CLARUS LIS

CLARUS Prime

Service Manual

Installation, configuration, operation and maintenance

For support technicians, distributors and the laboratory's IT administrator

Version **9.95.2**

Revised **2026-11-09**

Clarus Medical Intelligence LLC

Contents

1 Requirements 6

1.1 What is installed in the laboratory 6
1.2 The server 7
1.3 Member computers 8
1.4 The network 8
1.5 The internet 9
1.6 Printers 9
1.7 Analysers 10
1.8 Before the day of installation 10

2 Installation 11

2.1 Before starting 11
2.2 Setup's pages, in order 11
2.3 Server or member 12
2.4 The recommended way, or choosing each part 13
2.5 The folders 13
2.6 A laboratory already on this computer 13
2.7 Activation in Setup 14
2.8 What Setup does after copying 14
2.9 When Setup finishes 14
2.10 Installing without administrator rights 15
2.11 Installing without the wizard 15
2.12 When installation stumbles 16

3 First run, licence, activation and moving it 17

3.1 The first setup 17
3.2 The trial 19
3.3 Activating the licence 20
3.4 Moving the licence to another computer 20
3.5 When work stops 21

4 Database and services 22

4.1 What runs on the server 22
4.2 The database 23

4.3 How the program starts 24
4.4 Stopping and restarting 24
4.5 Checking its health 25
4.6 When the database does not run 26

5 Network, branches and Clarus Link 28
5.1 How the computers and the branches are linked 28
5.2 Opening the server to the laboratory's network 28
5.3 Joining a member computer 29
5.4 When a member computer cannot reach its server 30
5.5 Linking the branches of a chain 30
5.6 Clarus Link 31
5.7 Working from outside the branch 32
5.8 When the network or the link stumbles 33

6 Analysers 34
6.1 How results arrive 34
6.2 Adding an analyser 35
6.3 The firewall and the network 36
6.4 Mapping the analyser's codes to tests 36
6.5 Checking the link 37
6.6 Three worked examples 37
6.7 Both directions: work orders 45
6.8 When results do not arrive 46

7 Printers 48
7.1 How the program prints 48
7.2 Binding printers to their roles 49
7.3 Printing settings 50
7.4 Stations and their states 51
7.5 When the printer does not print 51

8 Backup and restore 53
8.1 How the program saves the laboratory 53
8.2 Where the backups are kept 54
8.3 The Backups page 55
8.4 Verification and the restore drill 58

8.5 Keeping, and the backups folder 59
8.6 The second copy off the machine 60
8.7 Cloud backup 60
8.8 The recovery code 61
8.9 Restoring from a backup 62
8.10 Moving the laboratory to a new computer 63
8.11 Problems and what to do 64
8.12 A routine checklist for the technician 65

9 Updates and rollback 66
9.1 How an update arrives 66
9.2 Installing 67
9.3 Member computers 68
9.4 Going back to the previous version 68
9.5 The log and failures 68

10 Migration from RealLab 70
10.1 Before you start 70
10.2 The steps of a migration 71
10.3 What moves and what does not 72
10.4 The acceptance report 72
10.5 Undoing a migration 72
10.6 When a migration stumbles 73

11 Users, passwords and their recovery 74
11.1 The first administrator 74
11.2 Password rules 74
11.3 Users and permissions 75
11.4 A user who forgot their password 75
11.5 The administrator's recovery code 75
11.6 An administrator who forgot their password 76
11.7 Reviewing sign-ins 76

12 Language packs 77
12.1 What a language pack is 77
12.2 Installing and removing a language 77
12.3 Which paper in which language 78

12.4 When a language stumbles 78

13 Logs and diagnostics 80

13.1 The logs 80
13.2 The support screens 80
13.3 The status report to support 81
13.4 A remote support session 81
13.5 Before calling support 82

14 Troubleshooting by symptom 83

14.1 The program and signing in 83
14.2 Printing and devices 84
14.3 Data 84
14.4 Updates and language 85
14.5 When this is not enough 85

15 Uninstalling and reinstalling 86

15.1 Uninstalling 86
15.2 Reinstalling over existing data 87
15.3 Moving the laboratory to a new computer 87
15.4 When uninstalling stumbles 88

A Ports 89

A.1 Ports listening on the server 89
A.2 Ports listening inside the computer only 90
A.3 Connections going out of the laboratory 90
A.4 Firewall rules 90

B Paths 91

B.1 The main folders 91
B.2 Inside the program's folder 91
B.3 Inside the data folder 92
B.4 The logs 92
B.5 Outside the three folders 93

C Service names 94

C.1 Services 94
C.2 Scheduled tasks 94

C.3 When the program was installed without administrator rights 95
C.4 Other names 95

D Settings reference 96
D.1 The laboratory 96
D.2 The catalogue and the devices 96
D.3 People and papers 97
D.4 Data and licence 97
D.5 General settings in detail 97
D.6 Prices and contracts 99

E Messages 100
E.1 Signing in and the server 100
E.2 The network and the member computers 101
E.3 Clarus Link 102
E.4 Backups 102
E.5 Analysers 103

F Glossary 104
F.1 The program and the computers 104
F.2 Printing and devices 104
F.3 Data and security 105
F.4 Licence and updates 106

Chapter 1

Requirements

This chapter is for whoever prepares a laboratory before CLARUS Prime is installed. It sets out:

- what is installed in the laboratory, and on which computer;
- the system, disk and memory each computer needs;
- what the network, the internet connection, the printers and the analysers need.

It ends with a list to go through before the day of installation.

> **Tip**
> Setup refuses a computer that will not do, and warns about one that will only just do. But most of what spoils an installation day is something no program checks: a disk with no room for backups, a network set to "Public", a printer with no driver. Go through this list with the laboratory before the appointment.

1.1 What is installed in the laboratory

Every laboratory has **one server computer**. It holds the database and runs the program that keeps everything. The laboratory may have other computers, of these kinds:

Computer	What is on it	What it does
The server	The database and the whole program	Keeps the laboratory's data, takes the backups, and receives the analysers connected to it
A member computer	The program in its "member" role, with no database	Works on the server's database, prints on its own printers, and links the analysers connected to it
Any other device on the network	Nothing is installed	Opens the program in a browser, once the server is opened to the network's devices

A laboratory with branches has a server in each branch, and the branches are linked as described in Chapter 5: Network, branches and Clarus Link.

The computer an analyser is connected to is called that analyser's **station**. It may be the server itself, or a member computer beside the analyser (see Chapter 6: Analysers).

1.2 The server

Item	Required	What Setup does
Operating system	Windows 10 (version 1507 or later) or Windows 11	Refuses anything older
Architecture	64-bit only	Refuses a 32-bit system
Rights	An administrator account	Asks for them when it starts (see 2.10 Installing without administrator rights)
Free space on drive C	At least 5 GB; 10 GB or more is better	Refuses below 5 GB, warns below 10 GB
Memory	4 GB or more	Warns below it, does not refuse
Screen	1280 × 720 or more	Does not check it
Drive D	Recommended; see below the table	Puts the program, its data and its backups on it when there is one

The program takes about 1.1 GB once unpacked. The database comes on top of that, and grows as the laboratory works, and then the backups.

1.2.1 Drive D

When the computer has a fixed drive D that can be written to, Setup puts three things on it: the program in `D:\Clarus\Clarus_prime`, the data in `D:\Clarus\Clarus_prime\data`, and the backups in `D:\Clarus\Clarus_prime-backups`. Otherwise it puts the program in `C:\Program Files\Clarus\Clarus_prime`, the data in `C:\ProgramData\Clarus\Clarus_prime\data` and the backups in `C:\ProgramData\Clarus\Clarus_prime-backups` (see Appendix B: Paths).

Drive D keeps the laboratory's data away from the Windows drive, so it survives a reinstallation of Windows. But on many computers it is another part of the same physical disk, so it does not protect against a failed disk. That is why a second copy off the machine is still required (see 8.6 The second copy off the machine).

> **Caution**
>
> Setup measures the free space on drive C only. If drive D is full or small, it says nothing. Check it yourself: leave free space on D for the database and at least thirty daily backups of it.

1.2.2 What comes with the program

Nothing has to be installed on the server before the program. Setup brings with it:

- **a PostgreSQL 18 database**, which runs on this computer alone (see Chapter 4: Database and services);
- **a Python environment** of the program's own, inside the program's folder.

The program uses the **Microsoft Edge** browser that comes with Windows to make the PDF files of its reports, so Edge is not removed from the server.

1.2.3 Power and running

- **An uninterruptible power supply (UPS)** for the server is strongly recommended. A power cut while the database is being written is the worst thing that can happen to it.
- **The program starts when someone signs in to Windows**, not when the computer is switched on. So the server stays signed in; locking it with the lock screen does not stop the program (see 4.3 How the program starts).
- **Windows updates** sometimes restart the computer at night. Set their time outside working hours, and sign in again after them.

1.3 Member computers

Item	Required
Operating system	Windows 10 (1507 or later) or Windows 11, 64-bit
Free space on drive C	At least 2 GB
Memory	2 GB or more
Network	Reaches the server on the same local network, or through Clarus Link (see Chapter 5: Network, branches and Clarus Link)

On a member computer the program starts by itself at every sign-in, with no window, so it prints and links its analysers even when nobody has opened it.

1.4 The network

After installation the program listens to the server alone (the address `127.0.0.1`). When other computers need it, the server is opened to the network's devices from the program. Then:

- the program's port is opened to the network, **over an encrypted connection (HTTPS)**;
- a second port is opened for the member computers;
- Windows firewall rules are added for **Private** and **Domain** networks only. A **Public** network stays closed on purpose.

> **Caution**
>
> If the laboratory's network is set to "Public" in Windows, the other computers will not reach the server even after it is opened. The program also warns about this on its analysers page. Change the network type to "Private" in Windows' settings before opening the server.

The server should have a fixed address on the network, or an address reserved for it in the router, because analysers that connect to the server are set to its address.

All the ports, their defaults and how each is chosen, are in Appendix A: Ports.

1.5 The internet

Daily work does not need the internet: orders, results, printing and the local backup all work without a connection. When there is one, it is used for:

- **checking for updates** and downloading them (see Chapter 9: Updates and rollback);
- **the library of link profiles** for analysers (see Chapter 6: Analysers);
- **the cloud backup**, if the laboratory has bought it (see 8.7 Cloud backup);
- **Clarus Link**, when the computers cannot reach the server on the local network (see Chapter 5: Network, branches and Clarus Link);
- **the licence and its activation** (see Chapter 3: First run, licence, activation and moving it).

Every connection goes out of the laboratory; nothing comes in from the internet. So no port is opened for the program on the router.

1.6 Printers

Printer	What will do	Note
Reports	Any A4 printer with a Windows driver	The default paper is A4
Sample labels	A label printer that speaks ZPL or TSPL, or any label printer with a Windows driver	The default label is 50 × 25 mm, at 203 dots per inch
Receipts	A thermal printer with an 80 mm or 58 mm roll that speaks ESC/POS or has a Windows driver	The default roll is 80 mm

Install each printer's driver in Windows before linking it to the program, and print a test page from Windows itself. The details are in Chapter 7: Printers.

1.7 Analysers

The program reaches an analyser in one of four ways:

Way	What to prepare
The network (TCP or UDP)	The analyser and the server on one network, with a fixed address for the analyser or for the server
A serial cable (RS-232)	A serial port on the computer beside the analyser, which becomes the analyser's station
A shared folder	A folder the analyser writes its result files to, and the program reads
Manual entry	Nothing

Before the day of installation, ask the analyser's supplier for its LIS interface manual: the protocol, the kind of connection and the test codes. With that sheet an analyser is linked in minutes (see Chapter 6: Analysers).

1.8 Before the day of installation

1. The server runs 64-bit Windows 10 or 11, with an administrator account.
2. Drive C has 10 GB or more free, and drive D (if there is one) has room for the data and the backups.
3. The server has an uninterruptible power supply.
4. The laboratory's network is of type "Private" in Windows, and the server has a fixed or reserved address.
5. The printers' drivers are installed, and each printer has printed a test page from Windows.
6. The technician holds the analysers' LIS interface manuals, and the cables are there.
7. A place for the second copy off the machine: an external disk or a folder on another computer on the network (see 8.6 The second copy off the machine).
8. If the laboratory comes from RealLab: the technician holds a copy of its old database (see Chapter 10: Migration from RealLab).

Chapter 2

Installation

This chapter is for the technician who installs CLARUS Prime on the laboratory's computers. It follows Setup page by page, then explains what Setup does after copying the files, how to install without administrator rights or without the wizard, and what to do when an installation stumbles.

> **Tip**
>
> Before the day of installation, go through the list in 1.8 Before the day of installation. And install the server first: a member computer joins a server that is already working.

2.1 Before starting

- **Setup's file.** Its name starts with `CLARUS-Prime-Setup`. The same file installs a server and a member computer, in every language Setup speaks.
- **An administrator account.** Setup asks for administrator rights when it starts. Without them the database cannot be registered as a Windows service (see 2.10 Installing without administrator rights).
- **The internet.** It is not required to install. But the trial starts with the supplier's signature, which Setup fetches while it installs (see 3.2 The trial).
- **The old program closed**, if a version is already installed on this computer. Setup does not install over a program that is still running and holding its files.

2.2 Setup's pages, in order

Setup first asks for its language. From then on, every page, the licence and the data statement are in that language.

Page	What it asks	When it shows
Welcome	Nothing	Always
The licence agreement	Acceptance of the licence	Always
Installation type	Branch server, or a computer in an existing branch	A new installation. An update keeps the role it finds
Data & Privacy	Agreement to how the program handles the laboratory's data	A server only
Checking this computer	Nothing; it shows what it found	Always for a server. For a member, only when it found something to fix

Page	What it asks	When it shows
Ready to install	The recommended way, or choosing each part	A new laboratory's server
The folder	Where the program goes	When choosing each part, and for a member
A laboratory already on this computer	What the installation starts from	Only when Setup finds earlier data or backups for the chosen folder
Where the backups go	The backups folder	A server, when choosing each part
The laboratory's languages	The languages besides English	A new server, when choosing each part
The laboratory's country and this computer's settings	The country, the currency, the paper and the time zone	When choosing each part, and whenever Windows did not give the country
Activation	The serial number, or the member computer's licence number	Always
Ready	A summary of the choices	Only when choosing each part
Installing, then the finish page	Nothing	Always

2.3 Server or member

The "Installation type" page has two choices:

Choice	What it means
Branch server	The branch's database is kept on this computer and the program runs on it. Choose it for the first computer of a laboratory or a branch
A computer in an existing branch	It works on its branch server's database, and joins it with this computer's own licence number once the branch server allows that number. Nothing of the laboratory's data is kept on it

A member computer's Setup is shorter: it has no Data & Privacy page, no backups page and no languages page, because none of them belongs to it. The member joins its server the first time the program starts (see Chapter 5: Network, branches and Clarus Link).

> **Caution**
>
> A laboratory has one server per branch. Installing a second "Branch server" in the same branch makes a second, separate laboratory, not a copy of the first.

2.4 The recommended way, or choosing each part

For a new laboratory's server, the "Ready to install" page shows what Setup will do: the program's folder, the laboratory's data, its backups, and the country and currency. It offers two ways:

- **Install this way (recommended).** Setup goes straight to activation, and then installs.
- **Let me choose the folders, the languages and the country.** Setup shows each of those pages, then a summary before installing.

The recommended way still asks for the country if Windows did not give it. Nothing is chosen for the laboratory by guessing.

2.5 The folders

The program's folder. When the computer has a fixed drive D, Setup proposes `D:\Clarus\Clarus_prime`. Without one, `C:\Program Files\Clarus\Clarus_prime`. Either can be changed on the folder page.

The backups folder. Beside the program's folder on drive D: `D:\Clarus\Clarus_prime-backups`. Without drive D, `C:\ProgramData\Clarus\Clarus_prime-backups`. Why a second disk is better is explained in 8.2 Where the backups are kept.

The data folder. The database, the encryption keys and the logs. Setup places it by these rules, in order:

1. An update keeps the data folder the installation already has.
2. If the program is under Program Files, the data goes to `C:\ProgramData\Clarus\Clarus_prime\data`.
3. Otherwise, the data folder is inside the program's folder: `D:\Clarus\Clarus_prime\data` on drive D.

Every path is listed in B.1 The main folders.

2.6 A laboratory already on this computer

If Setup finds the data or the backups of an earlier installation for the chosen folder, it asks what this installation starts from:

Choice	What happens
Use the laboratory's data in the folder it found	The database is used as it is. The laboratory comes back with its users and data
Restore the newest backup	The laboratory is restored from that backup
Start a new laboratory	A new database. The earlier data stays where it is

Nothing is deleted, whichever is chosen. 15.2 Reinstalling over existing data explains when this page appears after uninstalling.

2.7 Activation in Setup

On a server, the serial number is optional. Left empty, the program starts its full 14-day trial. The serial can be activated at any time from the licence screen inside the program (see 3.3 Activating the licence).

Setup checks the serial as it is typed. If one character does not match the rest, it says so: 1 and I, and 0 and O, are the usual pair.

On a member computer, the box takes this computer's own licence number in its branch. A member has no trial. If the number is not at hand, leave the box empty and type it in the program's window after installing.

2.8 What Setup does after copying

After copying the files, Setup runs the installation script. It:

1. Records everything it does in `install-transcript.log`, in the program's folder.
2. Picks the program's port: the first free one from 8000 (see A.1 Ports listening on the server).
3. **On a server**, prepares the laboratory's database. This is the longest step. Then it registers the `ClarusPrimePostgres` service so the database starts with the computer (see 4.2 The database).
4. Adds the program to Windows' "Installed apps", under the name `Clarus_prime`.
5. Registers the scheduled tasks in the `\Clarus\Clarus_prime\` folder: updates, remote support, the firewall rules, and the program's start at sign-in (see C.2 Scheduled tasks).
6. Starts the trial or the activation, if the computer can reach the supplier.

2.9 When Setup finishes

The finish page says how the installation ended:

What it says	What it means
The program is activated and ready	The serial was accepted
Your trial has started	No serial was typed, and the trial was signed
The serial was not accepted	The program is installed and works in its trial. Try the serial again from the licence screen
The trial starts with our signature, which did not arrive	The computer could not reach the supplier. Open the program with the internet and start the trial from its screen, or with the phone code it shows (see 3.2 The trial)

What it says	What it means
Setup did not finish	The files were copied, but the database could not be prepared. See the 2.12 When installation stumbles

The first time a new laboratory opens the program, it asks for the laboratory's name, its contact numbers and its logo, and nothing more (see 3.1 The first setup).

> **Note**
> Setup cannot pin the program to the taskbar; Windows allows only the user to do that. Open the program from its desktop shortcut, right-click its icon on the taskbar, and choose "Pin to taskbar".

2.10 Installing without administrator rights

When Setup starts, Windows asks for administrator rights. A user who cannot give them may install the program for their own account only. Then:

- Without drive D, the program goes to `%LOCALAPPDATA%\Programs\Clarus\Clarus_prime`.
- The database is not a service. A sign-in task named `ClarusPrime PostgreSQL` starts it when that user signs in, and only then (see 4.2 The database).
- Updates and remote support will ask for administrator rights each time.

> **Caution**
> On a server this is the weaker way. After a restart, nothing works until that user signs in. Install the server with an administrator account whenever possible.

If the program is already installed for another account, or with other rights, Setup warns: installing again makes a second copy, with its own folder and its own database. The laboratory's data would then be in one copy and not the other.

2.11 Installing without the wizard

To install on several computers, run Setup from a command line with administrator rights:

```
CLARUS-Prime-Setup.exe /VERYSILENT /SUPPRESSMSGBOXES /NORESTART /LOG="C:\setup.log"
```

- `/LOG` records Setup's own steps in that file. Without it, Setup keeps no log of its own.
- `/ROLE=member` makes the member computer the default installation type.
- Without administrator rights, the database is not registered as a service.

Setup's exit code tells a deployment script how it ended:

Code	Meaning
0	Finished
3	The files are in place, but the database could not be prepared. The program will not start
1	The installation script stopped on an error of its own. The program will not start

When the code is not 0, the reason is in `install-transcript.log` in the program's folder.

2.12 When installation stumbles

What shows	Likely cause	What to do
The computer check refuses to continue	A 32-bit system, Windows older than 10, or less than 5 GB free on the system drive (2 GB for a member)	Solve what the page names, then run Setup again (see 1.2 The server)
The computer check says a port is in use by another program	Another program already listens on it	Nothing: the program takes the next free port and records it (see A.1 Ports listening on the server)
The computer check warns about other security software	An antivirus other than Windows Defender	Nothing at first. If the database then fails to start, allow the program's folder in that antivirus and install again
"Setup did not finish" with an error code	The database could not be prepared	Restart the computer, then run Setup again as an administrator. If it fails again, send `install-transcript.log` to support
The program already on this computer is still running	The old version holds its files	Close it, or restart the computer, then run Setup again
"The database service could not be registered"	Setup did not run as an administrator	Run it again as an administrator. Until then, the database does not start after a restart
The finish page says the trial's signature did not arrive	No internet during installation	Start the trial from the program's screen with the internet, or with the phone code

Chapter 3

First run, licence, activation and moving it

This chapter is for the support technician handing a laboratory an installed program. It explains:

- The steps of the first setup after installation.
- The trial, and activating the licence with and without the internet.
- Moving the licence to another computer, and what happens when work stops.

