Siemens Competitive Advantage:
The Digital Factory, Totally Integrated Automation, and TIA Portal

Stefan Werner, March 23-24, 2016
Only a holistic automation approach including the whole value add chain will yield sustainable competitiveness.
Customer requirements

- Consistent data management
- Global standards
- Uniform interfaces for hardware and software
**Totally Integrated Automation** creates real value added in all automation tasks

**Integrated Engineering**

**Benefit**

Consistent, holistic engineering over the entire product development and production process

**Industrial Data Management**

**Benefit**

Access to all the important data occurring in productive operation – along the entire value chain and across all levels

**Industrial Communication**

**Benefit**

Integrated communication based on international, cross-vendor standards that can be flexibly combined

**Industrial Security**

**Benefit**

Systematic minimization of the danger of an internal or external attack on plants and networks

**Safety Integrated**

**Benefit**

Reliable protection of personnel, machinery, and environment with seamless integration of safety technologies in standard automation
Totally Integrated Automation (TIA)
The complete automation portfolio for digitalization from the Field to MES
Siemens Competitive Advantage: Reduction of Engineering time

Stefan Werner, March 23-24, 2016
Totally Integrated Automation Portal
What is TIA Portal?

Integrated Functions
- PLC
- HMI
- IO
- IPC
- Drives
- NET

Device Integration

Common Databases

Allows you to increase your Engineering Efficiency – up to 30% across the design, commissioning and maintenance phases as determined by users.
What leads to saving time of your Engineering Efforts?
… edit your automation tasks faster than before

Consistent Usability and Workflows
… due to one central engineering tool for the whole project

Reuse of Project Components
… due to scalable HW portfolio, library functionality

Reduced Commissioning Time
… due to built-in diagnostics, trace and simulation features

Automatic Code Generation
… via open interfaces and project generation tools

How will you achieve Engineering Efficiency – up to 30%?
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How will you achieve Engineering Efficiency – up to 30%?
Integrated Engineering…
…with TIA Portal saves significantly engineering time

- One common framework
- Unique and consistent user interface concept
- Multiple Controllers, HMI, Networks, IO, Drives, etc. in one
Consistent Usability and Workflows
One tool for the entire project

Integration of multiple devices - PLCs, HMI, drives, IPCs, safety in one software

Integration means easier data handling between devices in a project

Easier to configure networks with multiple devices in one project
Consistent Usability and Workflows
Simple interaction in configuring different devices

Simple and easy drag and drop capabilities
Consistent Usability and Workflows
Security Integrated... From code and access protection, to securing the networks

Know how protection, copy protection
… protect intellectual properties against unauthorized editing and illegal copying

Access protection
… protection against unauthorized access into your system

VPN, Firewall
… consistent engineering of VPN, firewall rules for secured networks
Consistent Usability and Workflows

System Diagnostics... integrated – automatically generated, no code required

- No programming necessary
  ... automatically generated at the device configuration

- Consistent display concept
  ... On the PLC display, TIA Portal, HMI, Webserver, and includes Drives fault information

- Easy and fast identification of errors
  ... clearly displayed error messages of fault location and cause
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How will you achieve **Engineering Efficiency** – up to 30%?
Scalability
SIMATIC Controller portfolio – seamlessly engineered

Advanced Controller
SIMATIC S7-1500

Software Controller
SIMATIC S7-1500

Distributed Controller
SIMATIC ET 200SP CPU

Basic Controller
SIMATIC S7-1200

System performance
Application complexity
Scalability
The complete controller portfolio for your automation task!

### Advanced Controller (S7-1500)

<table>
<thead>
<tr>
<th>CPU</th>
<th>Interface modules</th>
<th>Power supply</th>
<th>Communication modules</th>
<th>Signal modules</th>
<th>Technology modules</th>
</tr>
</thead>
</table>

### Basic Controller (S7-1200)

<table>
<thead>
<tr>
<th>Switch modules</th>
<th>Power supply</th>
<th>Communication modules</th>
<th>CPU</th>
<th>Signal modules</th>
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<th>Signal boards</th>
</tr>
</thead>
</table>

### Software Controller S7-1500

![Software Controller Image]

