

SN 2022/29 - exOS - Product Release

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SN 2022/29 - exOS - Product Release

Key Information

This sales notice provides an overview of the features and the target market/userbase of the new product - exOS. It is available as a Technology Package in the upgrades dialog of Automation Studio v4.10 or above and on the [B&R Website](#).

Sales Notice Number	SN 2022/29
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Portfolio Line	Automation Software
Quicklinks	PnS exOS
Status	VALID
Confidentiality	GLOBAL



Introduction

With the increasing adoption of digitalization, some applications in the machine automation domain are trending towards requiring solutions beyond the traditional tasks of a PLC. These applications may utilize programming languages such as JavaScript, Python, C++, etc., to build future-proof and featureful systems. B&R's enhanced crossover for Operating System, exOS, makes it possible to incorporate Linux software into industrial control systems enabling state-of-the-art automation solutions.

The machine builders primarily use the PLC system for time-critical applications with high-speed motion or I/Os to achieve fast and deterministic response times, an essential element in building safe machines with high throughput. This part requires a real-time operating system such as our Automation Runtime, typically programmed via IEC 61131-3 languages such as Ladder, ST, FBD, C/C++, Etc. Now, with the help of exOS, programmers can also develop Linux software that should directly run on the machine at near-real-time speed and synchronization to explore the possibilities below.

- Managing advanced databases
- Deploying sophisticated path-planning algorithms
- Establishing cloud connectivity
- Executing machine learning models
- Artificial Intelligence optimization loops

exOS is now a released product, allowing a straightforward integration of Linux-based software with B&R Automation Studio and Automation Runtime environment with B&R Hypervisor, empowering many innovative use-cases with emerging technologies. It is available as a Technology Package in the upgrades dialog of

Automation Studio v4.10 or above and on the B&R Website. Please check the system requirements section below to utilize exOS functionality in a system with Automation Runtime, B&R Hypervisor, and B&R Linux system.


Sales and order processing details

Product positioning

exOS is a door-opener technology enabling us to market our products to existing customers interested in emerging technologies and companies/markets beyond our reach.

Examples of ideal exOS opportunities:

- Applications that require robust synchronization and integration between real-time operations and Linux software
- Engineering teams that heavily use Linux-based software
- Users that want to use programming languages/frameworks not natively supported by Automation Runtime
- Companies that want to develop special hardware without driver support in Automation Runtime
- Businesses that create their control/embedded systems with Linux software
- Machine builders without in-house experts are ready to work with third-party Linux software developers to provide value-added functionality.

 If businesses/companies/users do not have Linux software development expertise or are unwilling to get external help, they will not be able to develop exOS packages independently.

Sales Presentation Kit

The sales presentation for exOS is available at Y:_public files\presentations\Sales Presentation Kit\ENG\03 - Innovative Technologies\P35 - Industrial Ethernet\P35_exOS.pptx or in the PnS exOS Product Room.

