OPC UA Companion Specification
Due to the flexible modeling of the data structure in CoDaBix®, we have created the best conditions for mapping complete OPC UA Companion specifications.
The logical functionality can be easily implemented by the user with integrated Typescript.

Everything in one system.
No matter OPC UA Methods or dynamic nodes need to be created / removed - anything is possible.
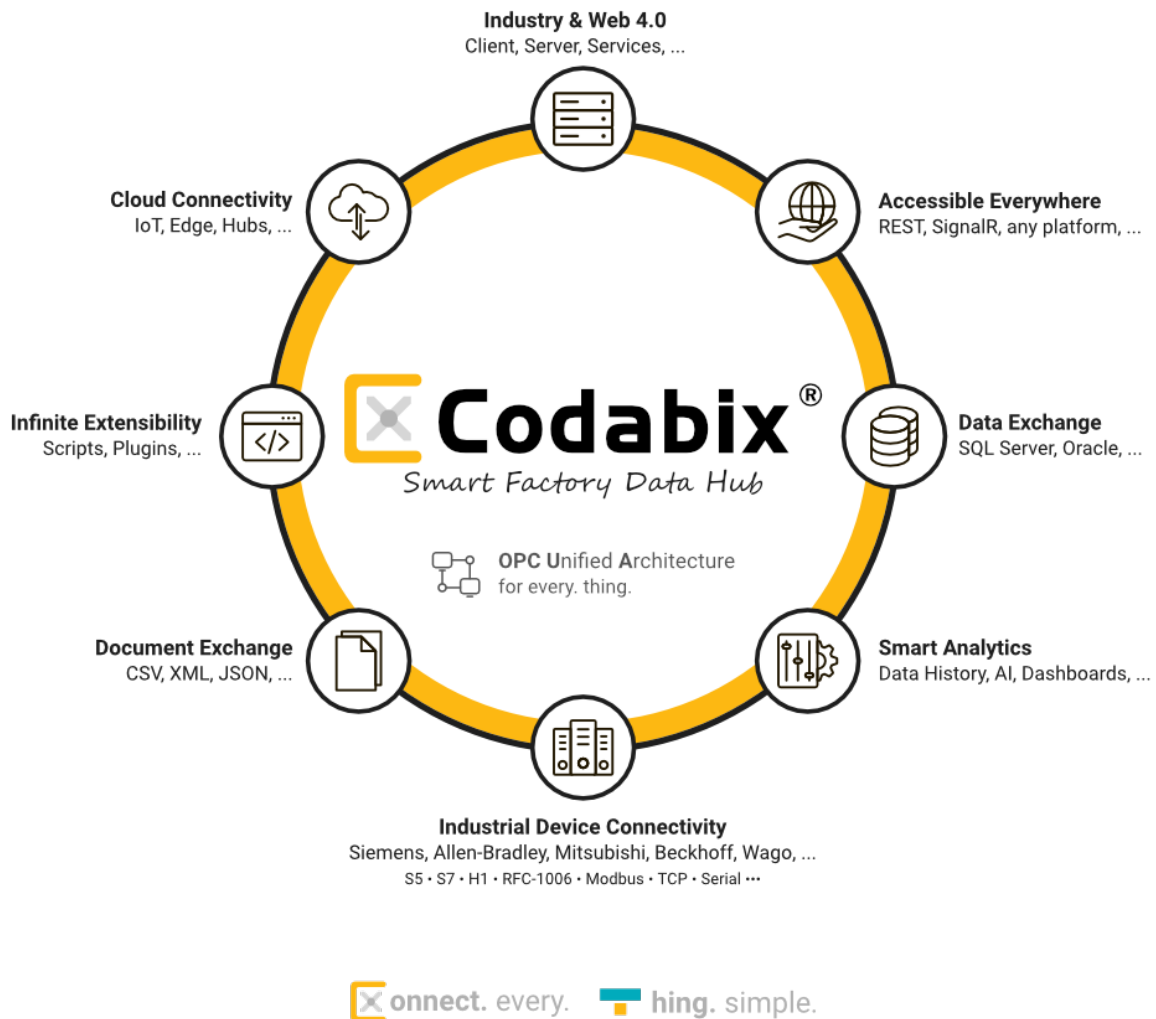
Use / Application

With CoDaBix® a heterogeneous machine environment with different intelligence characteristics, control systems, data formats and connection (bus) protocols can be lifted (and harmonized) to a customer-specific standard.
The core is the OPC UA conform structure as well as the central OPC UA connection to all "CoDaBix® data".
"Real" machine data and "virtual" variables (= data from / to database, text file, or web interface etc.) is processed in the same manner.
The Node tree ("Variable tree") by OPC UA standard thus plays a major part in CoDaBix®. The data of the connected sources can be mapped arbitrarily in a logical and hierarchical tree structure.

Each element is treated as a "Node" in CoDaBix®.

All variables and their properties such as name, current value, timestamp, min / max value and so on are provided in the internal high-speed cache. The access is possible in a bidirectional way as a read and write access.
The integrated database allows historical storing of any desired process variables.
For further processing by higher-level systems (for example MES, ERP) CoDaBix® provides its own standardized, but also customized interfaces in form of "plugins".
Access to current values and stored historical values is easily possible via OPC UA, REST / JSON, directly via the database or by script plugin (JavaScript).
This allows CoDaBix® to be connected to any data source or data storage in horizontal and vertical direction. The data is automatically exchanged (after a change), occurring event- or trigger-controlled.

Plugins for Devices / Interfaces and Data Exchanges

- OPC UA (Server and Client)
- OPC Classic (DA)
- SQL databases
    - MySQL
    - MSSQL
    - Oracle SQL
    - any other database system if required
- CSV / XML / text files
- web application via REST / JSON interface
- SAP
- Devices
    - SIMATIC S7, S5
    - RFC-1006 (ISO on TCP)
    - SINEC H1
    - Allen Bradley
    - Beckhoff
    - Schneider
    - Mitsubishi
    - Omron
    - your PLC is missing - no problem contact us
- OPC Classic

Configuration

The CoDaBix® configuration is done via the integrated web interface. For the plugins a configurator for each on its own is available.

In general, the parameterization via an XML config file is possible. The format of the XML config file is freely selectable and documented accordingly.

Therefore, CoDaBix® can be combined and connected in a simple way with available project planning system / parameterization applications (e.g. COMOS).

Requirements

Codabix is supported on following operation systems:

- Windows
    - Workstation: Windows 10/11 (x64/Arm64)
    - Server: Windows Server 2016/2019/2022
- Linux
    - Debian 11 (Bullseye) or higher (x64, Arm64, Arm32)
        - including derivates such as Raspberry Pi OS (for Raspberry Pi)
    - Ubuntu 20.04 or higher (x64, Arm64)
    - Fedora 37 or higher (x64)
    - OpenSuse Leap 15.0 or higher
- Raspberry Pi (e.g. UniPI, KUNBUS)
    - Raspberry Pi OS 11 (Bullseye) or higher

Detailed requirements see here.

The requirements for CPU power, memory and hard drive are dependent on the desired data throughput and data volume.

From:

<https://www.codabix.de/> - **CoDaBix®**

Permanent link:

https://www.codabix.de/en/what-is-codabix

Last update: **2023/08/01 14:19**