

CertiReport User Manual

Scheduled, certified reporting for SAP Business One — technical and functional manual

CERTICONS LLC

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1. Introduction

1.1 What CertiReport is

CertiReport is a self-hosted web application that schedules, produces, certifies and delivers reports from SAP Business One companies, on SAP HANA and on Microsoft SQL Server alike. It runs as a pair of Windows services on a server of your own, reads the company databases with a read-only user, keeps its own data in an embedded PostgreSQL database that the setup installs, and puts every report, schedule, run and delivery behind one role-secured portal with an audit trail.

A report in CertiReport is a versioned package: one or more SQL datasets (one SELECT per platform), typed variables, cross-variable rules and one or more outputs (Excel, CSV, PDF from an HTML template, or a Crystal Reports layout). A schedule bundles published reports, binds their variables (a fixed value, a date expression, a lookup, or an iteration over business partners that produces one item per partner), fires on a cron trigger in a time zone of your choice and delivers each item by e-mail, to a folder, to an SFTP server, a SharePoint library or a Microsoft Teams channel, or writes it back to the business partner in SAP Business One. Every PDF can carry a verification code and QR code that anyone can check on a public page, and can be signed with the company's certificate.

The product covers the whole life of a scheduled report:

Area	What CertiReport does
Companies	Connections to SAP Business One companies on SAP HANA (through the SAP HANA Client) and Microsoft SQL Server, each with a read-only database user, a connection test that reports whether the user can change data, a cap on concurrent queries, an optional Service Layer sign-in for write-back, a signing certificate and a logo; licensed per active company
Reports	Versioned report definitions (Draft, Pending approval, Published, Retired; four-eyes publishing), datasets per platform with @Name variables bound as parameters, a safety guard that accepts a single SELECT only, variable sources (free entry, fixed list, SQL lookup, SAP B1 pickers), concepts that let schedules bind one value for several reports, date expressions such as @StartOfMonth(-1), rules checked before a run, import from the SAP B1 Query Manager, seven starter reports
Outputs	Excel with themes (colours, fonts, formats, title block, totals, print setup) or a workbook template filled with markers, CSV, PDF rendered by Chrome or Edge from a Scriban HTML template with page setup and watermark, Crystal Reports layouts from an .rpt file or straight from the SAP B1 company in PDF, Excel and CSV
Schedules	Slots and bindings (fixed, expression, lookup, derived, iterate, business partners and partner groups), cron presets with a time zone, business calendars with a holiday policy, misfire and overlap policies, formats per schedule, conditional sending, file-name templates, checks before saving, test send, pause, duplicate and run now
Delivery	E-mail through a mail profile (SMTP, Microsoft 365 OAuth2 or Microsoft Graph) with a rich-text message, placeholders, data tables and language variants, attachment limits with splitting or zipping, download links instead of attachments, folder copies, SFTP, SharePoint, Teams cards, approval before sending, write-back of the files to the business partner in SAP Business One
Certification	SHA-256 of every file, a verification code and QR code in the PDF footer, a public verification page and API that compare an uploaded PDF byte for byte, PKCS#7 signature with the company's certificate, optional open password
Operations	Run history with items, retry and resend, a deliveries search, a transactional outbox with retries and dead letters, bounce handling with a suppression list, failure alerts, a weekly digest, a webhook after every run, retention of runs and mail, nightly

Area	What CertiReport does
	backups, Prometheus metrics, health endpoints, a prerequisite check for the engine server
Security	Users with six roles, authenticator app (TOTP) with recovery codes, mandatory authenticator for administrators, Windows and Microsoft Entra sign-in, lockout after failed sign-ins, rate limits on sign-in and verification, API keys with roles, a hash-chained audit log, encrypted secrets under a machine-protected key ring
Administration	Mail profiles, destinations, Excel themes and templates, business calendars, settings (public address, retention, failure alerts, digest, webhook, backups, bounce mailbox), export and import of a configuration as one JSON bundle, licence management
Languages	The portal in English, Arabic (right-to-left) and French, chosen per user

1.1.1 Architecture at a glance

Component	Windows service	Role	Default endpoint
Portal	CertiReport.Portal	Blazor web portal, REST API (/api/v1), API reference (/api/docs), health endpoints, command line for setup, backup and licensing	http://*:8080
Engine	CertiReport.Engine	Clustered Quartz.NET scheduler, report runs, rendering, mail dispatch, housekeeping, nightly backup, prerequisite check	health only, http://localhost:5091
Database	CertiReport.Database	Embedded PostgreSQL 18 server that holds companies, reports, schedules, runs, users, settings and the outbox	localhost:5444

Both services read the same configuration from the Windows registry, write their logs under %ProgramData%\CertiReport\logs and share one Data Protection key ring under %ProgramData%\CertiReport\keys, so a secret stored by the portal can be read by the engine. The scheduler is clustered: every enabled schedule is a Quartz trigger in the shared database, and the dashboard lists each engine node with its version and heartbeat. Chapter 10 describes the architecture, the configuration precedence and the data folders in detail.

1.1.2 How a report reaches a recipient

1. An administrator connects an SAP Business One **company** with a read-only database user and tests the connection (chapter 4).
2. A report designer writes a **report**: one SELECT per platform with @Name variables, the variables' types, sources and defaults, rules such as ToDate >= FromDate, and the outputs (an Excel theme or template, a PDF template, a Crystal layout). The report is saved as a **draft**, run on demand to check it, submitted for approval and **published** by a second user (chapter 5).
3. A scheduler creates a **schedule** over one or more published reports, binds every variable **slot** (a fixed value, a date expression such as @EndOfMonth(-1), a lookup, or an iteration over business partners), sets the cron **trigger** with its time zone and calendar, chooses the formats and the delivery (mail profile, recipients, message, folder, destination, write-back), runs **Check** and **Send a test**, and enables the schedule (chapter 6).
4. The **engine** fires the schedule, records a **run** with one **item** per iteration value (one per business partner, say), executes the datasets in parallel up to the company's concurrency cap, renders the files, certifies and signs the PDFs, and writes each item's e-mail into the **outbox** in the same transaction as the item's result (chapter 7).
5. The outbox **dispatcher** sends the messages through the mail profile, respecting its rate and attachment limits, retrying transient failures and recording every attempt. Folder copies, SFTP and

SharePoint uploads, Teams cards and the SAP Business One write-back happen per item. Bounces that come back to the sender mailbox are matched to the item (chapter 7).

6. Users follow the result in **Run history** and **Deliveries**, retry or resend single items, and recipients verify a PDF on the public **verify** page (chapters 7 and 8). Failure alerts and the weekly digest keep the administrators informed without opening the portal.

1.1.3 Key terms

Term	Meaning
Company	A connection to one SAP Business One company database (HANA or SQL Server) with its options; the unit the licence counts
Report, version	A report has a code and a name and a list of versions; a version is Draft, Pending approval, Published or Retired. Published versions are immutable; editing one starts a new draft
Dataset	One SELECT of a report, written once per platform (HANA and SQL Server); each dataset becomes a sheet in Excel and an object in the PDF template
Variable	A typed input of a report, written @Name in SQL and bound as a parameter; has a source (free, list, SQL lookup, SAP B1 picker), a default and rules
Concept	A shared meaning of variables across reports (for example BusinessPartner), so a schedule binds it once
Slot, binding	A slot is a variable (or a concept shared by several reports) a schedule must bind; a binding is how: fixed, expression, lookup, derived, iterate, business partners
Schedule	Published reports, bindings, a trigger, formats and a delivery; enabled or paused
Run, item	One execution of a schedule (or an on-demand run of a report); an item is one iteration value with its files and its message
Outbox, delivery attempt	The queue of e-mails written by the engine and the record of every send attempt, with retries and dead letters
Mail profile	An SMTP, Microsoft 365 OAuth2 or Microsoft Graph sender with limits, used by schedules and alerts
Destination	A named SFTP server, SharePoint library or Teams channel a schedule can deliver to
Business calendar	Weekend days and holidays, with a policy for runs that fall on a non-business day
Certification, verification code	The SHA-256 of a file and the XXXX-XXXX-XXXX code printed in a PDF footer with a QR code to the public verify page
Signing	A PKCS#7 signature with the company's certificate from the Local Machine store, optionally with an open password
Public address	The URL users and recipients reach the portal at, used in links and QR codes (Administration › Settings)
Hardware ID	The identifier of the server a licence is bound to, shown under Administration › License
Engine node	One running instance of the engine service, listed on the dashboard with its heartbeat

1.1.4 Deployment shapes

Shape	What runs where	Notes
One server	Portal, Engine and embedded database on one Windows server	The default the setup installs. The SAP HANA Client, Chrome or Edge and, optionally, the Crystal runtime go on this server
One server with an external PostgreSQL	Portal and Engine on the server, the metadata database on an existing PostgreSQL server	USE_EMBEDDED_DB=0 with a connection string at setup (chapter 2)
Portal behind HTTPS	As above, with a certificate from the Local Machine store	HTTPS_PORT and HTTPS_CERT_THUMBPRINT at setup (chapter 2); the public address set to the HTTPS name

Stored secrets are protected with a key ring bound to the server (DPAPI for the local machine), so the portal and the engine that share a key ring run on the same server. Moving an installation to another server means re-entering the secrets (chapter 2).

1.1.5 What CertiReport does not do

- It does not write to the SAP Business One company database. Reports are read with a read-only user; the only writes are through the Service Layer, when a schedule asks for the delivered files to be attached to the business partner or logged as an activity.
- It does not replace the SAP Business One client, the Print Layout Designer or the Crystal Reports designer. Crystal layouts are designed in Crystal Reports and rendered by CertiReport through SAP's runtime; layouts that depend on the SAP Business One print proxy do not run outside SAP Business One.
- It does not download anything at run time. The PDF renderer uses the Google Chrome or Microsoft Edge already installed on the engine server; the SAP HANA Client and the Crystal runtime are installed by you.

1.2 Who this manual is for

The manual is written for four groups of readers:

- **IT administrators and SAP Business One partners** who install, secure, back up and upgrade CertiReport. Chapter 2 (installation), chapter 4 (companies and licensing), chapter 9 (administration) and chapter 10 (technical reference) are written for them.
- **Report designers** who know the SAP Business One tables and write the SQL. Chapter 5 (reports) and chapter 8 (PDF templates and Crystal layouts) describe the designer, the variables, the outputs and the templates.
- **Schedulers and finance or sales staff** who decide what goes to whom and when. Chapter 6 (schedules) and chapter 7 (runs and deliveries) cover the schedule editor, the message, the delivery channels, the run history and the deliveries search.
- **Auditors and viewers** who follow what was sent. Chapter 7 and the audit log in chapter 9 are for them.

Basic familiarity with SAP Business One terms (company database, business partner, Query Manager, Service Layer) and with SQL is assumed; the glossary in chapter 10 defines the terms used throughout.

1.3 How this manual is organised

Chapter	Content
1. Introduction	This chapter: scope, conventions, version, support
2. Installation	Requirements, the setup wizard, unattended installation, HTTPS, service account, what setup creates, first sign-in, upgrade, backup and restore of CertiReport, moving to another server, uninstall, the prerequisite check, troubleshooting
3. The portal	Signing in, authenticator app, Windows and Microsoft sign-in, password change, language, layout and navigation, the dashboard and the getting-started checklist, roles at a glance, the licence banner
4. Companies and licensing	Company connections on HANA and SQL Server, the read-only user, test, concurrency, Service Layer, signing certificate, logo, active flag; the licence, its states and enforcement
5. Reports	The report list and versions, the designer, datasets, variables, concepts, rules, outputs, Query Manager import, starter reports, running on demand
6. Schedules	Slots and bindings, triggers and calendars, formats, delivery channels, the message editor, attachment handling, write-back, test send, checks, enable and pause
7. Runs and deliveries	Run history, run detail, retry and resend, warnings, the deliveries page, the outbox, bounces, failure alerts, the weekly digest, retention
8. PDF and Crystal	PDF templates and helpers, certification and verification, signing, Crystal Reports layouts and parameter maps
9. Administration	Users and roles, API keys, mail profiles, destinations, the bounce mailbox, Excel themes and templates, settings, export and import, the audit log
10. Reference	Architecture, configuration and registry keys, data folders and logs, command line, REST API, health and metrics, troubleshooting, glossary

1.4 Conventions

- Menu paths are written with the › separator in bold: **Administration › Companies** means the *Companies* entry under the *Administration* group of the navigation menu. Page names follow the navigation menu of the portal.
- Button and field labels are written in **bold** the first time they are introduced in a section, exactly as the portal shows them in English: **Save**, **Test connection**, **Run now**.
- Commands, file names, settings keys, SQL, placeholders and URLs are set in monospace. Longer commands appear in code blocks and are meant for an elevated PowerShell or command prompt on the server:

```
"C:\Program Files\CertiReport\Portal\CertiReport.Portal.exe" backup --to D:\Backups\CertiReport --keep 30
```

- Configuration keys use the colon notation of .NET configuration (Https:Port, Rendering:BrowserPath). On an installed server they are registry values of that name under HKLM\SOFTWARE\CertiReport, HKLM\SOFTWARE\CertiReport\Portal or HKLM\SOFTWARE\CertiReport\Engine (see chapter 10).
- Placeholders in commands are written in angle brackets: <server> is the host name of the CertiReport server, <version> the four-part version of the setup, <thumbprint> a certificate thumbprint.

- Report variables are written with their @ prefix as they appear in SQL (@FromDate); message placeholders in braces as they appear in the message editor ({ReportName}, {RunDate:MMMM yyyy}).
- %ProgramData% is the Windows ProgramData folder, normally C:\ProgramData. CertiReport keeps its database cluster, key ring, logs and generated files under %ProgramData%\CertiReport.
- Notes that prevent data loss or downtime are marked **Caution**.
- The portal is available in English, Arabic and French. This manual quotes the English labels; the translated labels sit in the same place on every page.

1.5 Security and data handling in brief

Topic	How CertiReport handles it
Access to SAP Business One	Through a read-only database user per company; the connection test reports whether the user can change data and the prerequisite check warns about it. The safety guard accepts a single SELECT per dataset and values are bound as parameters, never pasted into the SQL
Write-back	Only through the company's Service Layer, only when a schedule asks for it, and only to the business partner's attachments or activities
Secrets	Company and Service Layer passwords, mail passwords and client secrets, destination secrets and the webhook secret are encrypted with a key ring protected by the machine (DPAPI). API keys are stored as hashes and shown once. The database connection string lives in a registry value readable by administrators, SYSTEM and the service account only. No password travels in an export bundle or appears in a log
Accounts	Passwords of 12 characters or more with upper-case, lower-case and a digit; lockout for 15 minutes after 5 failures; authenticator app with recovery codes, mandatory for administrators who sign in with a password; Windows and Microsoft Entra sign-in for existing users only; sessions end within a minute of a password reset, deactivation or "sign out everywhere"
Portal hardening	Rate limits on sign-in and verification; HTTPS from a certificate in the Local Machine store, HTTP Strict Transport Security on every installed portal; X-Content-Type-Options, X-Frame-Options: DENY, Referrer-Policy, Cross-Origin-Opener-Policy and a restrictive Permissions-Policy on every response; PDF templates run sandboxed without file or network access
Audit	A hash-chained audit log of user, company, report, schedule, licence and account events (chapter 9)
Certification	Every file keeps its SHA-256; the public verification page exposes the issuer, report, date and hash of a certified PDF, never the file
Retention	Runs with their files are kept 400 days by default and finished mail 90 days; the engine's housekeeping deletes what is older (chapter 9)
Backups	One zip with the database dump, the key ring and optionally the files, nightly from the engine or on demand (chapter 2)

1.6 Version

This manual describes CertiReport 1.20 (release 1.20.1, October 2026). The version of an installation is shown on the dashboard (**System status**) as a chip next to the page title, in the **Version** column of the

engine nodes table, in Programs and Features and in the title of the setup. Release notes are shipped with every setup as `CHANGELOG.md` and summarised below; the website at <https://certireport.com> carries the current feature overview.

Version	Main changes
1.0	First release: portal, reports, scheduler, certified PDFs, Crystal layouts, setup
1.1	Embedded PostgreSQL database (or an external PostgreSQL server), administrator account created by setup, Visual C++ runtime installed by setup
1.2	Crystal layouts from the SAP B1 company, Crystal outputs in Excel and CSV
1.3	Business partner bindings with contact persons
1.4	Rich-text message editor with placeholders and preview
1.5	Test send, pause and duplicate schedules
1.6	Resend and retry single items
1.7	Attachment limit: split, zip or skip
1.8	Message language variants
1.9	File-name templates, conditional sending, business calendars, partner groups, data tables in messages, failure alerts, webhook, API keys, export and import
1.10	Excel themes
1.11	Excel templates
1.12	Destinations: SFTP, SharePoint, Teams
1.13	Bounce handling and suppression list
1.14	Backup and restore
1.15	Starter reports
1.16	Approval before sending, download links
1.17	Deliveries search
1.18	Weekly digest, Prometheus metrics (<code>/metrics</code>), <code>PUBLIC_URL</code> at setup and <code>set-public-url</code>
1.19	Licensing per company
1.20	Portal in English, Arabic and French
1.20.1	User manual and product website; a Crystal parameter map literal may be written in single or double quotes

1.7 Support and contact

CertiReport is developed and supported by CERTICONS LLC.

Website	https://certireport.com
Sales and licences	sales@certicons.com
Licence requests and activation	licensing@certicons.com
Support page (Start menu shortcut CertiReport Support)	https://www.certicons.com/certireport/support

When you contact support, include:

- the version from the dashboard or from Programs and Features;
- the output of `CertiReport.Engine.exe check` run on the engine server (see chapter 2), which lists the state of the database, the data folder, the PDF browser, the Crystal sidecar and every active company's connection, signing certificate and Service Layer sign-in;

- the relevant log files from %ProgramData%\CertiReport\logs (portal-<date>.log, engine-<date>.log); they never contain passwords;
- for a failed run, the run id from **Run history** and the notes on the failed item (see chapter 7);
- for a licence question, the Hardware ID shown under **Administration › License** (see chapter 4).

The setup writes its own log to the path given with /log, or to %TEMP% by default; keep it when an installation or upgrade fails.

2. Installation

CertiReport is installed with one setup program, `CertiReportSetup-<version>.exe`, on a Windows server. The setup shows the licence agreement and an options page, installs the two CertiReport Windows services and the embedded PostgreSQL database, creates the first administrator, stores the public address when it is given and starts everything. The same setup, run again with a newer version, upgrades an installation in place. This chapter describes the requirements, the setup wizard, the unattended command line, what the setup creates on the server, the first sign-in, upgrades, backup and restore, moving to another server, uninstallation and the prerequisite check.

