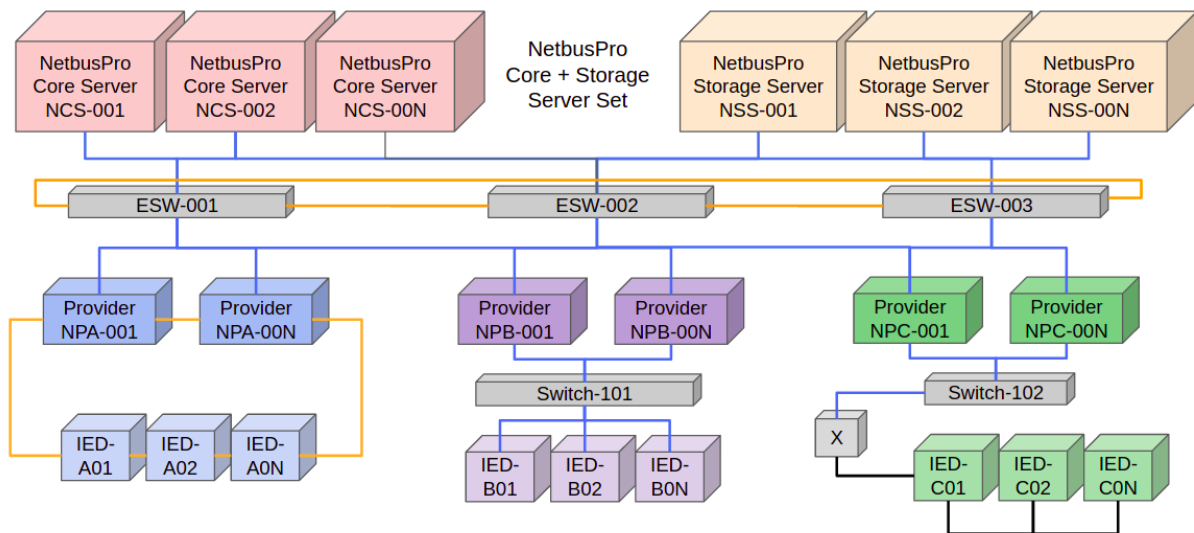


NetbusPro

Redundancy



XI. Netbus Pro System Redundancy

Ver 1.3

XI. Redundancy

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1. Preface

Netbus Pro System supports Redundant Operations in different levels and components of System Architecture. In this section, the redundancy options will be explained.

