EcoStruxure™

Process Expert

Implementing System Server Redundancy

Application Note
Original instructions

EIO0000004854.00
08/2022

Schneider Electric

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Safety Information

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

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A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book

Document Scope

This document describes a third-party solution that helps you prevent downtime and data loss when the computer running the EcoStruxure Process Expert system server malfunctions.

It does not describe how to install, configure, or use this third-party solution.

It is written for users who are familiar with EcoStruxure Process Expert and the principles of application availability by using hardware redundancy.

Validity Note

This document applies to Stratus everRun enterprise 7.9.1.1.

It also applies equally to EcoStruxure Process Expert and EcoStruxure Process Expert for AVEVA System Platform. For ease of reading, both are referred to as EcoStruxure Process Expert in this document.

Related Documents

Title of documentation	Reference number
EcoStruxure™ Process Expert - Installation and Configuration Guide	EIO0000001255 (eng)
EcoStruxure™ Process Expert - Licensing Guide	EIO0000001261 (eng)

You can download these technical publications at https://www.se.com/myschneider.

Registration required.

mySchneider Support Portal

Visit https://www.se.com/myschneider for support, software updates, and latest information on EcoStruxure Process Expert.

Registration required.

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Product Related Information

The examples in this manual are given for information only.

⚠ **WARNING**
UNINTENDED EQUIPMENT OPERATION
Adapt examples that are given in this manual to the specific functions and requirements of your industrial application before you implement them.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Hardware Redundancy by Using Stratus everRun

Overview

Although EcoStruxure Process Expert provides the ability to create system and database backups, a malfunction of the computer on which the EcoStruxure Process Expert system server is installed will cause downtime until the computer is repaired or the system server is installed on another machine and backups are restored. Also, some data loss may occur.

Stratus everRun offers an easy-to-use, off-the-shelf solution that helps prevent such downtime by having the system server installed and run on redundant hardware.

In case of a malfunction of one of the server computers, the redundant computer, and thus, the redundant system server takes over so that users can keep working with EcoStruxure Process Expert engineering and operation clients. The switch is transparent for users.

Working Principle

Overview of the everRun System

An everRun system uses the following architecture to help ensure the availability of an application:

- Two x86-64 server physical machines (PMs), which are connected by using direct Ethernet links and run the CentOS operating system.

- A redundant virtual machine (VM) with a Windows operating system, which runs on the PMs. The VM is created by using the everRun software. Hardware virtualization is executed directly on the host CPU by using the QUEMU (Quick Emulator) open-source hypervisor.

- The application that needs to be available is installed on the VM. Data and the content of the memory are constantly synchronized between the two PMs.

- The everRun Availability Console, which provides browser-based remote management of the everRun system. It is installed on a separate computer.

The solution is transparent for users, who are exposed only to one guest system and its application like in a traditional setup.

The type of availability that is achieved depends on the configuration of the everRun system. The following user-defined availability levels are provided for VMs:

- High Availability (HA)

- Fault Tolerant (FT). This setting is recommended for the EcoStruxure Process Expert system server.

For more information on availability, refer to *Modes of Operation* in the everRun User's Guide.
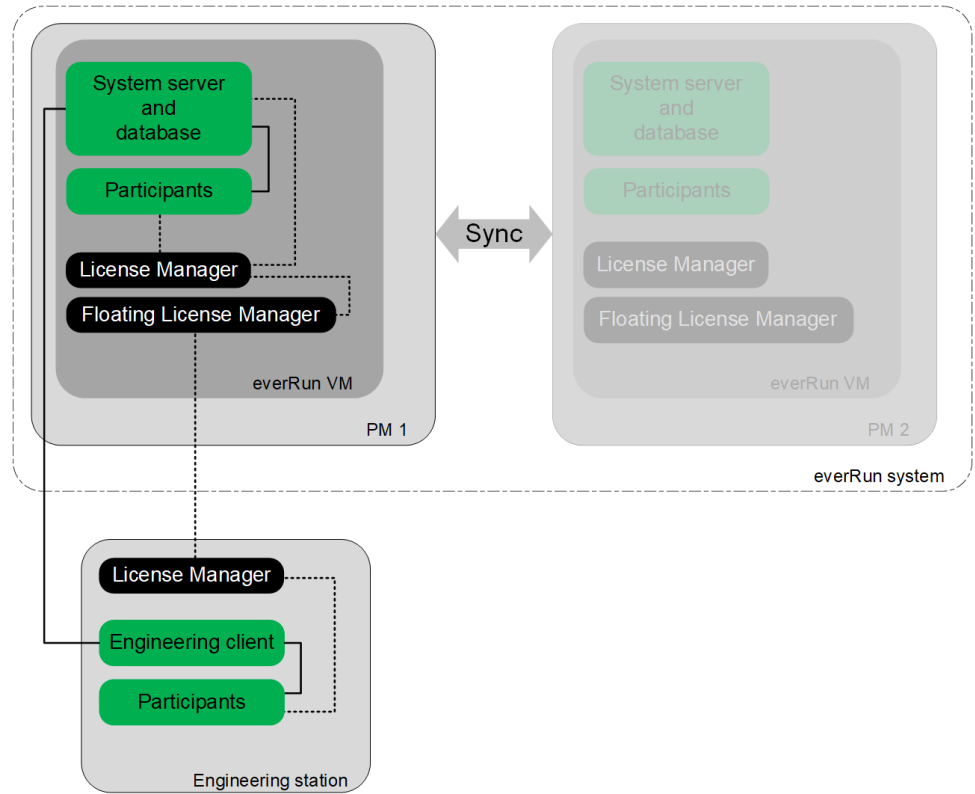
everRun requires a license to use it.