3.1 The first setup

After installation, and after the first administrator is created (see 11.1 The first administrator), the **First setup** screen opens. It also opens from the **Settings** menu until it is complete. Its steps:

Step	What is set in it
Welcome	The start
Laboratory identity	The laboratory's name and details, as they print on its papers
Region	The country, currency, time zone and program language. Setup suggests them from what it found on the computer
Where to start	Where the laboratory starts: a migration from RealLab, a clean start, or a branch in a chain
Main branch	The main branch
Users	The first users
Printing	How the program prints (see 7.1 How the program prints)
Prices	The price list
Reference ranges	The reference ranges
Public site	The laboratory's site for patients
Review and finish	A review of the above, then **Finish the setup**

Each step has a **Finish later** button. **«Finish the first setup: 1 step left» stays at the top of the home until you do** A server that is a branch in a chain sees fewer steps, because the chain decides the rest.

All of it can be set later from the settings (see Appendix D: Settings reference).

3.1.1 The laboratory's website

The site is hosted on Clarus's website service, under a name the laboratory takes in **Laboratory site**, on the **Address and publishing** tab, with **Take the name**. The name can be changed once, with **Change the name**.

When the service no longer has the site. A copy can keep the key of a site that the website service no longer holds. The tab then offers **Choose the site's name** again, with the old name already filled in, and offers no change of name. Press **Take the name** to create the site again under the same name, then publish it. Until then, a change of name or a publication is refused with one sentence saying the same thing.

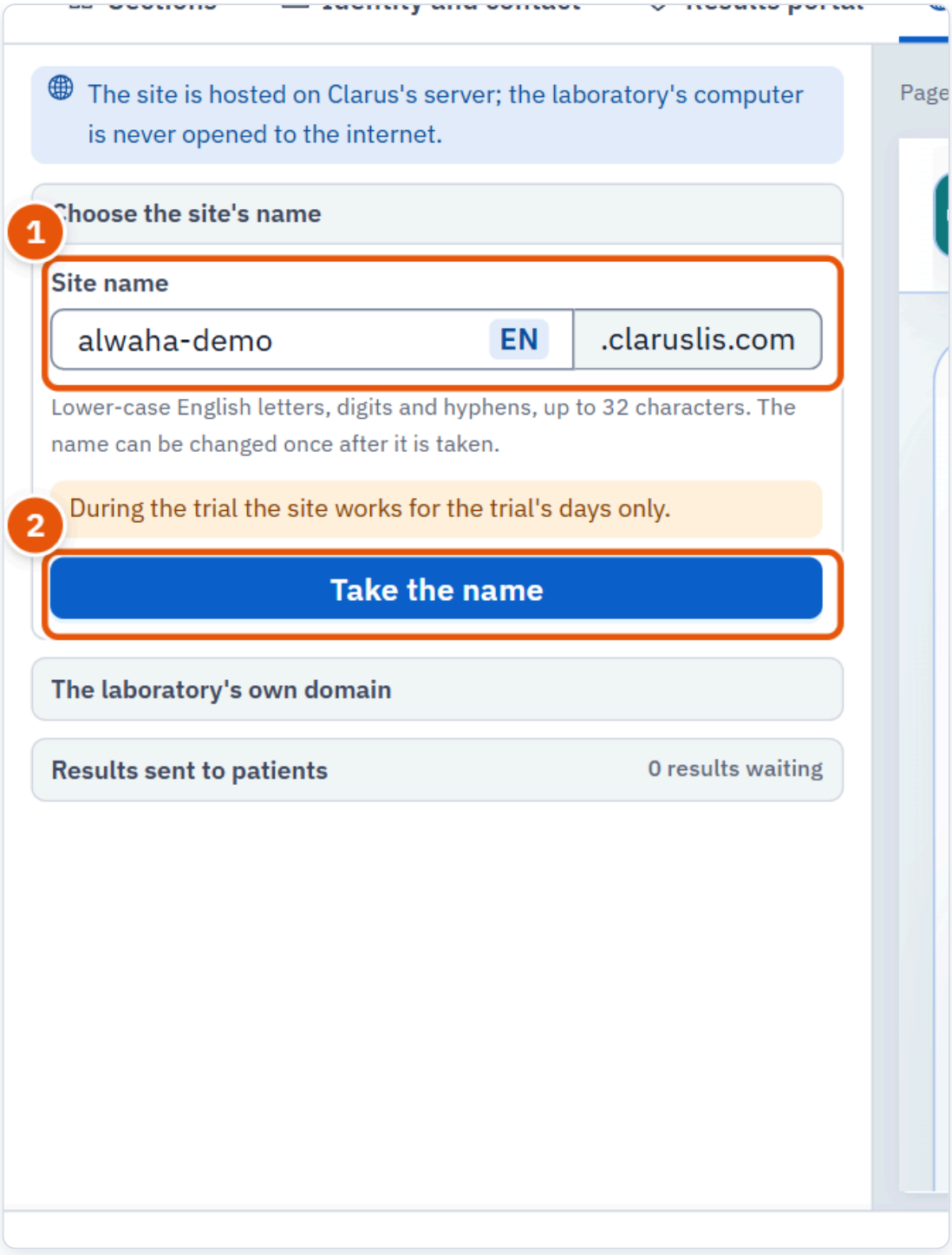


Figure 3-1: The address tab when the website service no longer has the site: the old name already filled in

Every refusal from the website service is shown in the program's language, not in the service's own English. That covers taking the name, changing it, and publishing.

3.2 The trial

After installation the program runs for **14 days** as a trial, with everything in it. The trial starts with a signature from the supplier:

- **With internet:** the signature arrives by itself.
- **Without internet:** in the **Start the trial** window, **Scan with your phone to download the trial file**, then **Choose the trial file**.

The trial's start is kept in more than one place on the computer (see B.5 Outside the three folders). So uninstalling and reinstalling the program does not restart the trial.

3.3 Activating the licence

The licence is per computer. It is bound to the computer by a fingerprint of its parts that tolerates some of them changing. Replacing a part or two does not stop the program, but replacing most of them makes it another computer to the program.

The **Licence** screen opens from the **Settings** menu, then **Licence**. It shows the licence's state (**Working** or **Stopped**), **Activated**, **Ends**, the **Installation code**, **Last verified** and the **Version**.

With internet:

1. In **Activating with the card number**, type the card number.
2. Press **Activate with the card number**. When it succeeds: **The licence was activated.**

Without internet (Activating with a file, without internet**):**

1. **The activation request: a small file carrying the installation code.** Press **Save the request file**.
2. **Send it to Clarus on WhatsApp, and the licence file comes back.**
3. **The licence file: choose the file you received.** Press **Choose the file**.

> **Caution**
>
> A copy activated over the internet needs to reach Clarus now and then. If it stays cut off for very long, work stops until it connects for a minute, and its data stays sound.

3.4 Moving the licence to another computer

The program stops on this computer as soon as it is moved, and all its data stays kept on it. Then activate the same number on the new computer.

1. If the new computer will work with the laboratory's data, take a backup first and carry it over (see 8.10 Moving the laboratory to a new computer).
2. In **Licence**, press **Move it to another computer**.
3. Type the laboratory's name to confirm, then **Move the licence**.
4. The **Hand-back code** appears. Copy it before closing the window and give it to the supplier: it proves the licence was handed back.

5. Activate the same number on the new computer.

> **Danger**
> Moving stops the program on the old computer at once. A damaged disk gives no hand-back code, so contact the supplier. Restoring, on the old computer, a backup taken before the hand-back does not give it the licence back.

3.5 When work stops

If the trial ends, the licence ends, the computer changes, or the program has been cut off too long, the **Work has stopped on this computer** page appears. **All of your data is safe and untouched on this computer. Nothing has been deleted, and you may export a complete copy at any moment.**

From that same page:

- **Activate the licence and work resumes**: type the **Card code**, the **Laboratory name** and the **Phone with country code**, then **Activate**. **The name and phone go to the supplier with the code, so it can sign the licence for this computer.**
- **Export**: a complete copy of the laboratory's data, at any time.

What shows	Cause	What to do
The trial has ended	14 days passed without activation	Activate the licence
The computer does not match the licence	Most of the computer's parts changed, or the data was carried to another computer	Move the licence as above, or contact the supplier
A long time without reaching Clarus	A copy activated over the internet has not connected for a long time	Turn the internet on for a minute
The licence could not be read.	The kept licence file cannot be read	Contact the supplier with the **Installation code**
The request file could not be made.	The request file could not be made	Try again, or contact the supplier

Chapter 4

Database and services

This chapter is for the support technician and the laboratory's IT administrator. It sets out:

- what runs on the server after installation: the database, the program and the scheduled tasks;
- how the program starts, and how to stop and restart it without harming anything;
- how to check the database's health, and what to do when it does not run.

> **Danger**
>
> The database is the whole laboratory. Its folder is never deleted, its configuration files are never edited by hand, and its port and password are never changed from outside the program. Everything a technician needs of this is described here, in its safe way.

4.1 What runs on the server

Name in Windows	Kind	What it is	When it starts
`ClarusPrimePostgres`	Windows service	The PostgreSQL database	With the computer, automatically
`Server` in the task folder `\Clarus\Clarus_prime\`	Hidden scheduled task	The program itself	At every Windows sign-in
`Updater` in the same folder	Scheduled task	The update installer	A minute after the computer starts, and when the program asks for it
`Support` in the same folder	Scheduled task	Carries out remote support actions	When the program asks for it

On a member computer the task `Member` takes the place of `Server`, and there is no database. All the names are in Appendix C: Service names.

> **Note**
>
> The program is not a Windows service. It does not appear in the list of services (`services.msc`) but in Task Scheduler, inside the folder `\Clarus\Clarus_prime\` . Only the database is a service.

4.2 The database

Setup brings **PostgreSQL 18** with it, and creates a database cluster of the laboratory's own:

Item	Value
Port	`5439`; if it is taken, Setup takes the first free port after it
Who can reach it	This computer alone (the address `127.0.0.1`); the network never reaches it
Database name	`clarus_lis`
The program's account in it	`clarus_lis`
Its administrator account	`postgres`
Sign-in	With an encrypted password (SCRAM-SHA-256), even from the computer itself
Encoding	UTF-8
Data folder	`pgdata` inside the program's data folder: `D:\Clarus\Clarus_prime\data\pgdata` or `C:\ProgramData\Clarus\Clarus_prime\data\pgdata`
Log	`postgresql.log` in the logs folder, rotated every 20 MB

Setup sizes the database's memory to the computer's: an eighth of the memory for its cache, between 128 MB and 1 GB.

4.2.1 The passwords

Setup generates two random passwords: one for the administrator account and one for the program's account. It keeps them in the file `cluster-superuser.json` in the data folder, which only administrators and the SYSTEM account can read.

The program keeps its address for the database, with its account's password, in its configuration file `clarus-lis.config.json` in the program's folder.

> **Caution**
>
> Neither `cluster-superuser.json` nor the configuration file is sent in a message or copied anywhere else: they hold the passwords. No step in this manual needs either by hand. The program reads them itself when it needs to, as in the restore drill (see 8.4.2 The restore drill).

4.2.2 A laboratory installed without administrator rights

When the program is installed for one user without administrator rights (see 2.10 Installing without administrator rights), the database is not registered as a service. Instead a sign-in task named

`ClarusPrime PostgreSQL` starts the database when that user signs in, and only then. So after the computer restarts, nothing runs until that user signs in.

4.3 How the program starts

The program starts with no window **at every Windows sign-in**, through the task `Server`. That is on purpose: after a night-time restart for a Windows update, the analysers start their day before anyone opens the program, so it has to be listening.

When it starts, this happens in order:

1. **It makes sure the database is running.** If the database service is stopped, it starts it and waits for it to answer, for two minutes at most.
2. **If it does not answer**, it tries to repair it by running the database setup again, for three minutes at most.
3. **If it still does not answer**, it stops and writes a message naming the log files `postgresql.log` and `postgresql-startup.log`, and the repair command to run by hand.
4. **It prepares the laboratory.** Meanwhile the program's pages answer that it is being prepared, and ask to try again in a few seconds.
5. **It runs**, and with it the station that prints and links the analysers (see Chapter 7: Printers).

Two copies of the program never start together. If a second user signs in to Windows while the program runs, it does not start again, and the program's desktop shortcut opens its window on the copy already running.

> **Tip**
> To keep the program running, keep the server signed in at all times. Locking it with Windows + L protects the screen and does not stop the program. Signing out does stop it.

4.4 Stopping and restarting

The safest way is always **to restart the computer itself** and then sign in. Windows then closes the database cleanly, and everything starts again in its order.

When the technician needs to stop the program alone without a restart, the stop script is in the program's folder:

```
D:\Clarus\Clarus_prime\packaging\windows\stop-clarus-lis.ps1
```

It stops, in order, the program first and then the database service. Run it from PowerShell with administrator rights. Then start the program again from its desktop shortcut, which starts the database

before it.

> **Danger**
>
> Never end `postgres.exe` from Task Manager, and never stop the database service while the program is writing to it. A sudden stop can leave the database needing recovery when it starts, or worse. A power cut does the same, which is why an uninterruptible power supply is recommended (see 1.2 The server).

4.4.1 A database running outside its service

After an update the database can be left running, but outside its registered service, so the service shows as stopped. In older versions this refused every new connection until Windows restarted. Now the database setup detects it by itself: it stops the copy running outside the service cleanly, then starts the service. If it cannot stop it, it leaves the database running and writes a warning; then restart the computer.

4.5 Checking its health

4.5.1 From the program

The **Support** menu has two screens:

- **Health and diagnostics**: the **Database** card with its size and integrity, and the server readiness card with the number of database connections and open sessions. Below them is the **Database maintenance** section.
- **Server and updates**: the database's kind, address and port, and the state of updates.

4.5.2 Database maintenance

In the **Database maintenance** section the technician measures the database's size with **Measure now**, and sees the last maintenance and what the server recommends. The operations are:

Operation	What it does
Quick check	A quick check of the data's integrity
Integrity check	A full integrity check, longer than the quick one
Repair foreign keys	Repairs the links between tables if any is broken
Update statistics	Updates the database's statistics, so queries run faster
Vacuum	Recovers the space left by deleted and changed records
Checkpoint	Writes what is held in memory to the disk

None runs unless the technician asks; each is recorded in the audit under their name, and none deletes a record. The database also cleans itself automatically in the background, as PostgreSQL does, so none of these is needed in ordinary use. Run **Update statistics** after a large migration, although the program already does it by itself after every migration from RealLab.

4.5.3 From a browser

On the server itself, the program answers two addresses the technician can open in a browser. The port is the program's port (see Appendix A: Ports):

Address	What it says
`http://127.0.0.1:<port>/api/health`	The program is running, and its version. It does not touch the database
`http://127.0.0.1:<port>/api/ready`	The program reaches the database. If it does not, it answers with code 503

If the first answers and the second does not, the program runs and the database does not.

4.6 When the database does not run

What shows	Likely cause	What to do
The program does not open after the server restarted	Nobody has signed in to Windows	Sign in, wait a minute, then open the program
A message at start naming `postgresql.log`	The database did not start	Read the last lines of `postgresql.log` and `postgresql-startup.log` in the logs folder (see Appendix B: Paths), then restart the computer
The service `ClarusPrimePostgres` is stopped and will not start	A full disk, a damaged database file, or security software blocking it	Check the free disk space first. Then read the log. Delete nothing from `pgdata`
`/api/health` answers and `/api/ready` does not	The program runs and the database does not	Restart the computer. If it happens again, run the repair command from the start message, with administrator rights
Port `5439` is taken by another program	Another program on the computer has PostgreSQL	Nothing: Setup took another port and recorded it. See the actual port in the configuration file
The program is slow and the database is large	Old statistics or unrecovered space	Run **Update statistics** and then **Vacuum** outside working hours

If the database folder itself is damaged, the way back is to restore from the latest backup (see 8.9 Restoring from a backup).

Chapter 5

Network, branches and Clarus Link

This chapter is for the support technician and the laboratory's network administrator. It explains:

- how the server is opened to the laboratory's network, and closed again;
- how a member computer joins its branch's server, and leaves it;
- how the branches of a chain are linked and exchange their data;
- what Clarus Link is, and how work goes on from outside the laboratory.

All of it is done in the program's **Branches and linking** screen, which has three pages: **Branches**, **Branch devices** and **Samples sent**.

5.1 How the computers and the branches are linked

Link	Between	Over
A member computer and its server	The computers of one branch	The laboratory's network, once the server is opened to it
A branch and the other branches of a chain	The branches' servers, and the centre	A direct address, Clarus Link, or both
Outside the laboratory	A member computer, a manager's phone, and the server	Clarus Link, over the internet

Each branch has its own server and its own database (see 2.3 Server or member). Linking branches does not make one database. Each branch keeps its own and exchanges with the others.

5.2 Opening the server to the laboratory's network

As installed, the program on the server answers that computer alone. Before any other device reaches it, the server must be opened to the laboratory's network.

Before opening it:

- The administrator has a password. The program does not open the server to the network's devices before that.
- The page is opened **on the server computer itself**. Elsewhere it shows the network's state and does not change it.
- The computer is connected to the laboratory's network, and Windows classes that network as private.

Steps:

1. In **Branches and linking**, on the **The laboratory's network** card, press **Open it** and confirm.
2. Windows shows its approval window on the server. Choose "Yes". The card waits until Windows applies the change.
3. The program starts again on its new address. Press **Start on the new address** if the page does not move by itself.

Then the card shows **The address the devices use**: the address the laboratory's devices type to reach the program, or its number.

What opening does:

- It opens the program's port, and the member computers' port after it, in Windows' firewall, on private and domain networks only (see A.4 Firewall rules). Only the laboratory's network is opened, never the internet.
- It makes a certificate of the laboratory's own, so every connection is encrypted. On each device that opens the program in a browser, press **Download the laboratory's certificate** and install it once in "Trusted Root Certification Authorities".

To close it, press **Close it**. The program starts again and answers the server computer alone.

> **Caution**
> If the server's address changes (a new router, or an address the network gives each time), the certificate names an address the computer no longer has. The card says so. Press **Renew the certificate**, then start again. The devices keep trusting it. The lasting cure is a fixed address for the server, set in the router.

5.3 Joining a member computer

A member computer joins its server by **its own licence number**. The number tells it its branch.

On the server, before the new computer types its number:

1. In **Branch devices**, on the **Joining a new device to the branch's server** card, type **The new computer's licence number** and press **Allow it**.
2. The number may then activate itself within 24 hours.

On the member computer:

1. Install it as "A computer in an existing branch" (see 2.3 Server or member).
2. The first time the program starts, it asks for **This computer's licence number**. Type it as it came.
3. The computer looks for its branch's server on the laboratory's network, and joins it.

4. If it does not find the server, it asks for **The branch server's name or address**. The server's **The laboratory's network** card shows them.

The new computer then appears in **Branch devices**. If its state is **Waiting for approval**, choose it and press **Approval**.

The list of the branch's devices shows each computer's name, its licence, its route (**Inside the branch** or **Through Clarus Link**), and when the server last heard from it. Its filter shows the devices that are working, waiting for approval, without a licence, or working from outside.

To take a computer out:

- From the server: choose it and press **Remove the device**. Its sessions end at once, and it does not work until it joins again.
- From the computer itself: in its **This device** screen, press **Leave the branch**. It stops working until it joins again by its licence number.

> **Note**
>
> A member computer that also serves analysers or printers has a station of its own. It shows in the device's details, and is set up as in 6.2 Adding an analyser and 7.4 Stations and their states.

5.4 When a member computer cannot reach its server

A member computer keeps the analysers' results that it could not send to the server. Its **This device** screen says how many messages wait, and since when. They go by themselves when the server answers again.

When the waiting place is full, the computer refuses new messages. The analyser then keeps its results and sends them again. Check that the computer reaches its server: the network, the cable, or the server itself.

5.5 Linking the branches of a chain

A chain is several branches, each with its server, and a **centre**. The centre sets the laboratory's identity, prices, reference ranges and public website, and they reach every branch from there.

The branches link by themselves from their licence numbers. When a branch server or a centre is activated, its numbers tell it which branches are its brothers, and it connects to them through Clarus Link (see 5.6 Clarus Link). There is no invitation to make and no key to type.

- **A star around the centre.** Each branch sends to the centre, and the centre passes it on to the others.
- **A laboratory with no centre number:** the server of branch B01 acts as the centre. **Linking status** names it, after **The branch acting as the centre:**

- **A centre number issued later:** the role moves from B01 to the centre once the centre holds everything. **Linking status** follows the move. B01 then works as an ordinary branch, and nothing of its data is deleted.
- **The internet cut between branches:** each branch goes on working with its own server. What it changes waits, and is sent when the connection returns.

At a new branch:

1. Install a "Branch server" (see 2.3 Server or member), and activate it with its own server number (see 3.3 Activating the licence).
2. In the first setup, choose **Join an existing chain**. Its catalogue and users come from the centre, so their steps are reviewed, not written (see 3.1 The first setup). **Open branches and linking** opens **Branches and linking**, where the link to the centre shows.

> **Note**
>
> The older ways of linking, by a key or by an invitation, are closed. The program refuses them with one sentence: linking now happens by the licence number. **Invite a branch to the chain** appears only while an invitation made earlier is still open or waiting. **Approve** confirms a branch waiting, and **Withdraw the invitation** stops an open invitation's key working.

Each link shows its state, its route and its last exchange:

State	Meaning
Linked	The two branches exchange
Waiting for the key	The link is there, but the two servers have not yet confirmed each other. It clears by itself once both are activated and reach each other; if it stays, check each one's licence and Clarus Link (see 5.8 When the network or the link stumbles)
Paused	The exchange is stopped for now
Link ended	The two branches no longer exchange

The branches exchange by themselves. **Exchange now** sends what waits at once. Between branches that cannot reach each other at all, the exchange travels as a file: one branch exports it, and the other takes it by **Import a file**.

