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Automation & Control systems

“Energy Automation Specialists”

Netbus Pro Cloud Presentation



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What is Netbus Pro Cloud System ?

Netbus Pro System is an effective “**Cloud Software Platform**” which contains several data integration services such as **data acquisition, collection, management, storage, presentation** which supports several communication media as **modern data exchange protocols** as well as **conventional automation protocols** to be able to provide “**modern, flexible, scalable and effective**” solution.

Netbus Pro Cloud System is the enhanced version of the former Netbus Cloud System which provides platform independent solution that works on several modern operating systems that supports distributed execution of cloud services on wide network infrastructure running on either standard or embedded hardware.

Introduction





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Netbus Pro Cloud System Netbus Pro System Highlights



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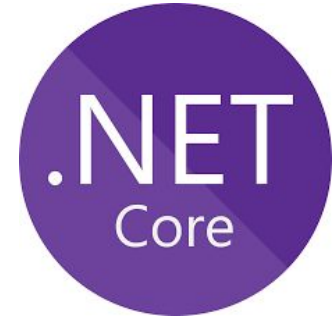
Netbus Pro System highlights

Netbus Pro System applications are based on the [.NET Core](#) platform which is an [open-source](#), general-purpose development platform.

It is perfectly possible to create .NET Core apps for Windows, macOS, and Linux for x64, x86, ARM32, and ARM64 processors. Frameworks and APIs are provided for [cloud](#), [IoT](#), [client UI](#), and [machine learning](#).

It is perfectly possible to plan and organize the system architecture according to the budget and specification of the project and the customer requirements.

Platform Independent





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Netbus Pro System highlights

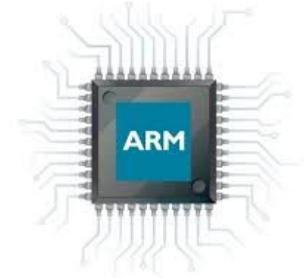
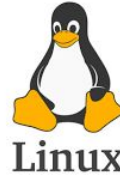
Netbus Pro System can run perfectly on most of the modern operating systems such as Windows, macOS, and Linux. In details it is supported on the following operating systems:

- Alpine: 3.9+ / Debian: 9+ / openSUSE: 42.3+
- Ubuntu: 16.04+ / Fedora: 26+
- RHEL: 6+ / SLES: 12+
- macOS: 10.13+
- Windows Client: 7, 8.1, 10 (1607+)
- Windows Server: 2012 R2 SP1+

Netbus Pro System can run perfectly on most of the modern hardware platforms and can run on following processors:

- X64 / x86
- ARM32 / ARM64

OS & HW Independent





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Netbus Pro System highlights

Open Source

.NET – A unified platform



The Netbus Pro System has very flexible system requirements.

It is based on **Open-Source** Software platform principles, it is an **Open-System** which is designed to support well known software standards and perfectly ready to integrate and exchange data with these applications using modern protocols.

Thanks to the flexible system requirements, it is perfectly possible to run Netbus Pro System's applications on a small ARM system as well as on full-fledged server platforms.



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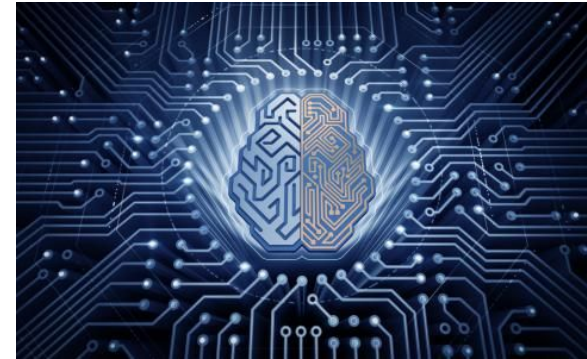
Netbus Pro System highlights

It is **on-the-edge** well designed “**super fast**” data exchange platform.

The “**Distribution Philosophy of The Netbus Services**” and the optional selection of “**Dedicated Hardware for Netbus Pro Core Service**” makes the system and the Netbus Pro Core application super fast and perfectly optimized.

Well-organized Web API interface provides fastest and effective queries and exporting / importing data chunks in JSON data format for the use of Netbus Pro Services as well as custom services and third party applications.

Netbus Pro = Fast & Effective





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Netbus Pro System highlights

Netbus Pro System has a **powerful distribution philosophy** with great load balancing and system improvement opportunities.

The distribution philosophy of the services and selection of “**Dedicated Hardware for Specific Services**” makes it super fast and perfectly optimized.

It runs on arm boards, desktop computers and server platforms as well.

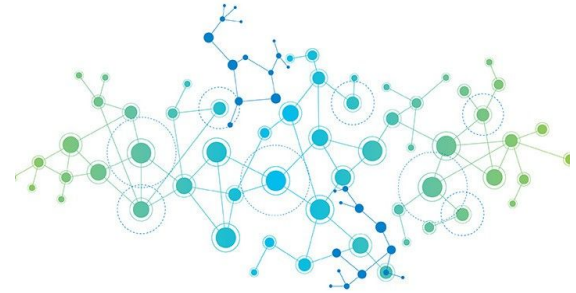
It supports **Redundancy** on several levels and components of System Architecture.

Authorized users can easily **Test and Diagnose** all devices' data exchange functionality via **user friendly and effective web interfaces**.

The powerful distribution philosophy provides great flexibility and opportunities :

“You may distribute and run any netbus service anywhere in the world on almost any hardware with a network connection”.

