

# LABVIEW AS A NEW SUPERVISION SOLUTION FOR INDUSTRIAL CONTROL SYSTEMS

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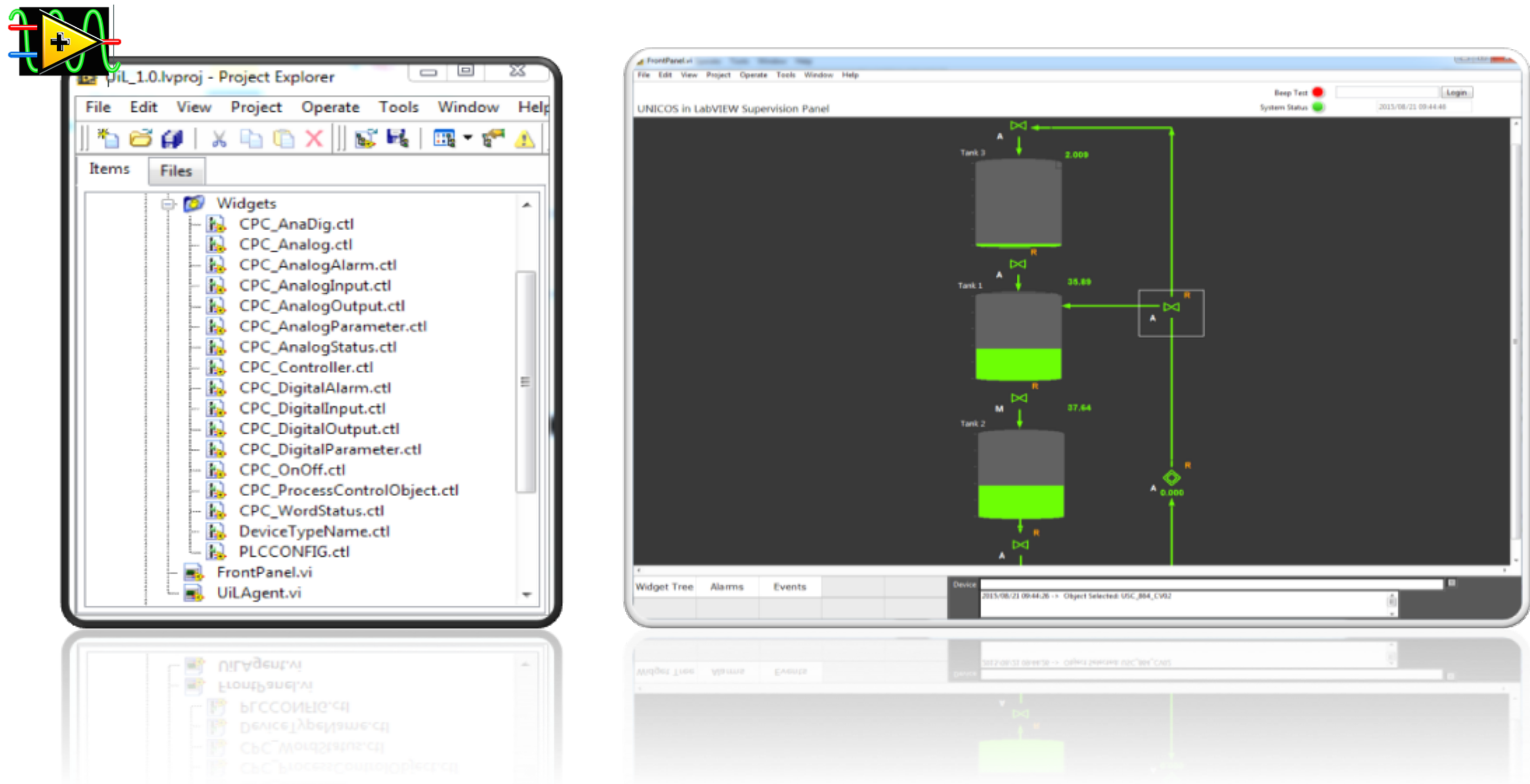
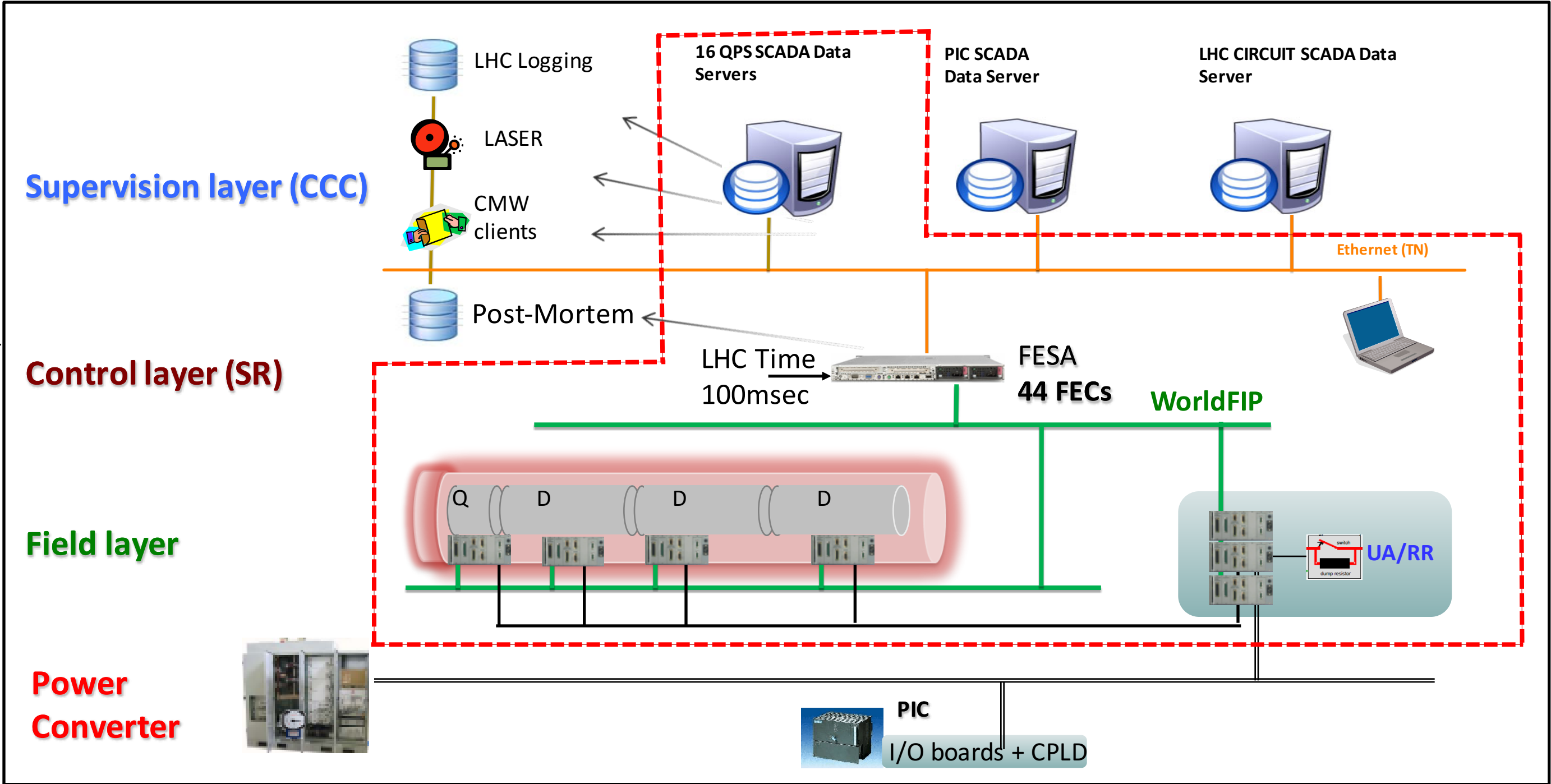