5.6 Clarus Link

Clarus Link joins, through the supplier's server, two computers that cannot see each other. It serves:

- the branches of a chain whose servers are not on one network;
- a member computer working from outside its branch;

- the managers' phones.

The connection is encrypted end to end. The supplier's server holds no key to it and reads nothing of it. It knows only which laboratory connected, when, and how many bytes passed.

Clarus Link is a service enabled for each laboratory. Its state shows in **Branches and linking**, and on the home page among the services. When it refuses a branch, the program says why:

What the program says	What to do
Clarus Link is not enabled for this laboratory	Contact the supplier to enable it
The trial has ended, so Clarus Link stopped	It returns when the service is enabled
Clarus Link does not recognise this copy yet	The copy must reach the update server at least once, and an activated copy must verify its licence online
Clarus Link is paused on the supplier's side	Nothing is wrong in the laboratory. Wait
Clarus Link already serves another copy holding this laboratory's identity	Run the laboratory's program on one computer only

In every case, access through the laboratory's own address still works where it is set up.

> **Note**
>
> A member computer whose server sits on a network Windows classes as public cannot reach it inside the laboratory, so it goes through Clarus Link, over the internet. Its **This device** screen says so. The cure is on the server: make its network private.

5.7 Working from outside the branch

A member computer may be allowed to work from outside its branch, for example a manager's laptop. In **Branch devices**, choose the device and set **Working from outside the branch**: **Closed**, **Always**, or **Until a day**.

The condition is set by the program: the device's Windows account has a PIN or a password, and its disk is encrypted with BitLocker.

A device can also be marked **trusted**. Then a user the manager chose signs in on it with the password alone, because the device's signature is the second factor. A personal device is never marked trusted. Its owner needs the app or an authenticator app (see 11.2 Password rules).

5.8 When the network or the link stumbles

What shows	Likely cause	What to do
This computer is not connected to the laboratory's network. Connect it by cable or Wi-Fi, then check.	The server has no network	Connect it by cable or Wi-Fi, then press **Check now**
The card says the network is not private	Windows classes the network as public, so its firewall keeps the devices out	Press **Make this network private** on the server
Windows did not apply the change: the approval was declined	Its window was answered "No", or not answered	Open it again and choose "Yes"
The certificate names an address this computer no longer has	The server's address changed	**Renew the certificate**, then start again. Then fix the server's address in the router
No device joins before the server is opened to the laboratory's computers.	The server was not opened to the network	Open it (see 5.2 Opening the server to the laboratory's network)
The branch's computers cannot find the server, which was opened before its number was activated	The discovery rule is missing	Open the server to the computers again, and accept Windows' question
A member computer works through Clarus Link inside the laboratory	The server's network is public	Make the server's network private
The member's outbox is full	The member has not reached its server for a long time	Check the network and the server. The results go by themselves afterwards
A link between branches is late to exchange or failing	No route between the two servers, or Clarus Link refused	Read the link's route and Clarus Link's reason. Exchange by file meanwhile
A browser on a device warns that the connection is not private	The laboratory's certificate is not installed on that device	Install it once in "Trusted Root Certification Authorities"

Chapter 6

Analysers

This chapter is for the support technician and the instruments engineer. It explains:

- How an analyser's results reach the program.
- How an analyser is added and linked, and how its codes are mapped to the catalogue's tests.
- How the link is checked, and what to do when results do not arrive.

6.1 How results arrive

No separate program is installed for analysers. The station inside the program itself serves them, the same station that prints (see 7.1 How the program prints). Each analyser has its own worker inside the station, so one analyser never holds up another.

Which computer serves the analyser?

- **A network analyser** is served by the server, unless another computer is chosen for it. An analyser connects to one address, so the member computers do not all open a port for it at once.
- **A serial analyser** is served by the computer its cable is plugged into. It is ticked on that computer's station, under **Analyzers cabled to this station** in the **Stations and printers** tab. An analyser belongs to one station, so ticking it on one takes it from any other.
- **A member computer** serves only what was ticked to it.

Ways of connecting:

Way	What happens	What the card needs
Network, the laboratory listens	The analyser connects to the station and sends its results. This is the default	**Network port**, by default `2575`. Each analyser has its own
Network, the laboratory calls	The station connects to the analyser, and connects again if the link drops	**The analyzer's network address** and its port
Network, the analyzer sends a datagram (UDP)	The analyser sends each result as one message and waits for no answer	**UDP port the analyzer sends to**, by default `20035`. The analyser's address is required
Serial port	A cable between the analyser and the station's computer	**Serial port**, **Line speed**, **Data bits**, **Parity**, **Stop bits** and **Flow control**. By default 9600, 8, **No parity** and 1, with no flow control

Way	What happens	What the card needs
File folder	The analyser exports its results as files to a folder, and the station reads the folder every two seconds	**The folder the analyzer exports its results to**. Each file read is moved to the `processed` subfolder

Protocols: ASTM (E1381 and E1394), HL7 in an MLLP envelope, TEXT and CSV with a template describing the message, and POCT1-A. POCT1-A does not run on a serial port. The program chooses the protocol from the maker and model (**From the maker and model**), and the technician may change it.

6.2 Adding an analyser

The page opens from the **Settings** menu, then **Devices and printers**, then the **Analyzers** tab. Changing it needs the **Manage devices** permission.

1. Press **Add an analyzer**.
2. Under **The analyzer**: type the **Analyzer code** and the **Analyzer name**, and choose the **Maker**, the **Model** and the **Department**.
3. Choose the way of connecting, and type what the table above asks for.
4. Set, when needed:
   - **Character encoding** and **Message envelope**.
   - **Where the sample number is in the message**.
   - **Waiting times**: leave them empty to keep the standard's times, and fill them in only when the analyser's manual says otherwise.
5. Under **Results**, decide whether the analyser's results are approved automatically: **This analyzer's results are approved automatically when they pass every approval check**.
6. Under **Alert**, type the **Minutes of silence before the alert while work waits (0 switches it off)**.
7. Press **Save**.

The analyser then shows the page **What to type in the analyzer's LIS settings**. It gives the address of the computer that serves it, its port, and the line and protocol settings, as they are typed into the analyser's own menus. Beneath it come **The analyzer's guide: what to set in its menus**, **Where a link usually stumbles** and **How to check once it is set**: this model's guide if the library has one, otherwise the general guide of its protocol. A guide not yet tried on a real analyser carries a mark saying so.

> **Caution**
>
> If the tube number is digits only and the analyser does not read the barcode, it may give the sample its own running number, and the result is then filed on another tube. Turn on barcode reading in the analyser, or give the tube number a prefix. The program warns of this on the analyser's card.

A label with a Code 39 check character. If the laboratory's label carries a check character, the program verifies it when the analyser sends the number back, then removes it. About one number in 43 has a **space** as its check character, so the label ends in a blank. Some analysers send that blank back and some trim it, and the program finds the tube either way. A wrong check character is refused. Two blanks or more at the end are padding, not a check character.

6.3 The firewall and the network

A network analyser needs a rule in the Windows firewall on the computer that serves it:

1. Press **Open the port in the firewall** on the analyser's card.
2. On the computer that serves the analyser, accept Windows' request within two minutes.

A rule is added for this analyser alone, in the group `Clarus LIS analyzers` (see A.4 Firewall rules).

The port is opened to the analyser's address alone when the card has one. Otherwise it is opened to the networks the laboratory declared. A UDP port is never opened without the analyser's address, because the sender's address in a UDP message can be forged.

> **Danger**
>
> The program never opens an analyser's port on a network Windows classes as Public. If the computer is on a Public network, no results arrive, and the card warns of it. If this is the laboratory's trusted network, the computer's administrator makes it Private in Windows' settings. The program never changes how a network is classed.

6.4 Mapping the analyser's codes to tests

The analyser sends each result under its own code. No result is filed until its code is mapped to a test of the catalogue.

From the Clarus library. The **Library** tab holds ready link files, each with the maker, the model, the way of connecting and the table of codes. Each file carries its evidence:

- **Tried on a real analyzer**.
- **Written from a document — review it**.

1. Choose the file and press **Take it**.
2. Choose the analyser it applies to.
3. Press **Review what it would change**. What would be added and what would change are shown.
4. Press **Apply these codes**.

Codes can differ between laboratories. Check the review against your own analyzer before releasing results through it.

If the library cannot be reached, opening a link file the laboratory holds always works: **Open a link file**. Likewise **Save the link file** saves the analyser's link to a file, for a matching analyser or as a backup. A link file carries no patient data.

By hand. The **Test codes** tab holds every code the analyser has sent, with those that arrived **Not mapped** first. Choose the code, press **Map it to a test** and choose the test. **One code may mean several tests: «Map it» changes its test, «Add it too» keeps it and adds this one, and a result lands on whichever the tube carries.**

6.5 Checking the link

On the analyser's card:

- **Test the connection**: the station connects to the analyser, or opens its port, and says whether it reached it.
- **Test message**: a message is pasted as the analyser sends it, and handled as if it came from the analyser. It tries the whole link before the analyser has sent anything.
- **The link now**: whether the link is open and since when, the last message, how many were received and held today, and **The station serving it**.
- **Link log**: every connection, disconnection and error, with its time.
- **The analyzer's messages**: the incoming and outgoing messages as they are, **Patient data hidden** or **Complete**. A message that was not filed carries its reason as a sentence in the program's language, not the analyser's code.
- **Held messages**: what the analyser sent that was not filed, each with its reason. Fix the reason, choose the rows and press **Process again**.

6.6 Three worked examples

Three analysers, one for each way of connecting. Each maker's own document says how its analyser connects. What is typed on the analyser's side is said here in general terms: the names of its menus are in its maker's manual.

6.6.1 A network analyser speaking HL7: Roche cobas pro

Roche's technical specification of cobas pro gives it a host connection over the network with HL7.

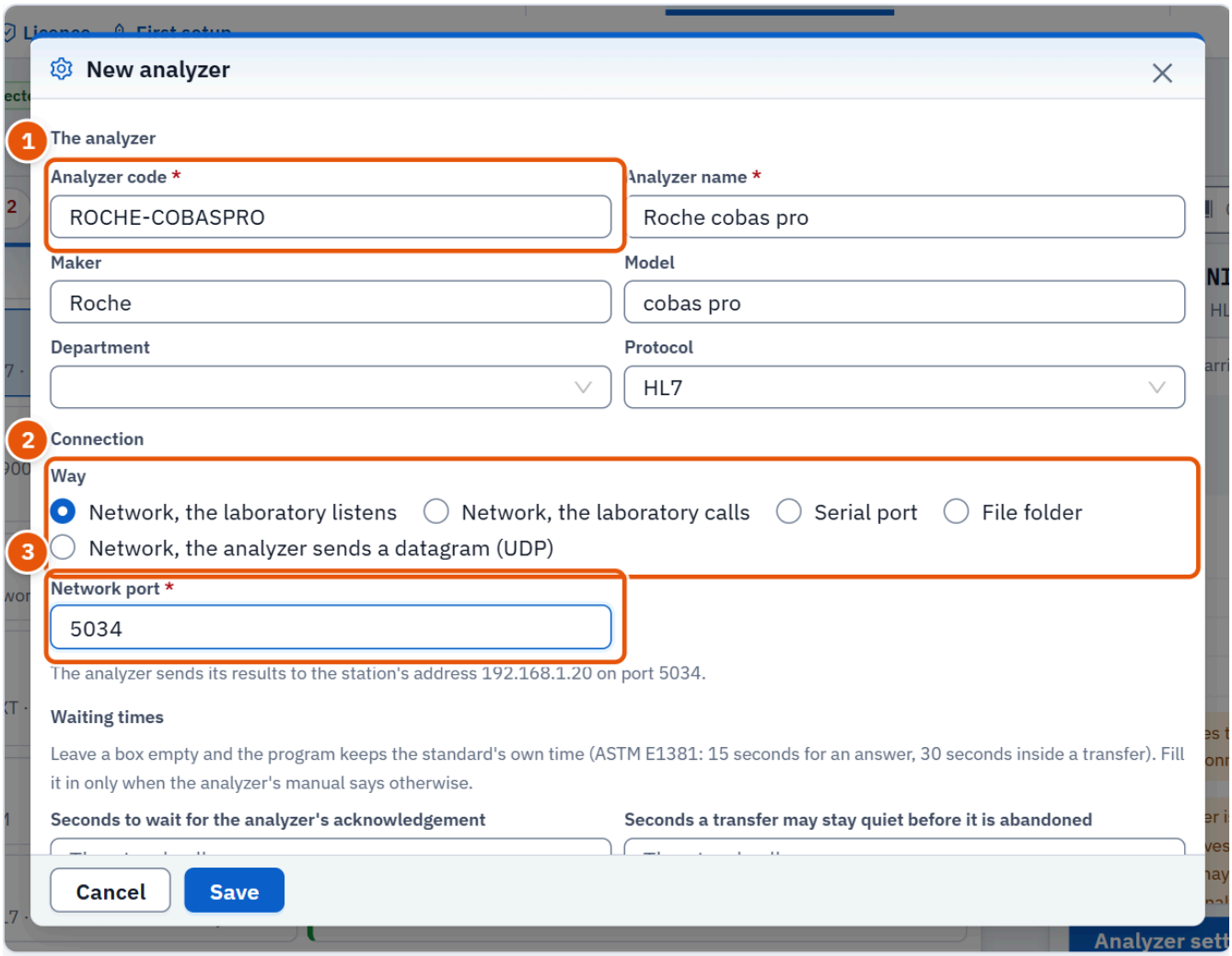


Figure 6-1: The new analyser's window, filled for cobas pro

1. Press **Add an analyzer**.
2. (1) Type the **Analyzer code** `ROCHE-COBASPRO`, the **Analyzer name**, the **Maker** `Roche` and the **Model** `cobas pro`, and choose `HL7` as the protocol.
3. (2) Choose **Network, the laboratory listens**.
4. (3) Type the **Network port**: `5034`. Each analyser has a port of its own.
5. Press **Save**, then **Open the port in the firewall** (see 6.3 The firewall and the network).

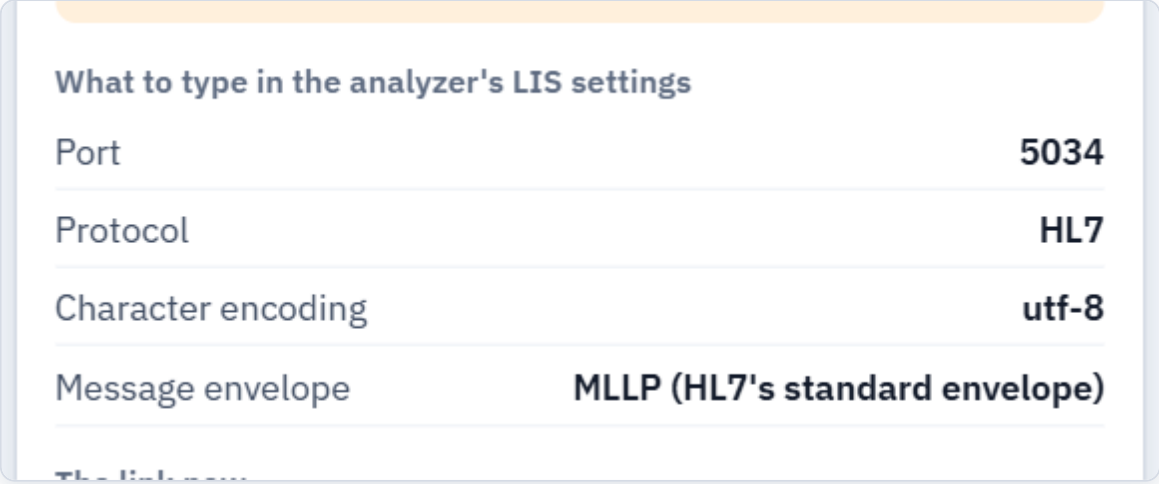


Figure 6-2: What to type on the analyser

The card then shows **What to type in the analyzer's LIS settings**: the address of the computer that serves the analyser and the port. **On the analyser's side**, in its settings for the laboratory system: the host's address and port as the card gives them, the protocol HL7, and sending results to the host automatically.

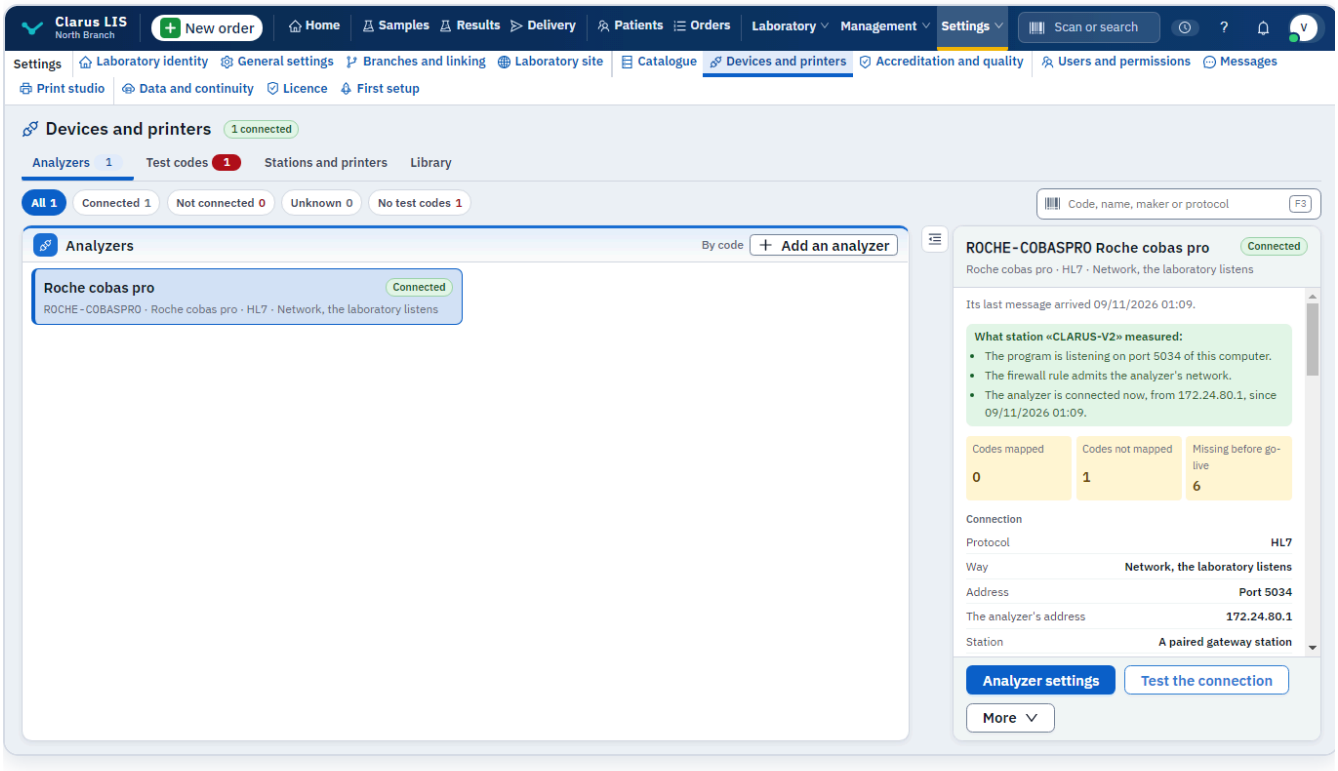


Figure 6-3: The connection test: the station reached cobas pro

With the analyser set up, press **Test the connection**: the station on the computer that serves it looks for it, and the card says whether it reached it, from which address, and since when. For a network analyser the card then lists what the station measured: whether the program listens on the analyser's port, whether the Windows Firewall rule admits the analyser's network, and whether the analyser is connected now.

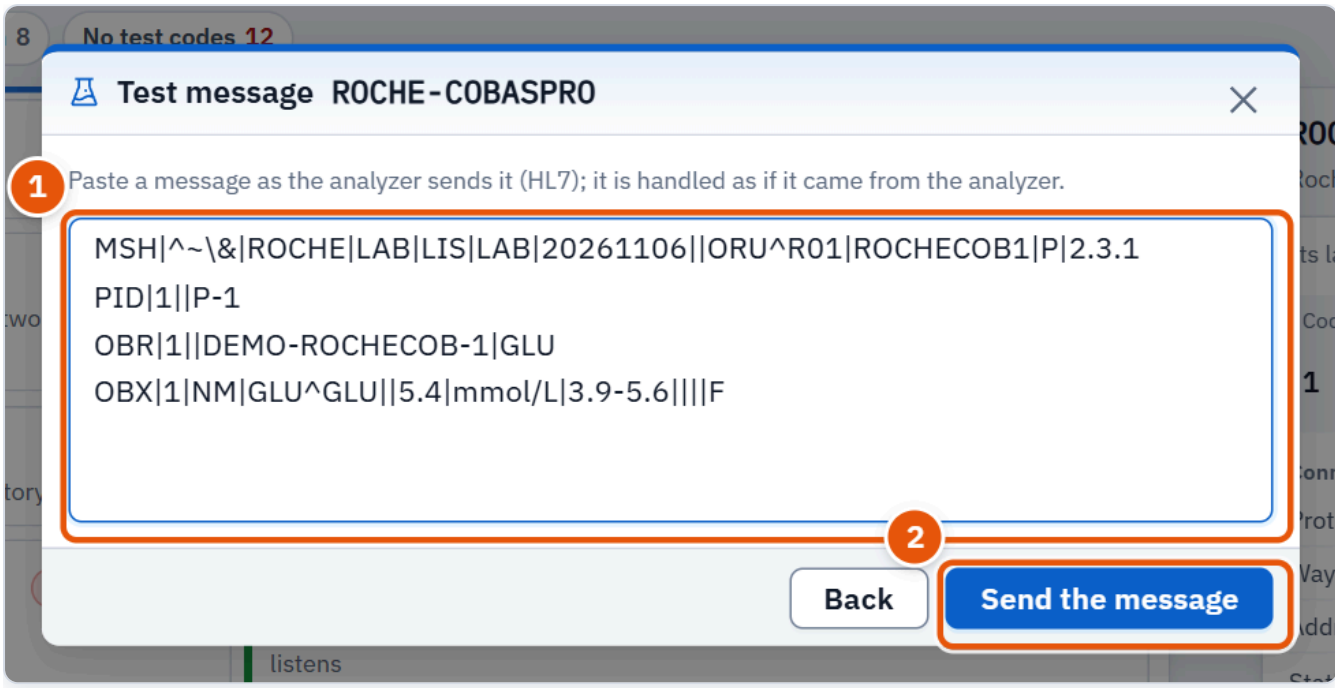


Figure 6-4: A test message pasted as cobas pro sends it

To try the whole link before the analyser has sent anything: **More**, then **Test message**.

