Migration to SIMATIC PCS 7 -
Making light work of transition.

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PCS 7

SIEMENS

Migration –
an investment in your future

With competitive pressure constantly increasing, companies are being driven to achieve ongoing growth in productivity and to reduce their time to market. Rising costs for raw materials demand continuous optimization of engineering and process operations. Globalization and new industry or regulatory requirements are also important drivers in today's marketplace.

A key component to improving productivity, reducing time to market and meeting other business pressures is a company's automation system. Many existing plants contain older automation systems that do not utilize current technology. These older systems often will not support implementation of the changes required to respond to today's business pressures. This confronts plant management with numerous issues that must be considered when evaluating the viability of their existing automation systems:

- As equipment and installed systems become older, there is an increased risk of unplanned shutdowns – and of lost production

- As production expands or branches out to new products, the performance of the existing process control system may not be adequate

- The installed system doesn't offer the needed openness and flexibility to allow the production system to be connected with corporate business systems, i.e. MES/ERP integration is not possible, or else is both very complicated and very expensive

- The installed system is costly to maintain

- The old system is no longer supported or is even obsolete

- The number of different systems in the plant reduces operator effectiveness particularly in plant upset situations (eg. in alarm management)

In any plans for modernization, producing a high Return on Investment (ROI) while reducing production risks and maintaining existing investments is generally of foremost importance to plant management. This is because the installed base of process control systems represents a major investment in hardware and application software, and carries with it valuable and comprehensive know-how developed by operations, engineering and maintenance personnel.

The main goal in moving to a modern automation technology platform, also known as migration, is to modernize the existing installed base in a phased approach without creating system barriers – and to do so without unplanned shutdowns or loss of production. At the same time, the existing investments, which have future value, must be secured for the long term to maximize Return on Assets (ROA). A successful migration should create a solid life cycle support strategy for the new system taking into account component availability, product warranties, upgrades, field service and technical support.

Legacy systems often times do not fulfill the requirements of modern production facilities regarding openness and flexibility, thus making it difficult for a company to respond to competitive business pressures.

Improve your competitive position

With its Totally Integrated Automation (TIA), Siemens is the only provider to offer a complete range of harmonized automation products, systems and solutions, for all industries – from the field level, through the automation level, and right up to the ERP level. This means that TIA provides the ability to optimize production processes across all areas of a plant, leading to reduced complexity and to increased productivity – all while providing a high degree of investment protection.

This leads users to realize a lower Total Cost of Ownership (TCO) – and thereby to improve their competitive position: through improved production throughput, increased availability, higher product quality, improved operator efficiency, and enhanced maintenance capabilities all with a shorter time to market.

Being flexible to react quickly to new market demands, while minimizing production downtime is a basic requirement for any company that wishes to enhance its position in the market. This is where the SIMATIC PCS 7 process control system from Siemens distinguishes itself. As a cornerstone of Totally Integrated Automation, SIMATIC PCS 7 forms a seamless all-in-one system with capabilities that exceed those of legacy systems and the ability to handle all of your process control requirements – a control system for all industries and all applications.

The modern HMI of SIMATIC PCS 7 enables seamless integration into existing legacy and IT systems, while minimizing the impact of change and improving operations efficiency.
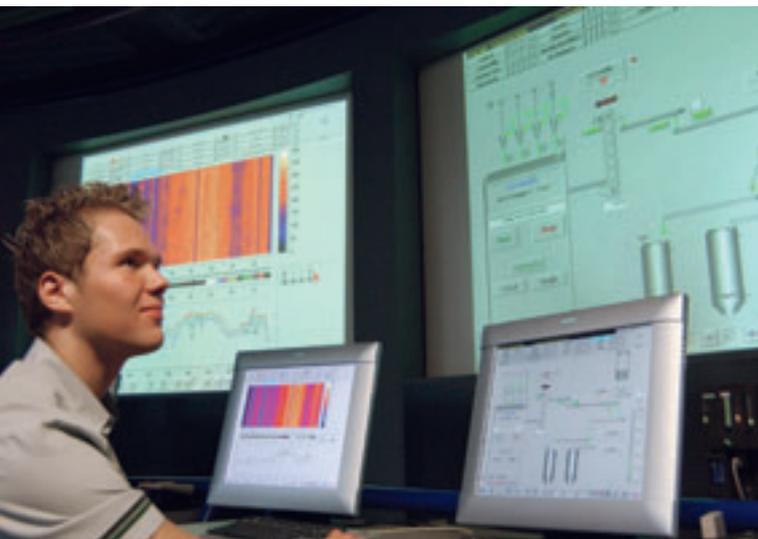
SIMATIC PCS 7 at a glance