## INTRODUCTION

To shorten the development time of industrial control applications, CERN has developed the Unified Industrial Control System (UNICOS) framework. At CERN the SCADA system of choice is WinCC OA, but for some specific projects (small or initial prototypes not connected to accelerator operation or not located at CERN) a more customisable supervision using LabVIEW is an attractive alternative. UNICOS in LabVIEW (UiL) provides a set of highly customisable re-usable components, devices and utilities. Because LabVIEW uses different programming methods than WinCC OA, the tools for automatic instantiation of devices on the supervision layer had to be re-developed, but the configuration files of the devices can be reused.

## UNICOS

- Connects, instantiates and interacts with both the supervision and control layers with commercial industrial components
- CERN de facto standard for industrial control systems
- WinCC OA as SCADA
- Siemens and Schneider PLCs
- Codesys extension to industrial computers

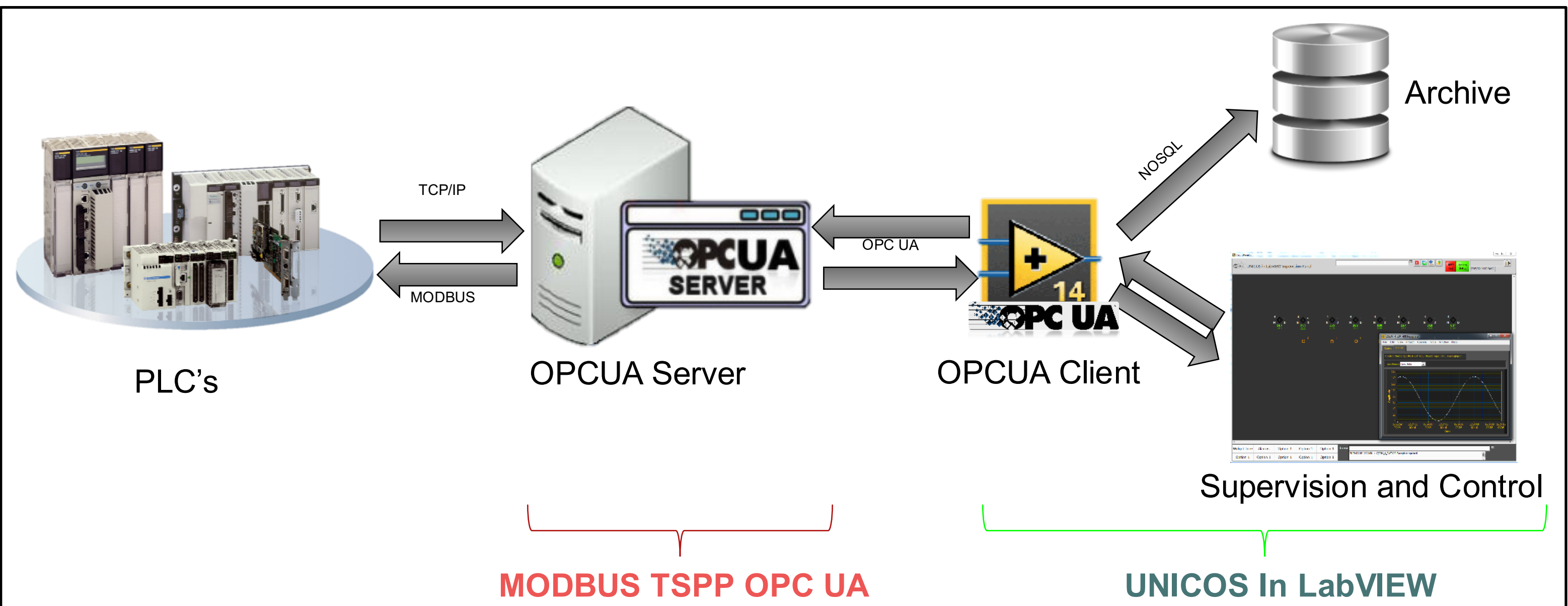


## UNICOS IN LABVIEW

- Implemented using COTS modules
  - LabVIEW
  - LabVIEW Datalogging and Supervisory Control Module (DSC)
  - Python bindings to MongoDB
- Drag and drop development
- Class based, extendable module design
- Cross network

## COMMUNICATION

- OPC UA (server)
  - TSPP protocol (CERN)
  - C++
- OPC UA (client)
  - Retrieve PLC data from server
  - LabVIEW
- Single interface
- Schneider and Siemens PLCs supported