Distributed Operation





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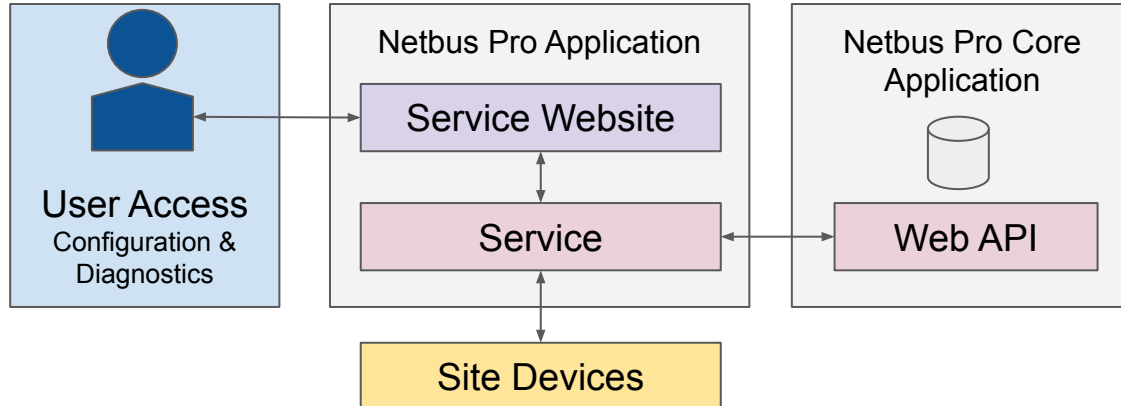
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Netbus Pro System highlights

Netbus Pro System consists of a set of powerful applications.

A Netbus application consists of a dedicated specific service and its web server which provides user friendly GUI to configure, manage and diagnose the service.

The GUI is presented through web pages and it is perfectly accessible from anywhere in the world through this web interface.



Manage from Anywhere





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Configuration & Management & Diagnostics

Web Servers

Netbus System Manager

Web Server Interface
Configuration and Management
Configure/Start/Stop Netbus services
Manage hosts, users and licenses

Netbus Services

Web Server Interfaces
Configuration and Management
Netbus Pro Core, Links & Storage web servers

Web API Consumers

Custom Services

Web API Consumers
Custom Services & Testing
Custom Services / Postman / Fiddler

End User Presentation

Web API Consumer
End user web pages
Build with Angular / React / etc.

Netbus Pro Core Service

Automation Link Services

Modbus / Siemens S7 / Custom Links
Automation Protocol Implementation



Automation Links to Site Devices

Web Link Services

MQTT / Kafka / Custom Links
Web Protocol Implementation



Web Clients / Servers

Web Links to IoT Clouds & Things

Netbus Storage Service

Mongo DB Storage / Fetch Integration
Permanent Storage of online data

Permanent Storage



Netbus Storage Server(s)



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Netbus Pro Core



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Netbus Pro Core

“**The Netbus Pro Core Application**” is a simple and powerful service with a simple web interface. The service is totally dedicated for data-exchange tasks such as accepting and sharing data. The Netbus Pro Core service provides only dedicated, independent core services and the Netbus Pro System supports distribution of services.

It is perfectly possible to separate the core service from other services and devices and locate it in a protected server room. In this case, the Netbus Pro Core application runs in relatively protected and supervised conditions.

Netbus Pro Core Application highlights the following features:

- Simple, powerful and effective data exchange interfaces between services
- Platform independent, robust and redundant data exchange service
- On-the-edge and state-of-the art using RESTful WebAPI technology
- Well designed, running in harmony full supporting distributed operations
- Super Fast thanks to In-Memory and MongoDB database infrastructure

Core At a Glance





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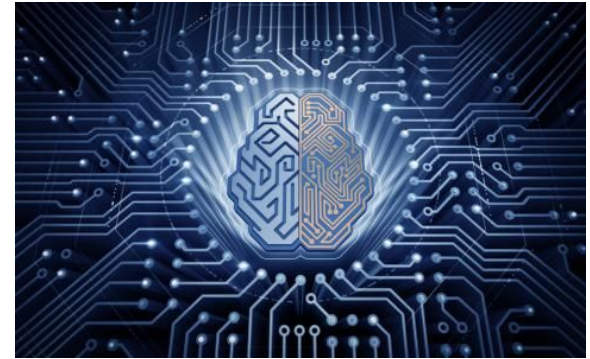
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Netbus Pro Core

Netbus Pro Core is **Super Fast** thanks to following strategies and technologies:

- Simple and dedicated core for data exchange tasks only
- The data is accepted and shared through the In-memory platform
- Permanent storage of the selected data is executed independently from the core
- System is highly scalable and performance of the system is perfectly upgradable
- System has a powerful distributed operation philosophy
- Full fledged with load balancing and performance improvement opportunities

Super Fast Core





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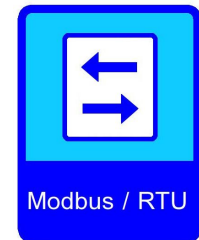
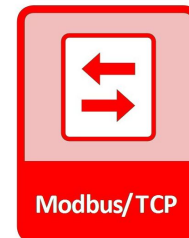
Netbus Pro Core

Netbus Pro System is designed to support well-known software standards and perfectly ready to integrate and exchange data with these applications using modern protocols.

Netbus Pro Core application can performs data acquisition tasks via conventional automation protocols then process and transfer data through modern and effective data exchange interfaces to the upper systems.



Open System





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Netbus Pro Core

Thanks to the flexible system requirements, it is perfectly possible to run Netbus Pro Core applications on small ARM systems as well as full-fledged server platforms. It is perfectly possible to plan and organize **“The System Architecture”** according to the budget and specification of the project.