▶ Based on standard SIMATIC hardware and software components (the world leader in automation)

▶ Modern, distributed client-server architecture

▶ Scalable from a small laboratory system up to large multi-unit plants with more than 100,000 I/O

▶ SIMATIC PCS 7 BOX – the compact, low-cost process control system for small applications such as pilot plants, laboratories or package units

▶ For all industries: process, discrete and hybrid – for continuous and batch applications

▶ Flexible and modular software licensing

▶ High-performance HMI system with integrated SQL server-based archive

▶ SIMATIC PCS 7 Web Client – monitoring and control via Internet/intranet: The worldwide and safe access to the plant

▶ Central engineering system with extensive selection of configuration languages, based on IEC 61131

▶ Bulk engineering tools for efficient implementation of automation standards

▶ Concurrent engineering allows for effective collaboration during configuration phase

▶ Flexible and simple integration of field devices and drives, based on PROFIBUS

▶ Homogeneously integrated safety features utilize common hardware and is TÜV-certified up to AK6 or SIL3.

▶ Common engineering tools are used to configure process and safety applications

▶ Increased availability through redundancy at all levels of the system (hardware, software and communications)

▶ Plant Asset Management integrated in SIMATIC PCS 7 provides online, real-time functions for monitoring, diagnostics and maintenance request

▶ SIMATIC BATCH modular batch system is tightly integrated into the engineering environment and complies with industry standards and regulations such as ISA S 88.01 and FDA 21 CFR Part 11

▶ Linkage to MES/ERP level through SIMATIC IT Framework

▶ SIMATIC Route Control provides the configuration, control, monitoring and diagnostics of material transports in pipeline networks

Comprehensive migration strategy – unique to the industry

Migration has never been a more important topic in the industrial marketplace as users confront the lifecycle management of their installed systems. Everyone from process control engineers to executive leaders is expressing their concerns and expectations about migration, from the availability of spare parts to process optimization.
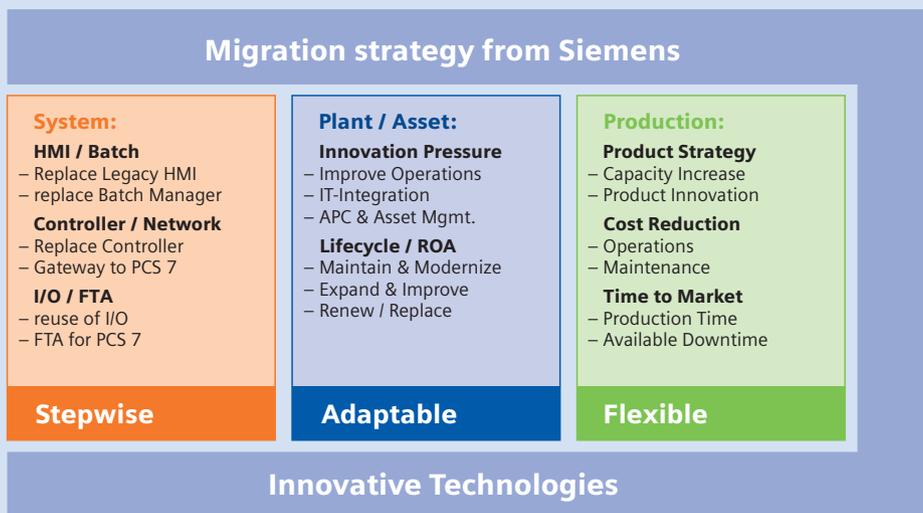
There are many compelling reasons for why migration is becoming so important. In many regions of the world, plant expansions and modernizations are much more common than new or "Greenfield" projects. Furthermore, the process automation industry itself has undergone massive industry consolidations of both suppliers and end users, and has seen significant changes in the lifespan for DCS components spurred by rapidly changing technology. While the expected lifespan for I/O and wiring is 25 years or more, the lifespan of HMIs and workstations is now typically 5 years.