- 1 Paste a result message as the analyser sends it.
- 2 **Send the message** records its results as if they came from the analyser. Use it with the number of a test tube only.

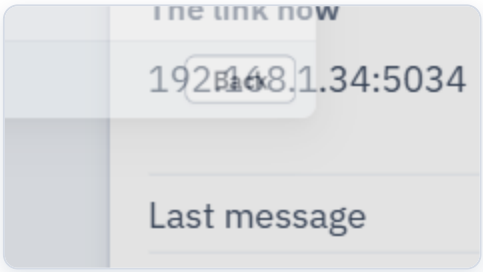


Figure 6-5: The messages that arrived from cobas pro

Once the analyser sends, each message shows in **The analyzer's messages**, as it arrived.

6.6.2 A serial analyser speaking ASTM: Stago STA Compact Max

Stago's document of its ASTM protocol connects the analyser over an RS-232 serial line, at 9600 bauds by default, with 8 data bits and no parity.

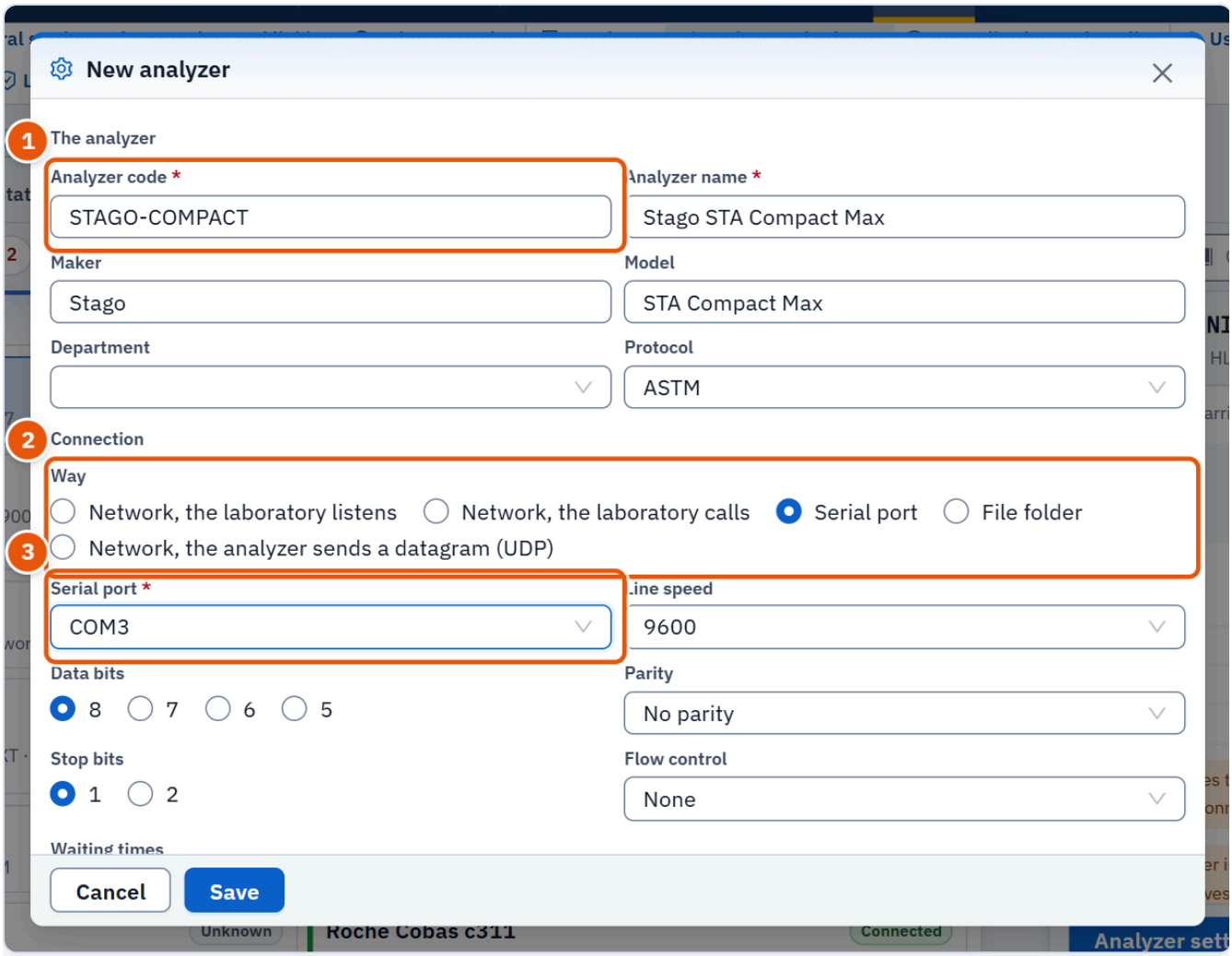


Figure 6-6: The new analyser's window, filled for STA Compact Max

1. Press **Add an analyzer**.
2. 1 Type the **Analyzer code** `STAGO-COMPACT`, the **Maker** `Stago` and the **Model** `STA Compact Max`, and choose `ASTM`.
3. 2 Choose **Serial port**.
4. 3 Choose the **Serial port** the cable is plugged into, here `COM3`, then **Line speed** 9600, **Data bits** 8, **Parity No parity** and **Stop bits** 1. The list holds the ports the stations report; an empty list points to the cable or its adapter's driver (see 6.8 When results do not arrive).
5. Press **Save**.

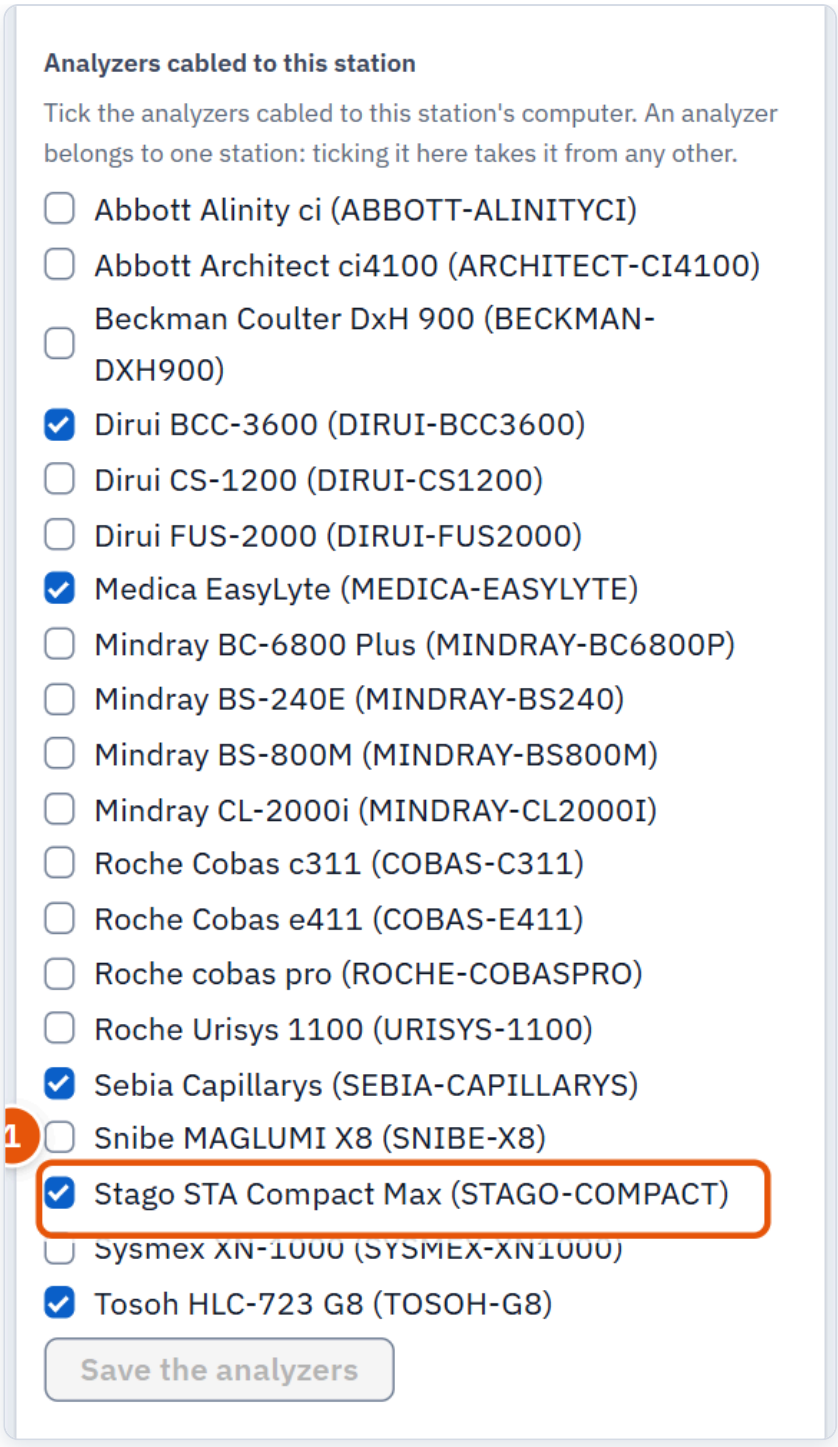


Figure 6-7: The analyser ticked on the station its cable is plugged into

A serial analyser is served by the computer its cable is plugged into. In the **Stations and printers** tab, choose that computer's station, 1 tick the analyser under **Analyzers cabled to this station**, and press **Save the analyzers**.

On the analyser's side, in its settings for the laboratory system: the same line settings as the card (speed, data bits, parity and stop bits), the protocol ASTM, and sending results to the host automatically.

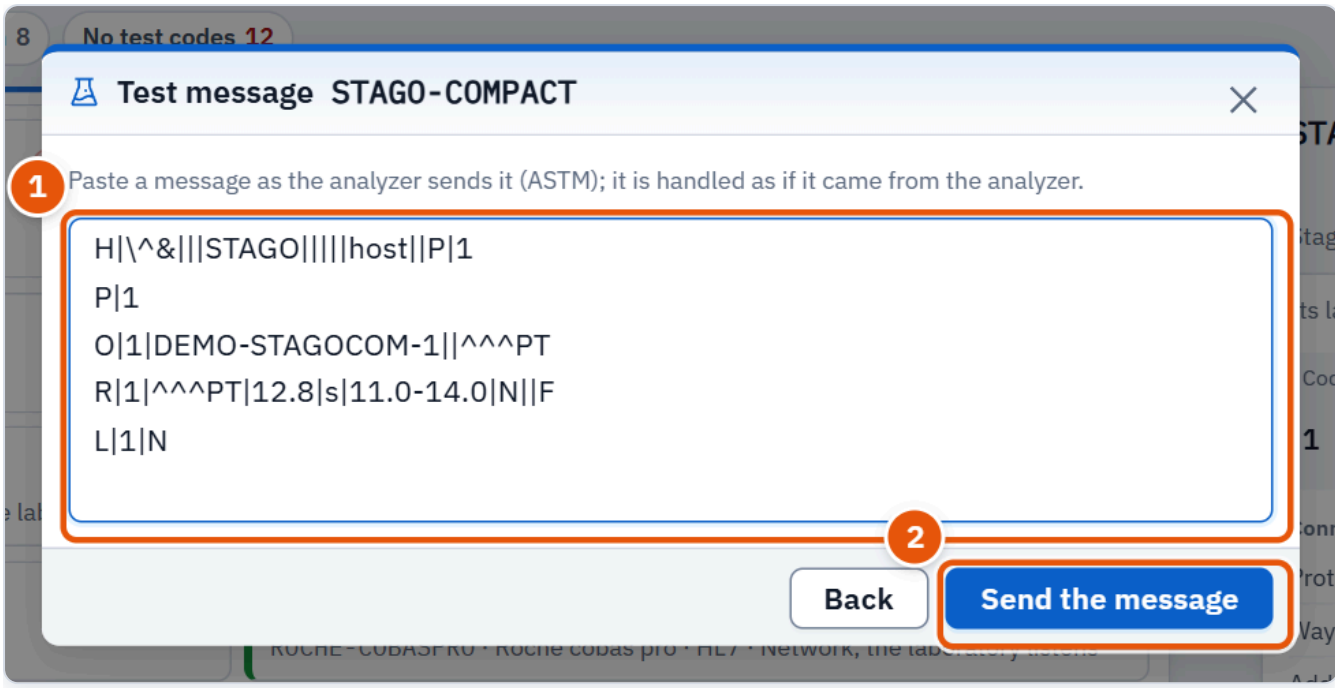


Figure 6-8: A test message pasted as STA Compact Max sends it

The test message is pasted as the analyser sends it, its records one per line, as in the HL7 example: 1 the message, 2 **Send the message**.

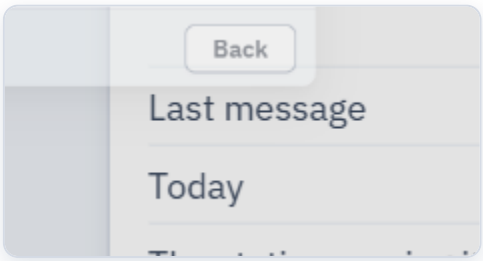


Figure 6-9: The messages that arrived from STA Compact Max

6.6.3 An analyser exporting files: Sebia Capillarys 3

Sebia's document of the PHORESIS host module lists, among its ways of connecting to the laboratory system, exchanging files. The analyser writes its results into a folder, and the station reads that folder.

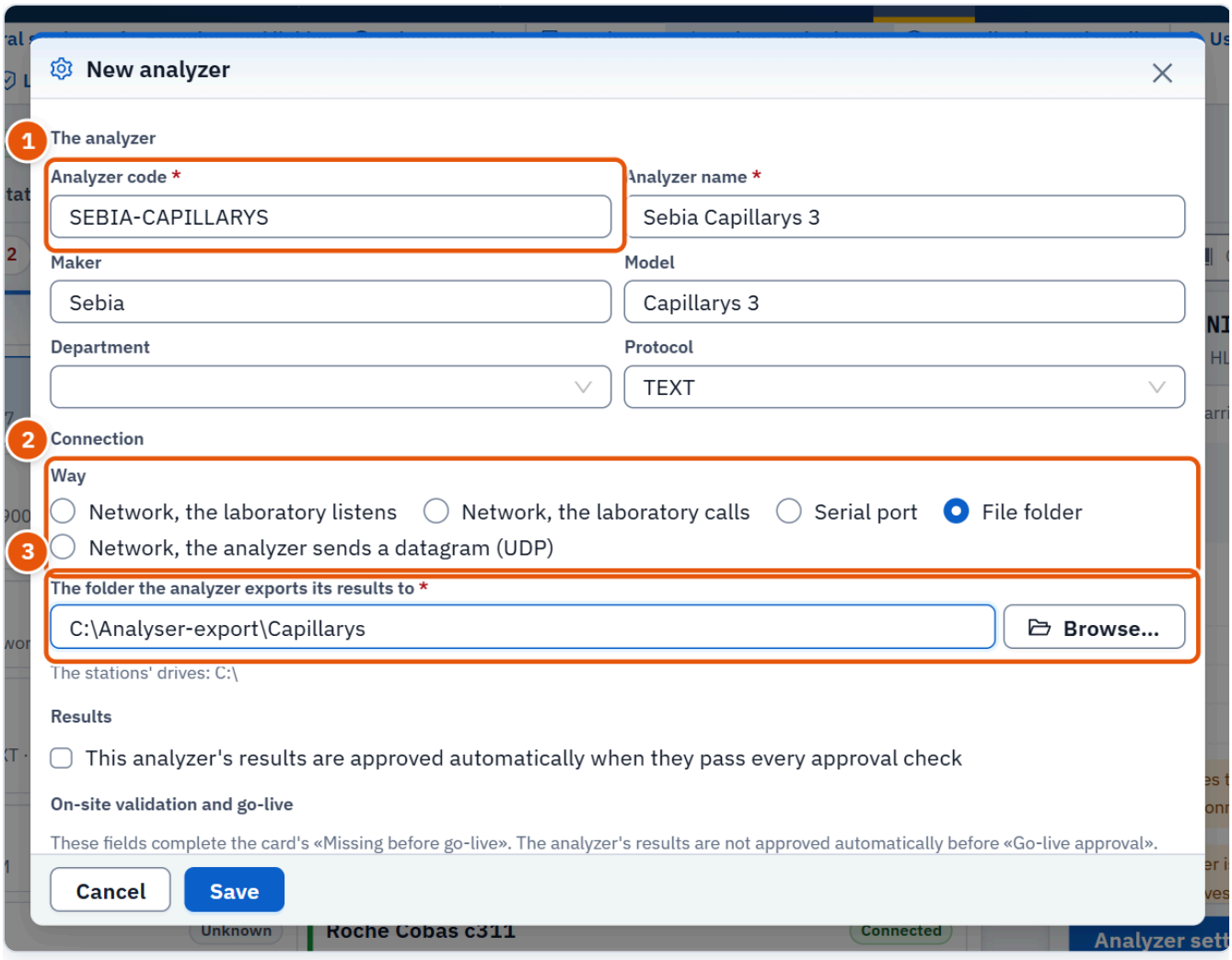


Figure 6-10: The new analyser's window, filled for Capillarys 3

1. Press **Add an analyzer**.
2. 1 Type the **Analyzer code** `SEBIA-CAPILLARYS`, the **Maker** `Sebia` and the **Model** `Capillarys 3`.
3. 2 Choose **File folder**.
4. 3 Type the **The folder the analyzer exports its results to**, or press **Browse** to choose it.

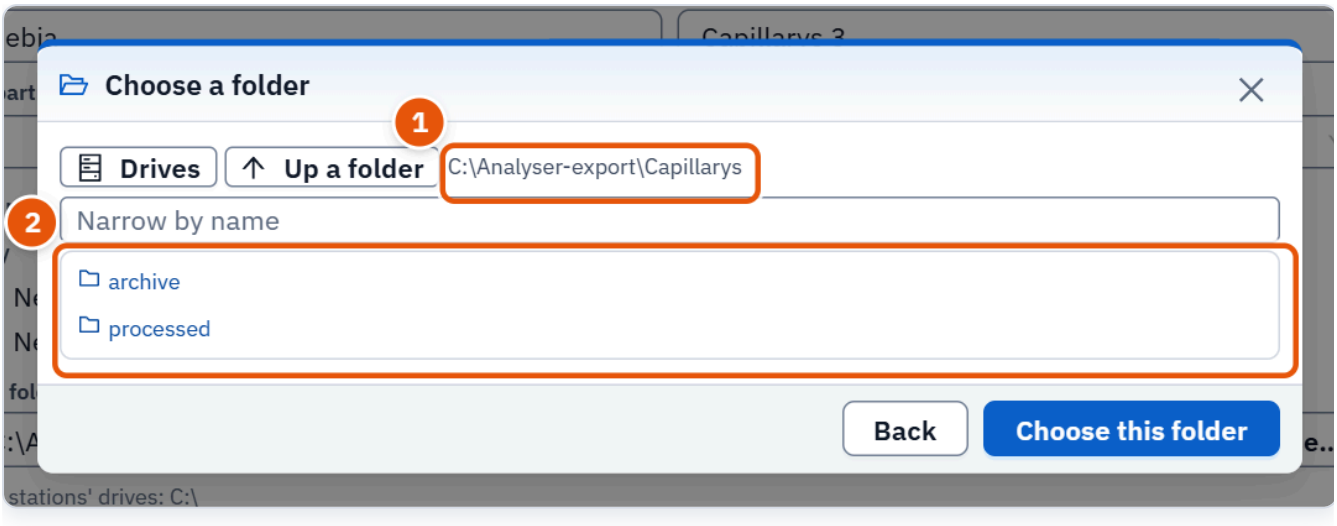


Figure 6-11: Choosing the folder on the station's computer

Browse opens the folders of the computer whose station serves the analyser, not those of the computer in front of you: 1 where you are, 2 its folders. Open the folder the analyser exports to and press **Choose this folder**.

The file's layout is not published in what was found for this analyser, so the example stops here: until the layout is set, the card says **This analyzer's file format is not set yet, so its files will not be read: set it under «Results files» below the card.** The layout is written from the maker's description of its result file.

On the analyser's side: export the results as files to the same folder, shared with the station's computer if the analyser's own computer is another.

6.7 Both directions: work orders

With **Both directions** chosen, the analyser takes from the program what to run on each tube, in one of two ways:

- **The analyser asks** about the tube when it reads the barcode. **How the analyzer asks about a tube** is chosen: ORM^O01, QBP^Q11, or QRY^Q02 with DSR^Q03.
- **The program sends** work orders as tubes arrive: **Send work orders to the analyzer automatically as tubes arrive**, with the **Work-order message**: ORM^O01, OML^O21 or OML^O33.

