Westfalia

WAREHOUSE SYSTEMS & TECHNOLOGIES

.stat .quality .load .pick .order .alarm .service .show .connect .flow .config .base .move .report .check .maint .yard .store .data .custom

Savanna.NET®

SOFTWARE & IT

**WAREHOUSE MANAGEMENT
AND MATERIAL FLOW FROM
A SINGLE SOURCE**

CONTROLLING THE FUTURE TODAY

Modern storage systems are defined by algorithms. They orchestrate, synchronize, and accelerate complex material flows, ensure lane efficiency, dynamics, intelligent use of space and load distribution. The code is developed by us.

More than 40 software developers are employed in creating the hub for every manual, semi-automated, or fully automated storage system: The tried and tested Savanna.NET® Warehouse Execution System (WES). Developed in 2005 together with our US sister company, it is now being used by more than 500 clients worldwide.

Our developers use a robust software platform with modern .NET® technology as a basis for powerful modules and tailor the system to specific requirements. Savanna.NET® combines the functionalities of warehouse management systems (WMS) and warehouse control systems (WCS). Since its launch, it has proven to be equal to all tasks of automated intralogistics – and is now consistently growing with those tasks. Our WES is easily integrated with virtual environments, built for modular scalability, and capable of centrally controlling and synchronizing multiple warehouses at a time.

And it provides a holistic IT support with faster and ongoing releases and updates. The IT infrastructure including peripherals and TERRA products – such as TERRA cloud, workstations, and high-availability servers – can be ordered as part of the package.

A powerful Programmable Logic Controller (PLC) acts as a switchboard between software and system. Thanks to Westfalia TERRA Automation, we also have full in-house capability to build and program PLC control systems. Being a total solutions provider, we can at your request provide you with matching software, IT hardware and PLC control systems – for seamless and highly efficient flow of your data and goods.

LOGISTICS SOFTWARE

IT INFRASTRUCTURE

PLC SYSTEMS

Software & IT

Warehouse Execution System

WAREHOUSE MANAGEMENT

Savanna.NET®

MATERIAL FLOW CONTROL

Automation solutions/PLC

IT hardware, cloud, high-availability computers

For automated and manual storage systems

WAREHOUSE EXECUTION SYSTEM

EFFECTIVE WAREHOUSE MANAGEMENT

PRECISE MATERIAL FLOW CONTROL

MAXIMUM DATA ACCURACY

Savanna.NET® is a Warehouse Execution System (WES) with enhanced functionalities for Warehouse Management Systems (WMS) and Warehouse Control Systems (WCS).

It allows viewing all automated storage system processes clearly on the screen, analyzes the processes, generates storage strategies, and controls highly complex material flows. This makes it an integral software solution for full control and visualization of your own automated warehouse or whole clusters of automated storage locations.

Our WES helps you to collect data of incoming goods, manage your inventory in real time, and draw up and manage order lists for inbound and outbound logistics. A single instance is all it takes to control storage technology and material handling in real time and to visualize both standardized and specific picking processes in digital and paperless form. All relevant data is tracked continuously over long periods of time.

Due to the close connection between both functionalities, the system is able to exchange data between the ERP system, warehouse management, and warehouse controlling more efficiently. As an integrated solution, the WES has many advantages over siloed systems for warehouse management and control.

Its modular and economic design allows for quick scaling to the required scope of functions. With the WES, you can centrally manage, control, and synchronize multiple warehouses. It offers maximum precision, transparency, and security of data. Also, lower susceptibility to faults minimizes the need for support. The standard user interface has been designed to allow faster familiarization with the system. A central role management ensures greater data security and clear workflows.

Savanna.NET® integrates flexibly with many applications, webbased services, PLCs, and ERP systems and convinces through faster and ongoing release and update capability.

WAREHOUSE MANAGEMENT SYSTEM (WMS)

With its core warehouse management functionality, Savanna.NET® controls the movement, storage, and retrieval of material within a warehouse – essentially managing the entire inventory.