To respond to these business and technology drivers, Siemens has created the industry's most comprehensive approach to migration. This means that Siemens is in a unique position to not only meet, but exceed our customer expectations due to our ability to provide a migration strategy which is Stepwise, Adaptable, and Flexible.

- **Stepwise** – allows incorporation of new technology incrementally and at various levels of your existing system in a way that is optimum for your plant.
- **Adaptable** – create a strategy which is tailored to the plant's lifecycle strategy (maintain and modernize, expand and improve, or renew and replace) and to maximizing Return on Assets (ROA).
- **Flexible** – designed to take into account the business issues facing production and operations, including the need to increase capacity, add new products, reduce costs or reduce the time to market.

The benefits of this comprehensive migration strategy are delivered through a series of products and services which Siemens has developed to transition users to newer technology. These products, tools and services can be combined to meet the specific migration requirements of your plant:

Designed to minimize the cost of change associated with migration, these products and tools allow users to reuse their intellectual property and to preserve existing hardware which still retains value.

Migration strategy from Siemens

System:	Plant / Asset:	Production:
HMI / Batch – Replace Legacy HMI – replace Batch Manager **Controller / Network** – Replace Controller – Gateway to PCS 7 **I/O / FTA** – reuse of I/O – FTA for PCS 7	**Innovation Pressure** – Improve Operations – IT-Integration – APC & Asset Mgmt. **Lifecycle / ROA** – Maintain & Modernize – Expand & Improve – Renew / Replace	**Product Strategy** – Capacity Increase – Product Innovation **Cost Reduction** – Operations – Maintenance **Time to Market** – Production Time – Available Downtime
Stepwise	**Adaptable**	**Flexible**

Innovative Technologies

The Siemens migration strategy is stepwise, adaptable and flexible allowing customers to perform a successful migration in a way that best meets their requirements.

Individual adaption of the migration solution driven by customer requirements and his plant structure.

Siemens unique approach to development of migration products

Siemens' unique approach to development of migration products starts with the philosophy that the structure of every process control system is similar. Each process control system contains a configuration database that consists of building blocks that are common to all systems, independent of supplier or vintage, such as:

- Function block types and instances
- Hardware address information
- Control strategy software
- User interface made up of process graphics, dynamic elements, faceplates etc.

| Product	Purpose
Conversion tools & services	Preserve & convert existing investment & know-how
Batch manager	Connect new batch manager to existing system
HMI connectivity	Connect new HMI to existing controller & I/O
Engineering libraries	Provide faceplates, function blocks with same look and feel as older system
Gateways	Allows peer-to-peer controller communication
I/O interface	Control existing I/O with new controller
Field termination assemblies	Preserve field devices and wiring

For an effective migration, the target (new) system must "understand" the information contained in the old system so that it can automatically reproduce the configuration within the new platform at a fraction of its original development cost. At Siemens we have created a universal technology that is embedded in all of our migration products which enables this preservation of intellectual property: Data Base Automation or simply DBA.

Designed with a modular "plug-in" interface, existing configuration data can be interpreted and read into the Data Base Automation tool from any process control system and can be displayed and configured using a common user interface. This architecture creates a universally applicable migration infrastructure that permits simple connection to different legacy process control systems thanks to its modular architecture. DBA allows migration of HMI, batch, and controller data, while creating a consistent look and feel for every control system migration. This migration tool is tightly integrated within the SIMATIC PCS 7 engineering system allowing for common configuration techniques to be used for both old and new systems alike.

Siemens migration tools are designed to focus on the automated conversion and reuse of existing intellectual property, allowing users to save time, reduce costs, minimize errors and maximize traceability and reliability.