NetbusPro

Redundancy

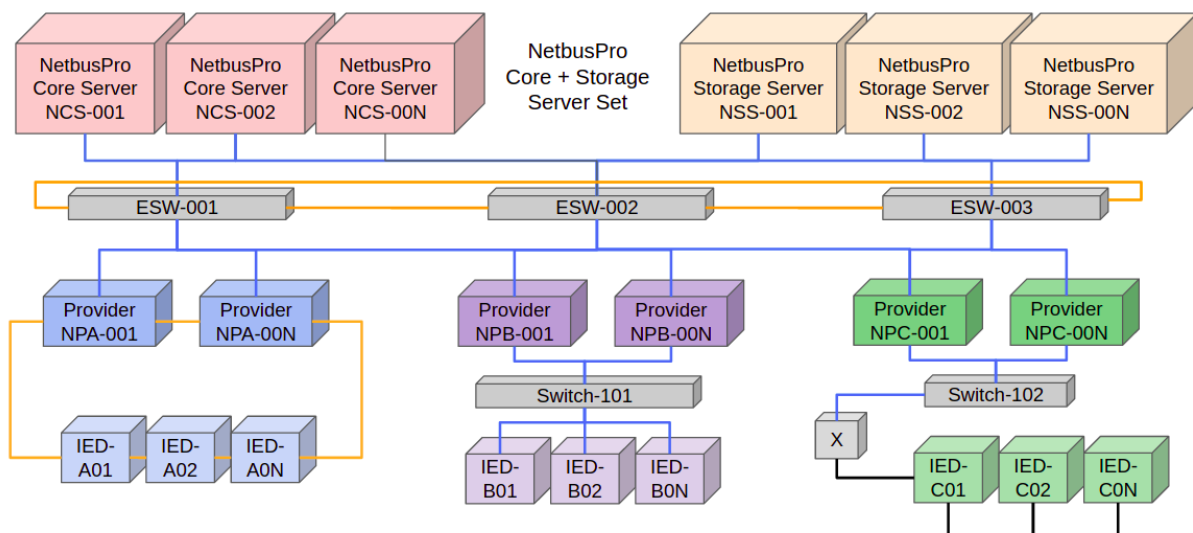


Figure 1: Block diagram of Netbus Pro System Redundancy

Redundancy options for the Netbus Pro platform is listed below:

- Core Server Redundancy
- Storage Server Redundancy
- Links Services Redundancy
- Storage Server Synchronization
- Provider Redundancy

Every option will be explained in detail in this document.

2. Redundancy Overview

2.1. Netbus Pro Core Server 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.

2.2. Netbus Pro Storage Server 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, the relevant 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.

2.3. Netbus Pro Link Services Redundancy

Netbus Pro System supports perfectly 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 / 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.

2.4. Storage Server Synchronization

Netbus Pro System doesn't support Storage Server Synchronization functionality yet.

2.5. Netbus Pro Provider Redundancy

Netbus Pro System supports The Provider Redundancy concept. Users may define more than one provider for the same device set to be able to read these devices redundantly. Netbus Pro Core server will receive the same values from both providers simultaneously and data will be doubled. To prevent this unnecessary doubled data, NetbusPro core server manages providers.

- Netbus System Manager - System Name property of the Provider

The System Name property of the provider has an important role in the Provider Redundancy. You can change the System's name from the Netbus System Manager's System page.

Netbus System Manager System Applications Users Licenses Host Config Virtual Logs Clients admin [Administrator]

System
Netbus System configuration items given here

System ID Details

sys These content will be sent to the explorers for identifying this device.

Netbus System
Netbus System Id configuration settings are given below:

Name	Netbus-Node-OKOLAP50-002
Type	Node
Model	Standard
Description	This is the standard Netbus Pro Node

Click to save or reload from file (sudo required to save the file)

Save Reload

Figure 2: System Page where Name of the system is defined

If you are planning to use Provider Redundancy in your system, please add a dash separator and an integer index to the group name of the provider.

Sample System Names for “Netbus-Node-X100” provider group is given below as an example:

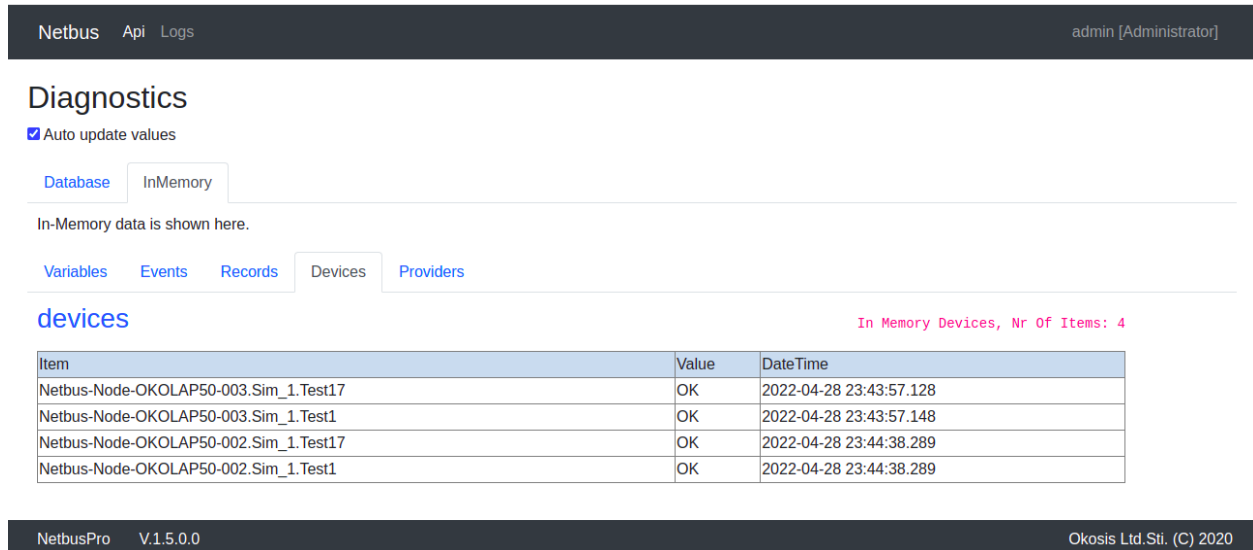
- Netbus-Node-X100-001
- Netbus-Node-X100-002
- Netbus-Node-X100-003