Besides, after the installation and commissioning of the system, the extension of the system and the popped-up extra requirements in a particular time may necessitate upgrades in the system.

In Netbus Pro Software platform, it is perfectly possible to perform improvements as **“on-the-fly and partial upgrades in the specific service & hardware only”** according to these newly developed requirements.



Scalable System





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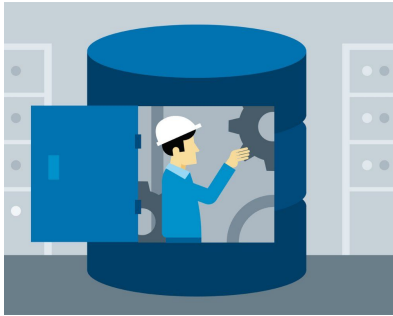
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Netbus Pro Core

State-Of-The-Art Solution



Netbus Pro Core service provides totally In-Memory data accepting and sharing opportunities. The data is accepted and shared totally through the fast and optimized memory of the core. Permanent storage of the selected data is implemented independently from the core application.

Data exchange is performed principally through **RESTful Web API Interface** which is on-the-edge modern and fastest data exchange standard of IoT systems and Industry 4.0 platforms.

Highly optimized and well-organized Web API interface provides fastest and effective queries and exporting / importing data chunks in JSON data format for the use of Netbus Pro Services as well as custom services and third party applications.





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Netbus Pro Core

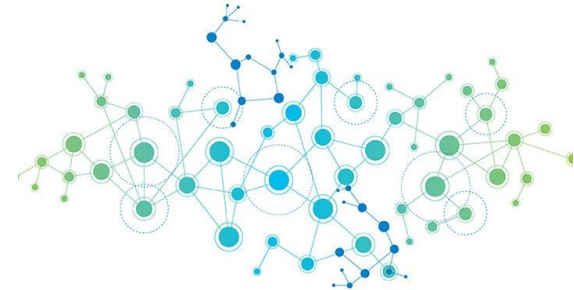
Distributed Operation

While all the Netbus Pro System services and utilities cooperate through the network and via **“The Netbus Pro Core Service”** and its modern and flexible data integration opportunities, all these services can be distributed on different computers on the network. This capability provides great opportunities such as **“Load Balancing”** and **“Performance Improvements”** as well as flexible system configuration and particular service upgrades.

The distribution philosophy of the services and selection of **“Dedicated Hardware for Specific Services”** makes the Netbus Pro System super fast and perfectly optimized.

The “Distributed Operation” capability provides great opportunities as:

- Flexible system architecture
- Flexible hardware requirements
- Load Balancing Opportunities
- Performance Improvements
- On the fly and partial upgrades
- Easy integration with custom and third party services
- Web based and management of separated and distributed services





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Netbus Pro Cloud System Redundancy



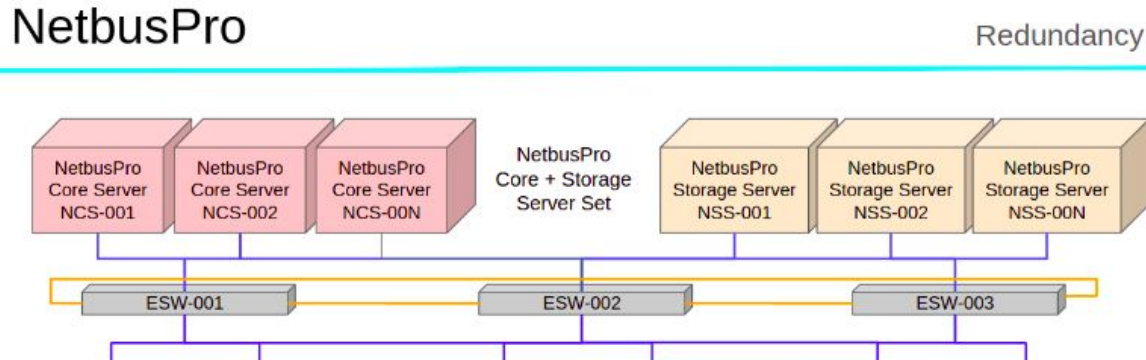
Redundancy

Core Redundancy

Netbus Pro System perfectly supports core redundancy. Netbus Pro Core System might be executed separately on the same computer (with different TCP ports) as well as on different computers perfectly.

The Netbus data provider services (for example Link services) supports multiple data transmission capabilities for more than one core service simultaneously. In this case more than one core will be available at a time and providers feed the core services simultaneously.

The consumer applications check availability of the core servers and choose to connect the preferred live server to get data. In a fail case the consumer could switch to the standby core server and operate without interruption.





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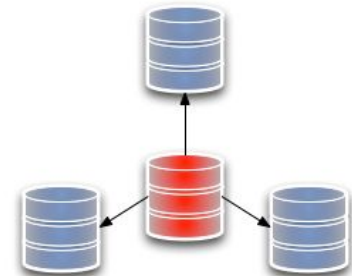
Redundancy

Netbus Pro Storage server stores the online data of Netbus Pro Core service to the persistent mongodb database. It is perfectly possible to run more than one Netbus Pro Storage server simultaneously and direct the data source to any Netbus Pro Core service. So, multiple Netbus Pro Storage servers run side by side and store the data of the Netbus Pro Core service simultaneously. In a fail situation of the core service, any active Netbus Storage server will fulfill the missing data in Netbus Pro Core. If the Netbus Storage server fails, it will receive the data from the Netbus Pro Core service when boot up and store this new data automatically to the persistent media.