Another unique approach in the industry is that Siemens treats migration products just like our standard SIMATIC products, not like "one-off" products. This means that we follow a rigorous product development process including thorough testing at the product and system level. We also follow the same product maintenance and lifecycle support guidelines as our standard products. This applies to technical support and product warranties as well. At Siemens, our development teams treat system compatibility as a priority, not as an afterthought. This ensures that modernization projects have minimal risk allowing you to take advantage of new technology while continuing to offer a high degree of investment security.

Because we are a world leader in automation and a financially stable company, Siemens is in a unique position to back our products for the long term, ensuring scope of supply well out into the future. Thus the plant manager may be sure that by partnering with Siemens for migration, he will enjoy reliable worldwide support, and that the investment made in migration will help to secure the long-term viability and operation of the plant.
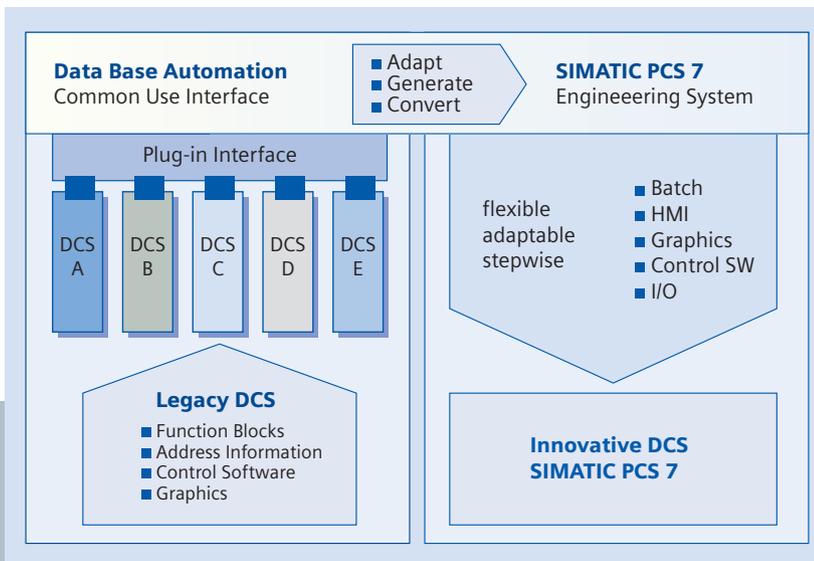
Data Base Automation: a universal, enabling technology that is used to migrate existing legacy DCS applications to SIMATIC PCS 7 while preserving engineering and process control know-how.

Realize the benefits of migration for your situation

The extensive portfolio of migration products and services from Siemens allows customers to create a migration strategy and timeline that is tailored to their individual needs allowing them to balance factors such as capital expenditures, process downtime and personnel resources. "We don't force you into a single strategy, but provide you with multiple options that can be implemented in a phased approach!"

One of the major challenges facing suppliers of migration solutions is to provide a stable, forward-looking automation system that can be applied effectively to existing systems. At Siemens, we rely on our state-of-the-art process control system SIMATIC PCS 7 to address this challenge, since it belongs to the system platform of the future, Totally Integrated Automation.

Our migration products and services are designed to allow you to preserve your existing assets while also realizing the full benefits of SIMATIC PCS 7.

- Tool-based conversion services, – to automatically convert existing process graphics for use within SIMATIC PCS 7 operator stations (HMI)
- SIMATIC PCS 7 operator stations (HMI) – provide HMI elements and a robust communication link to legacy system controllers for plant operation via new HMI technology
- SIMATIC BATCH – provides connectivity for a new batch nanager to interface directly to an existing controller's phase and recipe sequence logic
- Engineering libraries for use in SIMATIC PCS 7 controller and operator stations – function blocks, faceplates and dynamic HMI elements in SIMATIC PCS 7 that provide equivalent functionality to the existing system

- Network gateways – for allowing peer-to-peer communication between existing controllers and new SIMATIC PCS 7 controllers
- I/O interfaces to SIMATIC PCS 7 - allow an existing I/O subsystem (field devices, racks, terminations and I/O modules) to be controlled by a new SIMATIC PCS 7 controller
- Field Termination Assemblies (FTAs) – preserve existing wiring and minimize change by providing a 1:1 replacement of existing terminations and connection to standard SIMATIC PCS 7 I/O modules via a new FTA (with same form/fit and function

Because in the final analysis, migration doesn't have to mean the "bulldozing" of an existing system – and it means a whole lot more than simply exchanging the field termination assemblies!