The warehouse management features of the WES manage stock, record, and track batches, and help to fulfil orders and move products. In addition, the WES enables tracking all these operations over extended periods of time. By efficiently managing warehouse stock and pallet rack positions, the WES minimizes costs and processing times.

It allows easy management of warehouse stock and order processing. Unique IDs for load units and loads such as stock keeping units (SKUs) are key to warehouse automation. Like other item identifiers, they are stored in the central Savanna® database. This data enables the merging of goods and pallets from different storage areas and, for example, their staging in the right order for order picking or loading onto a truck. Operational processes are thus handled swiftly, cost-effectively, and accurately, while stock is recorded and tracked without errors or gaps.

Using the optional .connect interface, an ERP system receives all necessary information about stock changes from Savanna.NET®. This way, the available stock is known at all times and customers are informed and can be supplied on time.

Manage a variety of load carriers with greater ease and use your storage space more effectively. As warehouse operations grow in size, the range of load carrier types often changes as well. The Savanna.NET® WMS functionality supports load carrier management and helps to ensure optimal usage of the available storage space.

Ensure data security and manage your access rights. Appropriate data security in warehouse operations is crucial and often even vital for a business. The Savanna.NET® security functionalities help protect the interests of enterprises and customers while allowing all employees to view the information that is relevant to them.

WAREHOUSE CONTROL SYSTEM (WCS)

High efficiency in retrieving goods, accelerated picking, fewer packaging and shipping errors, less back orders and returns, higher customer satisfaction and loyalty: warehouse automation has many benefits.

The more complex and comprehensive the intralogistics automation, the higher the demands on a warehouse control system (WCS). Layout, software, and electromechanics of a warehouse must be finely tuned to each other and to the business requirements to consistently make full use of the strengths of the system.

With its extensive material flow control functions, Savanna.NET® controls all activities of automated logistics systems in real time. It optimizes your material handling, smartly adjusting it to new requirements at an early stage and thus maximizing efficiency and process reliability in operation – in any market situation, with any throughput or order volume. Functions can easily be deactivated for manual or semi-automated warehouses. Savanna.NET® is flexible, customized, and scalable to any requirements and degrees of automation.
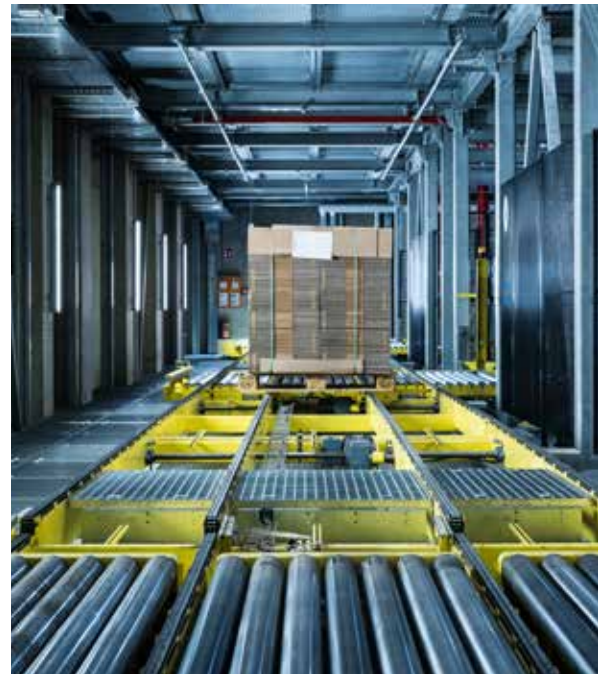
Use your data to manage automation. When merged and interpreted correctly and converted into logical operations in the shortest possible way, data can optimize processes. Savanna.NET® with its integrated system eliminates the need for a WMS-WCS interface, resulting in a lean structure without overhead. Duplicate data or checks are no longer necessary.