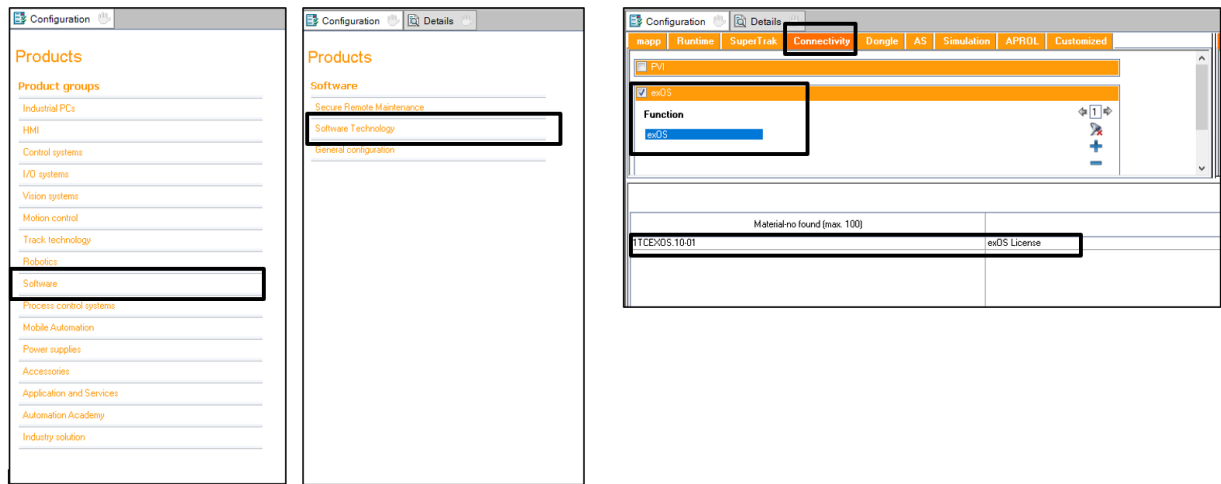
Product details

Material	Description	AS Version	Availability
1TCEXOS.10-01	License for exOS (TC). One license per target system is required.	AS4.10 and above	July 2022

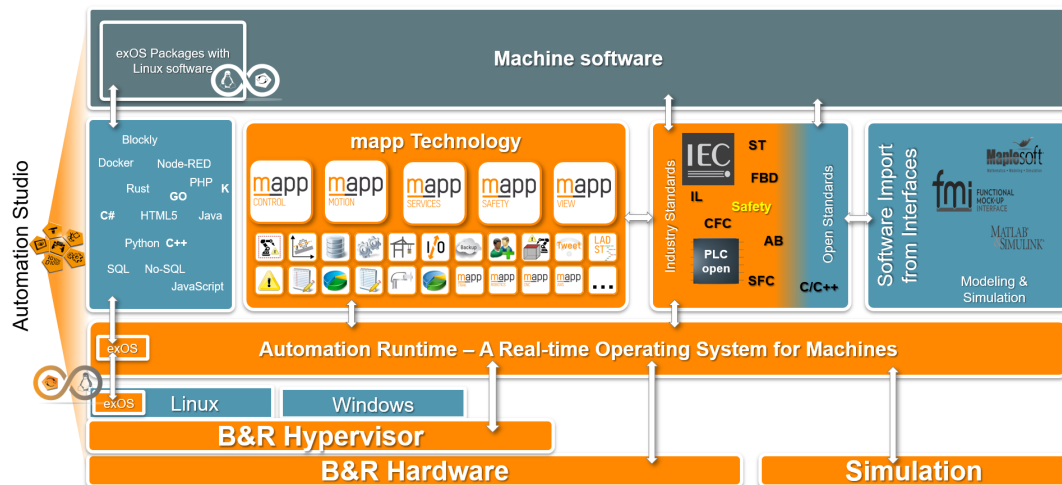
Quoting exOS license in IQ

The license for exOS is available in IQ under Products > Software > Software Technology > Connectivity > exOS.

Note: To utilize exOS functionality, the users will also require a system with B&R Hypervisor and B&R Linux.