Both directions work only with HL7 and ASTM, never with files. The **Work orders** screen shows what was sent to each analyser, what came back, and what was not filed and why.

6.8 When results do not arrive

What shows	Likely cause	What to do
No station serves this analyzer now: run the program on the computer it is connected to.	The program is not running on the computer that serves the analyser	Sign in to Windows on that computer (see 4.3 How the program starts)
No station has been marked as cabled to this analyzer yet: tick it on its station in «Stations and printers».	A serial analyser not ticked on any station	Tick it on the station of the computer its cable is plugged into
No station has reported a serial port yet. Plug the cable into the station's computer, then open this window again.	The cable is not plugged in, or the USB adapter's driver is not installed	Plug in the cable, install the adapter's driver, then open the window again
Waiting for the firewall rule	No firewall rule	**Open the port in the firewall**, and accept Windows' request
The permission request lapsed: ask again or **The permission was refused: ask again**	Nobody accepted Windows' request in time	Ask again, and accept it on the computer that serves the analyser
A warning that the network is Public	Windows classes the network as Public	The computer's administrator makes it Private, as above
The port is taken	Another program, or another analyser in the program, uses the port	Choose another port, and type it into the analyser too
A shared port needs the analyzer's address	Two analysers on one port	Type each analyser's address on its card
The analyzer could not be reached	The analyser's address is wrong, the analyser is off, or it is on another network than the computer	Check the address and the cable, then **Test the connection**
The folder is missing	The export folder does not exist on the station's computer	Create the folder or correct its path
This analyzer's file format is not set yet, so its files will not be read: set it under «Results files» below the card.	The analyser's file format is not set	Set it as the message says
The link is open, no results, and the messages are in **Held messages**	An unmapped code, or a sample number the program does not know	Map the code, or correct **Where the sample number is in the message**, then **Process again**

What shows	Likely cause	What to do
Strange letters in patients' names on the analyser	The encoding does not match the analyser	Correct the **Character encoding**
The link drops in the middle of a transfer	The times are shorter than the analyser needs	Set the **Waiting times** as the analyser's manual says

Chapter 7

Printers

This chapter is for the support technician and the laboratory's computer administrator. It explains:

- How the program prints the label, the receipt and the report, and from which computer.
- How each printer is bound to its role, set up and tested.
- What to do when a printer does not print.

7.1 How the program prints

The program has three printing roles, and each role has its printer:

Role	What it prints	Default paper	Usual command language
Label printer	The tube's label	A 50 × 25 mm label. Its size is chosen between 20 and 110 mm wide and between 10 and 80 mm high	ZPL or TSPL
Receipt printer	The patient's receipt	An 80 mm thermal roll. Also 58 mm, A4 and A5	ESC/POS
Report printer	The results report	A4	The Windows driver

Printing goes one of two ways, chosen in **How the program prints**:

- **Silent printing through the stations**, the default. Each station sends the job to the printer chosen for its role, with no window at all.
- **The browser's print dialog**. The browser's print window opens for every label, receipt and report, and the user picks the printer.

The station is part of the program itself, so it is never installed on its own. The server has a station, and so does every member computer. Each station reads its own computer's printers and prints on them:

- **The server's station** pairs itself with the laboratory the first time the program starts.
- **A member computer's station** is given to it when it joins the server, and taken away when it is removed.

So a user on a member computer prints on the printers at their own desk, not on the server's. A computer that only opens the program in a browser, with nothing installed, has no station. It always prints from the browser's print window.

> **Note**
>
> If no printer is chosen for a role on the station, the browser's window opens for that role alone, and the other roles stay silent.

7.2 Binding printers to their roles

The page opens from the **Settings** menu, then **Devices and printers**, then the **Stations and printers** tab. Changing it needs the **Manage devices** permission.

1. Choose the station from the list. Under **The chosen station** appear its state, its printers, the analysers cabled to it, and its latest jobs.
2. Under **Printers**, choose a printer for each role from those the station detects on its computer.
3. Choose the **Command language** for each printer:
   - **Automatic**: the program knows the printer's language from its name. It is the right choice in most cases.
   - **ZPL**, **TSPL** or **ESC/POS**: the program sends the printer's commands in its own language.
   - **Windows driver**: the program draws the page as a picture and prints it through the printer's Windows driver.
4. Press **Save the printers**.
5. Press **Test page**. A test page comes out of every bound printer.

When a printer first appears, the program chooses its role and language by itself, from its name:

- **Zebra** is a label printer speaking ZPL.
- **TSC** and its like are label printers speaking TSPL.
- 58 and 80 mm roll printers are receipt printers speaking ESC/POS.
- Label printers whose language the program does not write, such as Brother QL and DYMO LabelWriter, print through the Windows driver.
- **A printer the program does not recognise is taken for a report printer.** An A4 page out of an unknown device is a smaller mistake than sending patients' labels to a printer that cannot read them.

It then binds each role to a printer by these rules:

- **The label role takes only a label printer.** If there is none, the role stays empty and the label prints from the browser's window. That is safer than sending patients' labels to the office printer and telling the user they printed.
- **The report role** takes any printer that is not a label printer, preferring the Windows default printer.
- **The receipt and report roles** stand in for each other when one has no printer.

What the program chose is shown beside each role under **What the station detects**, and what the technician saves comes before it.

> **Caution**
>
> The program never prints directly to virtual printers, such as printing to PDF or XPS. If the station finds nothing else, the message reads: **Only virtual printers were found, and nothing is printed to them directly.**

7.3 Printing settings

The same page has the **Printing settings** button. It holds:

Section	Setting	What it does
The way	**How the program prints**	Silent printing or the browser's window, as above
The label	**Label printer resolution**	`203` dots per inch by default. It must match the printer's real resolution, or the label comes out at the wrong size
The label	**Print direction**	**As the printer is set**, **Normal** or **Upside down**
The label	**Horizontal offset (mm)** and **Vertical offset (mm)**	Correct where the print lands on the label
The report	**Report horizontal offset (mm)**, **Report vertical offset (mm)** and **Report size (%)**	Correct a printer that shifts or shrinks the page
The receipt	**Receipt horizontal offset (mm)**, **Receipt vertical offset (mm)** and **Receipt size (%)**	The same for the receipt

An offset runs from −30 to 30 mm, and a positive one moves right and down. A size runs from 50 to 150%. An empty box keeps the printer as it is set. These values apply on paper only, silent or through the browser's window, and never change the PDF a patient receives.

To calibrate the label printer:

1. Press **Calibration label** and choose the station. A label comes out showing the real edges of the print.
2. If the label is shifted from its edges, type the offset needed in millimetres.
3. Save, and print the calibration label again until it sits straight.

The label's size and what is printed on it, the receipt's paper and its parts, and the report's layout, header, footer and signatures are all designed in **Print studio**. They are explained in Appendix D: Settings reference.

7.4 Stations and their states

Each station has a card in the **Stations and printers** tab. Its state is one of **Online**, **Offline**, **Updating** or **Revoked**, with the time it was last seen beneath.

Latest jobs shows the state of every job sent to it:

State	Meaning
Waiting	Waiting for the station to take it
At the station	The station took it and has not reported the outcome yet
Done	Printed
Failed	Not printed. The reason is written beside it
Timed out	The station did not take it in time

A station updates itself with the program on its computer, so it needs no update of its own.

Taking a station back. The **Take the station back** button stops the station. It neither prints nor receives from the analysers cabled to it until it is paired again. The server's station, once taken back, stays that way and does not return by itself. If it was taken back by mistake:

1. Stop the program on the server (see 4.4 Stopping and restarting).
2. Rename the file `gateway-station.json` in the data folder. Do not delete it.
3. Start the program. The station pairs again, with a new card.
4. Bind its printers to their roles again, and tick the analysers cabled to it.

Pairing a new station. The **Pair a new station** button makes a pairing code for the separate station program, on a computer that is neither the server nor a member. The code is valid for a limited time and is shown once only. The server and the member computers never need it.

7.5 When the printer does not print

What shows	Likely cause	What to do
Printing through the browser: the station's direct printing is not available now. The print station is not running or has not reported in: check that the program is running on that computer.	The program is not running on the station's computer	Sign in to Windows on that computer and wait a minute (see 4.3 How the program starts)

What shows	Likely cause	What to do
No print station has been paired yet.	The server's station has not paired yet	Restart the program on the server. If the station was taken back, follow the steps above to bring it back
Direct printing is not set to the station in the print settings.	The way is set to the browser's window	Choose **Silent printing through the stations** in **Printing settings**
No printer is chosen for this document: choose one on the «Devices and printers» screen.	No printer for this role on the station	Bind a printer to the role, then print a test page
This station cannot print reports silently: update the program on it.	The program on that computer is older than the server's	Update the program on that computer (see Chapter 9: Updates and rollback)
The printer did not print: it is switched off, unplugged or stuck.	The printer is off, unplugged or stuck	Switch it on and check its cable. **It is still in the Windows queue and may print when the printer comes back.**
The printer is out of paper.	Paper or labels ran out	Load new paper
This printer's driver takes text only and cannot draw pictures. Choose the printer's own language for it (for example ESC/POS) or another printer.	The printer's driver is text only, and its language is set to **Windows driver**	Choose its right language, such as ESC/POS
The label comes out blank, or prints strange text instead of a barcode	The command language does not match the printer	Choose the language the printer speaks, or **Windows driver**
The label prints larger or smaller than its edges	The resolution set is not the printer's	Correct **Label printer resolution**, for example `300` instead of `203`
The print is shifted from the edge	The printer's calibration	Use the **Calibration label** and the offsets
The browser blocked the print window. Open the page to print it.	The browser blocked pop-ups	Press **Open the page**, or allow the program's pop-ups in the browser
A message that only part was sent to the printer	Sending stopped half-way	Reprint the rest, as the message says

Chapter 8

Backup and restore

This chapter is for the support technician and the laboratory's IT administrator. It covers:

- how the program saves the laboratory's data by itself every day, and where it puts the backups;
- how to make sure a backup can really be restored;
- how to keep a second copy off the machine;
- how to restore the laboratory from a backup, on the same computer or on a new one.

It ends with a table of problems and what to do about each, and a routine checklist.

> **Danger**
>
> A backup is the only way back to the laboratory's data when a disk fails, a computer is stolen or a virus strikes, and a backup that has never been restored cannot be relied on. A technician does not leave a laboratory before the Backups page shows a recent backup that is verified and whose restore drill passed.

8.1 How the program saves the laboratory

8.1.1 The automatic daily backup

When it is installed, the program creates a daily backup job with the code `LOCAL-DAILY`. It works like this:

- **The job is due at once after installation**, so the first backup is taken in the program's first minutes, not the next day.
- **The program looks for due jobs every fifteen minutes** while the program runs on the server, and takes every backup whose time has come.
- **After each successful backup**, the next is set twenty-four hours later.
- **If the computer was off at the time**, the backup is taken at the first check after it starts, so no day is skipped.

The backup runs inside the program itself, not as a separate Windows scheduled task, so nothing is backed up while the program is not running on the server. The program starts by itself, with no window, at every Windows sign-in on the server (see 4.3 How the program starts), so on a server that was restarted and that nobody has signed in to, the program is not running. That is the first thing to check when the page says there is no recent backup (see 8.11 Problems and what to do).

8.1.2 What one backup holds

One backup is a set of files that share a name and are always kept and removed together. The name is the job's code, then the date and time the backup was taken in universal time (UTC). A backup taken on `2026-11-03` at `02:00:00` UTC is named:

File	What it holds
`LOCAL-DAILY-20261103-020000.postgres.dump`	The whole laboratory database: patients, orders, results, invoices, settings, catalogue and users
`LOCAL-DAILY-20261103-020000.manifest.json`	The backup's card: the file's fingerprint (SHA-256), when it was taken, and a signature proving this program wrote it
`LOCAL-DAILY-20261103-020000.media.tar.gz`	The attachments: uploaded pictures and documents. It is not created when the laboratory has none

The file is written first under a temporary name ending in `.part`, then renamed when it is complete. A file ending in `.part` is an unfinished backup, and nothing is restored from it.

The **Download a backup now** button gathers the whole set into one file whose name ends in `.clarus-backup.zip`. That file is the easiest way to carry the laboratory to another computer.

8.1.3 Encryption

Backups are not encrypted by default, and this is deliberate. A backup restores on any computer with no code or key that could be lost. The price is that whoever holds the file can read it. Protecting the medium is therefore the laboratory's responsibility:

- where the external disk is kept;
- who can reach the computer;
- whether the computer's disk is encrypted.

This is the same for every medical system that runs inside the laboratory.

The page says of each backup whether it is **encrypted** or **not encrypted**. Where an installation does encrypt its backups, the code that opens them on another computer is the **Recovery code** (see 8.8 The recovery code).

8.2 Where the backups are kept

Setup puts the backups **outside the program's folder and outside the data folder**, so neither uninstalling the program nor deleting the data folder can take them:

Computer	Default backups folder
Has a usable fixed drive D	`D:\Clarus\Clarus_prime-backups`
Has no drive D	`C:\ProgramData\Clarus\Clarus_prime-backups`

The data folder itself is `D:\Clarus\Clarus_prime\data` on a computer with a drive D, and `C:\ProgramData\Clarus\Clarus_prime\data` on any other.

The backups folder is changed on the page, in the field **The backups folder on this computer** (see 8.5 Keeping, and the backups folder). This is required after restoring a laboratory that came from another computer, because the job still names the old computer's folder.

> **Caution**
>
> On many computers drive D is only another part of the same physical disk. If the disk fails, both are lost. Backups on the computer alone are not enough: set up a second copy off the machine (see 8.6 The second copy off the machine).

8.3 The Backups page

Open the page from the **Settings** menu, then **Data and continuity**, then the **Backups** tab. It is seen by users with the **Manage settings** or **Import data from a previous system** permission. Taking, verifying and restoring backups need **Manage backups**.

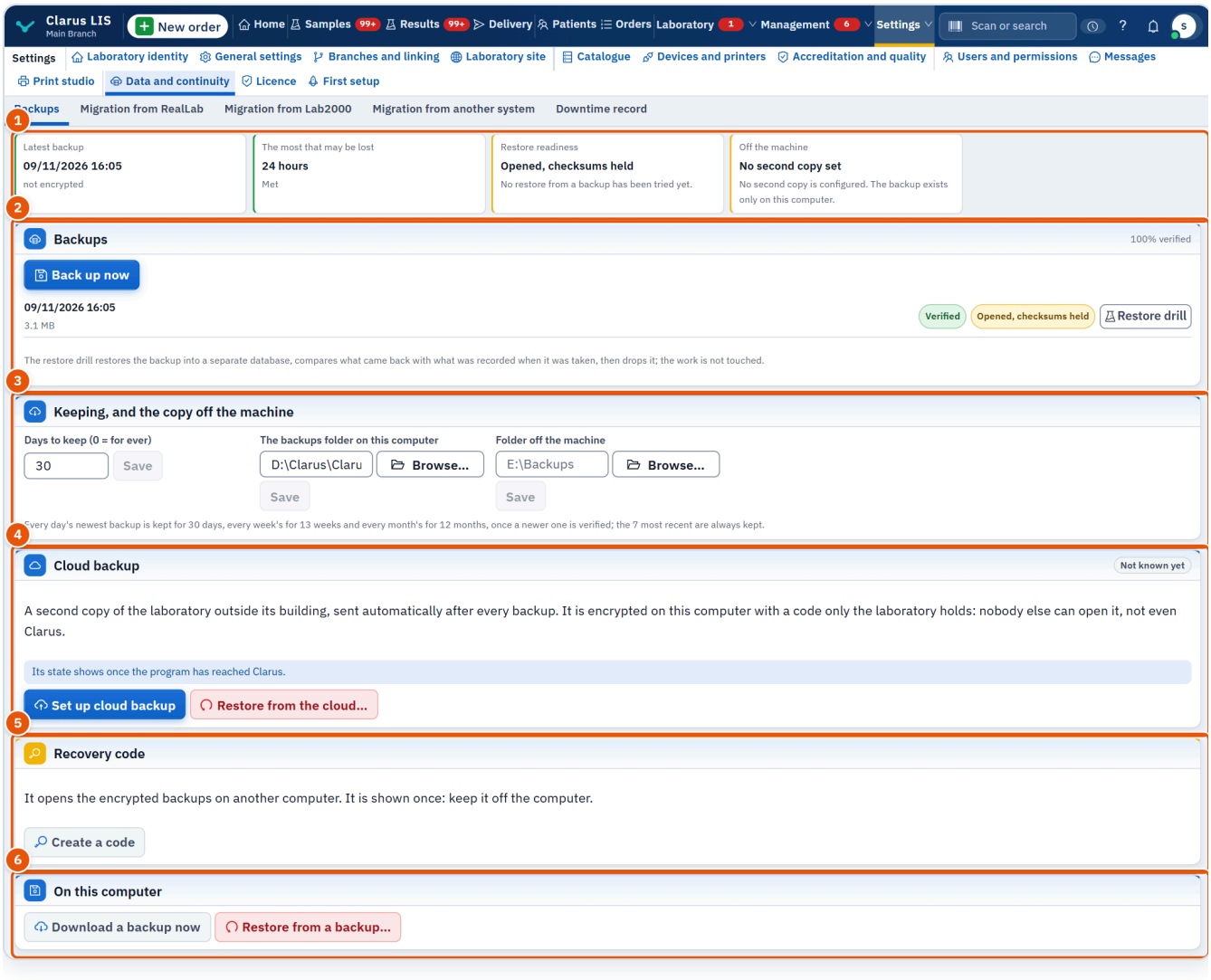


Figure 8-1: The whole Backups page, its parts numbered

From the top of the page:

- 1 **The four facts:** the state of protection at a glance.
- 2 **Backups**: the backups taken, with the buttons to take, verify and drill them.
- 3 **Keeping, and the copy off the machine**: how long backups are kept, the backups folder and the second copy.
- 4 **Cloud backup**: the paid service for a copy outside the building.
- 5 **Recovery code**: to open encrypted backups on another computer.
- 6 **On this computer**: download a backup now, and restore from one.

8.3.1 The four facts

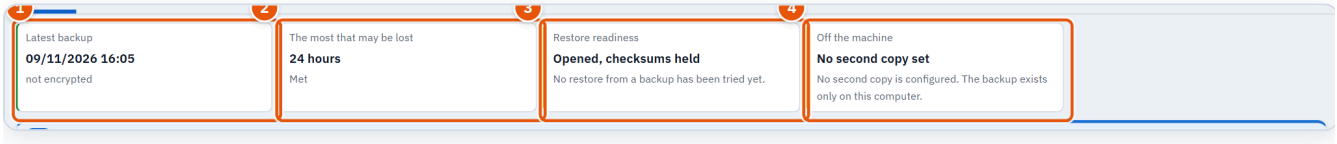


Figure 8-2: The four facts at the head of the page

Fact	What it means	When to worry
1 **Latest backup**	When the latest successful backup was taken, and whether it is encrypted	When it reads **No backup yet**, or the date is more than a day old
2 **The most that may be lost**	The most work that may be lost: twenty-four hours, that is, one backup a day at least	When **Not met: no recent backup** shows under it
3 **Restore readiness**	Whether restoring a recent backup has been tried, and passed	When it reads **Restore not tried** or **Restore drill failed**
4 **Off the machine**	The folder a second copy goes to, and whether it can be reached now	When it reads **No second copy set**, or the folder cannot be reached

Each fact's colour sums it up: green is sound, yellow needs attention, red needs action now.

When free space on the disk runs low, a note says so above the list of backups:

- **Warning:** at ten gigabytes or less, or at 15 % or less of a disk of fifty gigabytes or less.
- **Critical:** at three gigabytes or less.
- **Emergency:** at one gigabyte or less. The note then says that the database is about to stop.

8.3.2 The list of backups

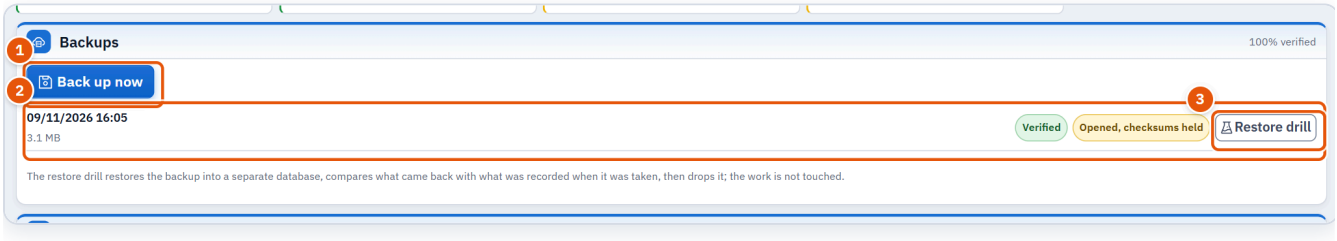


Figure 8-3: The list of backups and its buttons

The list shows the latest twelve backups. Each has a line with its time, its size and whether it is encrypted, and its status badges:

- **Verified**, **Not verified** or **Verification failed**: the result of the verification.
- **Restore drill passed** or **Restore drill failed**: the result of the restore drill, if one was run.
- A backup that could not be taken carries a single red badge, and is not counted as a backup.

The list's buttons:

- 1 **Back up now**: takes a backup at once, outside the schedule. Use it before any large piece of work: an update, a migration, a restore or a move.
- **Verify it**: shown on every successful backup not yet verified (see 8.4 Verification and the restore drill).
- 3 **Restore drill**: shown on every successful backup (see 8.4.2 The restore drill).