Scale by adding further modules and fine-tune your flow of material. Functions can be activated or deactivated with modules as required. This allows your company to either link Savanna® to an existing warehouse management software or control the warehouse management via Savanna.NET®. And you can add the material flow control functions in both cases.

Your storage system can easily be expanded with automated elements even at a later date. Material flow control is additionally enhanced and fine-tuned through modules and specific adjustments and programming based on client requirements, modifying the existing standard modules.

» WMS

.data
MASTER DATA
The .data module is used for master data management, such as item, pallet and customer master data.

.order
ORDER LISTS
Order lists containing the relevant item needs can be created or determined by the host for storage and retrieval of goods.

.report
REPORTING
The .report module offers options for fast and simple report generation, with stock levels, master data, transport orders, data communication with ERP and/or PLC, etc.

.quality
QUALITY
Savanna.NET® offers automated administration for unit loads with lock status. A unit load can be specifically removed from storage for checks.

» WCS

.store
STORAGE
The .store module provides various load unit, incoming goods handling and storage space management versions in different warehouse types.

.flow
CONVEYORS
.flow manages the various conveyor elements with its individual versions.

.config
CONFIGURATION
.config offers effective configuration tools, such as defining new storage zones in a block warehouse.

.alarm
ALARM SERVICE
.alarm fulfils important system information tasks and handles alert forwarding as part of a company's logistics software.

.connect
INTERFACE
.connect ensures the integration of Savanna.NET® into your existing IT infrastructure.

.stat
STATISTICS
With features such as warehouse utilisation evaluation, throughput statistics, vehicle movements, etc. the .stat module includes the typical KPIs for plant assessment.

.maint
INSPECTION
.maint warns of necessary inspections in good time so that these can be scheduled without operational interruptions.

.show
VISUALIZATION
.show allows the visual tracking of individual load units from the sources to the destinations and shows the filling status of the conveyor lines.

» OTHER OPTIONS

.yard
LOAD CONTROL
.yard controls the registration of the lorry in the loading area, retrieval (for example via SMS) and allocation of the loading zone. As a result, loading times can be optimized.

.check
STOCKTAKING
As stocktaking software, .check supports the most common processes, such as sample stocktaking and continuous stocktaking.

.pick
ORDER PICKING
The Savanna.NET® supply chain software uses the .pick module to control all of the order picking for a logistics system.

.custom
EXCLUSIVE SOLUTION
The .custom module is the development area for exclusive customized expansions.

.move
HANDLING
.move controls goods transport through fork lifts and other handling systems. Staff are guided through vehicle terminals.