### Distributed Controller (ET 200SP CPU)

<table>
<thead>
<tr>
<th>CPU</th>
<th>ET 200SP modules</th>
</tr>
</thead>
</table>
Scalability
Safety Integrated… in S7-1200 and S7-1500
Scalability
Safety Integrated… all a part of the Totally Integrated Automation portfolio

Fail-Safe Engineering

STEP 7 Safety Advanced V13
- F-program structure auto-generated
- TÜV Certified – Safety library/functions

Fail-Safe Controller

S7-1500F for Advanced Control
- Field proven coded processing
- Faster and with onboard status display

Fail-Safe I/O

ET 200SP
- No DIP Switches
- Hot Swappable
Scalability
Safety Integrated… a Complete Solution for all of your needs
Reuse of Project Components
Comprehensive library concept… share automation parts company-wide

- Modularize and reuse plant sections… reduce engineering time as project parts can be shared across a company portfolio

- Support of company standards… manage automation components centrally and share company-wide

- Version control… track changes easily and update from a central location
Reusing of Project Components
With TIA Portal – Libraries

You can create custom libraries that can be a mix of devices, blocks, tags, HMI screens.

With Libraries, project parts can be shared across a company’s product lines.

Global Libraries - allows for easy customization of projects and flexible machine configuration.
In which projects are the functions in use?
Which version is used?
How can the functions be updated with the current version?

Copy functions and integrate in the different projects
SIMATIC STEP 7 in TIA Portal - Libraries
Reuse– Standardize with libraries in the TIA Portal I

Develop

Standardize

Reuse

Store function in the library as type and version it

Use write-protected instance of the type in the projects
Reuse of Project Components
With TIA Portal – Libraries
SIMATIC STEP 7 in TIA Portal - Libraries

Reuse – Standardize with libraries in the TIA Portal II

Libraries

Function Type

Expand/change function and assign new version

Version 1.0

Version 2.0

Update instances by mass operations

Main

Version 2.0

Version 1.0

Libraries

Main

Libraries

Read only

Version 2.0

+ Reuse of types in the project can be recognized immediately.
+ Application of the standards will be guaranteed by read-only instances
+ Instances can be updated automatically
+ Versioned type guarantees, that changes are traceable and comparable
+ Reduce development time
+ Increase quality

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How will you achieve **Engineering Efficiency**
– up to 30%?
Reduced Commissioning Time
Advanced tools for commissioning and service

- **Integrated variable trace**
  … with cycle based acquisition of process values for analysis

- **Advanced integrated tools**
  … simulations for quicker analysis and logic comparisons

- **Remote Connectivity**
  … manage, control and monitor decentralized plants remotely
Reduced Commissioning Time
Integrated trace functionality

Trace editor – easy troubleshooting for sporadic faults on machine
Reduced Commissioning Time
Detailed compare

Detail code comparison with easy identification of code differences

TIA Portal
Reduced Commissioning Time
Integrated simulation tools

Reduced commissioning time by simulating PLC and HMI code without hardware.
Simulation for faster time to market - PLCSIM Advanced

- Virtual S7-1500 (F/T) controller
- Virtual Commissioning e.g. together with Process Simulate
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How will you achieve **Engineering Efficiency** – up to **30%**?
Automatic Code Generation
Integration into Engineering Workflows via open interfaces

Export/Import of:
- Program blocks
- Tags
- Screens and HMI Data
- etc.

API for:
- Go-Online/offline
- Export/Import
- Library Handling
- Compile
- etc.
Automatic Code Generation
Adding new dimensions to the TIA Portal: Auto generation of HMI screens (V14)

Efficient interplay of WinCC and PLC Code - SiVArc

- **Auto** generation of HMI screens from PLC code
- Scalable solution from Panel up to SCADA
- Fully integrated in TIA Portal
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How will you achieve Engineering Efficiency – up to 30%?
Why do we think we are your best choice for the step to digitalization?

The Solution Reaches Further

Extensive Portfolio range

Products early in their Lifecycle
How Siemens makes Modernizing achievable?

Concerned about Modernizing?
Worried about:
- **Loss** of current knowledge
- **Risk downtime** during the changeover
- **Data transparency** to other controllers
- Partnering with **confidence**
- **Steep** Learning curve

Siemens makes modernization easy with:
- Conversion tools
- A step approach
- Data sharing with existing
- Support
- Training

www.usa.siemens.com/modernize
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