In this case, the “Netbus-Node-X100” provider group is defined with three redundant providers with priorities given as the indexes at the end.

Netbus-Node-X100-001 will have the highest priority in case of equal healthy device condition.

- Netbus Pro Core - Devices tab

Netbus Pro Core server listens to the device status of the providers. Netbus Pro Core's api page's Devices tab shows all the devices registered and updated in the Core server.



The screenshot displays the Netbus Pro Diagnostics interface. At the top, there's a navigation bar with 'Netbus', 'Api', and 'Logs' links, and a user profile 'admin [Administrator]'. Below this, the 'Diagnostics' section is active, with a checkbox for 'Auto update values' checked. Two tabs, 'Database' and 'InMemory', are present, with 'InMemory' selected. A message states 'In-Memory data is shown here.' Below this, there are tabs for 'Variables', 'Events', 'Records', 'Devices', and 'Providers', with 'Devices' selected. The 'devices' section shows a table with 4 items. The table has columns 'Item', 'Value', and 'DateTime'. The data shows four devices, all with a status of 'OK' and timestamps from 2022-04-28.

Item	Value	DateTime
Netbus-Node-OKOLAP50-003.Sim_1.Test17	OK	2022-04-28 23:43:57.128
Netbus-Node-OKOLAP50-003.Sim_1.Test1	OK	2022-04-28 23:43:57.148
Netbus-Node-OKOLAP50-002.Sim_1.Test17	OK	2022-04-28 23:44:38.289
Netbus-Node-OKOLAP50-002.Sim_1.Test1	OK	2022-04-28 23:44:38.289

At the bottom of the interface, a footer bar shows 'NetbusPro V.1.5.0.0' on the left and 'Okosis Ltd.Stl. (C) 2020' on the right.

Figure 3: Netbus Pro Diagnostics page devices tab which show status of devices

Netbus Link Service's "device" UpLink defines the destination Netbus Core Server's url. So, the link service updates the status information in the Netbus Core Server web-api periodically.

- Netbus Pro Core - Provider tab

Netbus Pro Core reviews the System Name of the providers and generates provider groups. Each provider group has the same SystemName plus an index at the end, added with a dash.

For example Netbus-Node-OKOLAP50 group contains providers as:

- **Netbus-Node-OKOLAP50-001**
- **Netbus-Node-OKOLAP50-002**
- **Netbus-Node-OKOLAP50-003**

At the provider page of the Netbus Pro Core server, every provider is shown with its group name, index and Access permission as well as last update time. This table is generated and updated by Netbus Pro Core server itself, it is not written and updated by Link Services.

Netbus Pro Diagnostics page, Provider tab. The page displays a table of providers with the following data:

Group	Name	Index	Access	Devices	DateTime
Netbus-Node-OKOLAP50	Netbus-Node-OKOLAP50-003	3	StandBy	0	2022-04-28 23:45:58.291
Netbus-Node-OKOLAP50	Netbus-Node-OKOLAP50-002	2	OK	2	2022-04-28 23:45:58.291

The page also includes a header with 'Netbus Pro' and 'admin [Administrator]', and a footer with 'NetbusPro V.1.5.0.0' and 'Okosis Ltd.Stl. (C) 2020'.