.load
LOADING
Savanna.NET® controls the pallet staging and loading in the shipping area. The loading staff receives the necessary loading information via retrieval indicators.
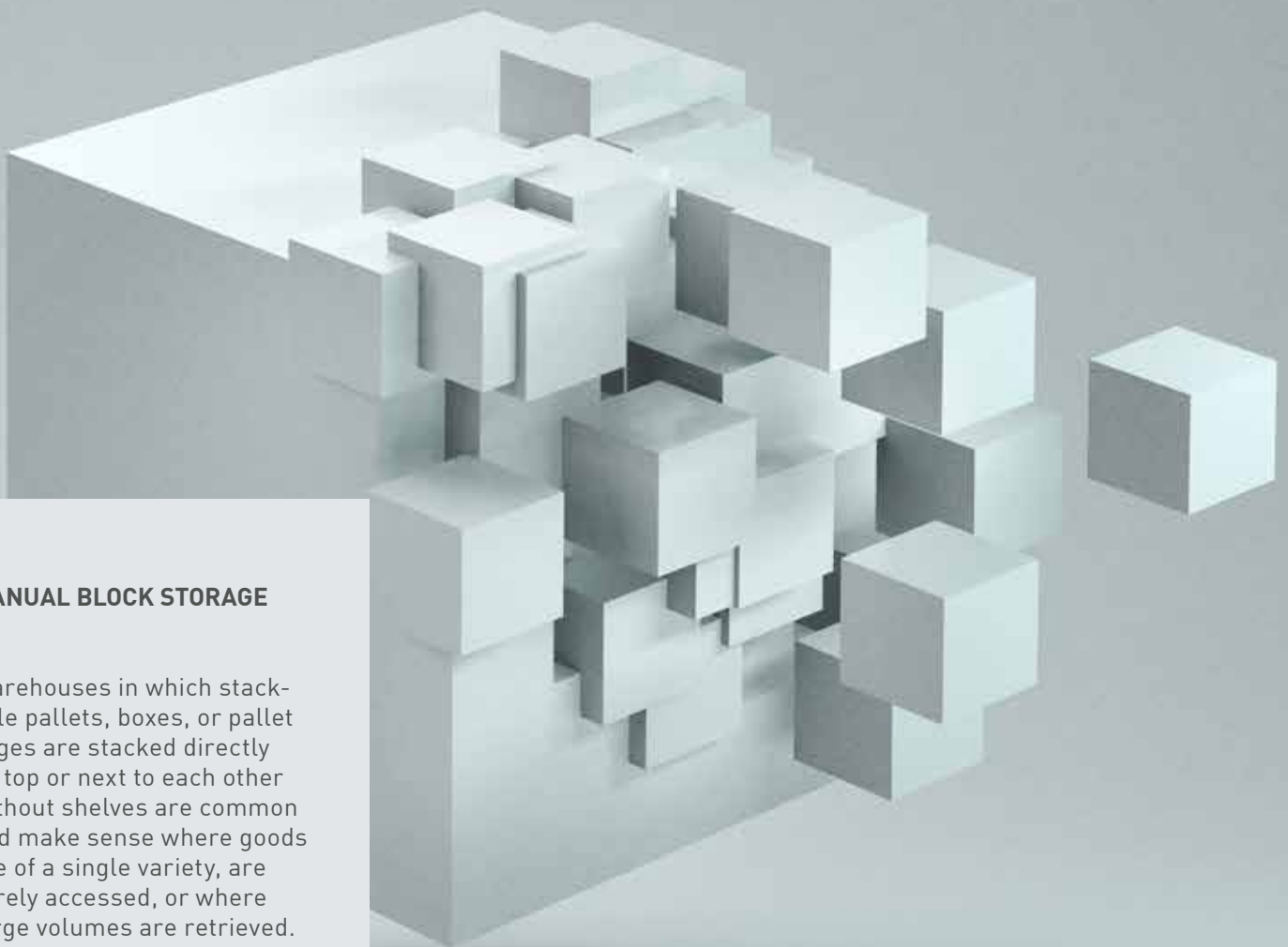
.service
REMOTE-ACCESS
The .service module facilitates remote diagnosis / remote inspection of the system for service purposes both during commissioning and in ongoing operations.

SCALABLE

MODULAR

FUTURE-PROOF

i

MANUAL BLOCK STORAGE

Warehouses in which stackable pallets, boxes, or pallet cages are stacked directly on top or next to each other without shelves are common and make sense where goods are of a single variety, are rarely accessed, or where large volumes are retrieved. Such block storage systems must be integrated into the intralogistics as effectively as possible. Our WES provides you with a precise warehouse management tool, offering maximum transparency and a familiar, intuitive user interface for any level of complexity. That way, your block storage software is ready for automation or optimally integrated into the semi-automated system.

DESIGN PHILOSOPHY

Thanks to a design oriented on processes and interfaces, our WES is flexible and scalable. This allows future-proof, sustainable, and economical automation of intralogistics – i.e. step by step and in line with the growth, storage processes and requirements of your business.