Remote I/O, field devices and drives are easily integrated into SIMATIC PCS 7 using the international standard, PROFIBUS.

The state-of-the-art SIMATIC PCS 7 controller is more powerful than the controller of legacy systems allowing users to reap the benefits of tighter control and improved quality.

Common migration scenarios

With the comprehensive set of products and services available for migration to newer technology, Siemens provides numerous options for migration that can be tailored to the unique requirements of a specific plant.

Below are several common solutions that have been used by customers to address their migration requirements:
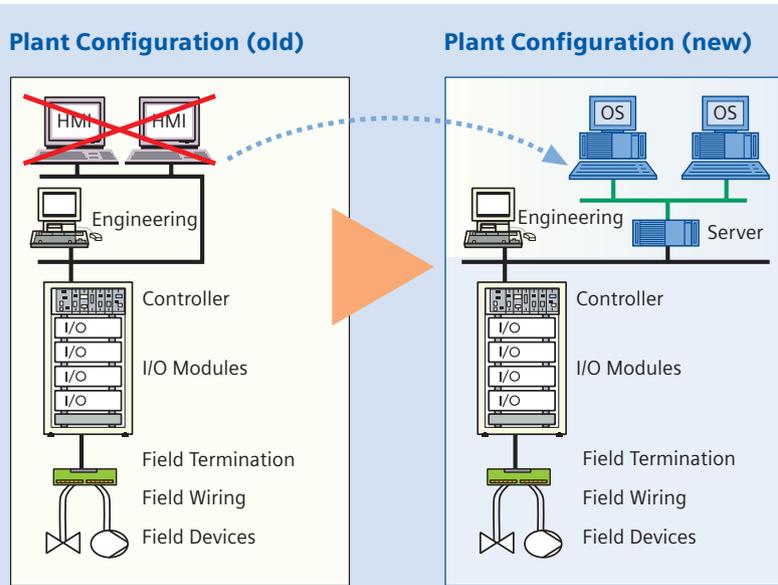
- HMI Replacement
- Plant Expansion
- Modernization

Example 1

Plant Configuration (old)

Plant Configuration (new)

Example 1: HMI replacement

In today's environment there are many reasons why it might make sense to replace aging HMI terminals as part of a migration strategy. Due to the rapid changes in PC technology it is possible that the HMI of the existing system is technically outdated, or its spare parts may be prohibitively expensive, or even obsolete. Changing business requirements, particularly integration of the control network with the corporate network, improved network security, or other functional expansions may also require an HMI upgrade. In these cases, the old HMI can simply be replaced by a new state-of-the-art Operator Station (OS) based on SIMATIC PCS 7 – thus protecting the investments made in controllers, I/O, process graphics and application software. Conversion tools enable existing process graphics to be redrawn within SIMATIC PCS 7 OS at a fraction of their engineered value.

Major benefits:

- Extends the life of an existing control system incrementally and provides new operational capability
- Minimum cost impact
- Enables connectivity to ERP systems and tighter IT integration
- Provides for a smooth transition for operations personnel to new HMI technology
- System upgrades can be performed online without requiring unplanned downtime
- Minimizes total cost of ownership by reducing design, installation and startup costs

Plant Configuration (old) | **Plant Configuration (new)**

HMI / HMI / Controller / I/O Modules / Field Termination / Field Wiring / Field Devices