The following figure illustrates the architecture of an everRun system in an EcoStruxure Process Expert infrastructure.
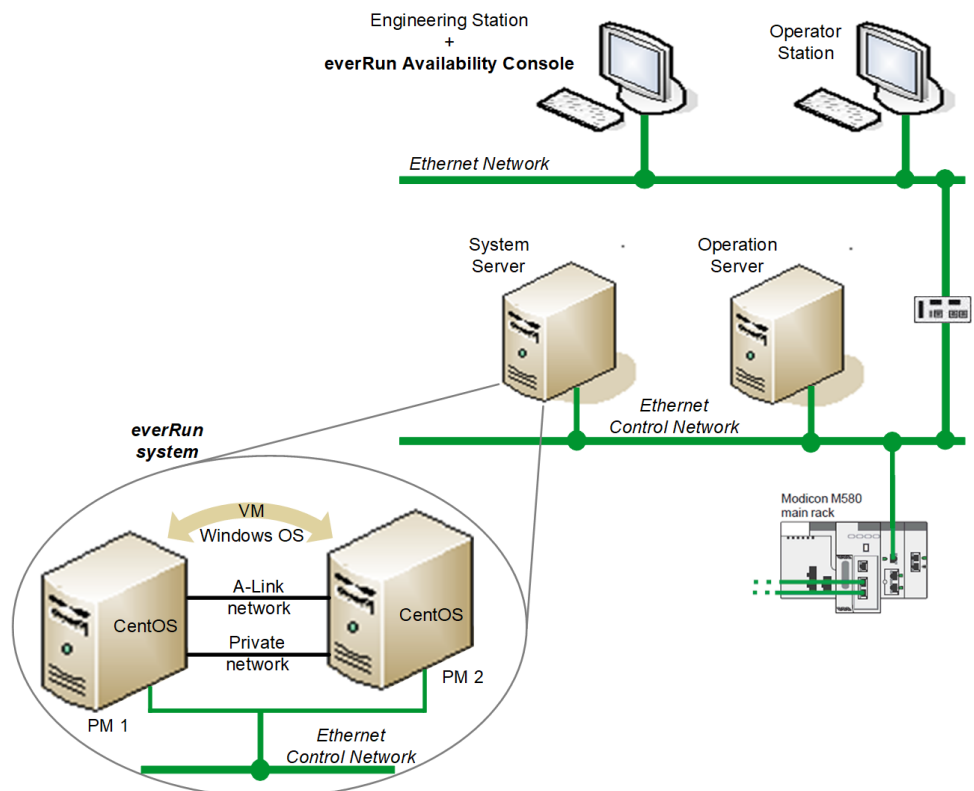
EcoStruxure Process Expert System Server Redundancy

The following figure illustrates how system server redundancy is implemented by using an everRun system.

An engineering client can be installed on the system server computer (everRun VM).

The everRun Availability Console can be installed on the engineering station or another remote computer.

Performance Considerations

Tests have been performed by using a host computer that meets the minimum hardware requirements described in this manual.

The performance levels that were measured are very close to those of a traditional EcoStruxure Process Expert infrastructure (single server).

Using hardware, software, and/or settings other than those described may result in EcoStruxure Process Expert client/server communication interruptions and/or degraded performance.

> **NOTE:** Database migration has not been tested extensively and should therefore not be performed on an everRun system.

System Requirements

Overview

The requirements described in this topic apply to an everRun system with one VM on which an EcoStruxure Process Expert system server is installed and configured for the following usage:

- Medium and large applications

- Distributed architecture (remote engineering clients)

- A maximum of 4 instances of the Control Participant can run simultaneously (default value).

For details on the system requirements for EcoStruxure Process Expert, refer to the *EcoStruxure Process Expert Installation and Configuration Guide*.