2.1 Requirements

2.1.1 Server

Requirement	Detail
Operating system	64-bit Windows Server 2012 R2 or later (Windows 8.1 or later on a workstation). The setup refuses to run on anything else.
.NET	None to install. Both services are published self-contained with the .NET 10 runtime inside.
Visual C++ runtime	The embedded PostgreSQL server needs the Microsoft Visual C++ 2015-2022 x64 Redistributable. The setup installs it when it is missing and the embedded database is chosen; this may ask for a restart (exit code 3010).
Disk	The program files under <code>C:\Program Files\CertiReport</code> (portal, engine, PostgreSQL server) and the data under <code>%ProgramData%\CertiReport</code> : the database cluster, the key ring, the logs (30 days) and the generated report files, which grow with every run until retention removes them (default 400 days, see chapter 9).
Ports	8080 for the portal (HTTP), or the port you choose; 8443 or another port when HTTPS is enabled; 5444 for the database, bound to <code>localhost</code> only; 5091 on <code>localhost</code> for the engine's health endpoint. The setup opens the portal port in Windows Firewall.
Browser for PDF	Google Chrome or Microsoft Edge installed on the engine server. PDF outputs are rendered by that browser in headless mode; nothing is downloaded. Chrome is tried first; <code>Rendering:BrowserPath</code> names another executable. Without a browser PDF outputs fail (Excel, CSV and Crystal outputs still work).
SAP HANA Client	For companies on SAP HANA the portal (connection test) and the engine (report runs) load the ADO.NET provider of the SAP HANA Client 2.x (64-bit) from <code>C:\Program Files\sap\hdbclient\dotnetcore\v8.0 (Sap.Data.Hana.Net.v8.0.dll)</code> ; install the client on the server first. The setting <code>DataSources:HanaClientPath</code> names another folder. Without the client a HANA connection fails with <code>SAP HANA Client not found</code> .
SQL Server	For companies on Microsoft SQL Server no client is needed; the driver is built in.
Crystal Reports (optional)	.NET Framework 4.8 and the SAP Crystal Reports runtime for .NET Framework, 32-bit or 64-bit, any 13.0 service pack, installed on the engine server. The Install Crystal Reports layout support option installs the Crystal sidecar only when such a runtime is registered on the machine; install SAP's runtime first, then run the setup (or run it again).

Requirement	Detail
	A setup built with SAP's 64-bit runtime included installs that runtime itself when the option is ticked and none is registered.

The browser for the portal is any current browser on the users' workstations; the portal is a Blazor Server application and needs a WebSocket connection to the server.

2.1.2 Accounts and permissions

- Run the setup from an elevated session (a local administrator). The setup runs its configuration commands (db-setup, create-admin and, with a public address, set-public-url) as LocalSystem and registers services, firewall rules and an Event Log source.
- The three services run under one **service account**. The default is NT AUTHORITY\NetworkService. In production use a group managed service account (gMSA) such as DOMAIN\svc-certireport\$, so the engine can write to network folders and SFTP or SharePoint credentials do not have to be stored for a built-in account. The setup grants the account full control of %ProgramData%\CertiReport and read access to the connection string in the registry; it registers the database service for the same account.
- For HTTPS and for PDF signing the service account needs read access to the private key of the certificate in the Local Machine Personal store (see 2.4 and chapter 8).
- For every SAP Business One company you need a read-only database user. The scripts sql\hana-readonly-user.sql and sql\sqlserver-readonly-user.sql in the install folder create one (CERTIREPORT_RO on HANA, certireport_ro on SQL Server); replace the password and repeat the grant for every company schema or database. Chapter 4 describes the company connection.

2.1.3 Database

By default the setup installs its own PostgreSQL 18 server (**embedded database**) as Windows service CertiReport.Database, listening on localhost only, with its cluster under %ProgramData%\CertiReport\pgdata. You give it a superuser password once; the application gets its own login certireport with a generated password, which the setup stores in the registry where only administrators, SYSTEM and the service account can read it.

An existing PostgreSQL server can be used instead (USE_EMBEDDED_DB=0 with a connection string, see 2.3). The setup then installs no database service and does not run the database step; the portal creates the schema in the named database at first start.

2.1.4 Network

Direction	From	To	Port	Purpose
inbound	users' browsers	CertiReport server	8080 (HTTP) and, when enabled, the HTTPS port	the portal; a WebSocket connection is kept open while a page is shown
inbound	monitoring	CertiReport server	the portal port	/health/live, /health/ready, /metrics (API key), /api/v1
inbound	recipients	the public address	the portal port or your reverse proxy	/verify and /d/<token> download links, when recipients outside the network use them
local only	portal and engine	localhost	5444	the embedded database
local only	monitoring	localhost	5091	the engine's /health/live

Direction	From	To	Port	Purpose
	g on the server			and /health/ready
outbound	portal and engine	SAP HANA or SQL Server	the database's SQL port, as entered on the company page	company queries, connection tests
outbound	portal and engine	SAP B1 Service Layer	the port in the Service Layer URL on the company page	write-back, Service Layer test
outbound	engine	mail server, Microsoft 365	SMTP or HTTPS (Graph)	sending, bounce mailbox (IMAP or Graph)
outbound	engine	SFTP servers, SharePoint, Teams	22 or HTTPS	destinations
outbound	engine	your webhook endpoint	HTTPS	run summaries

The portal and the engine are one installation on one server; the embedded database accepts connections from that server only.

2.2 The setup wizard

Download CertiReportSetup-<version>.exe, right-click it and choose *Run as administrator*. The setup is a WiX Burn bundle; it shows the CertiReport logo, the version and the following pages.

2.2.1 End User Licence Agreement

The first page shows the End User Licence Agreement (EULA.rtf). Tick **I accept the terms of the licence agreement** to enable the buttons:

Button	Effect
Options	Opens the setup options (2.2.2).
Install	Installs with the current options. On a fresh installation open Options first: the database superuser password and the administrator password are required and have no default.
Cancel	Asks for confirmation and closes the setup.

2.2.2 Setup options

The **Setup options** page carries every choice. On an upgrade the values of the previous installation are read back from the registry, so you only change what you want to change; passwords are never stored and are not needed again.

Section	Field	Default	Meaning
	Install location (with Browse)	C:\Program Files\CertiReport	Program files: Portal\, Engine\, pgsql\, sql\, license\.
	Portal HTTP port	8080	The port users open in the browser. Written as Kestrel:Endpoints:Http:Url = http://*:<port> and opened in Windows

Section	Field	Default	Meaning
Database (PostgreSQL installed by setup as Windows service CertiReport.Database)	HTTPS port (optional)	empty	Firewall. Together with the thumbprint switches on HTTPS on this port (see 2.4).
	HTTPS certificate thumbprint (Local Machine store)	empty	Thumbprint of a certificate in the Local Machine Personal store.
	Service account for both Windows services (NetworkService, or a gMSA such as DOMAIN-certireport\$)	NT AUTHORITY \NetworkService	Account of CertiReport.Portal, CertiReport.Engine and CertiReport.Database.
	Database port	5444	Port of the embedded server; localhost only. The setup checks that the port is free.
Portal administrator (first sign-in)	Database superuser (postgres) password - required on first install	none	Used once to create the application login and database. Keep it: it is needed again only to repair the application login.
	User name	admin	The first portal user, with the Administrator role.
	Password (12+ characters, upper and lower case, a digit)	none	Created when the portal has no users yet; ignored on an upgrade.
	Create a desktop shortcut to the portal	ticked	Adds <i>CertiReport Portal</i> to the desktop. Start menu shortcuts are always created.
	Install Crystal Reports layout support	not ticked	Installs the Crystal sidecar under Engine\CrystalHost. The box can always be ticked, but the sidecar is installed only when an SAP Crystal Reports runtime for .NET Framework is registered on this machine (2.1.1).

The page explains that the database listens on this computer only and is stored under %ProgramData%\CertiReport\pgdata, and that the administrator account is created only when the portal has no users yet. Click **OK** to return to the first page, then **Install**.

The public address of the portal (PUBLIC_URL) is not on the options page; set it after the installation under **Administration › Settings** or pass it on the command line (2.3).

2.2.3 Progress, success and failure

The **Installing CertiReport** page shows the packages as they run. The setup installs the Portal and Engine Windows services, registers the firewall rule, prepares the embedded PostgreSQL database (service `CertiReport.Database`), creates the administrator account and starts the services. Two commands run inside the MSI and log into the MSI log (2.5.5): `CertiReport.Portal.exe db-setup` (embedded database only) and `CertiReport.Portal.exe create-admin` (only when an administrator password was given). A failure of either fails the installation and rolls it back; a cluster created by that same run is discarded, so a retry starts clean. With `PUBLIC_URL` a third command, `CertiReport.Portal.exe set-public-url`, runs after them; its failure is logged but does not fail the installation.

On success the page **CertiReport is installed** says that the database, Portal and Engine services are running and that you sign in with the administrator account chosen in the options (the user name is shown). It lists the next steps (add a company connection, a mail profile, publish a report, create a schedule; run `CertiReport.Engine.exe check` in the Engine folder; documentation and support at www.certicons.com/certireport) and shows the portal address `http://localhost:<port>`. **Open the portal** opens it in the default browser; **Close** ends the setup. If a restart is pending (Visual C++ runtime), a **Restart** button appears instead.

On failure the **Setup failed** page links to the log file. Open it, and the `CertiReport_*.log` MSI log next to it, and look for the output of `db-setup` or `create-admin` (2.9).

2.2.4 Help and command-line switches of the setup

`CertiReportSetup-<version>.exe /?` shows the help page: `/install`, `/repair`, `/uninstall`, `/layout <directory>` (a complete local copy of the setup), `/passive` (minimal UI, no prompts), `/quiet` (no UI), `/norestart` and `/log <file>`; without `/log` a log is written to `%TEMP%`. Every option of the options page can be given as `NAME=value` (2.3).

2.2.5 Modify, repair and uninstall

Running the setup of the installed version again, or choosing *Uninstall/Change* in Programs and Features, opens the **Modify CertiReport** page:

- **Repair** reinstalls the program files and services with the current settings.
- **Uninstall** removes CertiReport and its services. The database cluster, generated reports and logs under `%ProgramData%\CertiReport` are kept (2.8).

Programs and Features shows the product with its icon, publisher CERTICONS, the version and links to the about and support pages.

2.3 Unattended installation

Every choice of the options page is a bundle variable that can be passed on the command line, so the setup runs without a window. Run it from an elevated prompt:

```
CertiReportSetup-1.20.1.1.exe /quiet /norestart /log C:\Windows\Temp\CertiReport-setup.log `
  HTTP_PORT=8080 `
  SERVICE_ACCOUNT="DOMAIN\svc-certireport$" `
  DB_SUPERUSER_PASSWORD="<strong password>" `
  ADMIN_USER=admin ADMIN_PASSWORD="<first administrator password>" `
  PUBLIC_URL=https://reports.example.com
```

Parameter	Default	Meaning
InstallFolder	C:\Program	Program files.

Parameter	Default	Meaning
	Files\CertiReport	
HTTP_PORT	8080	Portal HTTP port.
HTTPS_PORT, HTTPS_CERT_THUMBPRINT	empty	Both together switch the portal to HTTPS with the certificate from the Local Machine store (2.4).
SERVICE_ACCOUNT	NT AUTHORITY\NetworkService	Account of the three services; a gMSA such as DOMAIN\svc-certireport\$ in production.
USE_EMBEDDED_DB	1	1 installs and manages the PostgreSQL server; 0 uses an existing server named by METADATA_CONNECTION.
DB_PORT	5444	Port of the embedded server (localhost only).
DB_SUPERUSER_PASSWORD	none	Required on the first install with the embedded server; also needed to repair the application login.
METADATA_CONNECTION	written by setup	Npgsql connection string when USE_EMBEDDED_DB=0, for example Host=db.example.com;Port=5432;Database=certireport;Username=certireport;Password=... The embedded setup writes Host=localhost;Port=5444;Database=certireport;Username=certireport;Password=<generated>.
ADMIN_USER, ADMIN_PASSWORD	admin, none	First portal administrator; created only when no user exists, so ignored on upgrades. Without ADMIN_PASSWORD the account is not created and the first administrator is made in the portal with the setup token (2.6.2).
PUBLIC_URL	empty	The address users and recipients reach the portal at (Administration > Settings > Public address). Needed for links in e-mails, Teams cards and download links and for the verification QR code. The setup runs CertiReport.Portal.exe set-public-url with it.
DESKTOP_SHORTCUT	1	0 leaves out the desktop shortcut.
INSTALL_CRYSTAL	0	1 installs the Crystal Reports feature; the sidecar is installed only when SAP's runtime is registered on the machine (or bundled with the setup, see 2.1.1).

Values from a previous installation are read back from the registry, so an upgrade only needs the parameters that change. Passwords are never stored by the setup: DB_SUPERUSER_PASSWORD is used once to create the application login, ADMIN_PASSWORD once to create the account.

Exit codes: 0 on success, 3010 when a restart is pending (the Visual C++ runtime asked for one), otherwise an MSI error code. The /log file and the MSI log next to it hold the details, including the output of db-setup, create-admin and set-public-url.

Upgrade and uninstall without a window:

```
CertiReportSetup-1.20.1.1.exe /quiet /norestart /log C:\Windows\Temp\CertiReport-upgrade.log  
CertiReportSetup-1.20.1.1.exe /uninstall /quiet /norestart
```

After an unattended install, `http://<server>:8080/health/ready` answers 200 when the portal and its database are up, and `CertiReport.Portal.exe set-public-url <url>` changes the public address later without opening the portal.

2.4 HTTPS

The portal serves plain HTTP on the chosen port. To serve HTTPS as well:

1. Import a certificate for the portal's host name into the Local Machine Personal store (`certlm.msc, Personal > Certificates`) with its private key.
2. Give the service account read access to the private key (right-click the certificate > *All Tasks > Manage Private Keys*).
3. Install or upgrade with **HTTPS port (optional)** and **HTTPS certificate thumbprint** filled in (or `HTTPS_PORT=8443 HTTPS_CERT_THUMBPRINT=<thumbprint>`). The setup writes `Https:Port` and `Https:CertificateThumbprint` under `HKLM\SOFTWARE\CertiReport\Portal` and opens the port in Windows Firewall (rule *CertiReport Portal (HTTPS)*). Both values are remembered across upgrades.

You can also set the two registry values by hand and restart `CertiReport.Portal`. The thumbprint may contain spaces or colons; the portal keeps the hexadecimal digits only.

Behaviour to know:

- A configured thumbprint that is not found in the store stops the portal at start with the message `Https:CertificateThumbprint <thumbprint> was not found in the Local Machine Personal certificate store`. rather than serving HTTP only. Check the Application event log and `portal-<date>.log`.
- HTTP stays available on its port. If users must not use HTTP, block the HTTP port in the firewall or on the network.
- HTTP Strict Transport Security is sent by every installed portal (everywhere but the Development environment), so a browser that has opened the HTTPS address once insists on HTTPS for that host name afterwards.
- The sign-in cookie and the language cookie are marked *Secure* when the request came over HTTPS.
- Set **Administration > Settings > Public address** to the HTTPS address so that e-mail links, download links, Teams cards and verification QR codes use it.
- Microsoft Entra sign-in (chapter 3) needs a redirect URI on the portal's public address; use HTTPS for it.

2.5 What the setup creates

2.5.1 Windows services

Service	Display name	Account	Start	Recovery
CertiReport.Database	CertiReport.Database	service account	automatic	registered with <code>pg_ctl register</code> ; description <i>PostgreSQL database that stores CertiReport's configuration, schedules and run history</i>
CertiReport.Portal	CertiReport Portal	service account	automatic (delayed start)	restart after 60 seconds on the first, second and following failures; the

Service	Display name	Account	Start	Recovery
				counter resets after one day. Description <i>Web portal and REST API for CertiReport report scheduling.</i>
CertiReport.Engine	CertiReport Engine	service account	automatic (delayed start)	same as the portal. Description <i>Runs scheduled SAP Business One reports and delivers them.</i>

The two CertiReport services start delayed so that the database service is up first. Both wait for the database: the portal applies pending migrations at start (Database:MigrateOnStartup is true for the portal), the engine waits for the schema and then starts the scheduler.

2.5.2 Program files

Folder	Content
Portal\	CertiReport.Portal.exe and its files; also the command line for db-setup, create-admin, set-public-url, license, backup and restore
Engine\	CertiReport.Engine.exe; CertiReport.Engine.exe check is the prerequisite check
Engine\CrystalHost\	the Crystal sidecar (CertiReport.CrystalHost.exe for a 64-bit runtime, CertiReport.CrystalHost32.exe for a 32-bit one), only with the Crystal feature
pgsql\	the embedded PostgreSQL server (bin, lib, share), only with the embedded database
sql\	hana-readonly-user.sql, sqlserver-readonly-user.sql
license\	EULA.rtf, THIRD-PARTY-NOTICES.txt

2.5.3 Data folder

%ProgramData%\CertiReport is created with full control for the service account:

Folder or file	Content
pgdata\	the PostgreSQL cluster (embedded database); its server log under pgdata\log (postgresql-<weekday>.log, one file per weekday, rewritten weekly)
keys\	the Data Protection key ring, shared by the portal and the engine, protected with DPAPI for the local machine; every stored secret (company passwords, mail passwords, client secrets, destination secrets, the webhook secret) is encrypted with it
files\	generated report files under yyyy\MM\<run id>
layouts\cache\	Crystal layouts fetched from SAP B1 companies
logs\	portal-<yyyyMMdd>.log and engine-<yyyyMMdd>.log: a file per day, 30 days kept, a file rolls at 50 MB
setup-token.txt	present only while no user exists and the setup did not create one (2.6.2)

Paths:Data in the configuration moves the whole folder.

Caution. The key ring is bound to the machine. Without keys\ the stored secrets cannot be decrypted; without the cluster the database is gone. Back up both (2.7).

2.5.4 Registry

Key	Values
HKLM\SOFTWARE\CertiReport	ConnectionStrings:Metadata: the connection string with the generated password, readable by Administrators, SYSTEM and the service account only; settings both services share, such as DataSources:HanaClientPath or Paths:Data
HKLM\SOFTWARE\CertiReport\Setup	the setup's answers, read back on upgrade: HttpPort, ServiceAccount, UseEmbeddedDb, DbPort, AdminUser, InstallFolder, DesktopShortcut, InstallCrystal, Version, DatabaseService
HKLM\SOFTWARE\CertiReport\Portal	Kestrel:Endpoints:Http:Url (http://*:<port>), Https:Port and Https:CertificateThumbprint when HTTPS is enabled; any other portal setting you add, such as Authentication:Windows:Enabled or DataSources:HanaClientPath
HKLM\SOFTWARE\CertiReport\Engine	engine settings you add, such as Rendering:BrowserPath
HKCU\Software\CertiReport\Setup	StartMenu and Desktop markers of the installing user's shortcuts; no settings

String values under these keys are configuration keys: they come after `appsettings.json` and before environment variables and the command line (chapter 10). A service reads the registry at start, so restart it after a change.