OS / OS / Clients / ES / Server / Controller / I/O Modules / Field Termination / Field Wiring / Field Devices
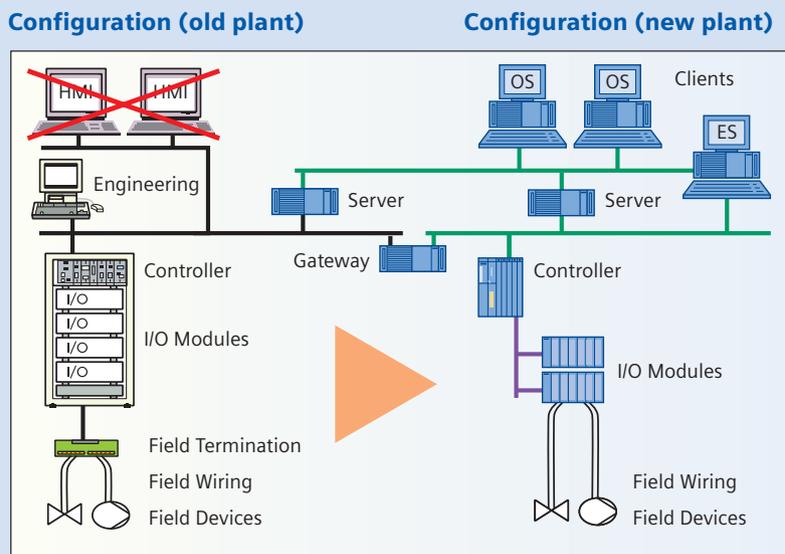
Example 3

Example 2: Plant expansion

Here, the existing plant is expanded by means of a new SIMATIC PCS 7 process automation system. The old system is retained for the time being, allowing coordinated operation between new and old, as well as a smooth transition to new technology. If the old and new systems are united under a common new HMI, then the system is architected to ensure that operators work with a common look and feel for both systems. Engineering libraries developed within SIMATIC PCS 7 to mimic the functionality and behavior of older systems help to minimize the learning curve for the engineers and maintainers of the system. This step-by-step modernization – addressing a new section of the plant first – thus offers the possibility of functional extensions such as fieldbus technology, IT integration, Totally Integrated Automation, and more, without the need for a complete system replacement.

Major benefits:

- Adds production capacity and manufacturing flexibility

- Allows for smooth introduction of new technologies (such as fieldbus) into the plant

- Enables connectivity to ERP systems and tighter IT integration

- Allows different automation systems to be brought under control of a common HMI

- Provides for a smooth transition for operations personnel to new HMI technology
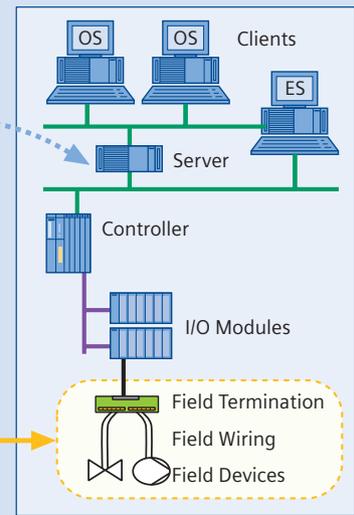
Example 2
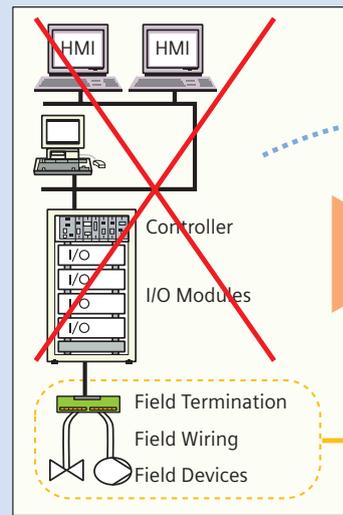
Example 3: Modernization

In some cases, difficulties with the supply of replacement parts of the old system, a lack of technical support or needed functional extensions, perhaps involving fieldbus technology or IT integration, make a comprehensive modernization necessary. In this case, the old system is replaced by the modern SIMATIC PCS 7 control system, even while – if needed – the system remains online to ensure that production goals are met. In this scenario, the investment in wiring, hardware components, existing I/O and field devices or intellectual property (the valuable application engineering) can be reused based on the customer's evaluation of what components hold maximum future value, thus helping to minimize total cost of ownership.