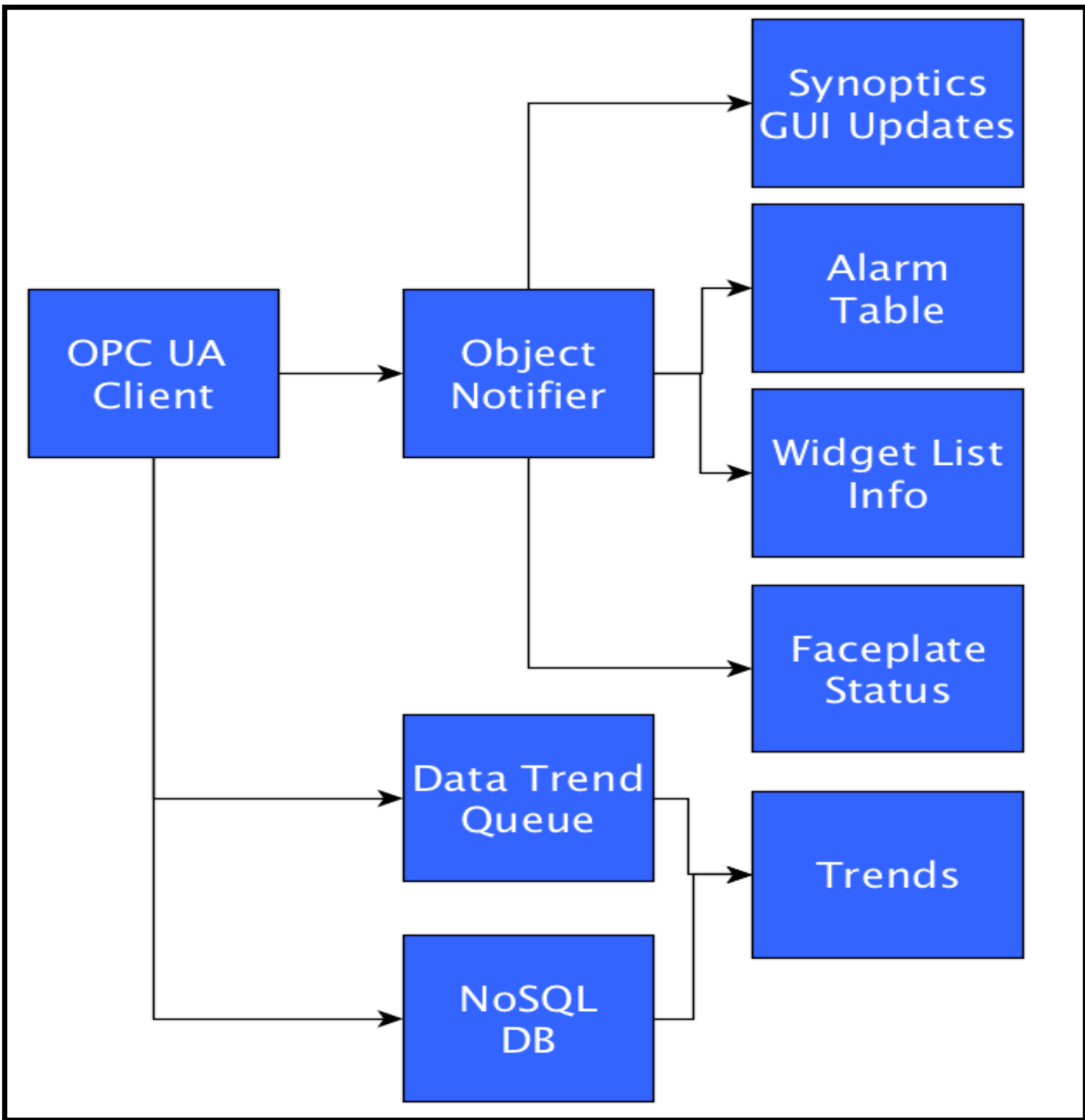


## WORKFLOW

The starting point for UiL development is the UAB generated configuration file. This file contains the front-end, typically a PLC, parameters and the devices to instantiate. The user navigates to the file, selects a project name and location where to save the project

## ARCHITECTURE

UiL subscribes, caches and re-serves data throughout the application using LabVIEW's internal queues. The most recent updates are stored and broadcasted through internal notifiers



## CONCLUSION

UiL has been successfully developed and is being used for prototypes at CERN. The combination of LabVIEW's intuitive drag and drop-based interaction, together with the similar look and feel of WinCC OA makes UiL a good choice for small to medium sized UNICOS applications as a cost effective supervisor. Our performance tests show that UiL can handle several hundred widgets running simultaneously without any significant load to the CPU



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