2.5.5 Other items

- Windows Firewall: inbound rule *CertiReport Portal (HTTP)* for the HTTP port, and *CertiReport Portal (HTTPS)* when HTTPS is enabled.
- Event Log: source *CertiReport* in the Application log. Both services write warnings and errors there when running as a service; everything from Information upwards goes to the log files.
- Start menu folder *CertiReport* with **CertiReport Portal** (`http://localhost:<port>`) and **CertiReport Support**; a **CertiReport Portal** desktop shortcut when chosen.
- Programs and Features entry *CertiReport* with the product icon and the links to the about and support pages.
- Setup log: the file given with `/log`, or `%TEMP%\CertiReport_<date>.log`, with the MSI log (`..._<nnn>_CertiReportMsi.log`) next to it. The MSI log holds the output of `db-setup`, `create-admin` and `set-public-url`.

2.5.6 The database step in detail

`CertiReport.Portal.exe db-setup --pgsql <pgsql folder> --data <data folder>\pgdata --port <port> --service-account <account> --superuser-password <password>` runs as `LocalSystem` and:

1. creates `%ProgramData%\CertiReport\pgdata` and grants Administrators, SYSTEM and the service account full control (inheritance off);
2. on the first install initialises the cluster with `initdb` (superuser postgres, SCRAM authentication, UTF-8, locale C), using the superuser password once;
3. writes a managed block into `postgresql.conf`: listen on localhost, the chosen port;
4. registers the Windows service `CertiReport.Database` for the service account (automatic start) and starts it, after checking that nothing else listens on the port (Port 5444 is already in

use by PID ... (name). Stop that program or choose another database port.), with three start attempts;

5. if the stored connection string still works, stops here (an upgrade changes nothing); otherwise connects as postgres (Could not connect as superuser postgres: check the password and the service log. when the password is wrong), creates (or resets the password of) the role certireport with a generated 32-character password, creates the database certireport owned by it, checks that the role can connect, and stores the connection string in the registry.

CertiReport.Portal.exe create-admin --user <name> --password <password> [--email <address>] then applies the migrations (retrying while the database starts) and creates the administrator when no user exists. When users exist it prints Users already exist; the administrator account from setup is not applied. and succeeds.

2.6 First sign-in

2.6.1 With the administrator from the setup

1. Open `http://<server>:8080` (or the HTTPS address). The Start menu and desktop shortcuts open `http://localhost:<port>` on the server itself.
2. Sign in with the **User name** and **Password** from the setup options (default user name admin).
3. Administrators who sign in with a password must set up an authenticator app before they can use the portal: the **Authenticator app** page opens at once. Scan the QR code with Microsoft Authenticator, Google Authenticator or another TOTP app, enter the six-digit code and click **Verify and turn on**. Save the ten recovery codes that are shown once (chapter 3 describes this page).
4. The dashboard (**System status**) opens with the **Getting started** checklist: **Report engine running**, **Company connected**, **Mail profile tested**, **Report published**, **Schedule enabled**, plus the optional **Public URL set** and **Signing certificate**. Each open step links to its page; the list disappears when the required steps are done.

The screenshot displays the CertiReport System status dashboard. The left sidebar contains navigation links for System status, Reports, Schedules, Run history, Deliveries, Excel themes, Excel templates, Business calendars, Companies, Administration, Users, Mail profiles, Destinations, Bounces, Settings, License, API keys, Export and import, Audit log, and API reference. The main content area shows the System status, which refreshes every 10 seconds. It includes three status boxes: Metadata database (Connected and up to date), Report engine (1 of 1 node(s) online), and Configuration (Companies: 1, Reports: 10, Schedules: 1). Below these is the Engine nodes table, which shows one online node on a desktop machine.

Status	Instance	Machine	Version	Started	Last heartbeat
Online	DESKTOP	DESKTOP	1.20.0	10/31/2026 6:37 PM	8:58:57 PM

5. Activate the licence under **Administration > License** (chapter 4). Without a licence you can sign in, design reports and prepare schedules, but no company can be added and no report runs.

2.6.2 With the setup token

When the portal starts and no user exists (the setup ran without an administrator password, or an external database was used and ADMIN_PASSWORD was not given), the portal writes a one-time token to %ProgramData%\CertiReport\setup-token.txt (readable by Administrators and the service account only) and logs the warning No users exist yet. Open /setup in the portal and enter the setup token from ... to create the first administrator.

1. Open the portal. The sign-in page shows *No users exist yet.* with the link **Create the first administrator**, which opens /setup. The page names the token file (*Only Windows administrators can read that file.*).
2. Read the token from the file on the server and enter it in **Setup token** (a wrong token answers *The setup token is not correct.*).
3. Fill in **User name** (default admin; letters, digits, ., _, @ and -), **Display name**, **Email**, **Password** (at least 12 characters with upper-case and lower-case letters and a digit) and **Confirm password**, then click **Create administrator**.
4. The sign-in page shows *Administrator created. Sign in to continue.* The token file is deleted. /setup redirects to the sign-in page as soon as a user exists.

Posts to the sign-in and setup pages are limited to 10 per minute per client address.

2.6.3 Checklist for a new server

Step	Where	Chapter
Run CertiReport.Engine.exe check	elevated prompt in Engine\	2.10
Set the public address	Administration › Settings	9
Activate the licence	Administration › License	4
Add a company and test the connection	Companies	4
Add a mail profile and send a test message	Administration › Mail profiles	9
Design or import a report and publish it	Reports	5
Create a schedule, check it, send a test, enable it	Schedules	6
Configure backups	Administration › Settings › Backups	2.7
Add users with the right roles	Administration › Users	9

2.6.4 Securing the server after the first sign-in

Measure	Where
Keep the administrator's recovery codes with the other server secrets	shown once on the Authenticator app page
Enable HTTPS and block the HTTP port from the network when the portal is reached from outside the server	2.4 and your firewall
Set the public address to the name users and recipients use	Administration › Settings
Create personal accounts with the smallest role that fits and keep admin for administration only	Administration › Users , chapter 9
Enter the failure-alert addresses so run failures and licence warnings reach someone	Administration › Settings , chapter 9
Switch on the nightly backup to a folder your backup software collects	Administration › Settings › Backups , 2.7
Keep the database superuser password and the setup log with your server documentation	–
Restrict who can sign in to the server: the setup token file,	–

Measure	Where
the key ring and the connection string are readable by local administrators	

2.7 Backup and restore of CertiReport

A CertiReport installation is three things:

What	Where	In the backup
Metadata database (companies, reports, schedules, runs, users, settings, outbox, licence)	embedded PostgreSQL, %ProgramData%\CertiReport\pgdata, port 5444	metadata.dump (pg_dump custom format)
Data Protection key ring (decrypts stored passwords, client secrets, API keys)	%ProgramData%\CertiReport\keys	keys/
Generated report files	%ProgramData%\CertiReport\files	files/ (optional)

One backup is one zip archive named CertiReport-backup-yyyymmdd-HH:mm:ss.zip with a manifest.json at its root (machine, date, version, database).

2.7.1 Taking a backup

Portal. Administration › Settings › Backups: choose the folder, **Archives to keep**, whether to include the report files, and switch on **Back up every night** with its hour. **Back up now** writes one immediately and lists the archives in the folder. The engine takes the nightly backup on whichever server runs it, at the first check after the configured hour. Point the folder at a share or a drive that your own backup software picks up. Chapter 9 describes the settings page.

Command line (as an administrator, any time, services running):

```
"C:\Program Files\CertiReport\Portal\CertiReport.Portal.exe" backup --to D:\Backups\CertiReport --keep 30
```

Option	Meaning
--to <folder>	Destination folder; without it the folder saved in the settings.
--keep <n>	Archives to keep in the folder; without it the saved setting.
--no-files	Leaves the report files out. The files are included only when the setting on the Backups page says so and this option is absent.

The command prints the result and returns 0 on success, 1 on failure.

2.7.2 Restoring

1. Stop the services CertiReport.Portal and CertiReport.Engine; leave CertiReport.Database running.
2. Run, as an administrator:

```
"C:\Program Files\CertiReport\Portal\CertiReport.Portal.exe" restore --from "D:\Backups\CertiReport\CertiReport-backup-20261031-020000.zip" --yes
```

Without --yes the command only prints what the archive holds (This replaces the metadata database 'certireport' and the key ring with the backup of <machine> taken <date> (CertiReport <version>).) and returns 3. --no-files restores the database and keys

only. 3. Start the services. The portal applies any migrations the current version needs on top of the restored data; the dashboard shows *Upgrade in progress* until they are done.

Caution. Restore replaces everything in the database (`pg_restore --clean`), writes the key files over the existing ones and merges the report files into the files folder. Take a backup of the current state first if it may still be needed.

2.7.3 Moving to another server

Install the same or a newer CertiReport version on the new server with the setup, then restore the archive there. Everything comes back except what the key ring protects: the keys are bound to the original machine (DPAPI), so after a restore on a different server the company database passwords, Service Layer sign-ins, mail profile passwords and client secrets, destination secrets and the webhook secret must be entered again. API keys are stored as hashes and keep working. The licence is node-locked: the Hardware ID of the new server differs, so request a reissue from CERTICONS (chapter 4).

2.8 Upgrade and uninstall

2.8.1 Upgrade

Run the newer `CertiReportSetup-<version>.exe` on the server (with a window or `/quiet`). The setup:

- reads the previous options back from the registry (ports, service account, database settings, install folder, shortcuts, Crystal feature, HTTPS settings), so nothing has to be typed again; passwords are not needed;
- stops the three services, replaces the program files and starts the services again;
- keeps the database, the settings and the connection string; db-setup finds the stored connection string working and provisions nothing;
- ignores the administrator fields, because users exist;
- lets the portal apply the new migrations at its first start. The dashboard shows *Upgrade in progress: N migration(s) pending* until then; the engine waits for the schema.

Every setup build is a major upgrade that replaces the installed product, including a build with the same version. Downgrading is refused (*A newer version of CertiReport is already installed*). Take a backup before an upgrade (2.7). The dashboard's engine nodes table shows the version each engine node runs.

2.8.2 Uninstall

Use *Uninstall* in Programs and Features, the **Uninstall** button of the setup's Modify page, or:

`CertiReportSetup-1.20.1.1.exe /uninstall /quiet /norestart`

The setup stops and removes the services `CertiReport.Portal`, `CertiReport.Engine` and `CertiReport.Database`, the program files, the firewall rules, the shortcuts and the registry settings. The database cluster under `%ProgramData%\CertiReport\pgdata`, the key ring and the report files are kept, so a later installation finds its data again. For a clean removal take a backup (2.7) and delete `%ProgramData%\CertiReport` by hand.

2.9 Service account and gMSA

The service account chosen in the setup runs all three services. What it needs:

Need	Why
Full control of <code>%ProgramData%\CertiReport</code>	granted by the setup: cluster, keys, files, logs

Need	Why
Read access to HKLM\SOFTWARE\CertiReport	granted by the setup: the connection string
Read access to the private key of the HTTPS certificate	when HTTPS is enabled
Read access to the private key of each company's signing certificate	when PDFs are signed (the Check button on the company page tells you, chapter 4)
Write access to the delivery folders	when a schedule delivers to a folder (chapter 6)
Outbound network access to the SAP B1 servers, mail servers, SFTP servers, Microsoft Graph and Teams	for queries and deliveries

To use a gMSA, create it in Active Directory and install it on the server before running the setup, then enter it as DOMAIN\svc-certireport\$ in **Service account**. The setup registers the three services for it and grants the folder and registry permissions. To change the account later, run the setup again with the new value (an upgrade, or the setup of the installed version): the Portal and Engine services and the permissions follow. The database service is registered once, on the first install, so its account does not follow: change it in the Services console (or with `sc config CertiReport.Database obj= <account>`) as well. The setup grants the new account full control of %ProgramData%\CertiReport\pgdata on every run.

When a built-in account such as NetworkService is used, resources on other machines see the computer account (DOMAIN\SERVER\$); grant folder shares accordingly, or prefer a gMSA.

2.10 The prerequisite check

CertiReport.Engine.exe check, run in C:\Program Files\CertiReport\Engine from an elevated prompt, prints one line per prerequisite of the server it runs on and exits with 1 when something required is missing. Run it after the installation, after an upgrade of the Crystal runtime or the browser, and whenever a run fails for reasons that look environmental.

Line	OK	Warning	Failure
Metadata database	reachable and up to date	reachable, N migration(s) pending (the portal applies them at start)	not reachable: check ConnectionStrings:Metadata and that CertiReport.Database is running
Data folder	the path, writable		not writable
PDF browser	the executable found (Chrome first, then Edge, or Rendering:BrowserPath)	none found: PDF outputs will fail; install one or set Rendering:BrowserPath	
Crystal sidecar	not installed (optional) or the runtime version, bitness, registration and the formats it supports		.NET Framework 4.8 missing, no SAP runtime installed, or the sidecar did not answer
Company <name>	connected, with the SAP B1 company name	connected but the database user can change data: use a read-only user	connection failed, with the provider's message (for HANA also SAP HANA Client not found when the client is missing)
Company <name>:	found with a readable		not found or private key

Line	OK	Warning	Failure
signing certificate	private key		not readable
Company <name>: Service Layer	signed in and out	sign-in failed, with the message	

Only active companies are checked. The last line reads All required prerequisites are in place. or N problem(s) need attention. The command runs with the engine's configuration (registry), so it tests what the service will see.

2.11 Troubleshooting the installation

Symptom	Cause and remedy
The setup refuses to start with <i>CertiReport requires 64-bit Windows Server 2012 R2 / Windows 8.1 or later</i>	Unsupported operating system.
Install does nothing on the first page	I accept the terms of the licence agreement is not ticked.
Setup fails; the MSI log says A database superuser password is required to create the database	First install without Database superuser password (or DB_SUPERUSER_PASSWORD). Run the setup again with it.
Setup fails; the MSI log says Port 5444 is already in use by PID ...	Another PostgreSQL or program listens on the database port. Stop it or choose another Database port .
Setup fails; the MSI log says Service CertiReport.Database did not start with the server log's last lines	Look at %ProgramData%\CertiReport\pgdata\log. Typical causes: the Visual C++ runtime missing (restart pending), the service account without rights on pgdata, antivirus locking the folder.
Setup fails; the MSI log says Could not connect as superuser postgres	The cluster exists from an earlier attempt and the password differs. Use the password of that cluster, or delete %ProgramData%\CertiReport\pgdata (only if it holds nothing you need) and run the setup again.
Setup fails; the MSI log says The stored connection string no longer works; the database superuser password is required to reset the application role	The certireport role or its password changed. Run the setup (repair or upgrade) with the superuser password; it resets the application role.
create-admin reports The administrator account could not be created: Passwords must be at least 12 characters...	The administrator password does not meet the rule: 12 characters, upper and lower case, a digit.
Exit code 3010	The Visual C++ runtime asked for a restart. Restart the server; the services start afterwards.
The portal does not answer on its port	Check the service CertiReport.Portal and portal-<date>.log. A configured HTTPS thumbprint that is not in the store stops the portal (2.4). The firewall rule covers the port chosen at setup only; a port changed in the registry by hand needs its own rule.

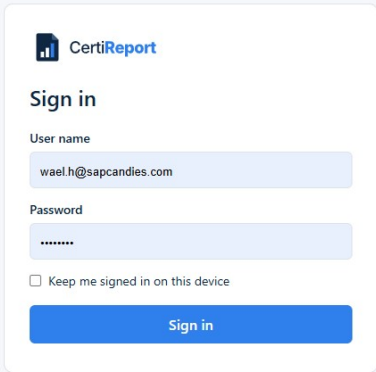
Symptom	Cause and remedy
The dashboard says <i>Unreachable</i> for the metadata database	CertiReport.Database is stopped, or the connection string is not readable by the service account. Start the service; check the ACL of HKLM\SOFTWARE\CertiReport.
The dashboard says <i>No engine node online</i>	CertiReport.Engine is stopped, or it cannot reach the database. A node counts as online while its last heartbeat is less than two minutes old.
<i>Upgrade in progress: N migration(s) pending stays</i> on the dashboard	The portal applies migrations at start; look for errors in portal- <i><date></i> .log. The engine waits and does not run schedules until the schema is current.
PDF outputs fail with a browser error	No Chrome or Edge on the engine server, or Rendering:BrowserPath points to a wrong path. CertiReport.Engine.exe check shows what was found.
Install Crystal Reports layout support was ticked but Engine\CrystalHost does not exist	No SAP Crystal Reports runtime for .NET Framework is registered on the machine, so the feature was left out. Install SAP's runtime (32-bit or 64-bit, 13.0) and run the setup again.
A HANA company fails with SAP HANA Client not found	The SAP HANA Client 2.x (64-bit) is not installed, or sits in another folder: install it or set DataSourcees:HanaClientPath (2.1.1).
The sign-in page says <i>No users exist yet</i> although the setup had an administrator password	create-admin failed (see the MSI log) or the portal was pointed at another database. Create the administrator with the setup token (2.6.2).
<i>Too many failed attempts. Try again in 15 minutes, or ask an administrator to unlock the account</i>	Five failed sign-ins lock the account for 15 minutes. An administrator can Unlock it under Administration > Users (chapter 9).
HTTP 429 on the sign-in page	More than 10 sign-in posts in a minute from one address. Wait a minute.
After a restore on another server the companies and mail profiles fail to connect	The key ring is machine-bound: re-enter the passwords and secrets (2.7.3).
A licence banner appears above every page	No licence, or the licence is invalid, expiring, in grace or expired, or more companies are active than licensed. See chapter 4.
Where to look, in order: the setup log and the MSI log (/log or %TEMP%), %ProgramData%\CertiReport\logs\portal- <i><date></i> .log and engine- <i><date></i> .log, the Application event log (source CertiReport, warnings and errors), %ProgramData%\CertiReport\pgdata\log for the database server, and CertiReport.Engine.exe check.	

3. The portal

The portal is the web application of CertiReport. Every user, from the administrator who connects the first company to the auditor who reads the log, works in it; the engine has no user interface of its own. This chapter describes how you sign in, how the account is protected, how the portal is laid out and what the dashboard shows. The pages reached from the navigation menu are described in chapters 4 to 9.

Open the portal at `http://<server>:8080`, at the HTTPS address when one is configured (chapter 2), or through the **CertiReport Portal** shortcut on the server. The page title of every page ends in *· CertiReport*.