Major benefits:

- Provides the maximum lifespan extension of the process automation system without replacing it in its entirety

- Removes dependence on existing vendors

- Minimizes total cost of ownership by allowing reuse of the most significant existing assets

Configuration (old plant) | **Configuration (new plant)**

HMI / HMI / Engineering / Controller / I/O Modules / Field Termination / Field Wiring / Field Devices

OS / OS / Clients / ES / Server / Server / Gateway / Controller / I/O Modules / Field Wiring / Field Devices

Additional details on system-specific migration solutions can be found in individual brochures

Contact your Siemens partner for more information!

Bundling industry expertise to provide first-class solutions

A successful and efficient migration is best achieved by working with a team of competent partners. Consequently, Siemens is accustomed to working hand-in-hand with the customer and with their system integrator(s), particularly when it involves the migration of third-party systems. In many cases, the system integrator may have specialized knowledge of the customer's existing application, or an expertise with the third-party control system, or an insight into the needs of the client and the requirements of the plant. In this way, plant management can be assured that the effective partnership between the system integrator and Siemens will result in a migration solution that is optimum for his business.

Providing a viable and flexible migration path from earlier Siemens control systems to SIMATIC PCS 7 has been one of the major drivers during the development of our migration products, tools and services. This work has been leveraged to create migration solutions that can also be used for third-party control systems from Bailey, Emerson, Honeywell, Invensys and ABB. Thus users of third-party control systems can rely on the global leader SIMATIC technology to secure their investments in new automation technology for the future. In this way, they benefit from the features of the modern SIMATIC PCS 7 process control system and the synergy effects resulting from the use of Totally Integrated Automation.

There are many reasons why Siemens is in a unique position to be your process automation partner for the future. Combining the innovative SIMATIC PCS 7 process control system with flexible migration solutions and services, plus industry expertise and migration experiences accumulated over years, in addition to global support creates a combination that provides maximum value for our customers.

Migration – Online, without loss of production.

Teamwork: plant management, system integrator and Siemens.

Selection criteria for migration partners

Based on many years of experience in process automation, Siemens has begun offering comprehensive migration solutions to help users effectively manage the lifecycle of their installed process automation systems.

The migration strategy is based on leveraging the innovative technologies of Totally Integrated Automation and by transitioning to the SIMATIC PCS 7

platform in a stepwise, adaptable and flexible fashion. Now users of earlier Siemens control systems, or of third-party control systems, are both able to benefit from the advantages of Totally Integrated Automation for their processes.

Below you can see for yourself how the Siemens migration strategy to SIMATIC PCS 7 addresses the key user migration requirements as defined by ARC.

User requirements *)	SIMATIC PCS 7 migration strategy
System openness and adherence to international standards	SIMATIC PCS 7 is an open platform that is built on the basis of international standards such as OPC, Industrial Ethernet, PROFIBUS, S88 and IEC 61131, and is a cornerstone of Totally Integrated Automation
Ability to preserve existing assets that still offer value and avoid replacing hardware assets that add no value	The SIMATIC PCS 7 migration strategy is flexible to allow users to preserve whatever existing investments provide future value: field wiring, terminations, I/O subsystems, controllers and application-software
Tools for effective graphics conversion	Conversion tools and services are provided to convert process graphic displays automatically at a fraction of their original engineering cost
Improved engineering efficiency	HMI displays, including dynamic elements, can be generated automatically from the existing controller configuration
Accommodation of higher level applications	Integration support for SIMATIC Batch and SIMATIC IT enables connectivity to ERP systems
Support by training solutions	Standard training courses and migration-specific training/workshops are available
Solid partner, also for the future	Siemens is a large, financially stable company that is a long-term player in the process automation industry
Ability to provide references	APACS+, TELEPERM M, SIMATIC PCS/TISTAR, DCS from Bailey and Honeywell, additional third-party systems in preparation

*) based on ARC study "Process Control System Migration Strategies" from February 2003, Page 8

Up-to-date information on SIMATIC PCS 7:
www.siemens.com/simatic-pcs7

More information about the migration to SIMATIC PCS 7:
www.siemens.com/simatic-pcs7/migration

Interactive catalog on the Web:
www.siemens.com/automation/ca01