Line 2 is the newest backup. The head of the list gives the share of backups that are verified.

8.4 Verification and the restore drill

Between "a backup was taken" and "it can be restored" lie two steps, each with its button.

8.4.1 Verification

The **Verify it** button checks the backup where it lies, three ways, and changes nothing:

1. The file's fingerprint (SHA-256) is still the one written on its card when it was taken, so not one byte of it has changed.
2. The card's signature is valid, so this program wrote the card and nobody edited it.
3. The database can read the backup's index.

Success turns the badge to **Verified**. Verification alone does not prove that a restore would succeed: that is the drill's work.

8.4.2 The restore drill

The **Restore drill** button really restores the backup, but into a separate temporary database whose name begins with `clarus_restore_drill_`. It counts the rows of the tables and compares them with what was recorded when the backup was taken, then drops the temporary database. **The laboratory's work is not touched at any moment.**

- When every count matches, the message says the drill finished and every count matched, with the number of rows and tables, and **Restore readiness** turns green.
- When they do not match, the message reads "**The drill finished, and the restored copy did not match what was recorded when it was taken.**". That backup cannot be relied on: take a new one and drill it, and if it fails again follow 8.11 Problems and what to do.
- The drill may be handed to the system task and run in the background. The message then says so, and the result shows on the backup a few minutes later, once the page is reloaded.

> **Note**
>
> The program's ordinary account cannot create a database, so the drill needs PostgreSQL's administrator account. Setup prepares that account when it sets up the database, and keeps it in a file that only the system account can read. If the drill is refused for lack of permission, run Setup again over the same installation: it repairs this without touching the data.

> **Tip**
>
> Drill the newest backup at least once a month, after every update of the program, and after every move of the laboratory to a new computer.

8.5 Keeping, and the backups folder

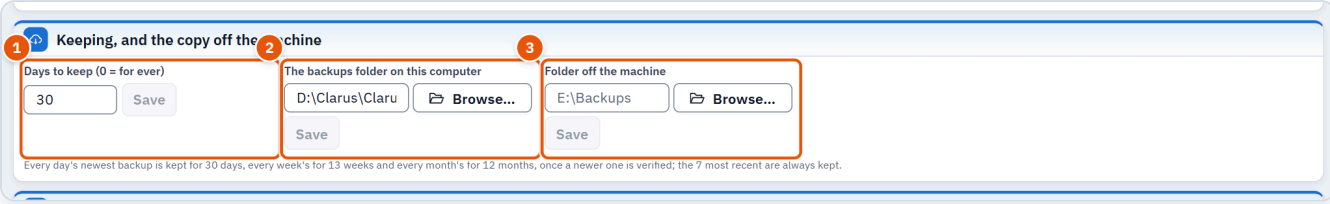


Figure 8-4: The keeping and off-the-machine card

The card has three fields, each with its **Save** button:

- 1 **Days to keep (0 = for ever)**: how many days backups stay before the oldest are removed.
- 2 **The backups folder on this computer**: where the daily backups are written.
- 3 **Folder off the machine**: the second copy's folder (see 8.6 The second copy off the machine).

The rule for keeping:

Value	What is kept
Nothing chosen (the default)	One backup a day for thirty days, then one a week up to thirteen weeks, then one a month up to twelve months
A number	The backups newer than that many days
0	Every backup; nothing is ever removed

Two floors no choice can go below:

- at least seven backups are always kept;
- no backup younger than seven days is removed.

So typing "1" cannot leave a laboratory with only the one backup taken this morning. Old backups are removed after each successful backup, a whole set at a time, so a database is never left without its card.

> **Caution**
>
> The value 0 fills the disk over time. Choose it only together with a plan to move old backups to another medium.

8.6 The second copy off the machine

A backup on the computer itself does not protect against its disk failing or its theft. In the field **Folder off the machine**, set a folder on one of these:

- an external disk attached to the computer, such as `E:\Backups`;
- a shared folder on another computer on the network, such as `\\NAS\ClarusBackups`.

Then press **Save**.

The folder then works like this:

- **After every successful backup**, the newest is copied there automatically.
- The folder is named in the fourth fact, **Off the machine**.
- **"Available"** means the folder exists and can be reached now. When the external disk is unplugged it is not available, and nothing is copied to it until it returns.
- **Copy the latest backup there now** copies the latest backup there at once, for instance when the external disk is plugged in again after an absence.

> **Tip**
>
> The well-known rule: three copies, on two different media, one of them outside the building. The daily backup with an external disk taken home, or with cloud backup (8.7 Cloud backup), meets it.

8.7 Cloud backup

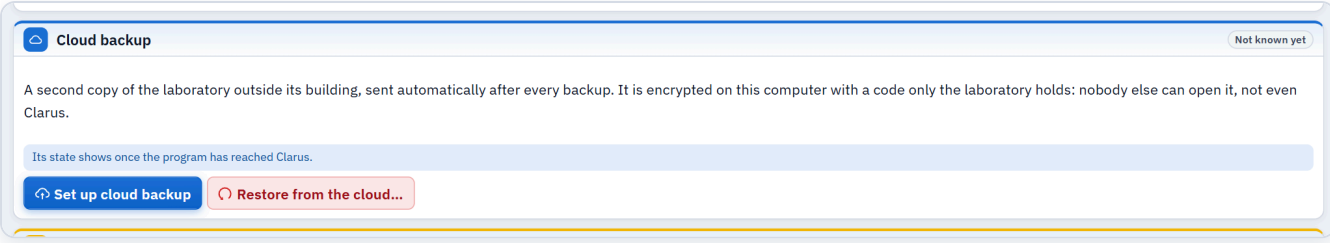


Figure 8-5: The cloud backup card

Cloud backup is a paid service, bought from the card itself. It gives:

- **a second copy outside the building**, sent automatically after every backup;
- **encrypted on the laboratory's computer** before it leaves, with a code only the laboratory holds, so nobody else can open it, not even the company.

Before it is switched on, the program shows the service's terms, and the service does not run until the laboratory agrees to them:

- what leaves the computer: the backup, encrypted; its size; when it was taken; and this copy of the program's licence;
- the copy is health data and may be kept outside the laboratory's country, so the service is switched on only where the country's rules allow health data to leave it;
- the code is the only key: if it is lost together with the computer, nobody can open the copies;
- the copies are deleted thirty days after the service ends.

To switch it on:

1. Press **Set up cloud backup**, read the terms, and tick **I have read this and I agree**.
2. Press **Create the code**. Write down the code shown, or save it with **Save the code as a file** on a medium kept away from the computer.
3. Type the code's last group to confirm, then press **Switch cloud backup on**.

Once it is on, the card shows:

- the last cloud copy, the number of copies kept and the space used;
- the result of the last **Restore drill from the cloud**.

Its buttons send a copy now, drill a restore from the cloud, restore from it, stop sending, and delete every cloud copy.

> **Danger**
>
> **Delete all cloud copies** deletes every copy of the laboratory in the cloud for good, and cannot be undone. The backups on the computer are not touched.

8.8 The recovery code

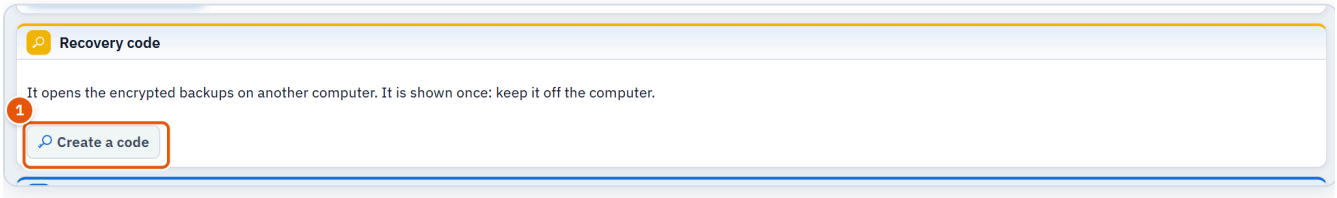


Figure 8-6: The recovery code card

The **Recovery code** opens **encrypted** backups on another computer:

- (1) **Create a code** creates the code and shows it **once**; the program does not keep it.
- Write the code down and keep it off the computer, then press **I have kept it**.
- Creating a new code with **Create a new code** makes the previous one useless.

No code is needed while the backups are not encrypted, which is the default (8.1 How the program saves the laboratory).

8.9 Restoring from a backup

A restore **replaces all of the laboratory's current data** with the backup's. That is why it is never a single button but a red window that asks for the laboratory's name.

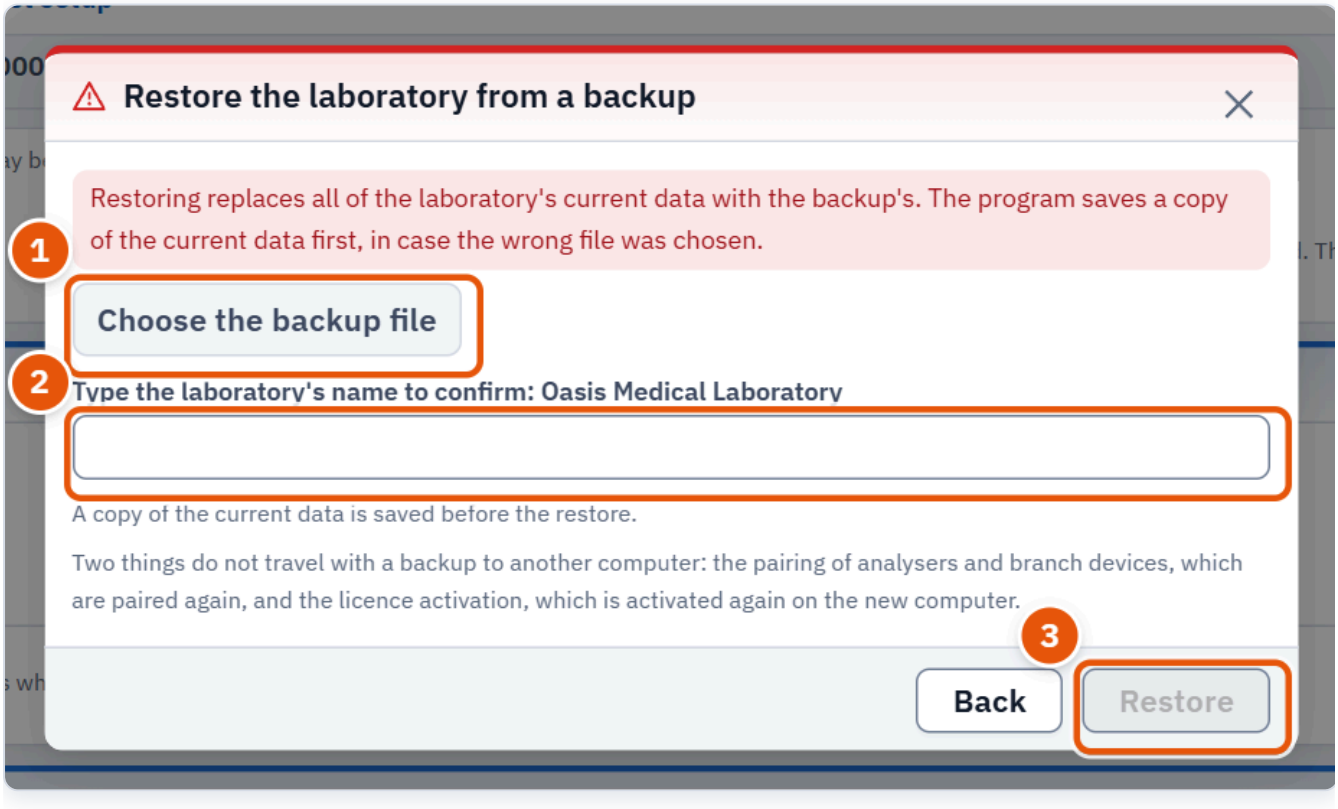


Figure 8-7: The restore window

The steps:

1. If the program is working, press **Back up now** first, so that you hold a copy of things as they are now.
2. Press **Restore from a backup** in the **On this computer** card.
3. 1 Press **Choose the backup file** and choose the file. The program accepts a `.clarus-backup.zip` file, a `.postgres.dump` file from the backups folder, or an export file from an earlier version.
4. 2 Type the laboratory's name as it is written above the field. If the laboratory has no name in **Laboratory identity**, write it there first.
5. 3 Press **Restore**, and do not close the program until it finishes.

Before it starts, the program saves **a safety copy of the current data**, and never deletes it. If the wrong file was chosen, the data comes back from that copy.

After the restore the page reloads by itself, except in two cases, where the window stays open and says what happened:

- **A file without attachments:** the database came back, but the file chosen carries no pictures or documents. Choose the `.clarus-backup.zip` file to restore them.

- **An old export, salvaged:** the program lists what came back from it and what did not, table by table, so no part of the laboratory is restored in silence.

Two things do not travel with a backup to another computer, and are done again on the new one:

- **the pairing of analysers and branch devices**, which are paired again as the analysers chapter describes;
- **the licence activation**, which is activated again as the licence chapter describes.

8.10 Moving the laboratory to a new computer

There are two ways. Both start from a recent, verified backup taken on the old computer.

8.10.1 The first way: through Setup

1. On the old computer, press **Back up now** and then **Verify it**, then copy the whole backups folder to an external disk.
2. On the new computer, copy the folder to `D:\Clarus\Clarus_prime-backups` before running Setup.
3. Run Setup. When it finds the data or the backups of an earlier installation it shows the page "A laboratory already on this computer", with three choices:
   - use the laboratory's data found;
   - **restore the newest backup**, naming its file;
   - start a new laboratory, leaving the earlier data where it is.
4. Choose "Restore the newest backup" and finish the installation.

Setup looks for the newest non-empty `*.postgres.dump` file in the backups folders on every fixed drive, and in the backups folder under ProgramData. **Nothing is deleted, whichever is chosen.**

8.10.2 The second way: from inside the program

1. On the old computer, press **Download a backup now** and save the `.clarus-backup.zip` file on an external disk.
2. Install the program on the new computer as a new laboratory.
3. On the Backups page, restore from the file as in 8.9 Restoring from a backup.

This way carries the attachments with the database in one file.

8.10.3 After the move, whichever way was used

1. Activate the licence on the new computer.
2. Pair the analysers and branch devices again.
3. Correct **The backups folder on this computer** if it still names the old computer's folder.

4. Set the second copy's folder again.
5. Take a backup, then run **Restore drill** on it.

8.11 Problems and what to do

What shows	Likely cause	What to do
No backup yet an hour after installation	The program is not running on the server, or the backups folder cannot be written to	Make sure the program is running on the server, then press **Back up now** and read the refusal if one appears
Not met: no recent backup	No successful backup for more than twenty-four hours	Read the last line of the list: a failed backup carries a red badge. The usual causes are a missing folder, a full disk, or a computer left off for long
A red badge on a backup	It could not be taken, and nothing was written	Correct the cause and take a new backup. A backup still "running" after six hours is closed as failed by itself, and its temporary file removed
Verification failed	The file changed after it was taken, was damaged on the disk, or its card was edited	Do not rely on this backup. Take a new one and verify it; if it happens again, check the disk
Restore drill failed	The restored copy does not match what was recorded when it was taken	Take a new backup and drill it. If it fails again, raise a case with support, giving the backup's time
The drill refused for lack of permission	The database administrator account is not set up	Run Setup again over the same installation
Off the machine not available	The external disk is unplugged, or the shared folder cannot be reached	Plug the disk in again, then press **Copy the latest backup there now**
A free-space note above the list	The disk is filling up	Move old backups to another medium, shorten the keeping, or move the backups folder to a larger disk
A message on restoring that the file holds no backup	The file chosen is not one of the program's backups	Choose the file whose name ends in `.clarus-backup.zip`
The database came back without attachments	The file chosen carries no pictures or documents	Restore again from the `.clarus-backup.zip` file

8.12 A routine checklist for the technician

At every visit:

- **Latest backup** is less than a day old, and **The most that may be lost** reads **Met**.
- The latest backup is **Verified**.
- **Off the machine** is set and available.

Once a month:

- **Restore drill** on the newest backup, with the result **Restore drill passed**.
- The free space on the backups disk is enough for at least thirty more days.

After every update, move or restore:

- A new backup, verified, then drilled.
- The backups folder and the second copy's folder point to the right places on this computer.

Chapter 9

Updates and rollback

This chapter is for the support technician and the laboratory's computer administrator. It explains:

- How the program learns of an update, and how it is downloaded and installed.
- What is kept before an update, and when the previous version comes back.
- How member computers update, and what to do when an update stumbles.

9.1 How an update arrives

The program asks Clarus's server for updates when it starts, then every six hours. This is switched off or on by the setting **Check for updates online** in **General settings**, which is also shown at the first run. **To look for updates the program asks the Clarus server every six hours, sending this installation's code, the computer's fingerprint, the licence, counts of the laboratory's work (patients, orders, samples, results and reports) and its hours of operation. The analyzers' connection profiles are uploaded to Clarus to be kept. No patient's name or data is sent.**

To look by hand: from the **Settings** menu open **Licence**, then **Check for an update** in the **Update** section. The same section shows the **Current version**.

Every update is signed. The program checks its signature after downloading it and before installing it, and an update whose signature does not hold is never installed.

An update the check found. When the check finds a newer version that is not required, the program says so without stopping anyone. Whoever holds the **Manage program updates** permission sees a notice at the bottom of the screen naming the version found. Once closed, it does not come back for that version on that computer. In **Licence**, the **Update** section says the version is available and not downloaded yet, and it carries **Download and prepare** for the same person. The update is then downloaded and checked while the program works, and it is installed only when someone presses **Update now** (see 9.2 Installing).

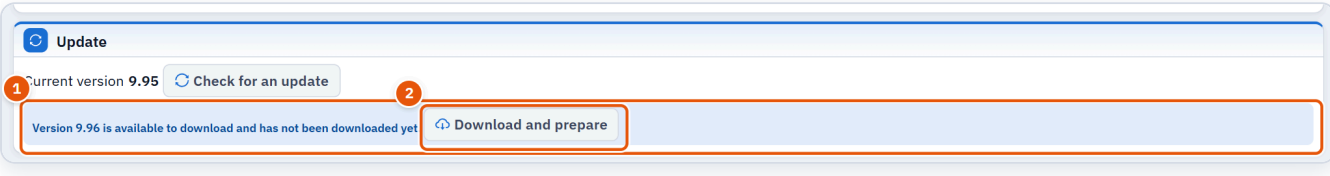


Figure 9-1: The licence screen's update section: a newer version found and not downloaded yet

9.1.1 A required update

An update may be required by a deadline. Until the deadline, its window reads **A required update** and shows the **Time left**, with **Download and prepare** and **Update now**. Nothing is refused while the time runs.

If the deadline passes without it: **The required update's deadline has passed. The program now opens only to update; verified results can still be read, printed and delivered.** In detail:

- **Refused:** new work. That is registering a patient, entering a result, a payment, an approval or a decision about money, pairing a phone, and changing a setting. The refusal names the version the laboratory must reach.
- **Still allowed:** reading every screen, and printing. Also signing in and out, the update itself, the licence, and taking a backup before updating. A verified result can still be delivered by the portal link, the result message or the manager's phone. On the manager's phone, taking access away still works: suspending a user, ending their sessions, switching work from outside off, and unpairing a phone. The exchange between a chain's branches is never stopped.

A failed update never locks. If the program tried the required update and it failed, the window says that the update did not complete. The program keeps working, and support is told of it at the next check. Read the update's log (see 9.5 The log and failures) and try again.

9.2 Installing

When an update is ready, the **An update is ready to install** window appears at the head of the program. It shows what is **Installed now**, what it **Will become**, and **What this update changes**. It is installed by whoever holds the **Manage program updates** permission. Anyone else is told: **Ask the laboratory's system administrator to update it.**

1. **Download and prepare**: the update is downloaded and checked while the program works as usual.
2. **Update now**: **Installing closes the program and reopens it. Finish what is on the screen first.**

During installation:

1. The program is stopped.
2. The current program folder is copied to `updates\rollback` in the data folder, into a folder named with its date and time. Only the two newest copies are kept.
3. The program's files are replaced with the new version's.
4. The program is started again. At its first start it brings the database up to the new version by itself.

The installation is run by the `Updater` task under the system account (see C.2 Scheduled tasks). If that task is not registered, the update asks Windows for administrator rights.

> **Caution**
>
> The copy in `updates\rollback` is of the **program** only, not of the data. Take a backup of the data before any large update (see Chapter 8: Backup and restore). And do not switch the computer off during installation.

Without internet. The newer Setup is installed over the existing installation. It keeps its folder and its data, and replaces only the program's files (see Chapter 2: Installation).

9.3 Member computers

A member computer takes its update from its branch's server, not from the internet. It is installed at its next start, or at once if the update is required. So update the server first, then restart the program on the members.

A member computer left on an older version than its server may be unable to do some work, such as printing reports silently (see 7.5 When the printer does not print).

9.4 Going back to the previous version

- **By itself:** if replacing the files fails during installation, the program puts back what it replaced, and the previous version stays as it was.
- **After installation:** there is no button on the screens to go back. If the program does not start after an update, contact support. The previous version is kept in `updates\rollback`, so nothing in it is moved or deleted by hand.

> **Danger**
>
> Never copy an old program folder over the new one yourself. The database was brought up to date at the new version's first start, and the old program does not know its new form.

9.5 The log and failures

Each update has a log in `logs` in the data folder, named `clarus-lis-updater-<date and time>.log`. A failed update is also written to `updates\handoff`, in a file starting with `failed-`. The state of the last update shows in **Server and updates**.