Netbus Pro System performs the permanent storage task of the selected data independently from the core service with a modern and standardized method as storing data to mongodb database.

It is perfectly possible to organize and configure multiple storage servers on the system which stores multiple copies of the data in a redundant manner. Netbus Pro Core system's data is restored by these services and the data automatically fulfilled on the core.

Storage Redundancy





Redundancy

Netbus Pro System supports Link-Services-Redundancy.

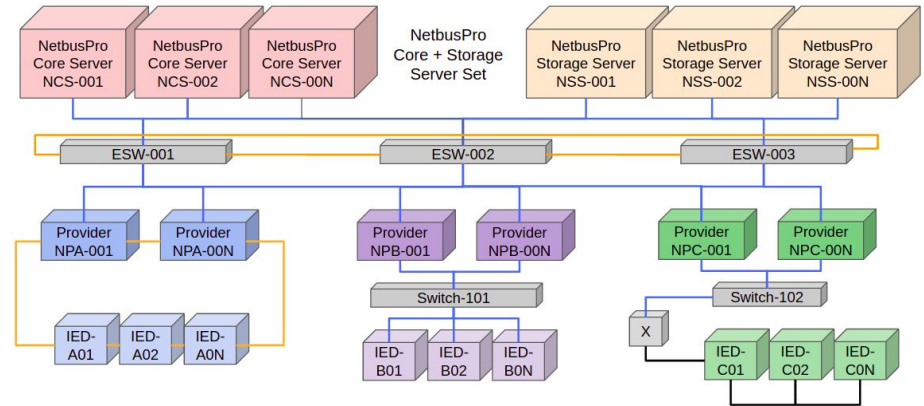
While Netbus Pro Core system is a WebAPI core, it listens to the data transfers from providers and processes any data received from the providers. Providers manage active or standby roles in-between to prevent double data storage in the Netbus Pro Core system.

On the other hand Netbus Pro Link services support transfer of retrieved data to Netbus Pro Core server(s) simultaneously. The Up-link definition of the Link service might contain more than one core service simultaneously and it transfers its data to both core servers automatically.

Provider Redundancy

NetbusPro

Redundancy





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Multi Platform Open & Flexible Web GUIs



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Multi Platform Open & Flexible Web GUIs

Netbus Pro System provides an open and flexible as well as multi platform and web friendly infrastructure to generate and present powerful Graphical User Interfaces (GUIs).

Netbus Pro System's NetbusGUIGenerator service imports the user generated GUIs and presents them through the web interface besides the Standard GUI pages which provides powerful tools such as Event Viewer and Chart Viewer.

It is perfectly possible to build any GUI page via SVG diagrams and javascript coding interface.

Some example SCADA applications are listed below:

- Energy Automation Systems (e.g. Single Line Diagrams)
- Process Automation Systems
- Factory Automation Systems
- Machine Automation and Reporting Systems
- Overall Equipment Efficiency (OEE) Systems
- Billing and Reporting Systems
- Data Acquisition and Collection Systems

Open and Flexible

The screenshot displays a SCADA control interface for a machine simulation. It includes several control elements:

- OEE (Overall Equipment Efficiency):** A gauge showing 66%.
- SPEED:** A gauge with a red-to-green gradient, currently set at 50.
- TIME:** A digital display showing 00:00:14.
- TARGET:** A digital display showing 3.
- ACTUAL:** A digital display showing 2.
- START:** A prominent green button.
- CONTROL:** A panel with a red 'R' and a plus sign.

 Below the gauges is a data table with the following content:

| Text | Type | TimeStamp | Tag | Value | Quality | Extra |
|--|---------|-----------------------------------|------------------------------|----------------------------------|---------|-----------------------|
| Machine Simulation generated a good product. | Product | 2022-04-28T23:48:14.266Z | MacSim.product | ["A":100,"P":0,"Q":100,"OEE":0] | Good | MacSim |
| Machine Simulation System started. | Event | 2022-04-28T23:48:07.22 | MacSim.bStarted | true | Good | MacSim |
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| Machine Simulation generated a good product. | Product | 2022-04-28T23:47:55.383Z | MacSim.product | ["A":100,"P":34,"Q":79,"OEE":26] | Good | MacSim |
| NetbusPro.MemoryThreshold is set. | Event | 2022-04-29T00:53:13.4394092+03:00 | NetbusPro.MemoryCheck.Status | 6865182700 | Good | NetbusPro.MemoryCheck |
| Machine Simulation generated a bad product. | Warning | 2022-04-28T21:04:55.11Z | MacSim.product | ["A":100,"P":40,"Q":77,"OEE":33] | Good | MacSim |



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Thanks to modern, standard, effective data exchange interfaces of Netbus Pro Core System, it is easy to integrate the web based flexible user interfaces to Netbus Pro System effectively.