Depending on the required functionalities, additional modules can be added to the base module, integrating all your intralogistics processes in one software – regardless of how complex your material flows may become. Standard functionalities can be adjusted to fit specific operational processes even better, i.e. differentiated storage strategies or visualization, analysis, and use of customer-specific key performance indicators.

Savanna.NET® manages and controls all or individual aspects of the storage process, maps any rack system, material handling system, aisle layout, conveyor loop and compartment height – all integrated within a single, reliable all-in-one solution which will serve your manual block warehouse just as

well as your automated warehouse. The open Microsoft C#.NET architecture allows you to continue using existing ERP and PLC systems and IT infrastructures. The technology/hardware and hardware/software interfaces allow for greatest flexibility. This minimizes costs and expenditure for programming, integration, system changes and training sessions. System certifications, close cooperation with software partners, and personal 24/7 support guarantee a high level of functionality, stability, flexibility and long-term viability of the system.

Savanna.NET® can be connected to or replace a third-party warehouse management software, in either case extending it by powerful material flow control functionalities. Or it can be implemented as a comprehensive WES, making full use of the automation potential right from the start.

INTEGRATION WITH ERP SYSTEMS

For decades now, we have integrated warehouse management systems with existing client processes and developed our software based on processes and interfaces. Using interfaces with defined data standards, the Savanna.NET® Warehouse Execution System (WES) closes the gap to external systems.

To map specific operational processes, we implement client-specific processes. Internal interfaces connect the functional units and/or modules of Savanna.NET®. They combine enhanced warehouse management and material flow control functionalities and make exchange of data much more effective and straight-forward than single software applications. This reduces expense for programming and integration, costs of technical support, and frequency of faults. With its interfaces, Savanna.NET® organically and effectively integrates the storage system with your operational processes, increasing productivity and service quality.

Thanks to its connectors, the software can communicate with any Enterprise Resource Planning system (ERP). Data standards allow for exchange of all information. We integrate commercially available ERP systems such as SAP, MS Business Central, and Baan but also specific systems as a default.

Savanna.NET® uses a standardized interface to communicate with various conveyor elements and transport vehicles. Your material flow control/WCS functionalities align these devices for purposes of login, logout, and transport. Its flexible, logic user interface makes Savanna.NET® particularly user-friendly. The WES client facilitates intuitive navigation.

HIGHLY COMPATIBLE

PROCESS-ORIENTED

INTUITIVE

INTEGRATION WITH IT STRUCTURE

ADMINISTRATIVE LEVEL

Host / ERP system

CONTROL LEVEL

Warehouse Management / Material Flow
Savanna.NET®

AUTOMATED CONTROL LEVEL

PLC

MANUAL CONTROL LEVEL

Scales
Scanner
Barcode
Printer
Stacker control system
Information terminals
Feedback terminals

E / A LEVEL

Sensors / Actuators
Element control

CONTROL ENGINEERING

Our PLC systems are true performance boosters for warehouses. Westfalia Terra Automation, our control systems business in Bremen, Germany, has its own in-house expertise for building and programming PLC systems. This means we can guarantee that all our intralogistics systems come from a single source, are "Made in Germany" and are immune to global service and supply bottlenecks. This is not only safer for your company – it is also more cost-effective.

A powerful Programmable Logic Controller (PLC) is the super-fast "nervous system" of an automated storage system – the vital link between software and intralogistics system. The PLC transmits the machine states to the material flow software and the warehouse management software in a fast and secure manner and ensures that instructions coming from the software are directly converted into the necessary operations of the storage and retrieval machines and the conveyor technology.

We offer first-class hardware, software, and expertise. No two warehouse systems are the same.

We focus all our know-how on your specific system. Our high-quality assemblies are consistently equipped with state-of-the-art, fast, and powerful CPUs (Central Processing Units). Also, we believe in employing our own experts to get things done. Our experts develop, produce, program, and install control systems that are tailored to each specific warehouse layout. They install and program interfaces for seamless processes, using our high-performance Warehouse Execution System Savanna.NET® or alternatively the third-party software that you use for material flow control and warehouse management.