3.1 Signing in

The image shows a web browser window displaying the CertiReport sign-in page. At the top left is the CertiReport logo. Below it is the heading "Sign in". There are two input fields: "User name" with the text "wael.h@sapcandies.com" and "Password" with masked characters. Below the password field is a checkbox labeled "Keep me signed in on this device". At the bottom of the form is a blue "Sign in" button. Below the button, the text "SAP Business One reporting" is visible in a small font.

The sign-in page

The sign-in page (`/account/login`) shows the CertiReport logo, the fields **User name** and **Password**, the option **Keep me signed in on this device** and the button **Sign in**. When Windows or Microsoft sign-in is enabled (3.4), the buttons **Sign in with Windows** and **Sign in with Microsoft** appear below a divider. The footer reads *SAP Business One reporting*.

1. Enter your user name and password. The user name is the one an administrator gave you under **Administration > Users**; it is not case-sensitive and surrounding spaces are ignored.
2. Tick **Keep me signed in on this device** if the browser should keep the session after it is closed. Without it the session ends when the browser closes.
3. Click **Sign in**. If your account has an authenticator app, the **Verification code** page follows (3.2.2). If an administrator set or reset your password, the **Change password** page follows (3.3). If you are an administrator without an authenticator app, the **Authenticator app** page follows (3.2.1).

After sign-in the portal returns to the page you asked for (the `returnUrl`) or to the dashboard. Only addresses inside the portal are accepted as a return address.

3.1.1 Messages on the sign-in page

Message	Meaning
<i>Incorrect user name or password.</i>	The user name does not exist or the password is wrong. The attempt counts towards the logout.
<i>Too many failed attempts. Try again in 15 minutes, or ask an administrator to unlock the account.</i>	Five failed sign-ins locked the account for 15 minutes (3.1.2).
<i>This account is deactivated. Ask an administrator to reactivate it.</i>	The account's Active switch is off under Administration › Users .
<i>Your Windows account is not linked to an active CertiReport user. Ask an administrator to add it.</i>	Windows sign-in found no active user whose Windows account matches your DOMAIN\user.
<i>Your Microsoft account is not linked to an active CertiReport user. Ask an administrator to add your email address.</i>	Microsoft sign-in found no active user with the e-mail address of your Microsoft account, or the account is locked out.
<i>No users exist yet. with the link Create the first administrator</i>	The portal has no user; see the first-run setup in chapter 2.
<i>Administrator created. Sign in to continue.</i>	The first administrator was just created with the setup token.
HTTP 429	More than ten sign-in or setup posts in one minute from your address; wait a minute.

3.1.2 Sessions, logout and rate limits

Rule	Value
Session cookie	CertiReport.Auth, valid for 8 hours and extended while you work (sliding expiration); marked <i>Secure</i> over HTTPS.
Keep me signed in	The cookie survives closing the browser.
Logout	After 5 failed password or verification-code attempts the account is locked for 15 minutes. New accounts are subject to logout from the start. An administrator can lift the lock early with Unlock on the user's page (chapter 9). Windows and Microsoft sign-in also refuse a locked account.
Rate limit	Posts to /account/* and /setup are limited to 10 per minute per client address; the public verification endpoints to 30 per minute.
Revalidation	The sign-in cookie is checked against the account every minute. A password reset by an administrator, a deactivation or Sign out everywhere ends all open sessions of that user within a minute.
Sign out	Sign out in the account menu ends the session and returns to the sign-in page.

Failed sign-ins are written to portal-*<date>*.log (Failed sign-in for *<user>*); refused Windows and Microsoft sign-ins are logged as warnings. Password changes, authenticator changes and administrator actions on accounts are recorded in the audit log (chapter 9).

3.1.3 Your first sign-in as a new user

An administrator creates your account under **Administration › Users** with a user name, a display name, an e-mail address, your roles and, for password sign-in, a temporary password that is shown to the administrator once. Your first sign-in then goes like this:

1. Open the portal and sign in with the user name and the temporary password.
2. The **Change password** page opens with *An administrator set your password. Choose your own before you continue.* Enter the temporary password as **Current password**, choose a **New password**

of at least 12 characters with upper-case and lower-case letters and a digit, confirm it and click **Change password** (3.3).

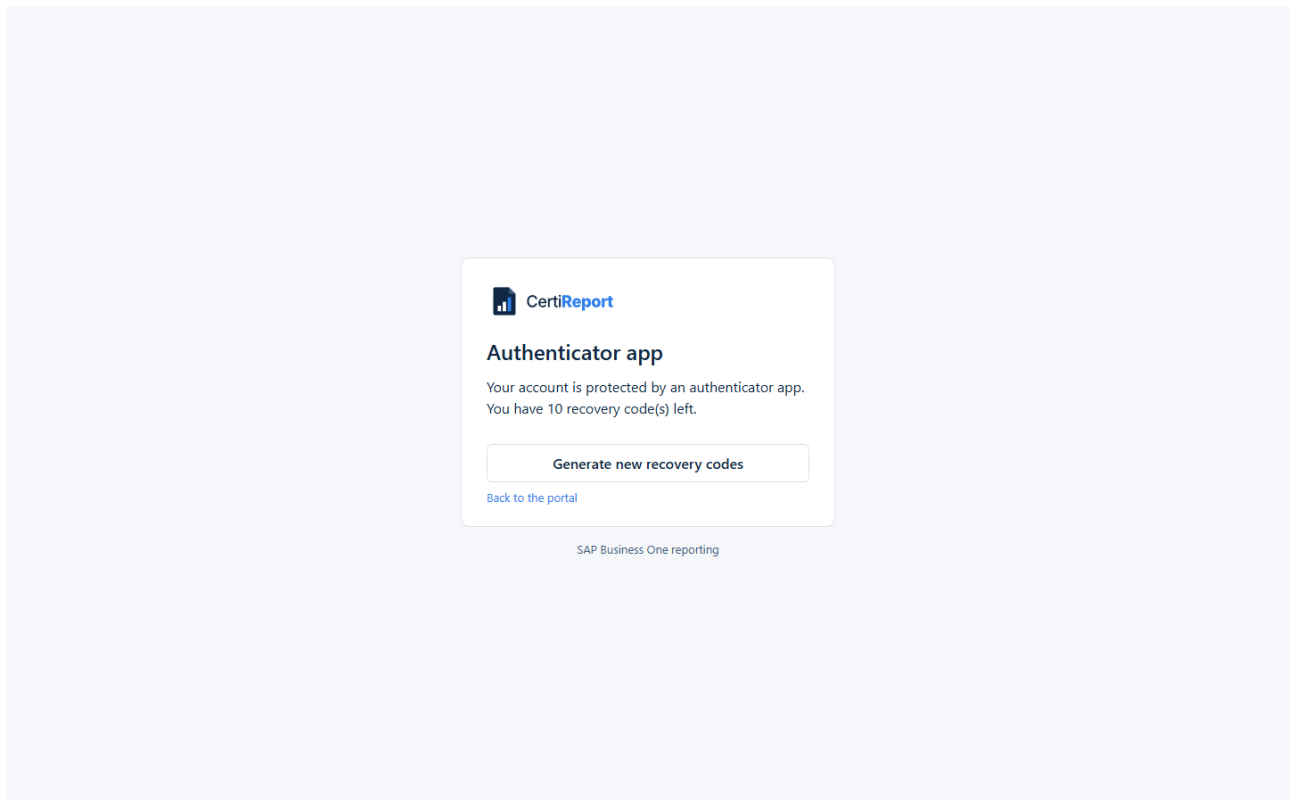
3. If you are an administrator, the **Authenticator app** page opens next; set up the app and save the recovery codes (3.2.1). Other roles may set it up later from the account menu.
4. The dashboard opens. Choose your language from the account menu if English is not the one you want (3.5).

If the administrator entered your **Windows account** or your Microsoft e-mail address instead, use **Sign in with Windows** or **Sign in with Microsoft** (3.4); no password or code is asked.

3.2 Authenticator app

CertiReport protects accounts with a second factor from an authenticator app (time-based one-time passwords, TOTP, six digits). **Administrators who sign in with a password must use one:** the setting `Authentication:RequireMfaForAdministrators` is true by default, and an administrator without an authenticator is sent to the **Authenticator app** page before any other page opens. Users in other roles may enrol voluntarily from the account menu. Users who sign in with Windows or Microsoft are authenticated by their directory and are not asked for a code.

3.2.1 Setting up the authenticator



Setting up the authenticator app

Open the account menu (top right) and choose **Authenticator app**, or follow the redirect after sign-in. The page (`/account/mfa`) shows, for an administrator, *Administrators must use an authenticator app. Set it up now to continue.* and then three steps:

1. *Install an authenticator app such as Microsoft Authenticator or Google Authenticator.*
2. *Scan this code, or enter the key by hand.* A QR code (account `CertiReport:<user name>`, issuer CertiReport) and the **Key** in groups of four characters are shown.
3. *Enter the 6-digit code the app shows.* Type it in **Code** (spaces and hyphens are ignored) and click **Verify and turn on.**

If the code is wrong the page says *That code is not valid. Check the time on your phone and try the newest code.* TOTP depends on the clock: the server's and the phone's time must be right.

After a valid code the page shows *Your authenticator app is set up.* and ten **recovery codes**. *Save these recovery codes somewhere safe. Each one signs you in once if you lose your phone. They are shown only now.* Click **Continue** to go on to the page you wanted. The event `MfaEnabled` is written to the audit log.

3.2.2 Signing in with a code

After the password, the **Verification code** page (`/account/login-2fa`) asks for the code: *Enter the 6-digit code from your authenticator app. If you lost your device, enter one of your recovery codes instead.* Enter it in **Code** and click **Verify**. A six-digit entry is checked as an authenticator code, anything else as a recovery code; each recovery code works once. The page does not remember the browser: the code is asked at every sign-in. **Back to sign in** returns to the password page.

Failed codes count towards the logout (*Too many failed attempts. Try again in 15 minutes.*).

3.2.3 Managing the authenticator

When an authenticator is already set up, **Authenticator app** in the account menu shows *Your account is protected by an authenticator app. You have N recovery code(s) left.* and the buttons:

Button	Effect
Generate new recovery codes	Replaces the remaining codes with ten new ones, shown once. Audited as <code>RecoveryCodesRegenerated</code> .
Remove authenticator	Turns the second factor off and discards the key. Not offered to administrators while the authenticator is required for them. Audited as <code>MfaDisabled</code> .
Back to the portal	Returns to the dashboard.

If you lose the phone and the recovery codes, an administrator can use **Reset authenticator** on your user page (chapter 9); you set up a new app at the next sign-in.

3.3 Changing your password

Choose **Change password** in the account menu (page `/account/change-password`). Enter **Current password**, **New password** and **Confirm new password** and click **Change password**; **Cancel** returns to the dashboard. The rule is shown on the page: *At least 12 characters, with upper-case and lower-case letters and a digit.* A special character is not required; the maximum length is 128. Messages from the password check (for example *Passwords must be at least 12 characters.*) are shown above the form. The change is audited as `PasswordChanged` and the session continues.

When an administrator created your account or used **Reset password** on it, your password is temporary: after signing in you are sent to this page with the note *An administrator set your password. Choose your own before you continue.* and cannot open another page (nor the API) until you have changed it; **Cancel** is not offered.

3.4 Windows and Microsoft sign-in

Besides the password, the portal can accept the identity of the Windows session (Kerberos or NTLM) or a Microsoft Entra ID account. Both are off until configured; both only sign in users that already exist in CertiReport, with their roles. **Users are never created by an external sign-in.** Both configurations are settings of the portal service, written as registry values under `HKLM\SOFTWARE\CertiReport\Portal` (chapter 10); restart `CertiReport.Portal` after a change.

3.4.1 Sign in with Windows

Setting	Value
Authentication:Windows:Enabled	true

The button **Sign in with Windows** appears on the sign-in page and opens `/account/windows-signin`, which negotiates with the browser. The portal looks for an active user whose **Windows account** field (**Administration** › **Users**, chapter 9) equals the authenticated account name, in the form `DOMAIN\user`. The user is signed in without a verification code (the directory is the second factor); a locked or deactivated user is refused with the message in 3.1.1.

The portal runs as a Windows service under the account chosen at setup (chapter 2); the browser negotiates with that account's identity. Whether the browser signs in without a prompt depends on the browser's zone settings for the portal's address, which are outside CertiReport.

3.4.2 Sign in with Microsoft (Entra ID)

Setting	Value
Authentication:Entra:TenantId	The directory (tenant) ID.
Authentication:Entra:ClientId	The application (client) ID of an app registration.
Authentication:Entra:ClientSecret	A client secret of that app registration.

All three must be set for the button **Sign in with Microsoft** to appear. Register a web application in Microsoft Entra ID with the redirect URI `https://<public address of the portal>/signin-entra`, create a client secret and grant the email scope (the portal asks for OpenID Connect sign-in with the email scope). The display name shown in the portal is the one on the CertiReport user, not the name from Microsoft.

Flow: **Sign in with Microsoft** posts to `/account/external-login`, which sends the browser to `https://login.microsoftonline.com/<tenant>/v2.0`. After authentication Microsoft returns to `/signin-entra`, and the portal continues at `/account/external-callback`:

1. If this Microsoft account was linked before, the linked user is signed in (no verification code).
2. Otherwise the portal takes the email claim (or preferred_username) and looks for a CertiReport user with that **Email**. If one exists, is active and not locked out, the Microsoft account is linked to it and the user is signed in; the next sign-in uses the link.
3. If no user matches, the sign-in page shows *Your Microsoft account is not linked to an active CertiReport user. Ask an administrator to add your email address.*

On the user page the e-mail field explains: *Used for Microsoft sign-in and for sending reports to this user.* Make sure every user who should sign in with Microsoft has the address of their Microsoft account there.

3.4.3 Preparing users for directory sign-in

For every person who should sign in through the directory, an administrator:

1. creates or opens the user under **Administration** › **Users** (chapter 9);
2. for Windows sign-in enters the account as `DOMAIN\user` in **Windows account**; for Microsoft sign-in enters the address of the Microsoft account in **Email**;
3. assigns the roles; the roles come from CertiReport, not from the directory, so a group membership in Active Directory or Entra ID has no effect on what the user may do;
4. keeps the account **Active**.

A user may have all three: a password, a Windows account and a linked Microsoft account. The authenticator requirement for administrators applies only to password sign-ins; an administrator who

always signs in with Windows or Microsoft is not asked to enrol. Clearing **Windows account** stops the Windows sign-in. A Microsoft account stays linked once the first sign-in has linked it; clearing **Email** only prevents a new link, so deactivate the user to stop the Microsoft sign-in. A deactivation stops both and ends the open sessions within a minute.

3.5 Language

The portal is available in **English**, **Arabic** (right-to-left) and **French**. The account menu lists the three languages with a filled circle next to the one in use; choosing one reloads the page in that language.

How the language is chosen, in order:

1. the language cookie set by the account menu (kept for a year);
2. the preference saved on your user when you chose a language while signed in, which follows you to another browser;
3. the browser's language (Accept-Language), when it is one of the three;
4. English.

Arabic switches the whole layout to right-to-left: the navigation drawer moves to the right, tables and forms mirror. Dates and numbers in the portal follow the chosen language; the company's or the schedule's time zone still decides the clock shown for runs.

What is translated: every page of the portal (navigation, headings, labels, help texts, buttons, dialogs, status chips such as *Succeeded* or *Published*, and messages shown after an action). What stays in English: texts the server produces and stores, such as validation errors from the services, the notes on run items, the e-mails the engine sends (alerts, digest, approval requests) and the API. Report content and the message templates are your own texts and go out as written. The sign-in and account pages are translated as well.

3.6 Layout and navigation

The screenshot displays the CertiReport portal interface. On the left is a dark navigation drawer with a menu icon and the 'CertiReport' logo. The menu items include: System status, Reports, Schedules, Run history, Deliveries, Excel themes, Excel templates, Business calendars, Companies, Administration (highlighted with a blue arrow), Users, Mail profiles, Destinations, Bounces, Settings, License, API keys, Export and import, Audit log, and API reference. The main content area is titled 'System status' with a subtitle 'Refreshes every 10 seconds' and a 'Version 1.20.0' badge. It contains three status cards: 'Metadata database' (Connected and up to date), 'Report engine' (1 of 1 node(s) online), and 'Configuration' (Companies: 1, Reports: 10, Schedules: 1). Below these is a table titled 'Engine nodes' with columns: Status, Instance, Machine, Version, Started, and Last heartbeat. The table shows one node with status 'Online', instance 'DESKTOP', machine 'DESKTOP', version '1.20.0', started at '10/31/2026 6:37 PM', and last heartbeat at '8:58:57 PM'.

Status	Instance	Machine	Version	Started	Last heartbeat
Online	DESKTOP	DESKTOP	1.20.0	10/31/2026 6:37 PM	8:58:57 PM

The portal with the navigation drawer and the dashboard

The portal has a dark **app bar** at the top, a **navigation drawer** on the left (on the right in Arabic) and the page content in the middle, limited to a comfortable reading width.

3.6.1 App bar

Element	Function
Menu button	Shows or hides the navigation drawer. On narrow screens the drawer is hidden by default and overlays the page.
CertiReport logo	Returns to the dashboard.
Account menu (your display name with a person icon)	Change password , Authenticator app , the three languages, Sign out .

3.6.2 Navigation drawer

The drawer lists only the pages your roles allow. The full menu, as an administrator sees it, with the permission that shows each entry:

Entry	Page	Shown with	Chapter
System status	the dashboard (/)	every signed-in user (system.view)	3.7
Reports	/reports	runs.view	5
Schedules	/schedules	runs.view	6
Run history	/runs	runs.view	7
Deliveries	/deliveries	runs.view	7
Excel themes	/admin/excel-themes	reports.design	9
Excel templates	/admin/excel-templates	reports.design	9
Business calendars	/admin/calendars	schedules.manage	6
Companies	/admin/companies	companies.view	4
Administration (group, expanded)		users.manage	
Administration › Users	/admin/users	users.manage	9
Administration › Mail profiles	/admin/mail	users.manage (the page itself needs smtp.manage)	9
Administration › Destinations	/admin/destinations	users.manage (the page itself needs smtp.manage)	9
Administration › Bounces	/admin/bounces	users.manage (the page itself needs smtp.manage)	7, 9
Administration › Settings	/admin/settings	users.manage	9
Administration › License	/admin/license	users.manage	4
Administration › API keys	/admin/api-keys	users.manage	9
Administration › Export and import	/admin/transfer	users.manage	9
Audit log	/admin/audit	audit.view	9
API reference	/api/docs, opens in a new tab	every signed-in user (system.view)	10

Seeing an entry does not grant every action on its page: a Report designer sees **Companies** but cannot add one (`companies.manage` is the Administrator's), and a Viewer sees **Reports** and **Schedules** but cannot run or edit anything. The pages hide or disable the buttons accordingly.