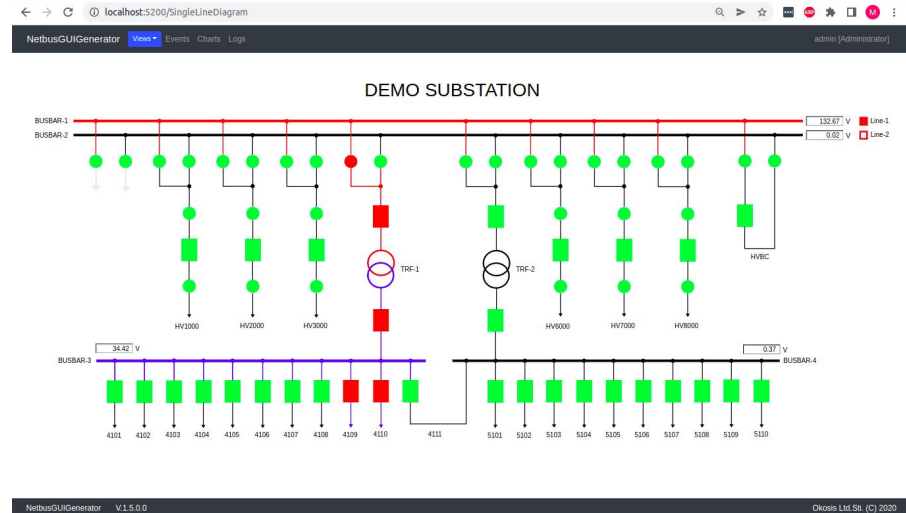
- **Use your computer's web Browser and a Mobile Phone as the Client Screen**

The desktop computer and your handheld device becomes a Client Screen for the Netbus Pro System.

- **Access the presentation from Anywhere**

While the Netbus Pro System GUIs are designed as web pages it is perfectly possible to access these web pages through the internet from anywhere in the World.

Web Based Presentation





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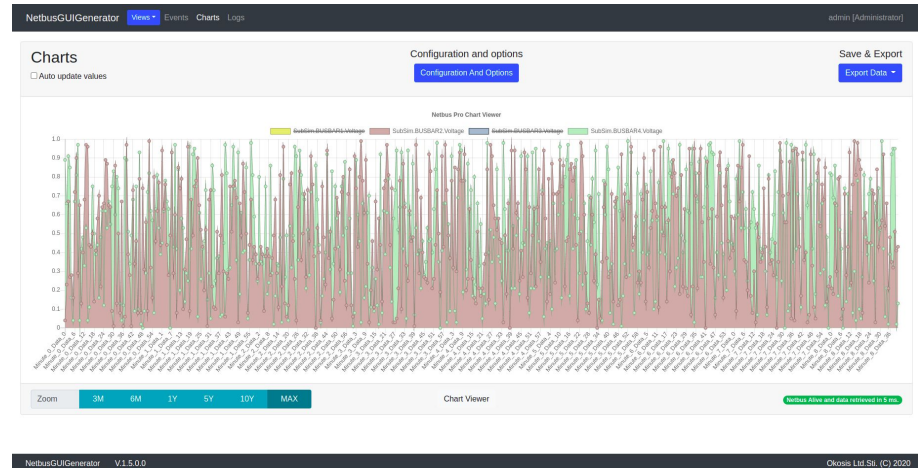
- **GUI Design using standard tools**

Designing the GUIs with standardized html / web production tools provides highly flexible generation opportunities. You may design your own GUI easily using the “Netbus Interfacing Software Library for javascript” provided by Okosis.

- **GUI Programming with standard javascript**

The programming of GUI pages is done using javascript language. Okosis provides a javascript library containing utility functions for interfacing Netbus Core System. You may design your own GUI easily and embed javascript library as well as your own generated functionality cooperated with the effective Netbus Pro Core System.

Multi Platform Support





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Netbus GUI Generator

Netbus GUI Generator Application provides easy integration with custom pages of the users and generates web pages and web links automatically. Users may design custom GUIs and transfer related files to the Netbus GUI folders.

The generator SW integrates users' GUIs using the NetbusGUIGenerator application and javascript libraries provided by Okosis.

NetbusGUIGenerator Views Events Charts Logs admin [Administrator]

Netbus GUI Ge
MachineSimulation
SingleLineDiagram

Welcome to Netbus GUI Generator web management page.

Netbus Pro GUI Generator application provides Graphical User Interface (GUI) for the Netbus Pro System.
The pages prepared for this application is given below :

MachineSimulation
SingleLineDiagram

Internal Applications Others

| Action | Function | Explanation |
|--------|-------------|-----------------------------|
| Views | Diagnostics | The Webapi diagnostics page |

NetbusGUIGenerator V.1.5.0.0 Okosis Ltd.Stl. (C) 2020



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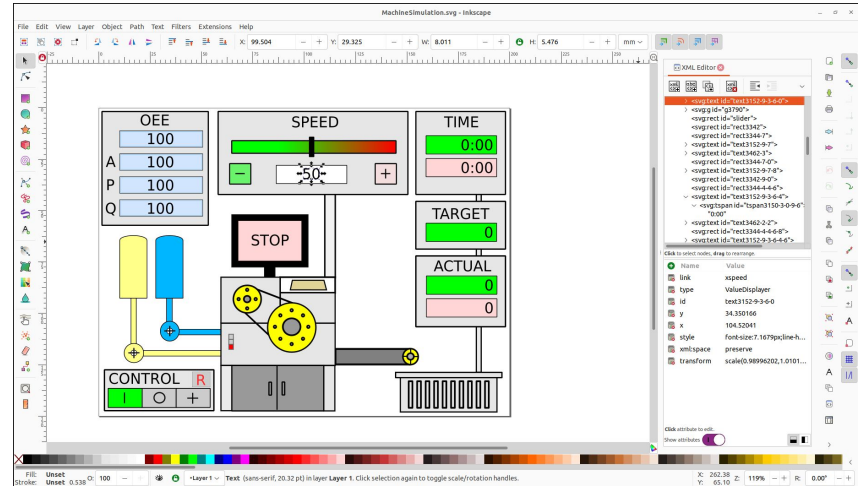
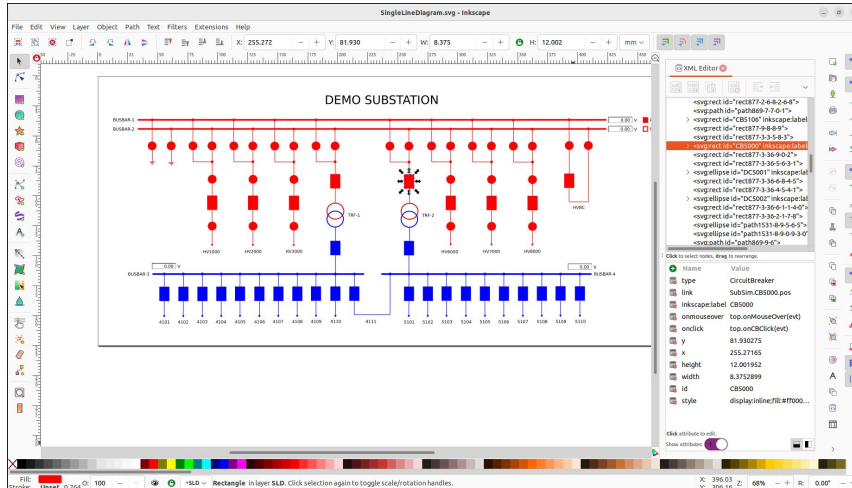
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Custom GUI Generation