For details on the everRun system requirements, refer to *Getting Started\Planning* in the *everRun User's Guide*.

PM Hardware Requirements

The following requirements are for each PM unless otherwise mentioned. When a requirement applies specifically to EcoStruxure Process Expert or everRun, it is indicated.

Component	Requirements
Server machine	For everRun: Any system listed on the Red Hat® Linux Hardware Catalog that support RHEL 7.x.
CPU	A CPU that meets the requirements for both EcoStruxure Process Expert and everRun added up. • Min. CPU mark: 10,000 • Min. base frequency: 2.6 GHz • Min. turbo frequency: 3.5 GHz • Cores: A min. of 18 vCPUs (threads). • Min. cache size: 8 MB • Min. bus speed: 8 GT/s For everRun: • If the two physical machines are equipped with CPUs that have a different number of vCPUs (threads), the number of vCPUs that is available to the everRun system is the lowest of the two. • The vCPU requirements take into account 2 vCPUs (default setting) that need to be allocated to the everRun system software. For EcoStruxure Process Expert: 16 vCPUs need to be allocated to the VM.
RAM	• Minimum: 24 GB • Recommended: 64 GB, DDR4 2600MHz For everRun: • The memory requirements take into account 2048 MB (default setting) that need to be allocated to the everRun system software. The remaining memory is to be allocated to the VM knowing that everRun automatically adds 20% to the amount that you allocate to the VM as overhead. • If the two physical machines do not have the same amount of RAM, the amount of RAM that is available to the everRun system is the lowest amount of the two.
Hard drive	SSD 512 GB capacity. NTFS file system. The higher the transfer speed, the better the overall performance. For everRun: A minimum of 2 disks with RAID configuration.
Network	Use static IP addresses.
IP addresses	For everRun: Refer to the *everRun User's Guide*.
Ports	For EcoStruxure Process Expert: 1 IP address is required (same as IP address of VM)
Input devices	Keyboard and mouse or compatible device.
Display	For EcoStruxure Process Expert: 1920 x 1080 resolution or higher

PM Software Requirements

Component	Requirements
BIOS	For everRun: SATA set to *AHCI* instead of *Intel RST* when using Intel Optane. Hardware support for virtualization is enabled.
Guest operating system	Windows Server 2019 Standard to install the EcoStruxure Process Expert system server.
Licenses	You need to acquire licenses to use the EcoStruxure Process Expert and everRun software before their 30-day trial/temporary licenses expire. For details, refer to: • EcoStruxure Process Expert Licensing Guide • *Using the everRun Availability Console\The Preferences Page\Managing the Product License* in the *everRun User's Guide* **NOTE:** As the EcoStruxure Process Expert system server is installed only once, no additional Schneider Electric license is required for the redundant server.

Implementing System Server Redundancy

Installation Workflow

The following table outlines the steps to install everRun and the EcoStruxure Process Expert system server on both PMs.

For details on the everRun installation, refer to *Getting Started\Software Installation* in the *everRun User's Guide*.

Step	Action
1	Ensure both PMs are connected by Ethernet cables as required.
2	Prepare the everRun installation media.
3	Configure BIOS/UEFI settings.
4	Install everRun on the first PM and record the management IP address of the PM.
5	Install everRun on the second PM.
6	Perform post-installation tasks.
7	Create one everRun VM by opening the **Virtual Machines** page on the everRun Availability Console and using the **VM Creation Wizard**. Select a boot source that will install the guest operating system that is required for the EcoStruxure Process Expert system server. **NOTE:** Select the **Fault Tolerant (FT)** level of protection for the VM; otherwise, EcoStruxure Process Expert client/server communication interruptions may occur in case of hardware malfunction. For details on the VM creation process, refer to *Using the everRun Availability Console \The Virtual Machines Page* in the *everRun User's Guide*
8	On the guest operating system, install the EcoStruxure Process Expert system server and Schneider Electric Licensing software. This installation is required only once. The everRun system manages the VM redundancy automatically. For details, refer to the *EcoStruxure Process Expert Installation and Configuration Guide* and the *Licensing Guide*. **NOTE:** The Floating License Manager can also be installed on another computer. In such case, configure the License Manager in the everRun VM with the IP address of this computer.
9	Activate licenses for the EcoStruxure Process Expert system server, generate and install certificates, configure role-based access control (RBAC), configure the system server as needed and start it. **Result**: Once the system server is ready, remote engineering and operation clients that have been configured with the IP address of the everRun VM by using their configuration wizard can connect to the system server. **NOTE:** For Control Participant services to be available for remote engineering clients, enter the IP address of the everRun VM in the License Manager that is installed on the EcoStruxure Process Expert client machine.

As standards, specifications, and design change from time to time,
please ask for confirmation of the information given in this publication.

EIO0000004854.00