A page opened by its address without the required permission shows *You do not have permission to open this page.*; a link that needs sign-in redirects to the sign-in page and back. The page **Access denied** (`/account/access-denied`) says *Your account does not have permission for that page. Ask an administrator if you need access.* with a link **Back to the portal**. Unknown addresses show a *Not found* page.

3.6.3 Common elements

- **Dialogs** open for editors and confirmations; **Cancel** closes without saving.
- **Snackbar messages** at the bottom confirm actions (*Changes saved.*, *User created.*) or show an error.
- **Status chips** (coloured labels) show states such as *Draft*, *Published*, *Queued*, *Running*, *Succeeded*, *Sent*, *Online*, *Offline*, *Deactivated*, *Locked out*; they are translated.
- Tables have a search field where the list can grow (users, reports, deliveries).
- Times on the dashboard are shown in the server's local time; run history and outputs use the company's or the schedule's time zone (chapters 6 and 7).
- The portal keeps a live connection to the server. If the connection drops (the service restarts, the network is interrupted) the page shows a reconnection overlay and reloads when the server is back; unsaved changes in an open editor are lost.

3.6.4 Error and not-found pages

Page	When	Content
Page not found (<code>/not-found</code>)	an address that matches no page	<i>The address does not match any page.</i> with the link Go to system status
Something went wrong (<code>/error</code>)	an unhandled error while a page was served	<i>The error has been logged. Quote this reference when contacting support:</i> followed by the request reference; the details are in <code>portal-<date>.log</code>
Access denied (<code>/account/access-denied</code>)	a page your roles do not allow	<i>Your account does not have permission for that page. Ask an administrator if you need access.</i>

3.6.5 The public verification page

`/verify` and `/verify/<code>` are the only pages that need no sign-in. They use the same plain layout as the sign-in page and let a recipient check a certified PDF by its verification code or by uploading the file. Chapter 8 describes certification and this page.

3.7 Dashboard: system status

The dashboard (`/`, **System status**) is the first page after sign-in and is visible to every role. It refreshes every 10 seconds (*Refreshes every 10 seconds*) and shows the product version as a chip next to the title (*Version 1.20.0*).

3.7.1 Status cards

Card	States
Metadata database	<i>Connected and up to date</i> (green); <i>Upgrade in progress: N migration(s) pending</i> (yellow) while the portal applies a new version's migrations; <i>Unreachable</i> (red) with the provider's message when the database does not

Card	States
	answer.
Report engine	<i>N of M node(s) online</i> (green) or <i>No engine node online</i> (red). A node is online while its last heartbeat is less than two minutes old.
Configuration	Counts of Companies , Reports and Schedules .

While the database is unreachable or migrations are pending, the counts are zero and the checklist and node table are empty.

3.7.2 Getting started

Until every required step is done, the panel **Getting started** lists what remains before the first scheduled delivery, with *N of 7 steps done. Optional steps are marked*. Each open step is a link to the page where it is done; a done step shows a green tick.

Step	Done when	Detail shown while open	Link
Report engine running	at least one engine node is online	<i>Start the CertiReport.Engine service on a server.</i>	–
Company connected	an active company passed its last connection test	<i>Add a company and test its connection.</i>	Companies
Mail profile tested	an enabled mail profile passed its last test	<i>Add a mail profile and send a test message.</i>	Administration › Mail profiles
Report published	a report version is in state Published	<i>Design a report and publish it.</i>	Reports
Schedule enabled	a schedule is enabled	<i>Create a schedule, check it, and enable it.</i>	Schedules
Public URL set (optional)	the public address is set	<i>Set the portal's public address for verification links and QR codes.</i>	Administration › Settings
Signing certificate (optional)	a company has a signing certificate	<i>Optional: choose a certificate per company to sign PDFs.</i>	Companies

The panel disappears once the five required steps are done; the optional steps do not hold it up. The licence is not part of the checklist; its state is shown by the banner (3.8).

3.7.3 Engine nodes

The table **Engine nodes** lists every engine that has registered in the database, online or not:

Column	Content
Status	<i>Online</i> or <i>Offline</i> chip
Instance	the node's identifier
Machine	the server's name
Version	the engine's product version; after an upgrade every node should show the same version
Started	when the service last started, in the server's local time
Last heartbeat	the time of the last heartbeat

When no engine has ever reported, the table says *No engine has reported yet. Start the CertiReport.Engine service*. Several nodes share the schedules: each enabled schedule fires on one of them.

The same information is available to API keys at GET `/api/v1/system/status` and, as Prometheus gauges, at GET `/metrics` (chapter 10).

3.7.4 Reading the dashboard

You see	It means	What to do
<i>Connected and up to date, 1 of 1 node(s) online, no checklist</i>	normal operation	nothing
<i>Upgrade in progress: N migration(s) pending</i>	the portal is applying a new version's schema	wait; the engine does not run schedules until it is done. If it stays, read <code>portal-<date>.log</code> (chapter 10)
<i>Unreachable</i> with a message	the database service is down or the connection string is wrong	start <code>CertiReport.Database</code> ; check <code>ConnectionStrings:Metadata</code> (chapter 10)
<i>No engine node online</i>	the engine service is stopped, cannot reach the database, or its heartbeat is older than two minutes	start <code>CertiReport.Engine</code> on the server; run <code>CertiReport.Engine.exe</code> check
a node <i>Offline</i> among others <i>Online</i>	that engine stopped reporting	look at that server; an offline node's row stays until the node reports again
an engine <i>Version</i> older than the chip at the top	the server was not upgraded	run the setup there (chapter 2)
the Getting started panel	a required step is still open	follow the links, in order
a red or yellow banner above the page	the licence needs attention	3.8 and chapter 4

3.8 The licence banner

CertiReport is licensed per active SAP Business One company (chapter 4). The layout reads the licence state on every navigation and shows a banner above the page content whenever something needs attention:

Colour	When	Example text
red (error)	no licence, an invalid licence (damaged, for another machine, not yet valid) or an expired licence past its grace period	<i>Licence: No licence installed. Request a licence for this server's Hardware ID from CERTICONS and activate it under Administration → License.</i>
yellow (warning)	more companies are active than licensed	<i>Licence: The licence covers 2 companies and 3 are active. Extend the licence to add more.</i>
yellow (warning)	the licence expires within 30 days	<i>Licence: The licence expires on 2026-11-30 (12 days). Renew it in time.</i>
yellow (warning)	the licence has expired and the grace period is running	<i>Licence: The licence expired on 2026-10-31; everything keeps working during the grace period until 2026-11-14.</i>

No banner is shown while the licence is valid with more than 30 days left and the active companies fit it. The same states are shown on the **Administration › License** page (chapter 4) and announced by e-mail (4.2.8).

The banner starts with **Licence:**, gives the reason and ends with the link **Administration → License**, which opens the licence page where the Hardware ID, the request text and the **Check** and **Activate** actions are. Only administrators can open that page; other users see the banner and should tell an administrator.

What the states mean for daily work: while the licence is missing, invalid or expired, no company can be added or reactivated and every run is refused with a *Licence:* error in run history; while it is valid, expiring or in grace, everything runs, but no more active companies than licensed can be added. When more companies are active than licensed, the first ones by creation are licensed and the rest are badged *Unlicensed* on the Companies page. The engine also e-mails the failure-alert addresses when the expiry comes near and weekly while runs are blocked (chapter 4).

3.9 Roles at a glance

Every user has one or more of six built-in roles; an API key carries roles in the same way. A role grants a fixed set of permissions, and the navigation and the buttons follow them.

Role	Description (as shown under Administration › Users)
Administrator	Full access, including users, companies and mail settings.
Report designer	Creates and edits reports and their SQL.
Scheduler	Creates and manages schedules.
Runner	Runs reports on demand.
Viewer	Sees run history and downloads output.
Auditor	Reads the audit log and run history; changes nothing.

Permission	Administrator	Report designer	Scheduler	Runner	Viewer	Auditor
system.view dashboard, API reference	yes	yes	yes	yes	yes	yes
runs.view reports, schedules, run history, deliveries	yes	yes	yes	yes	yes	yes
reports.run run on demand	yes	yes	yes	yes		
reports.design design reports, Excel themes and templates	yes	yes				
schedules.manage schedules, business calendars	yes		yes			
runs.approve approve or reject a held run	yes		yes			
companies.view see companies	yes	yes	yes			
companies.manage add and edit companies	yes					
users.manage users, settings, licence, API keys, export and import, the Administration menu group	yes					
smtp.manage mail profiles, destinations, bounces	yes					
audit.view audit log	yes					yes

Administrators who sign in with a password must use an authenticator app (3.2). Chapter 9 describes how users are created, given roles, unlocked, deactivated and signed out everywhere.

3.9.1 Choosing roles

Person	Roles	What they get
IT administrator	Administrator	everything, including companies, users, mail, licence and settings
Consultant who writes the SQL	Report designer	the designer, Excel themes and templates, a read-only view of the companies, on-demand runs; cannot publish a version they submitted themselves (four-eyes publishing, chapter 5)
Finance or sales staff who decide what goes out	Scheduler	schedules, business calendars, test sends, approvals of held runs, on-demand runs
Someone who only needs a report now and then	Runner	on-demand runs and their downloads
A manager who wants to see what was sent	Viewer	run history, deliveries, downloads; nothing can be changed
Internal or external audit	Auditor	the audit log and run history

Roles add up: a consultant who also maintains the schedules gets Report designer and Scheduler. API keys (chapter 9) take the same roles; give an integration the smallest set that covers its calls.

3.10 Account pages at a glance

Address	Page	Who reaches it
/account/login	Sign in	everyone
/account/login-2fa	Verification code	after a password when the account has an authenticator
/account/mfa	Authenticator app	signed-in users, from the account menu or by redirect
/account/change-password	Change password	signed-in users, from the account menu or by redirect
/account/access-denied	Access denied	after a refused page
/account/culture?culture=<code>	language switch (no page)	from the account menu
/account/logout (POST)	sign-out	Sign out in the account menu
/account/windows-signin	Windows sign-in round trip	when <code>Authentication:Windows:Enabled</code> is true
/account/external-login, /account/external-callback, /signin-entra	Microsoft sign-in round trip	when the Entra settings are set
/setup	Create the first administrator	only while no user exists (chapter 2)
/verify, /verify/<code>	public verification	everyone, no sign-in (chapter 8)

4. Companies and licensing

A *company* in CertiReport is one SAP Business One company database, on SAP HANA or on Microsoft SQL Server, that reports run against. Every report run, preview, lookup and Query Manager import opens a connection to a company with the credentials stored on its company record. The licence decides how many of those companies may be active at the same time.

This chapter covers the **Companies** page and the company editor, the read-only database user CertiReport expects, the connection test, the settings used by certified PDFs, write-back and Crystal layouts, and the **Administration** › **License** page with the licence states and their enforcement.

4.1 Companies

4.1.1 Who can see and change companies

Permission	Roles	What it allows
companies.view	Administrator, Report designer, Scheduler	Open Companies and read the list
companies.manage	Administrator	Add company , edit, test, delete

The **Companies** entry in the navigation drawer is shown to users with `companies.view`; the **Add company** button and the editor need `companies.manage`.

4.1.2 The company list

The screenshot shows the 'Companies' page in the CertiReport interface. The page title is 'Companies' with a subtitle 'SAP Business One company databases that reports run against.' There is a '+ ADD COMPANY' button in the top right. The main content area contains a table with the following data:

Name	Platform	Database	SAP B1 company	Connection	Database user
SBODEMOGB	SAP HANA	SAPL:30013 / SBODEMOGB	OEC Computers UK	OK	Can write

The left navigation drawer is visible with the following items: System status, Reports, Schedules, Run history, Deliveries, Excel themes, Excel templates, Business calendars, Companies (selected), Administration (expanded), Users, Mail profiles, Destinations, Bounces, Settings, License, API keys, Export and import, Audit log, and API reference.

The Companies page with one tested company

Companies lists every company record, sorted by name. Clicking a row opens the editor.

Column	Content
Name	The display name. An inactive company carries the chip Inactive ; an active

Column	Content
	company that the licence does not cover carries Unlicensed (see 4.2.7)
Platform	SAP HANA or SQL Server
Database	Server and schema or database, as server / database
SAP B1 company	The company name read from table OADM by the last connection test, or –
Connection	Result of the last Test connection: OK, Failed or Not tested
Database user	Whether the last test found the database user to be Read-only (green), Can write (orange) or Unknown

The list is empty on a new installation: “No companies yet. Add your first SAP Business One company to start building reports.”

4.1.3 Adding a company

The company editor with the connection test panel

Click **Add company**. The editor has the connection fields on the left, four collapsible panels below them, and the **Connection test** panel on the right.

Field	Meaning	Notes
Name	How the company appears in the portal, for example OEC UK Live	Required, up to 100 characters, unique
Platform	SAP HANA or Microsoft SQL	Changes the labels of the next two

Field	Meaning	Notes
	Server	fields
HANA server and SQL port / SQL Server instance	hana01:30015 for HANA; SQL01\B1 for SQL Server	Required, up to 256 characters
Company schema / Company database	The schema (HANA) or database (SQL Server) that holds the company, for example SBODEMOGB	Required, up to 128 characters
Database user	The user CertiReport signs in with	Required, up to 128 characters. Use a read-only user; see 4.1.5
Password	The user's password	Required for a new company. Stored encrypted on the server. When editing, leave it empty to keep the stored password
Additional options	Extra key=value pairs appended to the provider's connection string, separated by semicolons	Optional, up to 500 characters. HANA: databaseName=NDB for a tenant database. SQL Server: TrustServerCertificate=true

Additional options are checked before any connection is attempted. A fragment without = (for example a tenant name typed on its own) is rejected with the exact fragment and the correct form: "Additional options must be key=value pairs separated by semicolons; 'NDB' has no '='. For a HANA tenant database enter databaseName=NDB." (for SQL Server the hint reads "For example TrustServerCertificate=true.").

To add a company:

1. Open **Companies** and click **Add company**.
2. Enter the **Name** and choose the **Platform**.
3. Enter the server (with the SQL port for HANA), the schema or database, the read-only **Database user** and its **Password**.
4. Add **Additional options** only when needed (a HANA tenant database, a SQL Server self-signed certificate).
5. Click **Test connection** and read the result in the right-hand panel (see 4.1.6). Correct the fields until the test reports a read-only connection to the expected company.
6. Open the panels below for the logo and signing certificate (4.1.7), the Service Layer (4.1.8), the Crystal connection (4.1.9) and the limits (4.1.10) as far as you use those features; all of them can be filled in later.
7. Click **Add company**.

After the first save ("Company added.") the page stays open on the new company and the button becomes **Save changes** ("Changes saved."). A name that another company already has is refused: "A company named 'OEC UK Live' already exists." Saving an existing company writes an audit entry with the changed fields; the password itself is never written to the audit log, only the fact that it changed.

A company can only be added, or reactivated, while the licence allows another active company; otherwise saving fails with a message that starts with **Licence:** (see 4.2.7).

4.1.4 How CertiReport connects

SAP HANA. CertiReport does not ship SAP's HANA driver. It loads the ADO.NET provider Sap.Data.Hana.Net.v8.0.dll from the SAP HANA Client installed on the server, by default from C:\Program Files\sap\hdbclient\dotnetcore\v8.0. Install SAP HANA Client 2.x (64-bit) on every

server that runs the Portal or the Engine. If the client is installed elsewhere, set the configuration key `DataSources:HanaClientPath` (a registry value under `HKLM\SOFTWARE\CertiReport`, see chapter 10) to the folder that contains the DLL. When the client is missing, the connection test and every run fail with: "SAP HANA Client not found (...). Install SAP HANA Client 2.x (64-bit) on this server, or set `DataSources:HanaClientPath` to the folder that contains `Sap.Data.Hana.Net.v8.0.dll`."

The HANA connection string is built from the fields as `Server`, `UserName`, `Password` and `CurrentSchema` (the company schema), followed by the additional options. Values in SQL are bound as positional ? parameters.

Microsoft SQL Server. CertiReport uses the Microsoft SQL client built into the product; nothing has to be installed. The connection string is built from the instance, database, user and password with the application name `CertiReport`, followed by the additional options. If the server presents a self-signed certificate the test fails with the provider's certificate error and the hint to add `TrustServerCertificate=true` to the additional options.

Both platforms use SQL authentication with the user and password entered on the company. Windows authentication for SQL Server is not offered on the company page.

4.1.5 The read-only database user

Reports only read data, and CertiReport's own SQL guard accepts a single `SELECT` per dataset (see chapter 5). The real protection is the database user: give CertiReport a user that can read the company and nothing else. The connection test reports every write privilege it finds, and the Companies page badges the company **Can write** until that is fixed.

Setup installs two scripts under `C:\Program Files\CertiReport\sql`. Run them as a database administrator, replace the password, and repeat the grant for every company CertiReport should report on.

SAP HANA (`hana-readonly-user.sql`), run in the tenant database that holds the company:

```
-- CertiReport: read-only reporting user for an SAP Business One company on SAP
HANA.
-- Run as a HANA administrator (for example in HANA Studio or hdbsql) in the
tenant database that holds the company.
-- Replace the password, and repeat the GRANT for every company schema
CertiReport should report on.
```

```
CREATE USER CERTIREPORT_RO PASSWORD "Replace-With-A-Strong-Password-1" NO
FORCE_FIRST_PASSWORD_CHANGE;
```

```
-- A service account; stop the password expiring and locking scheduled reports
out.
```

```
ALTER USER CERTIREPORT_RO DISABLE PASSWORD LIFETIME;
```

```
-- Read access to the company schema only. No INSERT/UPDATE/DELETE, no system
privileges.
```

```
GRANT SELECT ON SCHEMA "SBODEMOGB" TO CERTIREPORT_RO;
```

```
-- Verify: this must return no rows.
```

```
SELECT "PRIVILEGE", "OBJECT_TYPE", "SCHEMA_NAME"
FROM "PUBLIC"."EFFECTIVE_PRIVILEGES"
WHERE "USER_NAME" = 'CERTIREPORT_RO'
```

```
AND "PRIVILEGE" IN ('INSERT', 'UPDATE', 'DELETE', 'DROP', 'ALTER', 'CREATE
ANY', 'EXECUTE', 'DATA ADMIN', 'USER ADMIN');
```

Microsoft SQL Server (`sqlserver-readonly-user.sql`), run as sysadmin:

```
-- CertiReport: read-only reporting user for an SAP Business One company on
Microsoft SQL Server.
-- Run as a sysadmin. Replace the password, and repeat the database section for
every company database.
```

```
USE [master];
CREATE LOGIN [certireport_ro] WITH PASSWORD = N'Replace-With-A-Strong-
Password-1', CHECK_POLICY = ON, CHECK_EXPIRATION = OFF;
GO
```

```
USE [SBODEMOGB];
CREATE USER [certireport_ro] FOR LOGIN [certireport_ro];
ALTER ROLE [db_datareader] ADD MEMBER [certireport_ro];
```

```
-- Belt and braces: refuse changes even if a role grants them later.
DENY INSERT, UPDATE, DELETE, EXECUTE, ALTER TO [certireport_ro];
GO
```

```
-- Verify: every column must be 0 except CanSelect.
EXECUTE AS USER = 'certireport_ro';
SELECT HAS_PERMS_BY_NAME(DB_NAME(), 'DATABASE', 'SELECT') AS CanSelect,
       HAS_PERMS_BY_NAME(DB_NAME(), 'DATABASE', 'INSERT') AS CanInsert,
       HAS_PERMS_BY_NAME(DB_NAME(), 'DATABASE', 'UPDATE') AS CanUpdate,
       HAS_PERMS_BY_NAME(DB_NAME(), 'DATABASE', 'DELETE') AS CanDelete,
       IS_ROLEMEMBER('db_owner') AS IsDbOwner;
REVERT;
```

The scripts are a starting point; adapt the user name, the password policy and the schema or database names to the customer's standards. What the user needs is SELECT on the company schema (HANA) or membership of db_datareader in the company database (SQL Server); it needs no system privileges, no EXECUTE, and no access to other schemas or databases. The Query Manager import reads OUQR and OQCN and the Crystal layout picker reads RDOC, all of which are tables of the company schema and covered by the same grant.