The users may design their **Custom GUIs** using any software platform that has the capability to access Web API RESTful interface which is supported by modern software platforms perfectly.

Here is the Inkscape software used to generate SVG files to be shown in the custom GUIs.





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Standard GUIs - Event Viewer

Netbus Pro System provides standard SCADA utility pages to provide a powerful web SCADA interface by default.

The Events Viewer page is prepared by default.

- **Events Interface**

The Event Viewer page is prepared by default and ready to use. Filtering of Events by several fields are provided as well in the Events page.

| Id | Text | Type | TimeStamp | Tag | Value | Quality | Extra |
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| Id | Text | Type | TimeStamp | Tag | Value | Quality | Extra |
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| 6378678749511000 | Machine Simulation generated a bad product. | Warning | 2022-04-29 00:04:55.110 | MacSim.product | {\"A\":100,\"P\":40,\"Q\":77,\"OEE\":33} | Good | MacSim |
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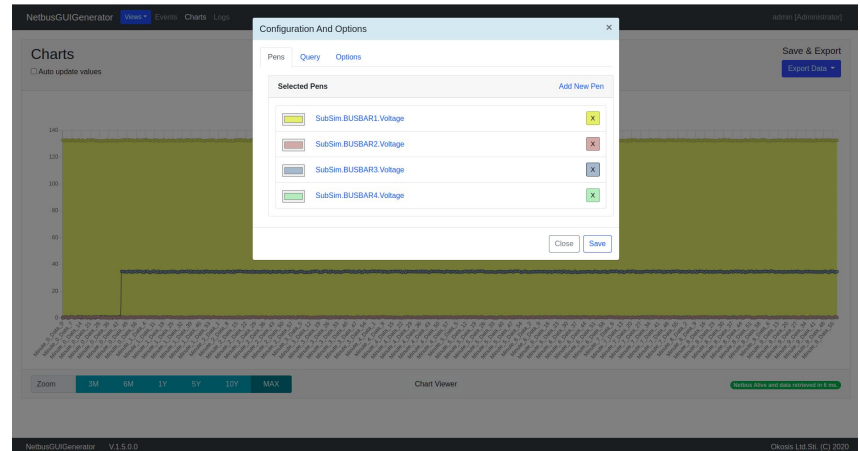
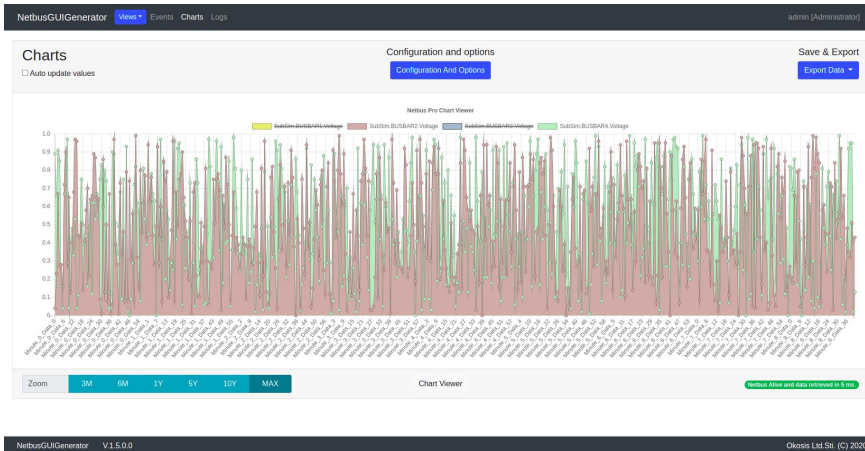
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Standard GUIs - Chart Viewer

- **Charts Interface**

The Charts Viewer page is prepared by default, users can select tags and colors as well as time period from user-friendly interfaces.





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**Web Based Setup And
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Web Based Setup and Management

Easy Installation

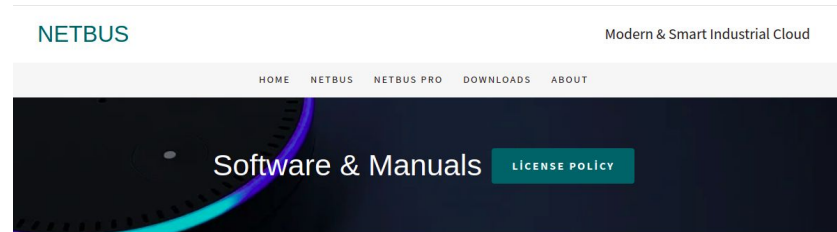
Netbus Pro System can be downloaded from the <https://www.netbus.io> web site and can be set up easily in a couple of minutes.