What shows	Likely cause	What to do
The update service could not be reached.	No internet, or a firewall blocking port `443`	Check the connection (see A.3 Connections going out of the laboratory), or update without internet
The update could not be downloaded and prepared.	The download was cut, or the update's signature did not hold	Try again. If it happens again, contact support
The update could not be applied.	Installation failed, and the previous version stayed	Read the update's log, and try again after closing every window of the program

What shows	Likely cause	What to do
In the log: `Package SHA-256 mismatch` or `did not verify`	The downloaded update file is damaged	Download it again
In the log: `The database service could not be started again`	The database did not come back after the update	See 4.6 When the database does not run
The program does not start after the update	A failure at the new version's first start	Contact support, and do not touch `updates\rollback`

Chapter 10

Migration from RealLab

This chapter is for the support technician who carries a laboratory's history from the old RealLab program into the program. It explains:

- What to prepare before migrating, and which files the program accepts.
- The eight steps of a migration, and what moves and what does not.
- How to read the acceptance report, and how to undo a migration.

> **Note**
> Migration needs neither RealLab nor an Access or SQL Server driver on the computer. The program reads the file itself, and changes nothing in it.

10.1 Before you start

- **The file.** A copy of the RealLab database, in one of these forms:

Extension	What it is
`.mdb` and `.accdb`	A Microsoft Access database
`.bak`	A SQL Server backup file
`.mdf`	A SQL Server data file

It may be 8 GB at most. An Access 97 file cannot be read, so it is first saved in Access as Access 2000 or later (`.mdb`).

- **Memory.** The program works out how much memory the file needs before reading it. If there is not enough, it asks for other programs to be closed.
- **A backup.** Migration takes no backup first, and needs none, because either all of it is written or none of it is. But if the program already holds real work, take a backup before migrating (see Chapter 8: Backup and restore).
- **The permission. Import data from a previous system**.
- **The time.** Migration runs on the server and estimates the time left as it goes. Choose a time when the server will not be switched off.

10.2 The steps of a migration

The page opens from the **Settings** menu, then **Data and continuity**, then the **Migration from RealLab** tab. It also opens from the program's first run. The page has eight steps:

1. **File**. Choose the RealLab file from the server's drives, or **Or write the file's path**. The program searches for RealLab files itself, offers the newest, and stops searching by itself after a minute. If the file is on another computer of the branch, it is uploaded to the server and migrated there, then deleted from it when the migration ends or is stopped.
2. **Preview**. **Reading the file, changing nothing:** the patients, visits and results in the file. If some rows the file says it holds do not come out of it, the program gives their number.
3. **What moves**. Choose what moves:
   - **The test catalogue and prices**: the tests, reference ranges, packages and price lists.
   - **Patient files**.
   - **Visits and their results**, with their reports and pictures. They need the patient files and the catalogue.
   - **Panel results**: blood counts, urine and cultures. They are written on the visits, so they need them.

Under **Visits from the year** a year is chosen, and the visits before it stay in the old file. The patient files always move, all of them.

1. **Names**. The tests in the file whose names the catalogue does not know. For each name: **The same as ours**, picked from the catalogue, or **Another test**, created as a new test. A test is never merged with another just because their codes look alike. If the catalogue knows every name, this step is skipped.
2. **Source laboratory**. The details of the laboratory the file came from.
3. **Consent**. A summary of what moves, and a statement that these are the laboratory's records. If the program already holds work, a second statement is asked, to migrate beside it. Then **Bring my data across**.
4. **Transfer**. **You may close this screen: the migration goes on in the program. Do not switch the computer off until it ends; that cuts it, and nothing of it is written.**
5. **Result**. The acceptance report (see 10.4 The acceptance report).

> **Danger**
>
> **Either all of it is brought across, or none of it is.** If the program is closed or the server switched off during the transfer, all of it is undone and the RealLab file is not touched. It then starts again from the beginning. Two migrations never run at once on one computer.

10.3 What moves and what does not

Moves	Does not move
What was chosen in the **What moves** step	What was not chosen. It stays in the RealLab file and is named in the acceptance report
Every patient file, whatever year was chosen	The visits before the chosen year
The rows that came out of the file	The rows that did not. If rows are missing, the migration starts only after an explicit statement about it
Prices written as numbers	Prices written as text become `0.00`, and the report names them

If the program already holds work, the migrated history is added beside it. Nothing is replaced and nothing is merged.

10.4 The acceptance report

After the transfer, the program shows:

- What is now in the program.
- What was not brought across, and why.
- What was left out on purpose, with nothing of it lost.
- A balance in numbers: what was read from the file, what was brought across, what was not, and what was joined to another. Both sides must agree.

Then **Bring in another file** for another file, or open the patients to check a few files by eye.

10.5 Undoing a migration

The same page has the section **Imports already brought in**. **An import can be undone while nothing has been done on CLARUS with what it brought.**

1. Press **Undo this import** on the migration in question.
2. The program counts what the migration brought and shows what will be deleted. **Undoing this import deletes these rows, and only these. What it added to the catalogue stays.**
3. Tick the statement about the deletion, then confirm.

If anything the migration brought has been worked on in the program, the undo is refused and the reason is given.

10.6 When a migration stumbles

What shows	Likely cause	What to do
The file could not be read.	The file is damaged, or not of an accepted form	Take a new copy from RealLab and try again
A message that the file is Access 97	An old form that cannot be read	Save it in Access as Access 2000 or later
The file opened, but not one record could be read from it: no patients, no requests and no catalogue. That is what a damaged or half-copied file looks like, not an empty laboratory. Try another copy of the file, or the backup it was made from.	The file opened, but it is empty or not a RealLab database	Make sure it is the right laboratory file
Parts of this file are not what Access wrote. The numbers above are your laboratory, but smaller than it.	Parts of the Access file are damaged	Repair it in Access, or take a newer copy
A message that rows did not come out of the file	The file is incomplete or partly damaged	Take another copy. If it happens again, it moves only with the statement
A message asking to close other programs	Not enough memory to read the file	Close the other programs on the server and try again
The migration could not start.	Another migration is running on the computer, or the start failed	Wait for it to end, then try again
The migration was cut and nothing of it was written.	The program was closed or the server switched off during the transfer	Start again, and do not switch the server off until it ends

Chapter 11

Users, passwords and their recovery

This chapter is for the support technician and the program's administrator in the laboratory. It explains:

- How the first administrator is created after installation.
- How users are added, given permissions, and given new passwords.
- How an administrator recovers a forgotten password, and where sign-in attempts are reviewed.

11.1 The first administrator

A new installation has no password yet. So on the server itself, and nowhere else, the sign-in screen offers **Sign in without a password (new installation)**.

1. On the server, press **Sign in without a password (new installation)**.
2. In **First administrator setup**, type the **Full name**, the **User name:** and the **Password** twice.
3. Press **Create the administrator**.

While the administrator has no password, the head of every screen says: **You signed in without a password. Give the administrator a password, so that nobody else signs in by this button; the server is not opened to the network's devices before it.**

> **Danger**
>
> Give the administrator a password before anything else. The server is not opened to the network's devices before it, and until it is set, whoever sits at the server signs in as the administrator.

11.2 Password rules

Rule	Value
Shortest administrator password	12 characters. Common passwords are refused
Shortest password for other users	8 characters
Wrong attempts before the account locks	5
How long it stays locked	15 minutes. Even the right password is refused meanwhile
An idle session ends after	60 minutes by default, changed in **Idle session timeout**

The program does not force passwords to be changed periodically, and does not require symbols or digits in them.

11.3 Users and permissions

The page opens from the **Settings** menu, then **Users and permissions**. Its two main tabs are **Users** and **Roles and permissions**.

Adding a user:

1. In the **Users** tab, press **New user**.
2. Type the **Full name** and the **User name**, and choose the **Role**.
3. Type a temporary **Password**. **The user changes it at first sign-in.**
4. Press **Save**.

Permissions. A user takes their permissions from their role, and roles are set in **Roles and permissions**. For one user in one branch: **Grant another permission in this branch**, or **Withdraw here**. **Every grant and withdrawal is written to the audit trail: who, for whom, which permission, in which branch, and when.**

Switching an account off. The **Account enabled** switch is turned off. Its holder can no longer sign in, and their name stays on the work they did.

Working from outside the laboratory. This account signs in from inside the laboratory only. Every account starts closed. If it is opened for a user, a **Second factor when signing in from outside** is chosen: **The Clarus Manager app**, **An authenticator app** or **The trusted device**.

11.4 A user who forgot their password

A user who is not an administrator does not recover their password themselves. They open **Forgot your password?** on the sign-in screen, then **Send an alert to the administrator**. The administrator gives a new one:

1. In **Users and permissions**, open the user.
2. Press **Set a new password** and type a temporary password. **The user changes it at first sign-in.**
3. If the account is locked after five wrong attempts, press **Unlock**, or wait 15 minutes.

11.5 The administrator's recovery code

Every administrator has a recovery code: sixteen characters in four groups. It is shown once, at the administrator's first sign-in that finds no code for them, in the **Password recovery code** window. **With this code you set a new password if you forget yours. It is shown this time only, so print the emergency sheet and keep it away from the computer.**

1. Press **Print the emergency sheet**. The sheet holds the laboratory's name, the username, the code, the laboratory's installation number, Clarus's support number, and the cloud backup code if cloud backup

is on.

2. Keep the sheet away from the computer. **Keep this sheet in a safe place: whoever holds it can set a new password for your account.**
3. Tick **I have saved the code**, then **Continue**.

If the sheet is lost, open **Password recovery code** from **My account**, then **New code**. **If you lost the emergency sheet, type your password: the old code stops working at once, and a new one is shown to print and save.**

11.6 An administrator who forgot their password

Recovery takes place **on the server itself, and only there**:

1. On the server's sign-in screen, press **Forgot your password?**.
2. In **Recover an administrator's password**, type the **Username**, then the recovery code from the emergency sheet.
3. Type the **New password** twice, and press **Set the new password**.

The new password is set, and every session opened with the old one has ended. Sign in now with the new password; a new recovery code will be shown to you.

A recovery code is used once. The administrator is given a new one at their next sign-in. Five wrong codes lock recovery for 15 minutes.

> **Caution**
>
> If the emergency sheet is lost, the administrator has forgotten their password, and no other administrator is left, contact Clarus support with the laboratory's installation number. No Windows tool resets the password, and nothing is changed in the database by hand.

11.7 Reviewing sign-ins

Opened from the **Management** menu, then **Security and audit**:

- **Access**: every sign-in attempt, successful and failed, and every lock.
- **Sessions**: the open sessions.
- **Audit trail**: every permission granted and withdrawn, every password recovery, and every recovery code issued.

Chapter 12

Language packs

This chapter is for the support technician and the program's administrator. It explains what a language pack is, how it is installed, updated and removed, and how the language of each paper the laboratory prints is chosen.

12.1 What a language pack is

English is the program's own language, and is always installed. Every other language is a pack: a signed file holding:

- The screens' texts.
- The texts of the reports, the receipts and the laboratory's papers.
- The program's messages when it refuses something.
- The tests' names and texts in that language.
- Its fonts, and the direction it is written in. Arabic runs right to left on every screen and paper.

A pack never changes the catalogue itself, so test codes and English names stay as they are. It only adds each test's name in its language.

These packs come with the program: Arabic, Egyptian Arabic, Berber, German, Spanish, French, Kurdish, Brazilian Portuguese, European Portuguese and Turkish. Each pack has a version number. A pack marked **Experimental: no native reader has rated it yet.**

12.2 Installing and removing a language

From the **Settings** menu open **General settings**, then the **Laboratory languages** section. It lists each installed language, its **Version**, and **In use for**.

A language comes from one of three sources, in this order:

1. **In the program's folder: no internet needed**. The packs that came with the program.
2. **From the language library**. Newer or new languages from the Clarus library, which needs the internet. Choose the language and press **Install**, review what it will add, then press **Apply**.
3. **Import from a file A signed language file, for a laboratory without internet.**

A pack marked **Needs a newer version of the program** is not installed until the program is updated (see Chapter 9: Updates and rollback).

Removing. Remove: whoever works in the language returns to English, and nothing of the laboratory's data is deleted.

With updates. Every program update carries its packs, and replaces the whole packs folder `clarus_lis\language_packs` in the program's folder. So nothing in it is edited by hand, because the next update wipes it.

12.3 Which paper in which language

The languages are set in **General settings**:

Setting	What it decides
Language	**The language the screens open in for whoever has not chosen one.** Each user chooses their own from **My account**
Report language	**The language the results report is printed in.**
Report notes language	**The language of the notes and interpretations printed under the results.**
Receipt language	**The language the payment receipt is printed in.** The laboratory's other papers follow it
Result message language	**The language of the message that sends a patient their results.**
Language of the patient's name	The language a patient's name is typed in when they are registered

The section shows, for each language, what it is used for, so a language in use is never removed unseen.

12.4 When a language stumbles

What shows	Likely cause	What to do
The language library cannot be reached now. A language file can still be imported.	No internet, or the library cannot be reached	Import the signed language file
Needs a newer version of the program	The pack is newer than the program	Update the program first
English texts among the language's	The pack has not translated these texts yet	Install the pack's newest version, from the library or with the next update

What shows	Likely cause	What to do
A test name in English on an Arabic report	The pack has no name for this test	The English name stays until the pack carries one. This never changes the result

Chapter 13

Logs and diagnostics

This chapter is for the support technician. It explains where the program writes its logs, what the support screens show, how a status report is sent to Clarus support, and how a remote support session is opened.

13.1 The logs

Log	Where	What to look for in it
`clarus.log`	`logs` in the data folder	The program's errors and warnings. Rotated every 10 MB, with five kept before it
`postgresql.log`	`logs` in the data folder	The database's errors while it runs
`postgresql-startup.log`	`logs` in the data folder	Why the database did not start
`clarus-lis-updater-<date and time>.log`	`logs` in the data folder	What happened in each update
`install-transcript.log`	The program's folder	What happened at installation
`clarus-member-*.log`	`data\logs` in the program's folder, on a member computer	The program running on the member computer

The full paths are in B.4 The logs.

> **Note**
>
> The logs can be read in any text editor while the program runs. Delete nothing from them by hand: the program rotates them itself. To send a log to support, the safer way is the status report described below. It takes what it needs from the logs, and cleans every line it takes.

13.2 The support screens

In the **Support** menu:

Screen	What it holds
Health and diagnostics	Cards: **Successful backups**, the **Database** and its integrity, **Verified audit events**, **Registered devices**, **Data protection** and **Local server readiness**. Beneath them is the database's maintenance (see 4.5 Checking its health)

Screen	What it holds
Cases and reports	The cases sent to support, and their reports
Go-live	What is left before the laboratory really works on the program
Server and updates	The database, its address and port, and the state of updates

13.3 The status report to support

Health and diagnostics and **Cases and reports** both have the **Send the system's state to support** button:

1. Under **Describe the problem (optional)**, write what happened, when, and on which screen.
2. Press **Read it before sending** to see the report as it will be sent.
3. Press **Send now**. The program then shows the report's reference at support: give it when you call.

Sends	Never sends
The version, the licence state, the free disk, the backups, the devices, and the last errors, each line cleaned.	**No patient, no order, no result, no report: no name, code or count that could identify anybody.**

From the logs, the report takes the last 400 lines of the three newest files, and cleans every line. If it cannot reach support, it is saved to a file to send by hand, and the screen says where.

13.4 A remote support session

Support enters your copy with your agreement, for a time you choose, and you stop it whenever you wish.

1. From **My account**, press **Ask for technical support**.
2. Describe the problem under **What is wrong?**. The status report that goes with it can be read first: **Show what will be sent**.
3. Press **Next: the agreement**, choose the **Session length**, then **I agree: open the session**.
4. The **Support session code** appears. Read it to the Clarus support engineer; it is good for entering for a limited time, which the screen shows. **The code is shown this time only and is kept nowhere.**

While the session is open, a strip shows at the top of every screen: **Clarus technical support is inside your copy now. Anyone in the laboratory can stop the session at any moment from the strip at the top of every screen.** The session ends by itself on time.

In the session's window:

- **Conversation**, including sending pictures of the analyser's or the program's screen.
- **What support did**: every change support made, what was there before and what is there after, and **The way back**.
- **Patient data**: support sees no patient data without a separate permission: **Allow patient data to be seen**. It can be withdrawn at any time: **Withdraw the patient-data permission**.

Support work that needs Windows administrator rights is carried out by the `Support` task (see C.2 Scheduled tasks). If that task is not registered, Windows asks for the administrator's consent on the computer itself.

13.5 Before calling support

Gather:

1. The program's version, from **Licence**.
2. A description of what happened, when, and on which computer and screen.
3. A picture of the message as it appeared.
4. The status report, sent or saved to a file.

Chapter 14

Troubleshooting by symptom

This chapter is one table that starts from what the technician sees, not from where the fault lies. For each symptom it gives what to check first, then the chapter with the detail. The problem tables at the end of each chapter are fuller than this one, and this table points to them.

> **Note**
>
> Before anything else: restart the computer showing the symptom, sign in to Windows, and wait a minute. The program starts when someone signs in, not when the computer starts (see 4.3 How the program starts).

14.1 The program and signing in

Symptom	Check first	Detail
The browser does not open the program on the server	Has someone signed in to Windows on the server? Is the `Server` task running in Task Scheduler?	4.3 How the program starts
The program opens on the server but not on another computer	Was the server opened to the network's devices? Is the network Private in Windows?	Chapter 5: Network, branches and Clarus Link
A message that the database is not running	The `ClarusPrimePostgres` service, and the free disk space	4.6 When the database does not run
The program is slow	The database's size, its maintenance, and the server's memory	4.5.2 Database maintenance
Sign-in refused with the right password	The account locks for 15 minutes after five tries	11.4 A user who forgot their password
The administrator forgot their password	The emergency sheet and the recovery code	11.6 An administrator who forgot their password
A strip at the top of every screen asks for the administrator's password	The first administrator has no password	11.1 The first administrator
The program opens only to update	A required update's deadline passed	9.1.1 A required update

Symptom	Check first	Detail
The website's name cannot be changed, and the site tab offers to take a name again	The website service no longer has the site	3.1.1 The laboratory's website
A message about the licence or the trial ending	The licence's state on its screen	Chapter 3: First run, licence, activation and moving it

14.2 Printing and devices

Symptom	Check first	Detail
The browser's print window opens instead of silent printing	Is the program running on that computer? Does this role have a printer?	7.5 When the printer does not print
A blank label, or strange text instead of a barcode	The printer's command language	7.2 Binding printers to their roles
A shifted label, or one of the wrong size	The resolution, the offsets and the calibration label	7.3 Printing settings
An analyser's results do not arrive	The link state on the analyser's card, and the link log	6.8 When results do not arrive
The analyser is connected and results are not filed	Held messages and unmapped codes	6.4 Mapping the analyser's codes to tests
A network analyser stops reaching after the computer or network changed	The firewall rule, and how the network is classed	6.3 The firewall and the network

14.3 Data

Symptom	Check first	Detail
The nightly backup was not taken	Was the program running at its time? The backup disk's space	8.11 Problems and what to do
The backups card on the health screen says restore is not ready	The restore drill	8.4.2 The restore drill
Lost data, or a damaged database	The last sound backup	8.9 Restoring from a backup
The RealLab migration does not start, or is cut	The file and its form, and the server's memory	10.6 When a migration stumbles

Symptom	Check first	Detail
Moving the laboratory to a new computer	A backup, then installation, then restore	8.10 Moving the laboratory to a new computer

14.4 Updates and language

Symptom	Check first	Detail
The program finds no update although one exists	The internet, port `443`, and the update-check setting	9.1 How an update arrives
An update failed	The update's log	9.5 The log and failures
The program does not start after an update	Do not touch `updates\rollback`; contact support	9.4 Going back to the previous version
A member computer stops printing reports silently after the server's update	Has the member updated?	9.3 Member computers
English texts on a screen in another language	The language pack's version	12.4 When a language stumbles

14.5 When this is not enough

Send the status report to support from **Health and diagnostics**, or ask for a remote support session (see 13.3 The status report to support).

Chapter 15

Uninstalling and reinstalling

This chapter is for the support technician. It explains what uninstalling the program removes and what it keeps, how to reinstall over existing data, and how to move the laboratory to a new computer.

15.1 Uninstalling

The program is uninstalled from the uninstall shortcut in the `Clarus` group of the Start menu, or from "Installed apps" in Windows' settings, under the name `Clarus_prime`. This needs an administrator account, unless the program was installed for one account only (see 2.10 Installing without administrator rights).

Before it stops anything, uninstalling takes one last backup on the server. If that backup fails, it warns and does not stop the removal. So the safer way is for the technician to take a backup by hand first (see Chapter 8: Backup and restore).

Then it asks: keep the laboratory's data, or remove everything? Keeping is the default.

What is affected	If the data is kept	If everything is removed
The program's folder	Removed	Removed
The data folder: the database, the encryption keys, the logs	**Kept**	Removed
The backups and their keys	Kept	**Kept**
The kept copy of the licence, and the trial's start mark	Kept	Kept
The `ClarusPrimePostgres` service	Stopped and unregistered	Stopped and unregistered
The scheduled tasks, and the sign-in Run value	Removed	Removed
The firewall rules for the program, the analysers and support	Removed	Removed

A member computer tells its server that it has left.

> **Danger**
>
> The encryption key `field_vault.key` in the data folder is what reads the sensitive fields. If everything is removed, those fields can no longer be read from the data folder. The backups stay, and the data is restored whole from them.

Silent uninstall. From an administrator command line, in the program's folder `D:\Clarus\Clarus_prime`:

```
unins000.exe /VERYSILENT /SUPPRESSMSGBOXES /NORESTART
```

It asks nothing, and always keeps the data.