Our IT experts and service technicians put new systems into operation and modernize existing systems, whether ours or those from third parties – naturally with a minimum of system downtime and with extensive testing. Thus, we can ensure the greatest possible availability of your partially or fully automated warehouse system.

INHOUSE COMPETENCE

FAST INSTALLATION

EXTENSIVE MODERNIZATION

YOUR ADVANTAGE:
A STRONG FAMILY

Westfalia is part of TERRA WORTMANN GROUP.

Siegbert Wortmann, chairman of the board of WORTMANN AG

Company headquarters in Hüllhorst, Germany

TERRA CLOUD Center in Hüllhorst, Germany

Siegbert Wortmann founded WORTMANN AG in 1986. Since 2010, the company has strengthened us in our efforts and offers our clients the entire IT hardware required for a modern logistics system. Using TERRA products and services, we can create the necessary infrastructure made up of backup solutions, clouds, and high-availability servers, making the most of the potential offered by our high-performance and precisely tailored logistics systems including PLCs and software.
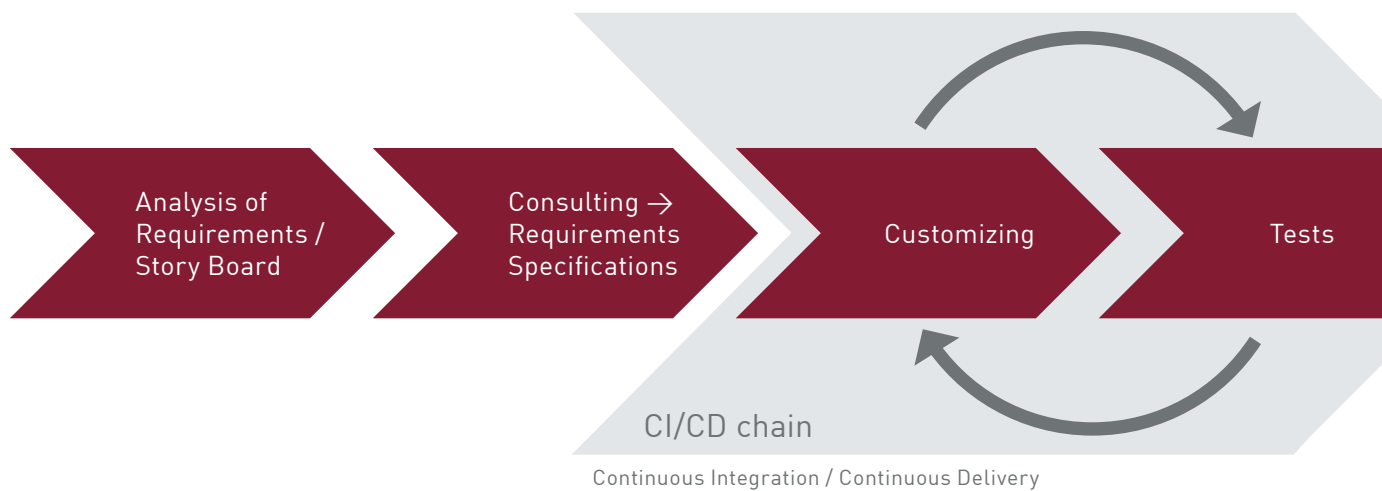
TERRA is the German IT brand: With a turnover of roughly 1 billion euros in 2020, WORTMANN AG is one of the most successful independent German IT companies. Acting as a manufacturer, distributor, and cloud service provider, the company and its over 700 employees support 15,000 specialist dealers and system developers all over Europe.

The portfolio of the TERRA proprietary brand includes tablets, notebook computers, PCs, workstations, servers, storages, ThinClients, and LCDs. All products are assembled in Germany.