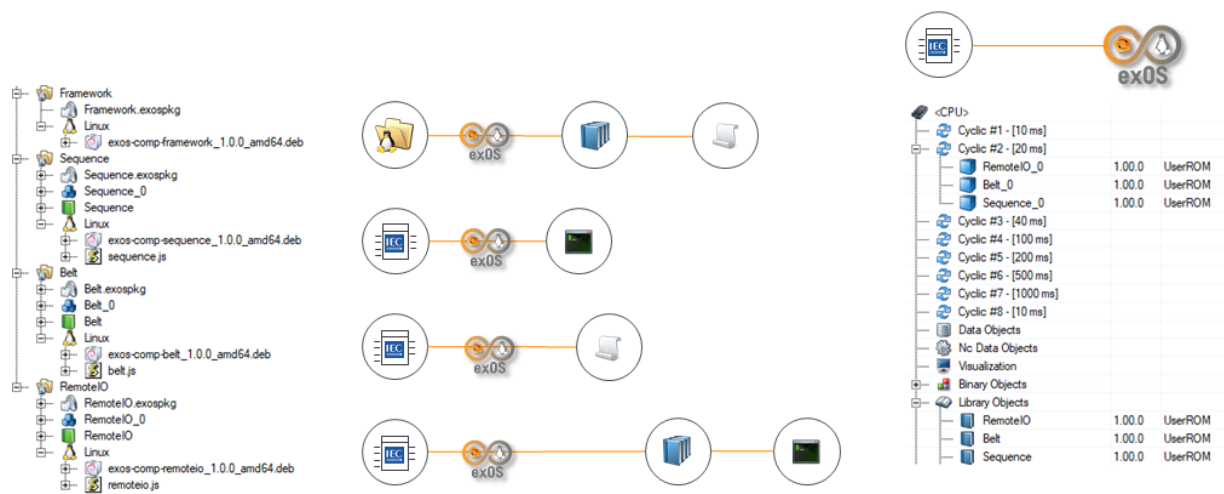
Software features and technical details



exOS packages (with source-code or binary executables) become an integrated part of an Automation Studio project. After the deployment of the machine software on Automation Runtime with B&R Hypervisor technology and Linux, these software packages automatically get deployed to Linux, providing deep integration of B&R Automation Runtime and the Linux system with the following functionality:

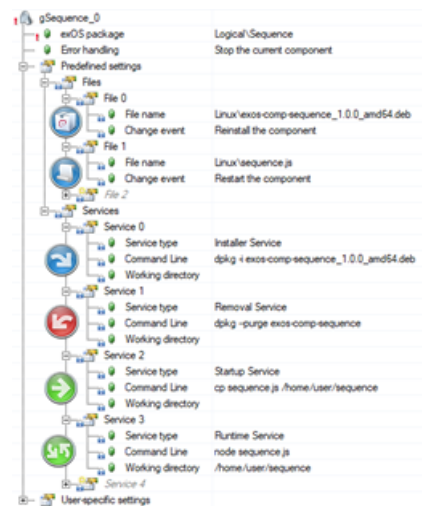
Software management

The exOS Technology Package allows adding Linux software alongside AR resources in an Automation Studio project. In other words, exOS packages contain both Automation Runtime and Linux modules, which are handled together in the Logical view of Automation Studio. The whole machine automation software is therefore managed from a single point.



Deployment, execution and diagnostics

Users can configure the deployment and execution of Linux programs via the exOS Technology Package in the Configuration view of Automation Studio. The PLC is then in charge of transferring the according files to the target Linux system and handles installation, removal, upgrade, and execution of the software modules.



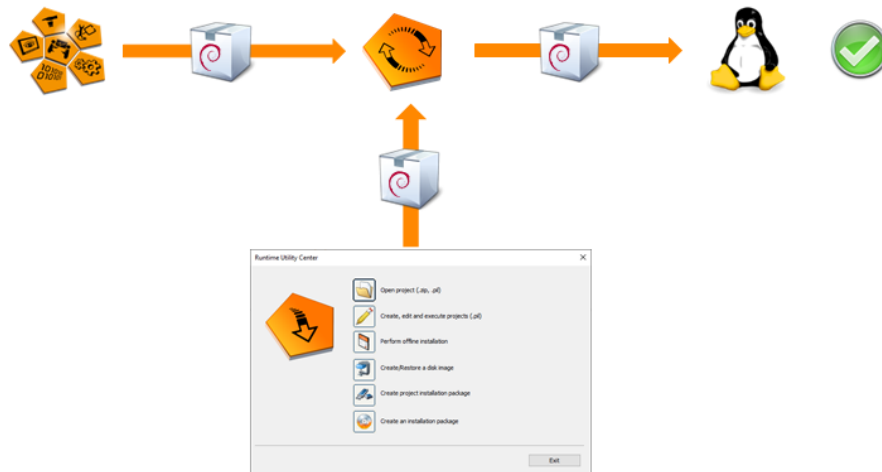
The state of the Linux target and its components can be constantly monitored from the PLC side via diagnosis function blocks. In addition, all output (i.e., stdout, stderr) of Linux services for installation, startup, or removal, as well as all failure output (i.e., stderr) of runtime services, is logged and forwarded to the Automation Runtime Logbook. So it is accessible via Automation Studio, SDM, and Runtime Utility center.