Netbus Pro System can be downloaded from the web site <https://netbus.io/links> and can be set up with **NUSRET (Netbus Utility for Setup / Removal / Extraction Tool)**

The User runs “**sudo ./install.sh**” and the installation of the system is done automatically without any user interference and the Netbus Pro System becomes ready to run in a couple of minutes.

The “License requesting and receiving” actions are performed through Netbus System Manager web site’s licenses page.

You may request a license through the web interface and when the license is issued, you may access your license by requesting it from the web site.



Software

| # | Software | Description | Family | OS | Version | Link |
|---|------------------------|----------------------|-----------|---------|-----------|--------------------------|
| 1 | Netbus Pro System | Core System Software | NetbusPro | Linux | V.1.5.0.0 | Download |
| 2 | Netbus Pro OPC Gateway | OPC Gateway | NetbusPro | Windows | V.2.1.4.2 | Download |
| 3 | Netbus OPC Gateway | OPC Gateway | Netbus | Windows | V.1.6.0.0 | Download |



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It is perfectly possible to explore netbus devices on the network (or with the IP Address of the device) and the users may access to configure, manage and diagnose these devices through the web pages of the related services.

It is perfectly possible to enable / disable and configure the Netbus Pro Core services on the computer and the explored netbus devices through the Netbus System Manager web site.

Netbus System Manager web site provides a “Clients” page to explore netbus devices existing on the same network as well as any device on the internet with an accessible IP Address.

Management via Web

The screenshot shows the Netbus System Manager web interface. The top navigation bar includes 'System', 'Applications', 'Users', 'Licences', 'Host', 'Config', 'Virtual', and 'Logs'. The 'Clients' page is active, displaying a table of explored clients. Below it, the 'Applications' page is shown, listing various services with their status, alias, command, and path.

| IP | Name | Model | Type | Health | Description |
|--------------|--------------------------|----------|------|--------|--------------------------------------|
| 192.168.1.24 | Netbus-Node-OKOLAP50-003 | Standard | Node | 0 | This is the standard Netbus Pro Node |

| Actions | Status | Alias | Command | Path | Args | Options |
|----------------|---------|----------------------|------------------|--|------|--------------|
| [Edit] [Stop] | Started | NetbusPro | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusPro/NetbusPro.dll | | autostart=10 |
| [Edit] [Start] | Stoppid | NetbusStorageServer | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusStorageServer/NetbusStorageServer.dll | | |
| [Edit] [Stop] | Started | NetbusGLUGenerator | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusGLUGenerator/NetbusGLUGenerator.dll | | |
| [Edit] [Start] | Stoppid | NetbusSTLink | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusSTLink/NetbusSTLink.dll | | |
| [Edit] [Start] | Stoppid | NetbusModbusLink | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusModbusLink/NetbusModbusLink.dll | | |
| [Edit] [Start] | Stoppid | NetbusModbusRTULink | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusModbusRTULink/NetbusModbusRTULink.dll | | |
| [Edit] [Start] | Stoppid | NetbusEC104Link | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusEC104Link/NetbusEC104Link.dll | | |
| [Edit] [Start] | Stoppid | NetbusEtherCATLink | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusEtherCATLink/NetbusEtherCATLink.dll | | |
| [Edit] [Stop] | Started | NetbusSimLink | sudo dotnet exec | ~/home/oot/Publish/Netbus/NetbusSimLink/NetbusSimLink.dll | | |
| [Edit] [Start] | Stoppid | STPLCSimulator | sudo dotnet exec | ~/home/oot/Publish/Netbus/STPLCSimulator/STPLCSimulator.dll | | |
| [Edit] [Start] | Stoppid | SimEC104 | sudo dotnet exec | ~/home/oot/Publish/Netbus/SimEC104/SimEC104.dll | | |
| [Edit] [Start] | Stoppid | StaConModbusSlaveSim | sudo java -jar | ~/home/oot/Publish/Netbus/StaConModbusSlaveSim/StarComModbusSlaveSim.jar | | |



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Secure Access via Web

The user may access to configure and manage the explored netbus device using the Netbus System Manager web site with a valid username and password. Secure access is provided and only authorized access is allowed to perform management operations.

The image displays two screenshots of the Netbus System Manager web interface. The left screenshot shows the login page with the following elements:

- Header: Netbus System Manager | Clients | Login
- Form Title: Login | Please enter your credentials
- Fields: User Name, Password
- Checkbox: Remember me on this computer
- Buttons: Logout, Login

The right screenshot shows the successful login page for the 'admin' user, displaying the following elements:

- Header: Netbus System Manager | System | Applications | Users | Licences | Host | Config | Virtual | Logs | Clients | admin [Administrator]
- Form Title: Login | admin [Administrator]
- Message: User admin is logged in successfully with role Administrator
- Buttons: You may go back to the Main page, You may change your own User settings, You may edit user data using the Users menu item, Logout

Both screenshots have a footer: NetbusSystemManager V.1.5.0.0 | Okosis Ltd.Sri. (C) 2020