Figure 4: Netbus Pro's Diagnostics page Provider tab which shows the status of providers

If the Provider Redundancy functionality is enabled (if the "provider" uplink is defined in uplinks), Link Services acquires the "Access" variable from the Netbus Pro Core server. This value is crucial for the Link Service and used as an enabler/disabler for all the reporting actions directed to the Netbus Pro Core server.

- Link Services - UpLink definition : device

To enable provider redundancy in the provider system, the following link is added to the UpLinks list of the provider system's related link service's config web page under the UpLinks tab.

```
{
  "type": "webapi",
  "url": "http://localhost:5300/api/devices",
  "topic": "device",
  "period": "10"
}
```

Figure 5: Uplink definition which is added to the related Link service's uplinks

The device uplink is used in the NetbusLink service to report slave status to the NetbusPro. You can review the status of the slave devices' status in local NetbusSystemManager's Host page under Health tab.

Netbus System Manager System Applications Users Licences Host Config Virtual Logs Clients admin [Administrator]

Host

This page contains host diagnostics pages. Performance page contains CPU and memory load values and Processes page contains running processes list in the host machine.

Performance Processes **Health**

health

Health, Nr Of Items: 4

Item	Value	DateTime
Netbus-Node-OKOLAP50-003.Sim_1.Test17	TimeOut	2022-04-28 23:43:57.129
Netbus-Node-OKOLAP50-003.Sim_1.Test1	TimeOut	2022-04-28 23:43:57.149
Netbus-Node-OKOLAP50-002.Sim_1.Test17	OK	2022-04-28 23:46:30.072
Netbus-Node-OKOLAP50-002.Sim_1.Test1	OK	2022-04-28 23:46:30.083

NetbusSystemManager V.1.5.0.0 Okosis Ltd.Sti. (C) 2020

Figure 6: Netbus System Manager's Health page of local system which shows the status of local devices

- Link Services - UpLink definition : provider

Netbus Pro Core server determines the access permission of the providers. To enable the Provider Redundancy functionality in the provider, the following link is added to the UpLinks list of the provider system's related link service's config web page under the UpLinks tab.

```
{
  "type": "webapi",
  "url": "http://localhost:5300/api/providers",
  "topic": "provider",
  "period": "10"
}
```

Figure 7: Uplink definition of the provider which is added to the Link services' links

The Link Service checks this link to enable Provider Redundancy functionality. Besides, it uses this link to ask the access permission for the Netbus Pro Core server. You can view status of the devices and provider access permission in the Providers page of NetbusProCore's interface as:

Netbus Pro Diagnostics page, Providers tab. The page shows a table of providers with columns: Group, Name, Index, Access, Devices, and DateTime. Two providers are listed: Netbus-Node-OKOLAP50-003 (StandBy, 0 devices) and Netbus-Node-OKOLAP50-002 (OK, 2 devices). The page also includes navigation tabs for Database, InMemory, Variables, Events, Records, Devices, and Providers. The Providers tab is active, showing 'In Memory Providers, Nr Of Items: 2'.

Group	Name	Index	Access	Devices	DateTime
Netbus-Node-OKOLAP50	Netbus-Node-OKOLAP50-003	3	StandBy	0	2022-04-28 23:47:48.294
Netbus-Node-OKOLAP50	Netbus-Node-OKOLAP50-002	2	OK	2	2022-04-28 23:47:48.294

Figure 8: Netbus Pro's Diagnostics page Providers tab which shows the status of providers

If the access permission of the provider is "OK", then the provider sends the data to the Netbus Pro Core server. If the access permission of the value is "StandBy", that means this provider has less active devices (or same active device count but less index) and shouldn't send data to the Netbus Pro Core and is assigned as "StandBy" provider.