Success	gSequence_0	Startup successful: Component gSequence_0 operational
Information	gSequence_0	Startup info: Starting up component gSequence_0 successful
Success	gSequence_0	Installation successful: Installation of component gSequence_0 successful
Information	gSequence_0	Installation info: gSequence_0.0.install.log: Setting up exos-comp-sequence (1.0.0) ...
Information	gSequence_0	Installation info: gSequence_0.0.install.log: Unpacking exos-comp-sequence (1.0.0) ...
Information	gSequence_0	Installation info: gSequence_0.0.install.log: Preparing to unpack exos-comp-sequence_1.0.0_amd64.deb ...
Information	gSequence_0	Installation info: gSequence_0.0.install.log: (Reading database ... 104464 files and directories currently installed.)
Information	gSequence_0	Installation info: gSequence_0.0.install.log: Selecting previously unselected package exos-comp-sequence.
Information	gSequence_0	Installation info: Uninstalling remote component gSequence_0 successful
Information	gSequence_0	Installation info: gSequence_0.0.remove.log: Removing exos-comp-sequence (1.0.0) ...
Information	gSequence_0	Installation info: gSequence_0.0.remove.log: (Reading database ... 104971 files and directories currently installed.)
Information	gSequence_0	Installation info: Component gSequence_0 will be installed: File size/timestamp of exos-comp-sequence_1.0.0_amd64.deb has changed

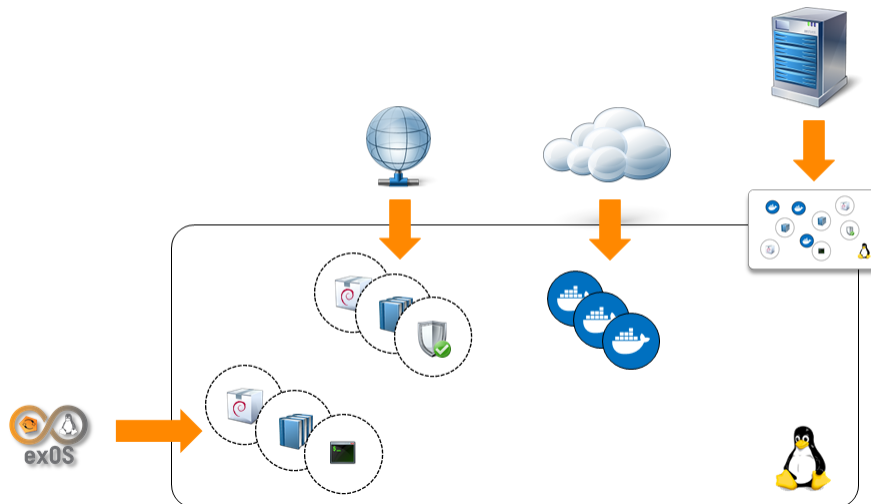
Efficient maintenance

exOS software management takes place via Automation Runtime, ensuring synchronization between the software modules and versions configured in the Automation Studio project and on the actual target system. Similar to firmware updates of field devices running automatically in the background, this allows for simple software updates in the field with minimal machine downtime.

All mechanisms of PLC software transfer can be used with exOS as well. So it includes updates via USB sticks, FTP server, or RUC installation scripts.