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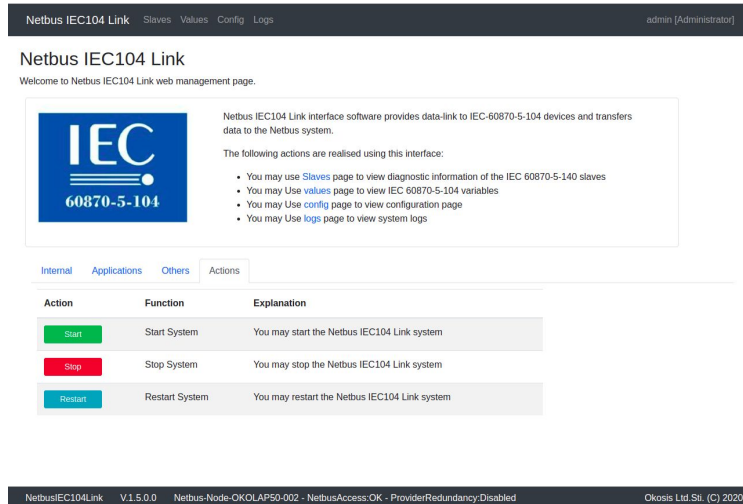
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Configuration via Web

Netbus Pro applications consist of several services which implement the tasks and a web site which provides GUI for configuration, management and diagnostics for this particular service. Every service has its own configuration, management and diagnostics pages.



Netbus IEC104 Link Slaves Values Config Logs admin [Administrator]

Netbus IEC104 Link

Welcome to Netbus IEC104 Link web management page.

Netbus IEC104 Link interface software provides data-link to IEC-60870-5-104 devices and transfers data to the Netbus system.

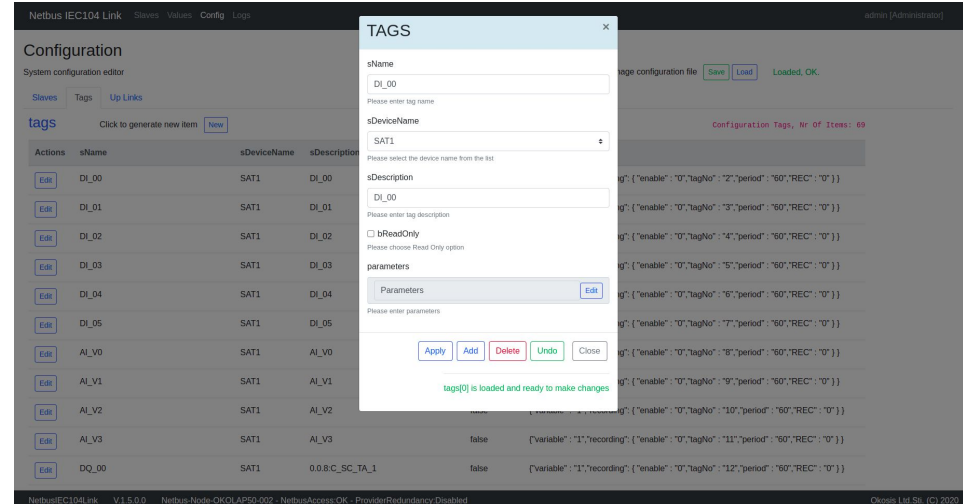
The following actions are realised using this interface:

- You may use [Slaves](#) page to view diagnostic information of the IEC 60870-5-104 slaves
- You may Use [values](#) page to view IEC 60870-5-104 variables
- You may Use [config](#) page to view configuration page
- You may Use [logs](#) page to view system logs

Internal Applications Others Actions

| Action | Function | Explanation |
|-------------------------|----------------|---|
| Start | Start System | You may start the Netbus IEC104 Link system |
| Stop | Stop System | You may stop the Netbus IEC104 Link system |
| Restart | Restart System | You may restart the Netbus IEC104 Link system |

NetbusIEC104Link V.1.5.0.0 Netbus-Node-OKOLAP50-002 - NetbusAccess:OK - ProviderRedundancy:Disabled Okosis Ltd.Sil. (C) 2020



Netbus IEC104 Link Slaves Values Config Logs admin [Administrator]

Configuration

System configuration editor

Slaves Tags Up Links

tags Click to generate new item [New](#)

| Actions | sName | sDeviceName | sDescription |
|----------------------|-------|-------------|-----------------|
| Edit | DI_00 | SAT1 | DI_00 |
| Edit | DI_01 | SAT1 | DI_01 |
| Edit | DI_02 | SAT1 | DI_02 |
| Edit | DI_03 | SAT1 | DI_03 |
| Edit | DI_04 | SAT1 | DI_04 |
| Edit | DI_05 | SAT1 | DI_05 |
| Edit | AI_V0 | SAT1 | AI_V0 |
| Edit | AI_V1 | SAT1 | AI_V1 |
| Edit | AI_V2 | SAT1 | AI_V2 |
| Edit | AI_V3 | SAT1 | AI_V3 |
| Edit | DQ_00 | SAT1 | 0.0.8.C_SC_TA_1 |

TAGS

sName
DI_00

Please enter tag name

sDeviceName
SAT1

Please select the device name from the list

sDescription
DI_00

Please enter tag description

bReadOnly
Please choose Read Only option

parameters [Edit](#)

Please enter parameters

[Apply](#) [Add](#) [Delete](#) [Undo](#) [Close](#)

tags[] is loaded and ready to make changes

NetbusIEC104Link V.1.5.0.0 Netbus-Node-OKOLAP50-002 - NetbusAccess:OK - ProviderRedundancy:Disabled Okosis Ltd.Sil. (C) 2020



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Thank you !

For more information please check web site

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