- Link Services - Web GUI - Provider Redundancy Status in footer

Provider's Redundancy Status is shown in the Provider's Link Service GUI's footer as follows:

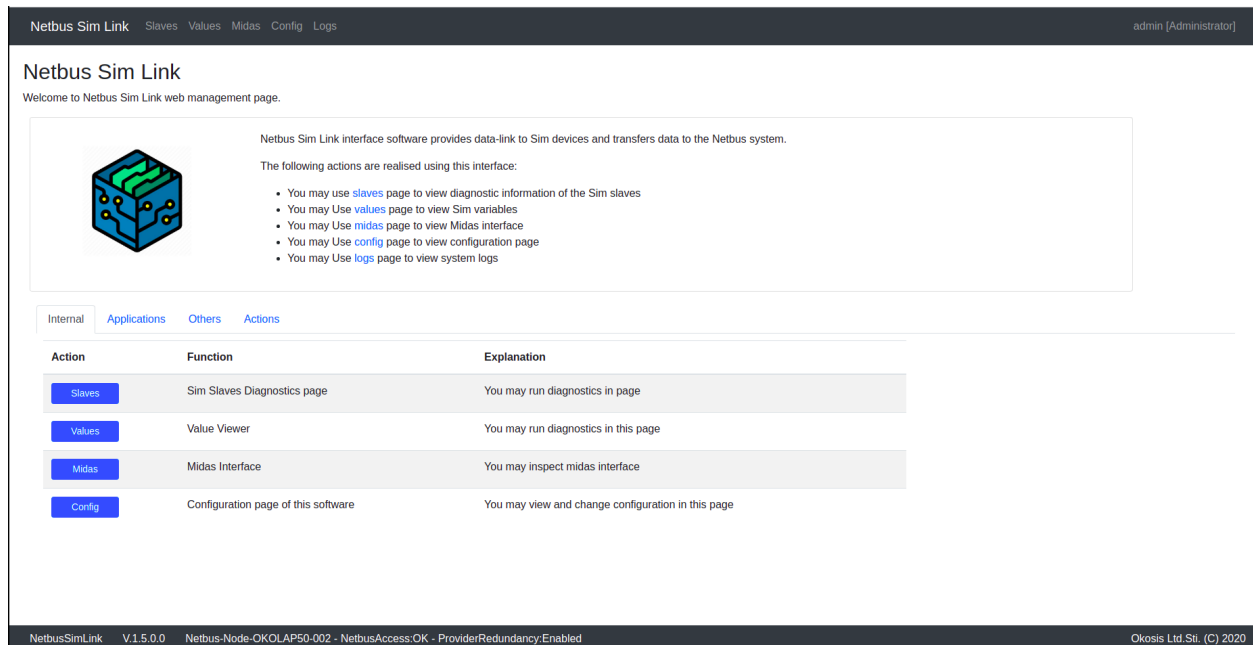


Figure 9: Link Service's web page(s) which shows the status of NetbusAccess in the bottom status line

Sample Status : [TheProviderSystemName - NetbusAccess - ProviderRedundancyStatus]

... Netbus-Node-OKOLAP50-002 - NetbusAccess:OK - ProviderRedundancy:Enabled ...

- **The Provider System Name :** Netbus-Node-OKOLAP50-002

This is the System Name, the provider's group name is Netbus-Node-OKOLAP50, index is 2.

- **NetbusAccess:** OK [OK, StandBy] : The provider has access permission or not.

If the provider has more active devices or equal active devices and less index, it is enabled, value is "OK", otherwise it has to wait and the value is "Standby"

- **ProviderRedundancy:** Enabled [Enabled, Disabled] : The provider redundancy status.

If there is a "provider" link in the link service's UpLinks, the provider redundancy is enabled.

If there is no "provider" link in the link service's UpLinks, the provider redundancy is disabled.