4.1.6 Testing the connection

Test connection opens a connection with the values on the form (the stored password when the field is empty), confirms that the database is an SAP Business One company, and lists any rights the user has to change data. For a company that is not saved yet the **Password** field must be filled: "Enter the database password." The test gives up after 20 seconds: "No response from hana01:30015 within 20 seconds."

The **Connection test** panel shows the message and, when the connection opened, a table:

Row	Source
Company	CompnyName from table OADM
SAP B1 version	Version from table CINF (left out when it cannot be read)
Database version	The server version reported by the provider
Time	Elapsed milliseconds

Possible outcomes:

Message	Meaning and action
"Connected to <i>Company</i> . The user is read-only."	Success (green). The company is badged Read-only
"Connected to <i>Company</i> , but the user can change	Warning (orange). The Rights to change data list

Message	Meaning and action
data. Use a read-only user for reporting (see installer)."	shows each privilege found, for example db_owner on DATABASE ROLE or INSERT on SCHEMA SBODEMOGB. Fix the user (4.1.5) and test again
"Connected to <i>Company</i> . Could not determine the user's privileges."	The privilege query itself failed; the badge stays Unknown
"Connected, but 'SBODEMOGB' is not an SAP Business One company database (table OADM not found or not readable)."	The schema or database is wrong, or the user cannot read OADM
Provider error text	Wrong server, user or password, or a rejected connection string. For SQL Server certificate errors the hint about TrustServerCertificate=true is appended

The privileges that count as "can write" are, on HANA, INSERT, UPDATE, DELETE, DROP, ALTER, CREATE ANY, EXECUTE, TRIGGER and INDEX on the company schema and the system privileges DATA ADMIN, USER ADMIN and ROLE ADMIN; on SQL Server, the roles sysadmin, db_owner, db_datawriter and db_ddladmin and the permissions INSERT, UPDATE, DELETE, ALTER and EXECUTE on the database or on schema dbo.

For an existing company the test result (time, outcome, detected company name and version, read-only flag) is stored on the record and shown in the list. For a company that is not saved yet the result is shown but not stored.

The same test runs for every active company in CertiReport.Engine.exe check (chapter 2), together with the signing certificate and Service Layer checks below.

4.1.7 Certified PDFs: logo and signing certificate

This panel holds the two company-level inputs of certified PDF output (chapter 8).

Logo. Upload logo accepts one PNG, JPEG or SVG file of at most 512 KB; a larger file is refused with "The logo must be 512 KB or smaller." The logo is shown in the panel once uploaded, **Replace logo** swaps it and **Remove** clears it. PDF templates reach it as company . logo; Excel title blocks and Excel templates ({{ Company . Logo }}) use the same image.

Signing certificate thumbprint. The thumbprint (hexadecimal, up to 64 characters, no spaces; the form refuses anything else with "A thumbprint is hexadecimal." and the value is stored in upper case) of a certificate in the *Local Machine* › *Personal* store of every server that runs the Engine. The service account needs read access to the certificate's private key. Leave the field empty and PDFs are not signed.

Check looks the certificate up without saving:

Result	Meaning
"No certificate: PDFs are not signed."	The field is empty
"No certificate with this thumbprint in the Local Machine or current user Personal store."	Not installed on the server running the portal
"Found, but its private key is not available to this account; grant the service account read access to the key."	Installed, but the service account cannot sign with it
"Found, but it has expired."	Installed and readable, but past its validity
"Found with a usable private key."	Ready. The subject, issuer and expiry date are

Result	Meaning
	shown underneath

The check runs on the Portal server with the Portal's service account. When the Engine runs on another server, or under another account, install the certificate there as well and confirm with `CertiReport.Engine.exe` check.

4.1.8 SAP B1 Service Layer (write-back)

Schedules can attach the sent files to the business partner and log an activity in SAP Business One (chapter 6). That goes through the company's Service Layer, configured here.

Field	Meaning
Service Layer URL	For example <code>https://b1server:50000/b1s/v1</code>
SAP B1 user	The SAP Business One user the write-back signs in as
Password	Stored encrypted; leave empty when editing to keep the stored one
Company database	The CompanyDB for the Service Layer login. Empty = the schema or database entered above
Accept the Service Layer's self-signed certificate	On by default; switch it off when the Service Layer has a certificate the server trusts

Test Service Layer signs in with these values (the stored password when the field is empty), reads the company name through `CompanyService_GetCompanyInfo` where the Service Layer version offers it, signs out, and reports "Signed in to the Service Layer." with the company name, the Service Layer version and the elapsed time, or the error returned. Both the URL and the user must be filled before the test runs: "Enter the Service Layer URL and user." A company without a stored Service Layer password needs one in the field: "Enter the Service Layer password."

Clearing the **SAP B1 user** also drops the stored Service Layer password on save.

4.1.9 Crystal Reports layouts

ODBC connection string for the Crystal sidecar is the connection the Crystal runtime uses when it renders a layout for this company (chapter 8). Leave it empty and CertiReport builds it from the settings above: the HANA ODBC driver (`DRIVER={HDBODBC}; SERVERNODE=hana01:30015; CURRENTSCHEMA=SBODEMOGB`, with `DATABASENAME=<tenant>` inserted when **Additional options** names a `databaseName`) or ODBC Driver 17 for SQL Server (`DRIVER={ODBC Driver 17 for SQL Server}; SERVER=SQL01\B1; DATABASE=SBODEMOGB`). The database user and password entered above are used in either case. Enter a string of your own when the engine server needs a different driver name or server address.

4.1.10 More settings

Setting	Meaning	Default
Max concurrent queries	How many queries may run against this company at the same time. The items of a bulk run execute in parallel up to this number; the cap protects the production database	4 (1 to 32)
Time zone	The company's time zone. Excel outputs of on-demand runs show the run date in it, and a new schedule starts with the time zone of the first active company (chapter 6)	The server's local time zone

Setting	Meaning	Default
Active	Off keeps the company and its settings but hides it from the company lists of the designer, the run page, the schedule editor and the Query Manager import. Only active companies count against the licence and only active companies are covered by it, so a run for an inactive company is refused with a Licence : message (4.2.7)	On

4.1.11 Stored secrets and the connection cap

The database password and the Service Layer password are encrypted before they are stored, with the Data Protection key ring both services share under %ProgramData%\CertiReport\keys (chapter 10). The portal never shows a stored password; the **Password** fields stay empty when you edit a company, and “Leave empty to keep the stored password.” tells you one is on file. The key ring is part of the CertiReport backup (chapter 2), so a restored installation can still open its companies.

Max concurrent queries is enforced per process: the Engine holds at most that many open queries against the company at a time while a run’s items execute in parallel, and the Portal applies the same cap to previews, lookups and on-demand runs of its own users. A query that has to wait for a free slot simply starts later; nothing is refused. Lower the value when the SAP Business One server shows load during bulk runs, raise it when runs of many items take too long and the database has headroom.

4.1.12 Deleting or deactivating a company

Delete asks for confirmation in the dialog **Delete company** (“Delete *Name*? Reports for other companies are not affected.”) and removes the record (“Company deleted.”). It is refused while any schedule still uses the company: “Schedules still use this company. Deactivate it instead, or move the schedules first.” Report definitions are independent of companies and are not affected.

To take a company out of use without deleting it, switch **Active** off and save. The company stops counting against the licence immediately. Reactivating it is checked against the licence like adding a new company.

4.1.13 Companies elsewhere in the product

- **System status** (chapter 3) counts the companies, and the getting-started step **Company connected** is ticked once an active company has passed its connection test.
- `CertiReport.Engine.exe` check (chapter 2) tests every active company from the engine server and prints one line per company: Company OEC UK Live: Connected (OEC Computers UK), a warning Connected (...); the database user can change data – use a read-only user, or the failure message. A company with a signing certificate adds a line Company ...: signing certificate (fails when the certificate or its private key is not available to the engine’s account) and one with a Service Layer adds Company ...: Service Layer. Run it after moving the Engine to another server or changing its service account.
- The configuration export and import (chapter 9) do not carry companies or their passwords. A schedule in a bundle names its company; on import it is skipped when no company of that name exists here: “Company ‘OEC UK Live’ does not exist here. Add it under the same name first.” Create the companies on the target system by hand, with the same names, before importing.
- The audit log (chapter 9) records Company entries for *Created*, *Updated* and *Deleted* with the settings before and after; the database password appears only as the flag PasswordChanged, the logo only as HasLogo.

4.1.14 Connection troubleshooting

Symptom	Cause and remedy
"SAP HANA Client not found (C:\Files.0.Data.Hana.Net.v8.0.dll)..."	Install SAP HANA Client 2.x (64-bit) on the server, or point <code>DataSources:HanaClientPath</code> at the folder that contains the DLL. Both the Portal (tests, previews, lookups) and the Engine (runs) need it
"The SAP HANA Client at ... could not be loaded: ..."	The client is present but a different bitness or a damaged installation; reinstall the 64-bit client
"No response from hana01:30015 within 20 seconds."	Wrong host or port, a firewall between the CertiReport server and the database, or the database is down. For a HANA tenant database add <code>databaseName=<tenant></code> to the additional options
"Connected, but 'SBODEMOGB' is not an SAP Business One company database..."	The schema or database name is wrong, or the user has no SELECT on it
A certificate error on SQL Server	The instance presents a self-signed certificate; add <code>TrustServerCertificate=true</code> to Additional options , or install a trusted certificate on the instance
"Additional options must be key=value pairs..."	A fragment without <code>=</code> ; write <code>databaseName=NDB</code> or <code>TrustServerCertificate=true</code>
Can write badge	The user holds write privileges; run the script in 4.1.5 or remove the extra roles, then test again
The test succeeds in the portal but runs fail	The Engine runs on another server or under another account; check the HANA client, the firewall and the certificate there with <code>CertiReport.Engine.exe</code> check

4.2 Licensing

4.2.1 How licensing works

CertiReport is licensed per SAP Business One company: a licence entitles a customer to a number of *active* companies on one CertiReport server. There is no trial period. Without a licence CertiReport installs and starts, users sign in, design reports, import starters and prepare schedules, but no company can be added or reactivated and no report runs (scheduled, on demand, test send or through the API).

The licence key is a compact JWT signed by the CERTICONS vendor key (ES256, issuer CertiReport-License). The product holds only the public key, so a key can be verified but not forged. Its claims are the customer, the edition (Standard, Professional or Enterprise), the number of companies, the Hardware ID of the server, the grace period in days, a licence id and the validity period. The installed key is stored as a setting in the metadata database, so it travels with a backup; being bound to the Hardware ID it is useless on another server. Activation and removal are written to the audit log.

4.2.2 Hardware ID

The licence is node-locked to the server's Hardware ID, a SHA-256 of the Windows MachineGuid and the host name, shown as six groups of five characters: XXXXX-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX. It changes when Windows is reinstalled or the server renamed; request a reissue from CERTICONS in that case. For containers and test systems the configuration key `License:HardwareId` or the environment variable `CERTIREPORT_HARDWARE_ID` overrides the computed value.

4.2.3 The License page

System status

Reports

Schedules

Run history

Deliveries

Excel themes

Excel templates

Business calendars

Companies

Administration

Users

Mail profiles

Destinations

Bounces

Settings

License

API keys

Export and import

Audit log

API reference

License

CertiReport is licensed per SAP Business One company; the licence entitles a number of active companies on this server. Without a valid licence no company can be added and no report runs; designing reports and schedules stays possible.

Current licence

Valid

Customer	CERTICONS (internal test server)
Edition	Professional
Licence id	CR-EFD8DF
Companies	1 active of 1 licensed
Valid	31 Oct 2026 to 31 Oct 2027, grace 15 days
Days left	364

The licence covers 1 company and 1 is active. Extend the licence to add more.

Hardware ID of this server: 59A2D-AAFDB-8A25D-CBA4F-FF6A8-C11ED
The licence is bound to this id. It changes when Windows is reinstalled or the server renamed;
then request a reissue. [REMOVE LICENCE](#)

Request a licence

Companies

1

PREPARE REQUEST

Activate a licence

Paste the key you received from CERTICONS (the content of the .lic file). Check verifies it without installing; Activate installs it and replaces any previous licence.

Licence key

CHECK

ACTIVATE

Headless: CertiReport.Portal.exe license --file CertiReport-License.lic; license shows the state, license --request prints the request, license --remove removes it.

Administration › License with a valid licence

Administration › License needs the `users.manage` permission (Administrator). The page has three panels.

Current licence shows the state as a chip (green **Valid**, orange **Expiring** or **Grace period**, red **No licence**, **Invalid** or **Expired**) and, when a key is installed, a table:

Row	Content
Customer	The licensee
Edition	Standard, Professional or Enterprise
Licence id	The id printed in the licence request for renewals
Companies	“ <i>n</i> active of <i>m</i> licensed”
Valid	Start and end date, and the grace period when there is one
Days left	Days to expiry (negative once expired)

Below the table the page shows the reason for a warning or error state, the **Hardware ID of this server**, and **Remove licence** when a key is installed. Without a key the panel shows only the number of active companies.

4.2.4 Requesting a licence

1. In **Request a licence**, enter the number of **Companies** you need. The field starts at the larger of the companies already active and the companies currently licensed.
2. Click **Prepare request**. The request text appears:

CertiReport licence request

Hardware ID: ABCDE-FGHIJ-KLMNO-PQRST-UVWXY-Z0123
Host name: REPORTS01
CertiReport version: 1.20.0

Companies requested: 3
Companies active: 2
Current licence: L-2026-0042 (Standard, 2 companies, valid to 2027-03-31, state Valid)

Please issue a CertiReport licence bound to the Hardware ID above.
Send to: licensing@certicons.com

The Current licence line appears only when a key is installed. 3. Click **Copy** to put the text on the clipboard, or **E-mail request** to open your mail client with the request addressed to licensing@certicons.com.

CERTICONS returns a .lic file whose content is the licence key.

4.2.5 Checking and activating a key

1. In **Activate a licence**, paste the key (the content of the .lic file) into **Licence key**.
2. Click **Check** to verify it without installing it. A good key shows "Valid licence for *Customer (Edition): n companies, valid to date*." A bad key shows the reason:

Message	Cause
"Invalid or unrecognised licence key (damaged, or not issued by CERTICONS for CertiReport)."	Wrong product, altered text, or an incomplete paste
"This licence is bound to a different machine (Hardware ID ... instead of ...)."	Issued for another server; request a reissue with this server's Hardware ID
"This licence does not include any company."	The key carries zero companies
"This licence expired on <i>date</i> (grace period included)."	Too old to install

3. Click **Activate**. The key is installed and replaces any previous licence; the page shows "Licence activated." and the **Current licence** panel refreshes. Activating also clears the record of licence notices already sent, so expiry alerts start afresh for the new key.

A renewal or an extension to more companies is a new key activated the same way. Reducing the number of companies leaves the later companies unlicensed until they are deactivated or the licence is extended again (4.2.7).

4.2.6 Licence states

State	Chip	Meaning	Runs	Add or reactivate a company
Missing	No licence	No key installed	No	No
Invalid	Invalid	Bad signature, wrong product, another machine's Hardware ID, or not yet valid (nbf in the future)	No	No
Valid	Valid	Inside the validity period, more than 30 days left	Yes	While active companies < licensed
Expiring	Expiring	30 days or less to the end date	Yes	While active companies < licensed
Grace	Grace period	Past the end date, inside the grace period	Yes	While active companies < licensed
Expired	Expired	Past the end date and the grace period	No	No

The reasons for the Missing and Invalid states read: “No licence installed. Request a licence for this server’s Hardware ID from CERTICONS and activate it under Administration → License.”, “The installed licence is damaged or was not issued by CERTICONS for CertiReport. Activate a valid licence.”, “The installed licence is bound to another machine (...); this server’s Hardware ID is” and “The installed licence is not valid before *date*.” The other reasons shown on the page read, for example: “The licence expires on 2027-03-31 (12 days). Renew it in time.”, “The licence expired on 2027-03-31; everything keeps working during the grace period until 2027-04-30.”, “The licence expired on 2027-03-31 and the grace period of 30 days is over. Renew the licence to add companies and run reports.” and “The licence covers 2 companies and 2 are active. Extend the licence to add more.”

4.2.7 Enforcement and the companies counted

Only companies with **Active** on count. Deactivating a company frees its slot at once.

- In the states Missing, Invalid and Expired every run is refused with an error that starts with **Licence:** followed by the reason above; a scheduled run fails with that message in run history (chapter 7), an on-demand run shows it on the run page, and the API returns it.
- In the states Valid, Expiring and Grace everything runs; adding or reactivating a company beyond the licensed number is refused with **Licence: The licence covers ... Extend the licence to add more.**
- When more companies are active than licensed (a smaller licence was activated), the first *m* active companies by creation date are covered. The rest are badged **Unlicensed** on the Companies page with the tooltip “Not covered by the licence: no report runs for this company until the licence is extended or another company is deactivated”, and their runs are refused: “Licence: company ‘*Name*’ is not covered by the licence (2 of 3 active companies are licensed). Extend the licence or deactivate another company.”

Designing reports, previewing datasets and lookups in the designer are not licence-gated; they only need a company connection.

4.2.8 Banner and alert mails

A red banner above every page appears while the licence is missing, invalid or expired, and a yellow one while the licence is expiring, in its grace period or while more companies are active than licensed. It shows the reason and links to **Administration › License** (chapter 3).