The company operates its own partner service network, a central service center at its production location, and – in its capacity as Microsoft Cloud OS Network partner and Intel® Technology Partner – its own data center in Germany, i. e., TERRA CLOUD for hosting, housing, as well as infrastructure and software as a service.

We work hand in hand with combined capabilities and strong partners. Within the TERRA WORTMANN GROUP, which in 2022 achieved a turnover of over 2 billion euros, we also work shoulder to shoulder with other enterprises whose expert knowledge is a perfect match for our own services. These include G+W Steuerungsanlagenbau GmbH, a strong partner for control systems and electrical engineering, and Logentis GmbH, which since 2005 has been a successful provider of logistics software with an industry focus on trade and contract logistics. Logentis provides the powerful software NETVERSYS for shipping logistics and NETSTORSYS for warehouse management.

We move your intralogistics joined by strong business partners.

CI/CD CHAIN

Before implementation, we consistently enhance products based on the feedback of developers and clients as well as market input to optimize the performance of Savanna.NET®. This feedback becomes part of a requirements catalog compiled jointly. Together with you we assess what benefits you as the client can get from our product. The functional and technical analysis is supplemented by a joint requirements specification workshop along with ongoing consultation. The result is a highly detailed specification.

Our software, tailored to meet your specific requirements, is implemented with a Continuous Integration / Continuous Delivery (CI/CD) chain. This increases product safety since any errors are remedied faster, and new and tested versions can more quickly improve performance of the client system.

Continuous Integration means that our developers merge even minor code changes with the overall source code in a central software archive (repository) at high frequency and have their adjustments tested there automatically. Potential errors are soon identified and quickly corrected – long before the actual go-live of a system. That way, maximum product quality is ensured.

With Continuous Delivery, all tested code changes are automatically implemented in a testing or production environment. Performance is tested by simulating the live operation of a digital twin of the logistics system. The software is thus made available to the application environment on an ongoing basis and as early as possible. Our programmers can make minor adjustments and solve problems more quickly.