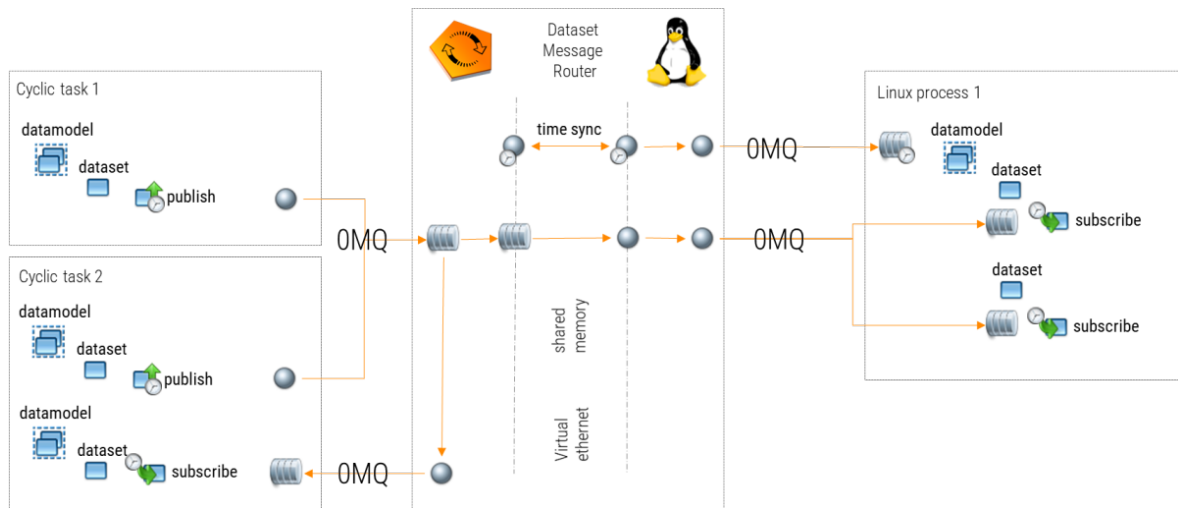
The AS/AR-based software management can also be combined with other mechanisms from the Linux or IT world such as package management with software repositories (e.g. via APT), containerized subsystems or the creation/duplication of pre-made system images.



Communication and time synchronization

Each exOS component consists of two parts, one for the AR side and the other for the Linux side. Those parts are connected via an internal communication channel. Data is therein described as a data model which organizes datasets that can be published and subscribed. The exOS data communication mechanism ensures data consistency and transmission of all published data together with a synchronized origin NETTIME.

Data communication uses an event-based, buffered approach to bridge the hard-realtime AR with a best-effort or soft-realtime Linux system.



Using the B&R Hypervisor technology, data transmission takes place in the millisecond range, and shared memory allows for high-bandwidth data exchange between the systems, but B&R does not guarantee in terms of deterministic real-time behavior between Automation Runtime and Linux.

Knowledge resources

Knowledge resources such as presentations, video tutorials, demo projects, and additional technical details are linked from the exOS Product Room.

System requirements for exOS

This section contains the system requirements for exOS.

- Automation Studio
 - 4.10 and above
- Automation Runtime
 - B4.91 and above
- Operating System
 - B&R Linux 10
- Hardware with UEFI boot
 - APC/ PPC2200
 - APC/PPC3100 Kaby Lake (UEFI boot)
 - APC910 QM170/HM170/CM236 chipset (UEFI boot)
 - PPC900 chipset QM170/HM170 (UEFI boot)
 - MPC3100 Kaby Lake (UEFI boot)

Attend our wE-talk for additional information

Detailed information about exOS will be provided during a wE-talk on 17th Aug 2022. It will give you the opportunity to preview some features and take part in a Q&A session.

ENG	10.00 AM CEST	Link to register
ENG	14.00 PM CEST	Link to register