The Engine checks the licence daily at 07:15 server time and mails the failure-alert addresses (**Administration › Settings › Failure alerts**, chapter 9):

When	Subject	Frequency
Expiring (30 days or less left)	[CertiReport] Licence expires in n day(s)	Once per threshold: at 30, 14, 7 and 1 days before expiry
Grace, or runs blocked (Missing, Invalid, Expired) while at least one company is active	[CertiReport] Licence missing: reports do not run (or in grace period, expired, invalid)	Once per calendar week

The mail carries the reason, the Hardware ID, the active and licensed company counts, a link to the License page when a public URL is set, and the vendor address. When no failure-alert address is configured the Engine logs a warning and sends nothing.

4.2.9 Command line and API

The Portal executable manages the licence without the browser, for scripted installations (run from the installation folder as an administrator):

Command	Effect	Exit code
<code>CertiReport.Portal.exe license</code>	Prints state, Hardware ID, companies, customer, validity and the reason	0 when the licence allows runs, 3 otherwise
<code>CertiReport.Portal.exe license --file CertiReport-License.lic</code>	Checks and activates the key in the file	0 on success, 1 when refused, 2 when the file is missing
<code>CertiReport.Portal.exe license --request [--companies n]</code>	Prints the licence request text	0
<code>CertiReport.Portal.exe license --remove</code>	Removes the installed key	0

The REST API offers the same under `/api/v1/license` for an API key with the `users.manage` permission (chapter 10): GET `/api/v1/license` (status), GET `/api/v1/license/request?companies=n` (request text), POST `/api/v1/license/check` and POST `/api/v1/license` with a body `{"token": "..."}` , and DELETE `/api/v1/license`.

4.2.10 Removing a licence

Remove licence on the License page (or `license --remove`) deletes the installed key and the notice record. The state falls back to **No licence**: runs stop, companies cannot be added, and the weekly alert mail starts again while companies are active. Removal is written to the audit log with the user who did it. Use it only when moving a licence to another server at CERTICONS' request; otherwise activate the new key over the old one.

4.2.11 Common situations

Situation	What to do
New installation	Add the companies you need first if you like; they can be saved as inactive without a licence, but the first <i>active</i> company needs a key. Prepare the request (4.2.4) with the number of companies, send it, activate the key (4.2.5) and activate the companies
Renewal	Activate the new key before the end date, or during the grace period; the state returns to Valid and the expiry alerts restart for the new key
Another company is needed	Request a key for the higher count (the request text shows the active count and the current licence), activate it, then add or reactivate the company
A smaller licence was activated	The companies created last are badged Unlicensed and their runs are refused; deactivate companies until the active count fits, or request a larger key
The server was renamed or Windows reinstalled	The Hardware ID changed and the state is Invalid ("bound to another machine"). Send a new request with the new Hardware ID and activate the reissued key
CertiReport moves to a new server	Restore the backup (chapter 2), which brings the old key along; it is invalid there. Request a key for the new server's Hardware ID
Test or staging system	Each server needs its own key; the metadata database copied from production carries a key that is invalid on the copy

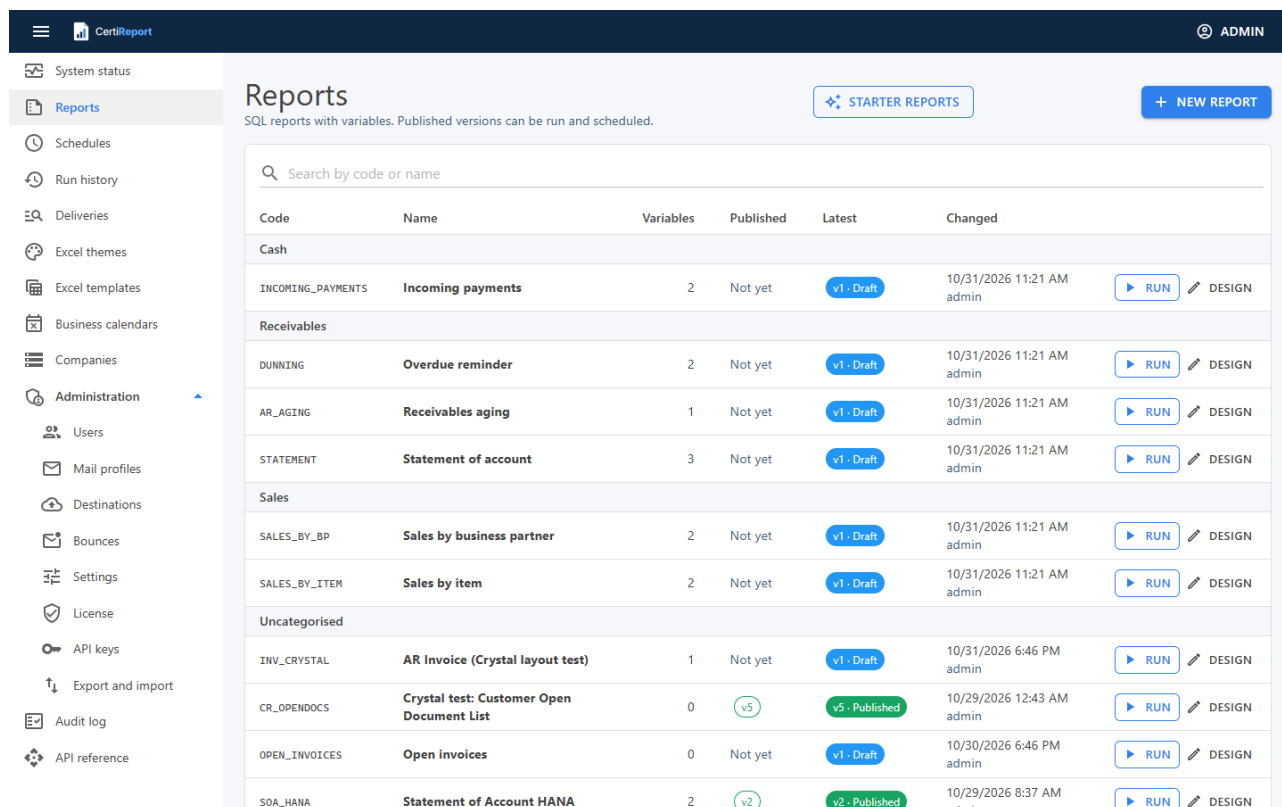
The audit log (chapter 9) holds a License entry *Activated* (customer, edition, companies, end date, user) for every activation and *Removed* for every removal.

5. Reports

A report is a versioned package: one or more *datasets* (a single SELECT per database platform), typed *variables* that the SQL references as @Name, and *outputs* (Excel, CSV, PDF from an HTML template, or a Crystal Reports layout). Reports are designed and published in the portal; published versions are run on demand from the **Reports** page or by schedules (chapter 6).

This chapter covers the report list, versions and approval, every tab of the report designer, variables with their sources, defaults and rules, the output formats with their Excel themes and templates, the import from SAP Business One Query Manager, the starter reports, and running a report on demand.

5.1 The report list



Code	Name	Variables	Published	Latest	Changed	
Cash						
INCOMING_PAYMENTS	Incoming payments	2	Not yet	v1 - Draft	10/31/2026 11:21 AM admin	▶ RUN ✎ DESIGN
Receivables						
DUNNING	Overdue reminder	2	Not yet	v1 - Draft	10/31/2026 11:21 AM admin	▶ RUN ✎ DESIGN
AR_AGING	Receivables aging	1	Not yet	v1 - Draft	10/31/2026 11:21 AM admin	▶ RUN ✎ DESIGN
STATEMENT	Statement of account	3	Not yet	v1 - Draft	10/31/2026 11:21 AM admin	▶ RUN ✎ DESIGN
Sales						
SALES_BY_BP	Sales by business partner	2	Not yet	v1 - Draft	10/31/2026 11:21 AM admin	▶ RUN ✎ DESIGN
SALES_BY_ITEM	Sales by item	2	Not yet	v1 - Draft	10/31/2026 11:21 AM admin	▶ RUN ✎ DESIGN
Uncategorised						
INV_CRYSTAL	AR Invoice (Crystal layout test)	1	Not yet	v1 - Draft	10/31/2026 6:46 PM admin	▶ RUN ✎ DESIGN
CR_OPENDOC	Crystal test: Customer Open Document List	0	v5	v5 - Published	10/29/2026 12:43 AM admin	▶ RUN ✎ DESIGN
OPEN_INVOICES	Open invoices	0	Not yet	v1 - Draft	10/30/2026 6:46 PM admin	▶ RUN ✎ DESIGN
SOA_HANA	Statement of Account HANA	2	v2	v2 - Published	10/29/2026 8:37 AM admin	▶ RUN ✎ DESIGN

The Reports page

Reports in the navigation drawer lists every report grouped by **Category**; reports without a category are grouped under **Uncategorised**. The search box above the table filters by **Code** or **Name** as you type.

Column	Content
Code	The report code, upper case, for example SOA
Name	The report name
Variables	Number of variables of the latest version
Published	The published version as a green chip v3, or Not yet
Latest	The highest version number and its status, for example v4 • Draft
Changed	When and by whom the report was last changed
Run / Design	Run opens the run page (5.9); Design opens the designer (5.3)

Who sees what:

Permission	Roles	On this page
<code>runs.view</code>	every role	Open the list
<code>reports.run</code>	Administrator, Report designer, Scheduler, Runner	Run
<code>reports.design</code>	Administrator, Report designer	New report, Starter reports, Design

Run is disabled when the report has no published version and its latest version is retired. An empty list reads “No reports yet. Create one, pick from the starter reports, or import a query from SAP Business One Query Manager.”

5.2 Versions and states

Every report has numbered versions. The designer always shows the latest version; the run page and schedules use the published one.

Status	Chip	Meaning
Draft	Draft (blue)	Being edited; Save draft overwrites it
Pending approval	Awaiting approval (orange)	Submitted; a different user has to publish it
Published	Published (green)	Immutable; the version that runs and that schedules use. One per report
Retired	Retired (grey)	A former published version, or a published version taken out of use

How versions move:

- A new report is saved as version 1, Draft.
- **Save draft** on a Draft or Pending approval version overwrites that version and sets it back to Draft.
- **Save draft** on a Published or Retired version does not change it: a new draft with the next number is created. The designer header says “saving creates version $n+1$ ”.
- **Publish › Publish this version** validates the latest version (5.6), retires the previously published version and publishes this one. Schedules that use the report pick the new version up at their next run.
- **Publish › Submit for approval** saves and turns the Draft into Pending approval. It only applies to a Draft; otherwise the portal answers “The latest version is Published, not Draft.”
- **Publish › Retire published version** retires the published version. The confirmation warns: “Retire the published version? Schedules that use it will fail until a new version is published.”
- **Publish › Delete report** asks “Delete *name* and all its versions?” and deletes the report with all its versions. It is refused while a schedule uses the report (“Schedules still use this report. Remove it from them first.”) or when the report has run history (“This report has run history. Retire it instead of deleting it.”).

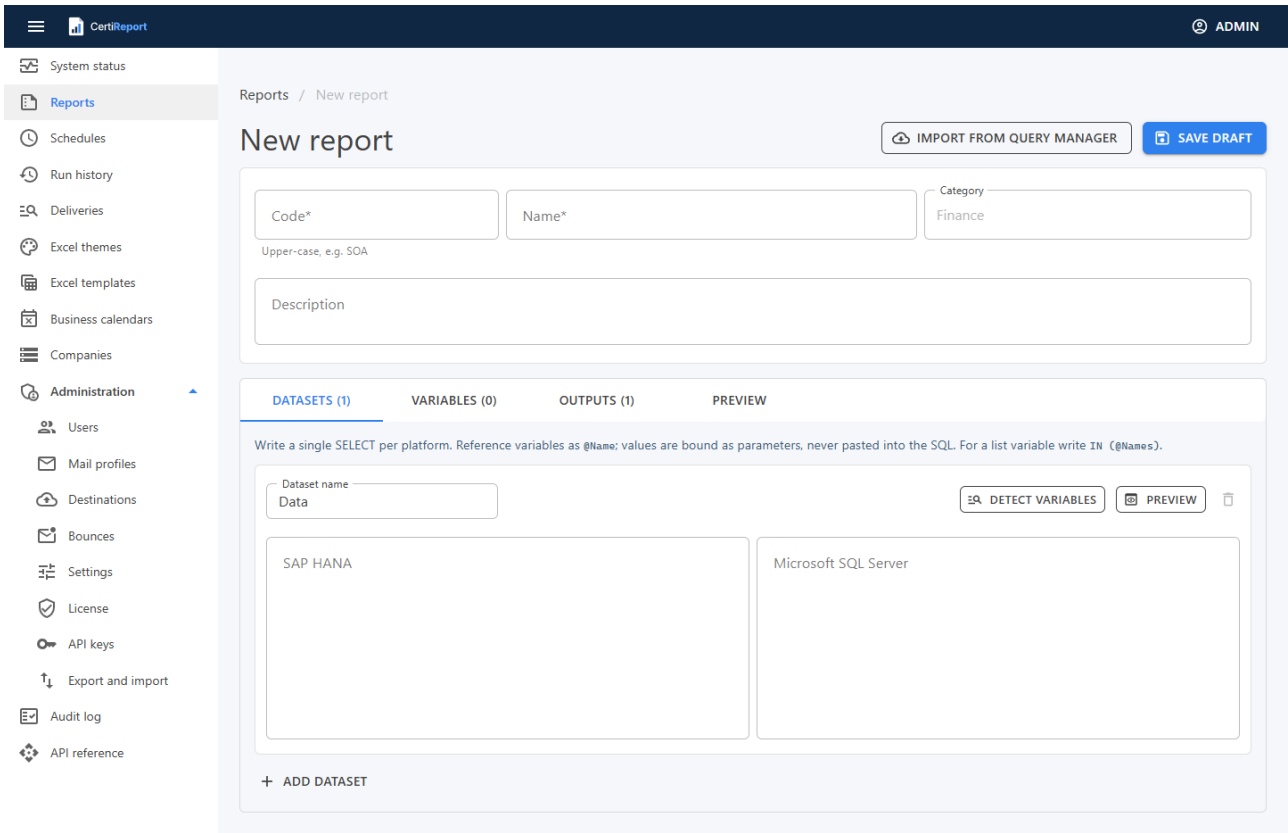
Every transition is written to the audit log with the version number.

5.2.1 Four-eyes publishing

A version submitted for approval must be published by someone else. When the user who created the version and last modified it tries to publish it while it awaits approval, CertiReport refuses: “A different user must approve a version submitted for approval.” Any other user with `reports.design` (an administrator or another report designer) opens the report and chooses **Publish this version**; the published version records who approved and published it.

A designer who does not need a second pair of eyes publishes a Draft directly with **Publish this version**; approval is a choice of the team, not a system-wide switch.

5.3 The report designer



The designer with the Datasets tab

New report or **Design** opens the designer. The header shows the version and status; the toolbar has **Import from Query Manager** (5.7), **Save draft**, the **Publish** menu (5.2) and **Run**.

The fields above the tabs:

Field	Rules
Code	Required, up to 32 characters, upper-case letters, digits and _ only, unique across reports. Lower case is converted on save
Name	Required, up to 200 characters
Category	Optional, up to 100 characters; groups the report list
Description	Optional, up to 2,000 characters; shown on the run page

Validation issues appear in a box under the toolbar after each **Save draft** (5.6). Red issues block publishing; orange ones are warnings.

5.3.1 Datasets

A dataset is one SELECT with a text per platform: **SAP HANA** on the left, **Microsoft SQL Server** on the right. Write the SQL for the platforms your companies run on; a report that is only ever run against HANA companies needs only the HANA text. A run against a company whose platform has no SQL fails with “Dataset ‘Data’ has no SQL for SAP HANA.”

A new report starts with one dataset named Data. **Add dataset** adds another (Dataset 2, ...); the bin icon removes one, but the last dataset cannot be removed. The **Dataset name** matters for outputs: Excel writes

one sheet per dataset, CSV takes the first dataset, PDF templates address datasets by name and treat a dataset called Header specially (chapter 8), Excel templates use the name in markers (5.5.5).

Per dataset:

- **Detect variables** scans both texts for @Name and adds a variable for every name that is not declared yet, with a label split from the name (FromDate becomes From Date) and type Date when the name ends in Date, otherwise String. The designer switches to the Variables tab when it added something.
- **Preview** runs this dataset against the preview company (5.3.4).

5.3.2 Variables in SQL: @Name binding

Write @Name wherever a value goes. CertiReport never pastes values into the text: every @Name becomes a parameter, @Name on SQL Server and a positional ? on HANA, and the typed value (date, number, text) is bound to it. The scanner skips @Name inside string literals, double-quoted or bracketed identifiers and comments, and ignores @@ROWCOUNT and other @@ system functions. A name must start with a letter or _ and may contain letters, digits and _.

A variable whose **Values** setting is *Several values* is written as IN (@Names). At run time the single @Names expands to one parameter per selected value (@Names_0, @Names_1, ... on SQL Server, as many ? on HANA). When the list is empty the placeholder becomes NULL, so IN (NULL) matches nothing and the SQL stays valid.

Optional single variables left empty are bound as NULL. Use the SQL idiom (@BP IS NULL OR T0."CardCode" = @BP) to make a filter optional.

5.3.3 The safety guard

Every dataset and every SQL lookup is checked by the read-only guard when the report is saved, and the issues are listed under the toolbar:

Platform	How the guard works
SQL Server	The text is parsed with the T-SQL parser. It must contain exactly one statement, which must be a SELECT (a leading WITH for a common table expression is fine). SELECT INTO, EXECUTE, OPENROWSET, OPENQUERY and calls to xp_* or sp_* procedures are refused. Syntax errors are reported with line and column
SAP HANA	The text is checked token by token. It must start with SELECT or WITH, contain a single statement (one trailing ; is tolerated), no INTO, and none of the keywords INSERT, UPDATE, DELETE, MERGE, UPSERT, REPLACE, TRUNCATE, CREATE, ALTER, DROP, RENAME, GRANT, REVOKE, CALL, EXEC, EXECUTE, COMMIT, ROLLBACK, LOCK, SET, IMPORT, EXPORT, LOAD, UNLOAD, BACKUP, RESTORE and the SQL Server extensions listed above. Strings, quoted identifiers and comments are ignored, so a column named "Set" is not a problem

The guard is a safety net against mistakes. The database user with read-only rights (chapter 4) remains the real protection.

5.3.4 Preview

The **Preview** tab runs one dataset against a company without writing files or a run record. Choose the **Company** (pre-selected when there is only one active company, otherwise the first one whose connection test succeeded), fill the variable form (5.4.6), and click **Preview Dataset**. The grid shows up to 50 rows, the row count, whether the limit was reached and the elapsed time. Variable problems are highlighted on the form: "Enter values for the highlighted variables." Without a company the preview stops with "Choose a company first."