Continuous Deployment finally serves to automatically release to our client and roll out in the client's warehouse system those changes that have successfully passed all tests. Software updates go live much faster, and client feedback is immediately taken into account in the development process. As a client, you can quickly use new releases with all their advantages and optimizations.
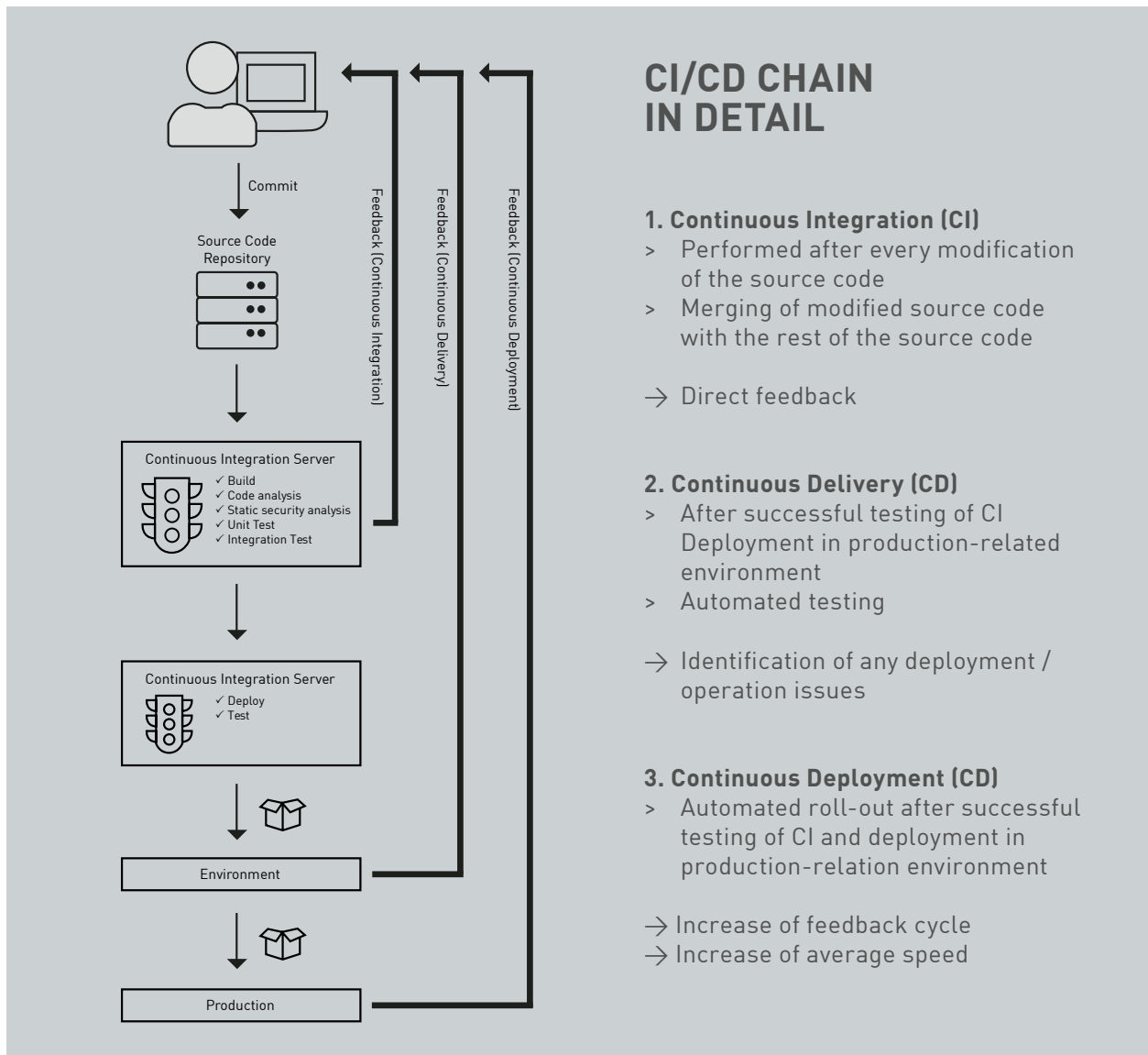
Westfalia is your committed and dedicated partner throughout the entire life cycle of your warehouse operation. We assist you at all times in your day-to-day business via 24/7 live support and fast and easy processing of follow-up orders to further expand your automation.

Our trained customer service team is available for any requirements, suggestions, and wishes at any time and will provide you with customized professional solutions. We constantly improve your software by means of ongoing release management. Depending on the scope of the given service package, improvements in the source code, bug fixes, and functional updates are included. Thanks to the release capability of Savanna.NET®, customer-specific adaptations are automatically available again after importing new program releases.

CI/CD CHAIN
IN DETAIL

Commit	
Source Code Repository	
Continuous Integration Server	✓ Build ✓ Code analysis ✓ Static security analysis ✓ Unit Test ✓ Integration Test
Continuous Integration Server	✓ Deploy ✓ Test
Environment	
Production	

Feedback (Continuous Integration)
Feedback (Continuous Delivery)
Feedback (Continuous Deployment)

1. Continuous Integration (CI)
> Performed after every modification of the source code
> Merging of modified source code with the rest of the source code

→ Direct feedback

2. Continuous Delivery (CD)
> After successful testing of CI Deployment in production-related environment
> Automated testing

→ Identification of any deployment / operation issues

3. Continuous Deployment (CD)
> Automated roll-out after successful testing of CI and deployment in production-relation environment

→ Increase of feedback cycle
→ Increase of average speed

ONGOING OPTIMIZATION

24/7 LIVE SUPPORT

RELEASE MANAGEMENT