Before uninstalling, close the program's window and every browser that opened it on the server. Windows does not delete open files, so they would stay in the program's folder.

15.2 Reinstalling over existing data

If the data folder stayed after uninstalling, Setup finds the database in it and uses it as it is, without creating a new one. The laboratory comes back as it was, with its users and its data.

Installing the newer version over an existing installation, without uninstalling, keeps the folder and the data and replaces only the program's files.

> **Caution**
>
> Never copy a data folder from another computer for Setup to find. The database alone is not enough without its keys and its licence. The right way is a backup and a restore, as in the next section.

15.3 Moving the laboratory to a new computer

1. On the old computer, take a backup and check it (see 8.10 Moving the laboratory to a new computer).
2. Keep the emergency sheet, which holds the recovery code and the cloud backup code (see 11.5 The administrator's recovery code).
3. Move the licence from the licence screen (see 3.4 Moving the licence to another computer).
4. Install the program on the new computer (see Chapter 2: Installation).
5. Restore the laboratory from the backup: from a file, or from the cloud backup with its code.
6. Activate the licence on the new computer.
7. Link again what does not travel with the backup: the analysers and printers on the new computer's station, and the member computers to their new server.

15.4 When uninstalling stumbles

What shows	Likely cause	What to do
The error `TaskDialogMsgBox: Invalid Buttons` when uninstalling	A fault in the uninstall window of the first 9.91 release	Install the newest version over it, then uninstall. Or use the silent uninstall
Files stay in the program's folder after uninstalling	The program's window or a browser held them	Close them, restart the computer, then delete what is left of the program's folder only
The `ClarusPrimePostgres` service is still running	The database did not stop in time	Restart the computer, then uninstall again
A new installation did not find the old data	The data folder is not where it usually is	Choose that same folder in Setup, or restore from a backup

Appendix A

Ports

Every port the program opens or connects to, its default, and how it is chosen. The program reserves no fixed port: each is taken at installation or when it is opened, the first free port after the default if the default is taken, and recorded where it landed.

A.1 Ports listening on the server

What listens	Protocol	Default	How it is chosen	Who reaches it
The program (its screens and requests)	TCP	`8000`	The first free port from `8000`, within 200 ports	The server alone, until it is opened to the network's devices; then over an encrypted connection (HTTPS)
The PostgreSQL database	TCP	`5439`	The first free port from `5439`	The server alone (`127.0.0.1`), always
The member computers' port	TCP	The program's port + 1	The first free port after the program's, within 50 ports	Member computers, over an encrypted connection in which each side proves who it is
Branch discovery	UDP	Three ports between `20000` and `49000`	Worked out from the branch's link secret, so they differ from one laboratory to another	The branch's computers on the local network
A network analyser (TCP)	TCP	`2575`	Typed by the technician on the analyser's card; each analyser has its own	The analyser
A network analyser (UDP)	UDP	`20035`	Typed by the technician on the analyser's card	The analyser, only from the address or the networks allowed

The program's actual port is written in the configuration file `clarus-lis.config.json` in the program's folder, in the field `port`. The database's port is the `port` line of the file `postgresql.conf` inside `pgdata`.

> **Note**
>
> The program falls back to port `5432` if it finds no database port recorded. But the installed database runs on `5439` or a port after it. The configuration file is the reference, not this value.

A.2 Ports listening inside the computer only

The program opens other ports on the address `127.0.0.1` alone, numbered by Windows at each start: to carry a member computer to its server, and for the remote support service. The network does not reach them, so they have no firewall rule.

A.3 Connections going out of the laboratory

To	Port	Why
Clarus's servers	`443` (HTTPS)	Updates, the library of link profiles, the cloud backup, and a member computer's road to its server when the local network does not reach it
Clarus's servers	`9443`	Reaching the laboratory from outside it, through Clarus
The mail server the laboratory sets	`465` by default	Sending messages and reports by email

Nothing comes into the laboratory from the internet, so no port is opened for the program on the router.

A.4 Firewall rules

Rule	Added when	Networks
The program's port (TCP)	The server is opened to the network's devices	Private and Domain only
The member computers' port (TCP)	The server is opened to the network's devices	Private and Domain only
Branch discovery (UDP)	The server is opened to the network's devices	Private and Domain only
One rule for each network analyser	The analyser is saved, after Windows' permission prompt is accepted	In the group `Clarus LIS analyzers`

A Public network is opened for none of them, on purpose.

Appendix B

Paths

Where Setup puts everything. The rule is one: when the computer has a fixed drive D that can be written to, the program, its data and its backups go on it. Otherwise the program goes in Program Files and its data and backups in ProgramData, because a program under Program Files never holds its own database.

B.1 The main folders

Folder	With a drive D	Without a drive D
The program	`D:\Clarus\Clarus_prime`	`C:\Program Files\Clarus\Clarus_prime`
The data	`D:\Clarus\Clarus_prime\data`	`C:\ProgramData\Clarus\Clarus_prime\data`
The backups	`D:\Clarus\Clarus_prime-backups`	`C:\ProgramData\Clarus\Clarus_prime-backups`
The kept copy of the licence	`C:\ProgramData\Clarus\Clarus_prime-licence`	`C:\ProgramData\Clarus\Clarus_prime-licence`

An installation's actual paths are written in the configuration file `clarus-lis.config.json` in the program's folder, in the fields `install_dir`, `data_dir`, `logs_dir` and `postgres_data_directory`. If the technician chose another folder at installation, the file is the reference.

B.2 Inside the program's folder

Path	What it holds
`clarus-lis.config.json`	The configuration file: the port, the paths, and the database's address and password
`runtime\python`	The program's own Python environment
`runtime\postgresql\pgsql\bin`	The PostgreSQL programs
`packaging\windows`	The scripts that start and stop the program and set up the database
`clarus_lis\language_packs`	The installed language packs
`install-transcript.log`	The installation log

B.3 Inside the data folder

Path	What it holds
`pgdata`	The database itself. Nothing in it is touched by hand
`cluster-superuser.json`	The database's two passwords
`security`	The encryption keys: `field_vault.key` for the sensitive fields, and `backup.key` that signs the backups and checks them
`logs`	The logs (see B.4 The logs)
`report_media`	The attachments: uploaded pictures and documents
`updates\rollback`	What is returned to if an update fails
`updates\handoff`	An update's files while they are handed over

Danger

The data folder is never moved or copied while the program runs, and copying it by hand is no substitute for a backup. A sound copy is taken by the program (see Chapter 8: Backup and restore). If the `security` folder is lost, what was encrypted with it is lost too.

B.4 The logs

File	In	What it holds
`clarus.log`	`logs` in the data folder	The program's log. Rotated every 10 MB, with five kept before it
`clarus-lis-updater-<date and time>.log`	`logs`	One log for each update
`postgresql.log`	`logs`	The database's log, rotated every 20 MB
`postgresql-startup.log`	`logs`	What the database wrote when it started
`install-transcript.log`	The program's folder	The installation log
`clarus-member-*.log`	`data\logs` in the program's folder, on a member computer	The member computer's logs

B.5 Outside the three folders

Path	What it is
`C:\ProgramData\Clarus\.clarus_prime-trial.json` and the registry key `HKLM\SOFTWARE\Clarus\Clarus_prime`	The mark of the trial's first start
The task folder `\Clarus\Clarus_prime\` in Task Scheduler	The program's tasks (see Appendix C: Service names)
The `Clarus` group in the Start menu	The program's shortcut and its uninstall shortcut

Appendix C

Service names

Every name the program registers in Windows. All are derived from the product's name, so its installation never collides with another Clarus product on the same computer.

C.1 Services

Name	What it is	Starts	Runs as
`ClarusPrimePostgres`	The PostgreSQL database	Automatically with the computer	LocalSystem; restarted by itself if it stops suddenly

There is no other service. The program itself is a scheduled task, not a service (see 4.3 How the program starts).

C.2 Scheduled tasks

All are in the folder `\Clarus\Clarus_prime\` in Task Scheduler:

Task	On	What it runs	When	As
`Server`	The server	The program, with no window	At every sign-in	The user who signed in
`Member`	A member computer	The program in its member role, with no window	At every sign-in	The user who signed in
`Updater`	Every computer	Installs a waiting update, and the restore drill when the program asks for it	A minute after the computer starts, and when the program asks for it. Two hours at most	SYSTEM
`Support`	Every computer	The administrator's actions a remote support session asked for, each checked first	When the program asks for it. One hour at most	SYSTEM

`Updater` and `Support` are registered only when the program's folder is protected, so that only administrators can change it. When they are not registered, an update or a support action asks Windows for administrator rights when it needs them.

C.3 When the program was installed without administrator rights

Name	Where	In place of
`ClarusPrime PostgreSQL`	A task at sign-in	The service `ClarusPrimePostgres`
`Clarus_prime Server`	The value in `HKCU\Software\Microsoft\Windows\CurrentVersion\Run`	The task `Server`

C.4 Other names

Name	What it is
`Clarus_prime`	The uninstall entry in "Installed apps"
`Clarus`	The Start menu group
`CLARUS-Prime-Setup`	The start of the Setup file's name
`Clarus LIS analyzers`	The group of firewall rules for analysers

Appendix D

Settings reference

Every screen of the program's **Settings** group, in the order the program lists them, with **Prices and contracts** from the **Management** group. For each: its pages or sections, what is set there, and the chapter that explains it. A screen shows only to a user whose role allows it (see 11.2 Password rules).

D.1 The laboratory

Screen	Its pages or sections	What is set there	See
Laboratory identity	**Name**, **Contact and address**, **Colours**, **Logo**	The laboratory's names, contacts, colours and logo, as its papers and public page show them	3.1 The first setup
General settings	Settings from the server, then sections from the interface (see D.5 General settings in detail)	Language, regional format, front desk, results, money, system, numbering, and more	This appendix
Branches and linking	**Branches**, **Branch devices**, **Samples sent**	Branches, the laboratory's network, member computers, the chain's links, Clarus Link	Chapter 5: Network, branches and Clarus Link
Laboratory site	**Sections**, **Identity and contact**, **Results portal**, **Address and publishing**	The laboratory's public website and its results portal	The user manual

D.2 The catalogue and the devices

Screen	Its pages or sections	What is set there	See
Catalogue	The tests' list, and each test's window: **Definition**, **Reference intervals**, **External laboratories**, **Members**, **Packages that hold it**, **Consents**, **Doctor's interpretation**	The laboratory's tests, their reference intervals, panels and send-out laboratories	The user manual
Devices and printers	**Analyzers**, **Test codes**, **Stations and printers**, **Library**	The analysers and their codes, the stations and their printers	Chapter 6: Analysers, Chapter 7: Printers

Screen	Its pages or sections	What is set there	See
Accreditation and quality	**Overview**, **Standards**, **Program functions**, **Registers**, **QC limits**	The accreditation standards, the quality registers, and the QC limits	The user manual

D.3 People and papers

Screen	Its pages or sections	What is set there	See
Users and permissions	The users and their roles	Accounts, roles, permissions, passwords and two-factor sign-in	Chapter 11: Users, passwords and their recovery
Messages	**Channels**, **Messages to patients**, **Templates**, **Ready messages**	The channels that send to patients (WhatsApp, SMS, email), and the messages' templates	The user manual
Print studio	**Report**, **Receipt**, **Label**, **Report engine**	How the report, the receipt and the label look	7.3 Printing settings

D.4 Data and licence

Screen	Its pages or sections	What is set there	See
Data and continuity	**Migration from RealLab**, **Migration from Lab2000**, **Migration from another system**, **Backups**, **Downtime record**	Migration from older programs, the backups, the record of the program's stops	Chapter 10: Migration from RealLab, Chapter 8: Backup and restore
Licence	The licence's state, its activation and its moving	Activation, the trial, moving the licence to another computer	Chapter 3: First run, licence, activation and moving it
First setup	The first setup's steps	The steps a new laboratory goes through, which can be reopened	3.1 The first setup

D.5 General settings in detail

The screen first shows the settings kept on the server, by group, then sections of the interface's own.

From the server:

Group	What it holds
Language	The program's language, and the language of the report, its notes, the receipt and the result message
Regional format	The country, the time zone, the date and time formats, the first day of the week, the currency
Front desk	The order's default priority, the collection instructions, the patient's name language and phone
Results and critical values	The constants of the calculations, the critical values' escalation, and who may release a result
Money and shifts	Whether money is collected only within an open shift
System and connection	The screens' refresh, the idle session's end, and the online update check (see 9.1 How an update arrives)

From the interface:

Section	What it holds
Request form: required items	What the new order requires
Payment methods taken and **Payment bar**	The payment methods taken, the order's starting amount, the ceiling on a manual discount
Report PDF export	Writing every released report as a file to a folder on the server
Numbering	The counters of the patient's file, the order, the sample's barcode and the invoice: each one's next number, and when it starts again
Patient titles and **Expense heads**	The patients' titles, and the treasury's expense heads
STAT tests	The STAT tests and their reporting times
Order of the printed report	The order of the tests in the printed report
Verifying the calculations	Each equation with its worked examples, to sign at installation and after an update that changes one
Sample storage places	The fridges and their shelves, with their temperature limits
Laboratory languages	The laboratory's languages (see 12.2 Installing and removing a language)
Operating health	The last backup, the licence and the sealed secrets, at a glance

> **Tip**
>
> After installing, and after an update that changes an equation, open **Verifying the calculations** and sign it. It is the laboratory's proof that the program's calculations were checked on its own computer.

D.6 Prices and contracts

In the **Management** group. Its pages: **Test prices**, **Branch prices**, **Price lists**, **Payers' printed lists**, **Payers**, **Contracts**, **Membership plans**, **Commissions** and **Visit and payer types**. It holds each test's base price, and what the price lists, the payers' contracts and the membership plans change. Its use is explained in the user manual.

Appendix E

Messages

The messages a technician meets most, in the program's own words, by area. For each: where it shows, what it means, and the chapter that explains what to do. Setup's own messages are in 2.12 When installation stumbles.

E.1 Signing in and the server

The message	Where	What it means	See
You signed in without a password. Give the administrator a password, so that nobody else signs in by this button; the server is not opened to the network's devices before it.	At the top of every screen	The administrator has no password yet. The server is not opened to the network before it has one	11.1 The first administrator
The licence could not be read.	**Licence**	The program could not read the licence's state	3.5 When work stops
The licence could not be checked.	**Licence**	The online check of the licence did not finish. The internet, or the supplier's server	3.3 Activating the licence
The update service could not be reached.	**Licence**	The update service could not be reached	9.5 The log and failures
The licence could not be moved.	**Licence**	Moving the licence did not finish. The program still works on this computer	3.4 Moving the licence to another computer
The request file could not be made.	**Licence**	The activation request file for activating without the internet could not be written	3.3 Activating the licence

E.2 The network and the member computers

The message	Where	What it means	See
This computer is not connected to the laboratory's network. Connect it by cable or Wi-Fi, then check.	**The laboratory's network**	The server has no network	5.2 Opening the server to the laboratory's network
Windows classes this network as public, so its firewall keeps the devices out. Make it private on this computer.	**The laboratory's network**	The network is public, so the firewall keeps the devices out	5.2 Opening the server to the laboratory's network
The certificate names an address this computer no longer has. Renew it, then start again; the devices keep trusting it.	**The laboratory's network**	The server's address changed	5.2 Opening the server to the laboratory's network
Windows did not apply the change: the approval was declined.	**The laboratory's network**	Windows' approval window was answered "No", or not answered	5.8 When the network or the link stumbles
Windows did not apply the change: an error occurred while applying it.	**The laboratory's network**	Windows failed to apply the firewall's change	5.8 When the network or the link stumbles
No device joins before the server is opened to the laboratory's computers.	**Branch devices**	The server is not opened to the network yet	5.2 Opening the server to the laboratory's network
This server was opened to the computers before its number was activated, so the branch's computers cannot find it on the network yet.	**Branch devices**	The rule that lets members find the server is missing	5.8 When the network or the link stumbles
Windows classes this computer's network as public, so its firewall keeps the branch's computers out.	**Branch devices**	The server's network is public	5.8 When the network or the link stumbles
This device's state could not be read. Restart the program on it.	**This device**, on the member	The program on the member computer does not answer	5.3 Joining a member computer

The message	Where	What it means	See
Joining the branch failed.	**Join the branch**, on the member	Joining did not succeed. Check the number, that the server allowed it, and that the server is opened to the network	5.3 Joining a member computer

E.3 Clarus Link

The message	What it means	See
Clarus Link is not enabled for this laboratory. Contact us to enable it. Access through the laboratory's own address, where it is set up, is not affected.	The service is not enabled for the laboratory	5.6 Clarus Link
Clarus Link does not recognise this copy yet. It must reach the update server at least once, and an activated copy must verify its licence online.	The copy has not reached the supplier yet	5.6 Clarus Link
Clarus Link already serves another copy of the program that holds this laboratory's identity, so this copy was turned away. Run the laboratory's program on one computer only. Access through the laboratory's own address, where it is set up, is not affected.	The laboratory's program runs on two computers	5.6 Clarus Link

E.4 Backups

The message	Where	What it means	See
No backup yet	**Backups**	No backup has been taken on this server	8.3.2 The list of backups
Not met: no recent backup	**Backups**	The last backup is older than the laboratory allows	8.3.1 The four facts
not encrypted	**Backups**	The backups are kept without encryption	8.1 How the program saves the laboratory
Verification failed	**Backups**	A backup's file does not match its signature. Do not restore from it	8.4 Verification and the restore drill
Restore drill failed	**Backups**	The last restore drill did not succeed	8.4.2 The restore drill

The message	Where	What it means	See
The drill finished, and the restored copy did not match what was recorded when it was taken.	**Backups**	The restored copy differs from the backup's record	8.4.2 The restore drill

E.5 Analysers

The message	Where	What it means	See
Not mapped	**Test codes**	A code the analyser sends is joined to no test, so its results are not filed	6.4 Mapping the analyser's codes to tests

Appendix F

Glossary

The words as this manual uses them, each with the chapter that explains it.

F.1 The program and the computers

Term	Meaning	See
Server	The computer that holds the laboratory's database, on which the program always runs	4.1 What runs on the server
Member computer	A computer of the branch that runs the program without a database, taking everything from the server	Chapter 5: Network, branches and Clarus Link
Station	The part of the program on every computer that prints on its printers and serves the analysers cabled to it	7.1 How the program prints
Branch	A site of the laboratory with its own server or computers, within one laboratory or a chain	Chapter 5: Network, branches and Clarus Link
Program folder	Where the program's files are. It is replaced at every update	B.2 Inside the program's folder
Data folder	Where the database, the encryption keys and the logs are. Updates never touch it	B.3 Inside the data folder
Service	A program Windows starts with the computer. Only the database is a service	C.1 Services
Scheduled task	What Windows' Task Scheduler runs. The program itself is a task that starts at sign-in	C.2 Scheduled tasks
Private and Public network	How Windows classes a network. The program never opens its ports on a Public one	A.4 Firewall rules

F.2 Printing and devices

Term	Meaning	See
Printer role	The label, the receipt or the report. Each role has its printer on each station	7.2 Binding printers to their roles
Silent printing	Printing straight to the role's printer, with no window	7.1 How the program prints

Term	Meaning	See
Command language	What the printer understands: ZPL, TSPL or ESC/POS, or drawing through the Windows driver	7.2 Binding printers to their roles
Resolution	The label printer's dots per inch, most often 203 or 300	7.3 Printing settings
Link file	An analyser's settings and codes in one file, from the Clarus library or another laboratory	6.4 Mapping the analyser's codes to tests
Code mapping	Joining a code the analyser sends to a test of the catalogue. Without it no result is filed	6.4 Mapping the analyser's codes to tests
Held messages	What the analyser sent that was not filed, with the reason, until it is processed again	6.5 Checking the link
Work orders	What to run on each tube, sent by the program to the analyser or asked for by the analyser	6.7 Both directions: work orders
ASTM, HL7 and POCT1-A	The languages analysers and the program talk in. MLLP is HL7's message envelope	6.1 How results arrive

F.3 Data and security

Term	Meaning	See
Backup	A signed, complete copy of the laboratory's data, to restore from	Chapter 8: Backup and restore
Restore drill	A trial restore of a backup in a separate place, proving it really restores	8.4.2 The restore drill
Migration	Carrying a laboratory's history from the RealLab program into the program	10.2 The steps of a migration
Acceptance report	What the program shows after a migration: what moved and what did not, with a balance of numbers	10.4 The acceptance report
Recovery code	A code for each administrator, to set a new password on the server if they forget theirs	11.5 The administrator's recovery code
Emergency sheet	A printed sheet with the recovery code, the installation number, the support number and the cloud backup code	11.5 The administrator's recovery code
Encryption key	The file `field_vault.key` that reads the sensitive fields in the database	B.3 Inside the data folder

F.4 Licence and updates

Term	Meaning	See
Trial	14 days with everything in the program before activation	3.2 The trial
Computer fingerprint	What binds the licence to the computer from its parts, tolerating some of them changing	3.3 Activating the licence
Installation code	The number that identifies the laboratory's installation to the supplier and support	3.3 Activating the licence
Hand-back code	What the program gives when the licence leaves a computer, proving it was handed back	3.4 Moving the licence to another computer
Required update	An update with a deadline. When it passes, new work is refused until the update, and reading, printing and delivering verified results stay open	9.1.1 A required update
Language pack	A signed file with a whole language's texts for the screens, the papers and the test names	12.1 What a language pack is
Status report	A summary of the program's state sent to support, with no patient data at all	13.3 The status report to support
Remote support session	Clarus support entering the laboratory's copy with its agreement, for a time it chooses	13.4 A remote support session