The **Preview** button on a dataset in the Datasets tab does the same and switches to the Preview tab.

5.4 Variables

System status

Reports

Schedules

Run history

Deliveries

Excel themes

Excel templates

Business calendars

Companies

Administration

Users

Mail profiles

Destinations

Bounces

Settings

License

API keys

Export and import

Audit log

API reference

Reports / New report

New report

IMPORT FROM QUERY MANAGER

SAVE DRAFT

Code*

Name*

Category

Finance

Upper-case, e.g. SOA

Description

DATASETS (1)

VARIABLES (0)

OUTPUTS (1)

PREVIEW

Name	Label	Type	Values	Source	Concept	Default
No variables. Write @Name in a dataset and press Detect variables, or add one here.						

+ ADD VARIABLE

The Variables tab

The **Variables** tab lists the variables in the order they appear on run forms; the arrows move a variable up or down, the bin removes it. Click a row to edit it, or **Add variable** for a new one; both open the variable editor dialog.

Add variable

Name (used as @Name in SQL)*

Label*

Type

String

Values

One value

Concept

Lets schedules bind this once across reports.

Required

Default

Used when running on demand.

Values come from

Free entry

Validation rules

CANCEL

OK

The variable editor

5.4.1 Properties

Field	Meaning
Name (used as @Name in SQL)	Required, up to 64 characters, letters, digits and _, not starting with a digit
Label	Required, up to 200 characters; the caption on run forms and schedules
Type	String, Integer, Decimal, Date, DateTime, Boolean or Enum. Values are converted to this type before they are bound; a value that does not convert is reported ("From date must be a date.", "Count must be a whole number.")
Values	One value; Several values (IN list): the variable holds a list and is written as IN (@Name); One value, can drive one run per value: a single value that a schedule may iterate over, one run per value (chapter 6)
Concept	Optional; see 5.4.3
Required	On by default. An empty required variable stops a run ("Business partner is required.")
Default	A literal, or for Date and DateTime variables a date expression (5.4.4). Used when running on demand; several values are separated by commas
Values come from	The source of the values; see 5.4.2
Validation rules	Minimum and maximum for Integer and Decimal, a regular expression pattern for String, and rules across variables (5.4.5)

5.4.2 Sources of values

Free entry. The user types the value. Dates get a date picker, Boolean a Yes/No choice, numbers a numeric field, text a text box. A multi-value free-entry variable takes comma-separated text.

Fixed list. Items, one per line, each either a plain value or value=label, for example:

L=Local currency
S=System currency
B=Both

The run form shows the labels and binds the values. Nothing is read from the database for a fixed list.

SQL lookup. A query per platform (**HANA lookup SQL, SQL Server lookup SQL**) that returns the options.

Value column (default Value) is bound to the variable and **Label column** (default Label) is shown; when a named column is missing the first and second columns are used. The lookup runs against the selected company with a 30-second timeout and returns at most 500 options; what the user types in the autocomplete box narrows the list by value or label.

A lookup may reference other variables of the report with @Name. List them under **Depends on** (comma-separated): when one of them changes on the run form, the dependent variable is cleared and reloaded, so a contact list can be filtered by the chosen business partner:

```
SELECT "CntctCode" AS "Value", "Name" AS "Label"  
FROM "OCPR" WHERE "CardCode" = @BP ORDER BY "Name"
```

Lookup SQL goes through the same safety guard as datasets.

SAP Business One lookup. A built-in picker, resolved by CertiReport on either platform. Each returns up to 200 rows ordered by code, as Code - Name, and searches code and name case-insensitively as the user types.

Lookup	Table	Value	Rows
Customers	OCRD	CardCode (text)	CardType = 'C'
Vendors	OCRD	CardCode (text)	CardType = 'S'
Business Partners	OCRD	CardCode (text)	Customers and vendors
Items	OITM	ItemCode (text)	Not frozen
Sales Employees	OSLP	S1pCode (integer)	Active
Customer Groups	OCRG	GroupCode (integer)	GroupType = 'C'
Vendor Groups	OCRG	GroupCode (integer)	GroupType = 'S'
Item Groups	OITB	ItmsGrpCod (integer)	All
Warehouses	OWHS	WhsCode (text)	Not inactive
Projects	OPRJ	PrjCode (text)	Active
Branches	OBPL	BPLId (integer)	Not disabled
Currencies	OCRN	CurrCode (text)	All
Payment Terms	OCTG	GroupNum (integer)	All

Set the variable's **Type** to match the value (Integer for the code-numbered pickers), so the parameter is bound with the right type.

In the Variables tab the **Source** column summarises the choice: Free entry, List (3), SQL lookup, SQL lookup (after BP) or B1: Customers.

5.4.3 Concepts

A concept names what a variable means, independently of the report. Schedules merge the variables of their reports that share a concept into one *slot*, so a schedule over three reports binds the business partner once (chapter 6). Six concepts ship with the product and cannot be deleted:

Concept	Code	Type
Business Partner	BusinessPartner	String
Period start	PeriodStart	Date
Period end	PeriodEnd	Date
As-of date	AsOfDate	Date
Aging buckets	AgingBuckets	String
Currency mode	CurrencyMode	Enum

Write-back to SAP Business One (chapter 6) uses the slot linked to BusinessPartner to find the partner. Variables without a concept are slots of their own in a schedule.

5.4.4 Defaults and date expressions

A **Default** for a Date or DateTime variable may be a fixed date (2026-01-01) or a date expression that is evaluated when the form opens (run on demand) or when the schedule fires (chapter 6). An expression starts with @ and takes an optional whole-number offset in brackets; without brackets the offset is 0.

Expression	Result for a run on Wednesday 15 October 2026
@Today	2026-10-15, the run date

Expression	Result for a run on Wednesday 15 October 2026
@Today(<i>n</i>)	<i>n</i> days after the run date; @Today(-1) is 2026-10-14
@StartOfMonth(<i>n</i>)	First day of the month, shifted <i>n</i> months; @StartOfMonth(0) is 2026-10-01, @StartOfMonth(-1) is 2026-09-01
@EndOfMonth(<i>n</i>)	Last day of the month, shifted <i>n</i> months; @EndOfMonth(-1) is 2026-09-30
@StartOfWeek(<i>n</i>)	Monday of the week, shifted <i>n</i> weeks; @StartOfWeek(0) is 2026-10-12
@EndOfWeek(<i>n</i>)	Sunday of the week, shifted <i>n</i> weeks; @EndOfWeek(-1) is 2026-10-11
@StartOfQuarter(<i>n</i>)	First day of the quarter, shifted <i>n</i> quarters; @StartOfQuarter(-1) is 2026-07-01
@EndOfQuarter(<i>n</i>)	Last day of the quarter, shifted <i>n</i> quarters; @EndOfQuarter(-1) is 2026-09-30
@StartOfYear(<i>n</i>)	1 January, shifted <i>n</i> years; @StartOfYear(0) is 2026-01-01
@EndOfYear(<i>n</i>)	31 December, shifted <i>n</i> years; @EndOfYear(-1) is 2025-12-31
@LastBusinessDay(<i>n</i>)	The last Monday to Friday before the run date shifted by <i>n</i> days; @LastBusinessDay is 2026-10-14, and for a run on Monday it is the Friday before

Names are not case-sensitive. A default that starts with @ but is not one of these is reported when the report is saved: "Default '@Yesterday' is not a valid date expression." On the run form the evaluated date is filled in and can be changed.

For other types the default is taken literally: L for a fixed-list variable, 100 for a number, C20000, C30000 for a multi-value variable.

5.4.5 Rules

Rules are checked when a report is run on demand, when a dataset is previewed and, for schedules, against the next fire times when the schedule is saved (chapter 6).

Rule	Where	Meaning
Minimum / Maximum	Integer and Decimal variables	"Count must be at least 1.", "Count must be at most 999."
Pattern (regular expression)	String variables	The value must match: "Code is not in the expected format."
Rules across variables , one per line	Any variable	A op B compares two variables of the same type with >=, <=, >, <, = (or ==) or <> (or !=): ToDate >= FromDate fails with "ToDate must be on or after FromDate." DaysBetween(A, B) op n limits a date range: DaysBetween(FromDate, ToDate) <= 366 fails with "The range from FromDate to ToDate must be on or before 366 days."

A cross rule whose variables are empty passes (the required check reports the gap). A rule that the designer does not understand is reported on save: "Rule '...' is not understood. Use the form ToDate >= FromDate or DaysBetween(FromDate, ToDate) <= 366."

5.4.6 The run form

The same variable form appears in the Preview tab, on the run page and in schedule bindings. The control follows the variable:

Variable	Control
One value, free entry, Date or DateTime	Date picker (yyyy-MM-dd, editable)
One value, free entry, Boolean	Yes / No choice
One value, free entry, Integer or Decimal	Numeric text field
One value, free entry, String or Enum	Text field
One value, any lookup (fixed list, SQL, SAP B1)	Autocomplete: type to search, up to 200 matches shown
Several values, free entry	Text field, "Separate values with commas."
Several values, any lookup	Multi-select list with All

Defaults are applied when the form opens, for variables that have no value yet. Problems are shown under the control in red.

5.5 Outputs

The **Outputs** tab lists the files a run produces. Each output has a **Format**, a **File name** template and format-specific options. **Add output** adds another; a report may have several outputs of the same format (an Excel file per theme, say). A schedule later ticks which of the report's outputs it produces and attaches (chapter 6); a run on demand produces all of them.

5.5.1 Formats

Format	File	Content
Excel (.xlsx)	.xlsx	One sheet per dataset, styled by an Excel theme (5.5.3), or an uploaded workbook template filled with the data (5.5.5)
CSV (first dataset)	.csv	The first dataset, comma-separated, UTF-8 with byte-order mark so Excel opens it correctly. Dates as yyyy-MM-dd (yyyy-MM-dd HH:mm:ss when a time is present), booleans as true/false, values containing commas, quotes or line breaks quoted
PDF (HTML template)	.pdf	A Scriban HTML template rendered by headless Chromium, with page setup, watermark, verification code and signature options (5.5.6)
PDF (Crystal layout)	.pdf	A Crystal Reports layout rendered by the Crystal sidecar (5.5.7)
Excel, as printed (Crystal layout)	.xlsx	The Crystal layout exported page by page
Excel, data only (Crystal layout)	.xlsx	The Crystal layout exported record by record
Excel 97-2003 (Crystal layout)	.xls	For older consumers
CSV (Crystal layout)	.csv	Exported by the Crystal runtime

5.5.2 File name templates

File name is a template; the format's extension is added. The default is {ReportCode}_ {RunDate: yyyyMMdd}.

Placeholder	Value
{ReportCode}	The report code
{Company}	The company name as set up in CertiReport
{RunDate}	The run date, yyyyMMdd unless a format is given

Placeholder	Value
{Name}	The value of variable <i>Name</i> , typed
{Name:format}	The value with a .NET format string, for example {ToDate:yyyyMM} or {Amount:0.00}

A multi-value variable renders as its first three values joined with -; an empty value renders as nothing. Characters Windows does not allow in file names are replaced with _, the result is trimmed and cut at 120 characters, and an empty result falls back to the report code. Example: SOA_{BP}_{ToDate:yyyyMM} produces SOA_C20000_202609.xlsx.

In a schedule that iterates over business partners the item key is appended when two items would otherwise share a name; a schedule may also override the file name altogether (chapter 6). Outputs of one run that would share a name (Excel as printed and Excel data only of the same layout, say) get a format tag in the name.

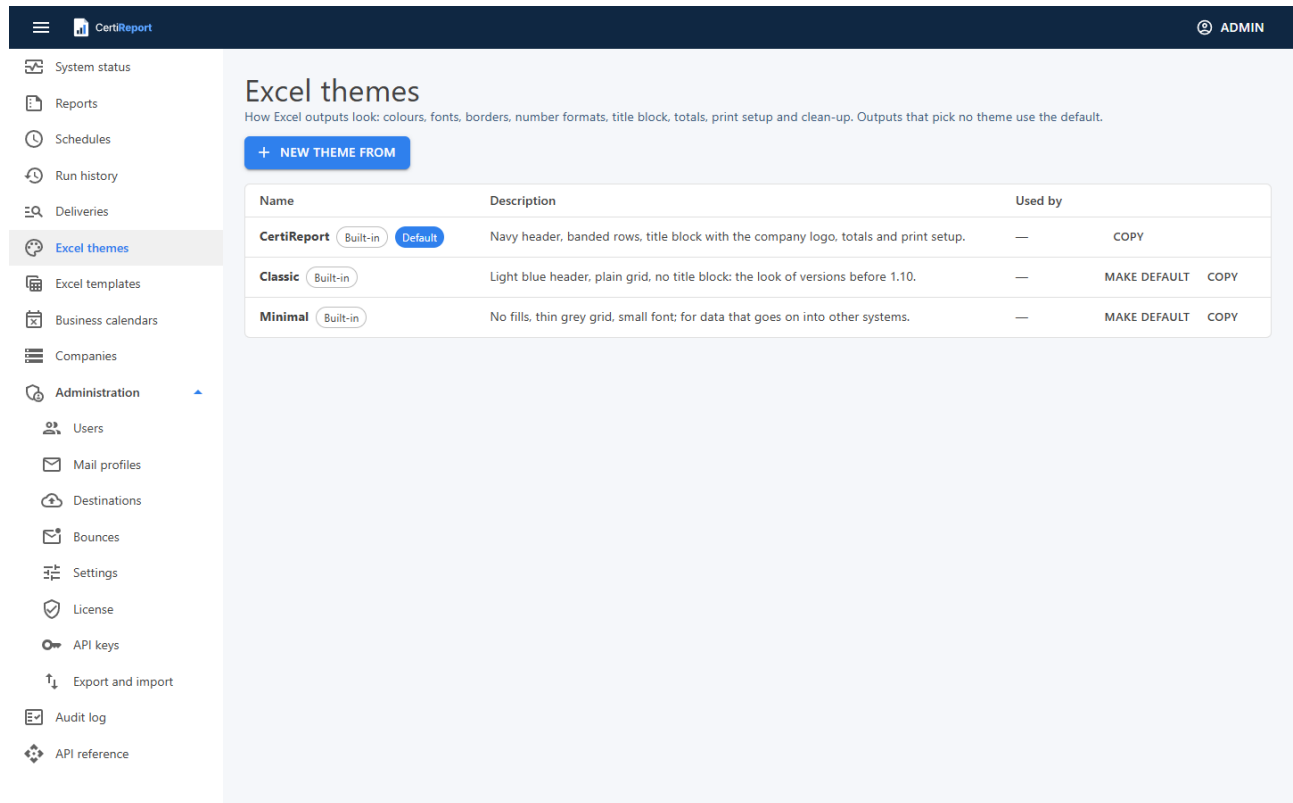
5.5.3 Excel: the themed table

With **Workbook template** set to **None (themed table)**, CertiReport writes one sheet per dataset and styles it with an Excel theme (5.5.4). The output's own choices sit on top of the theme:

Option	Meaning
Excel theme	A built-in or stored theme, or Default theme for whichever theme is marked default
Sheet name	Name of the first dataset's sheet, with the same placeholders as file names, for example Statement {AsOf:yyyyMM}. Empty = the dataset name. Other datasets keep their names; names are cut to 31 characters and cleaned of characters Excel refuses
Subtotals by column	A subtotal row whenever this column's value changes (first dataset), labelled Subtotal: value; sort the dataset by that column
Totals row	As the theme, Yes or No: a Total row under the numeric columns, key columns excepted
Title block	As the theme, Yes or No: report name, company, item and run date above the table, with the company logo when the theme shows it
Parameters sheet	As the theme, Yes or No: an extra sheet named Parameters listing the run's variables and run date
Hide columns	Column names, separated by commas, left out of the workbook (DocEntry, LogInstanc)
Column captions	Column=Caption pairs separated by ; (CardName=Customer; DocTotal=Invoice total); the theme's readable captions apply to the rest

Run dates in title blocks and the Parameters sheet are shown in the company's time zone (on demand) or the schedule's.

5.5.4 Excel themes



Administration › Excel themes

Excel themes in the navigation drawer (permission `reports.design`) holds the named looks for themed Excel output. Three themes are built in:

Theme	Look
CertiReport	Navy header, banded rows, title block with the company logo, totals row, print setup. The default on a new installation
Classic	Light blue header, plain grid, no title block, no totals: the look of versions before 1.10
Minimal	No fills, thin grey grid, small font; for data that goes on into other systems

Built-in themes cannot be edited or deleted, but **Copy** (or **New theme from**) starts a stored theme from one of them, named “*Theme (copy)*”. **Make default** marks the theme that outputs with **Default theme** use. Stored themes open in the theme editor; **Delete** (in the list and in the editor) is refused while report outputs use the theme (“The theme is used by 2 report output(s). Change them first.”). A stored theme may not take a built-in name (“‘Classic’ is a built-in theme; choose another name.”) or the name of another stored theme.

The theme editor saves with **Save** and shows a live **Preview** with sample statement rows. Its sections:

Section	Settings
General	Name, Description, Default theme for outputs that pick none
Colours	Header fill, Header text, Accent line, Body text, Band fill, Border (as #RRGGBB); Banded rows; Borders: None, Header and totals lines, Outline plus lines or Grid around every cell
Fonts	Font (Calibri, Arial, Segoe UI, Aptos, Cambria, Georgia, Verdana, Tahoma, Times New Roman or Consolas), Body size and Header size (6 to 24), Bold

Section	Settings
	header
Numbers and dates	Excel formats for Decimals, Money, Integers, Dates, Date and time; Negative numbers in red; Money columns (pattern on the column name) : a regular expression, decimal columns whose name matches (Total, Amount, Balance, ...) use the money format; Key columns (pattern) : integer columns whose name matches (...Entry, ...Num, ...Code, ...) are shown without separators, aligned left and not totalled
Sheet	Title block, Company logo, Totals row, Freeze header, Filter buttons, Fit column widths, Parameters sheet
Clean-up	Readable captions for SAP field names (CardName becomes Business partner, DocDueDate becomes Due date, a user field U_Region becomes Region); Trim text, blank empty cells; Hide columns (pattern) : columns whose name matches are left out of every workbook, for example <code>^(DocEntry LogInstanc UserSign)\$</code>
Print	Fit to page width, Landscape, Repeat header row, Footer with page numbers

5.5.5 Excel templates

System status

Reports

Schedules

Run history

Deliveries

Excel themes

Excel templates

Business calendars

Companies

Administration

Users

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Export and import

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Excel templates

Workbooks designed in Excel that CertiReport fills with report data: your layout, styles, formulas and charts stay; marker cells receive the values. Pick a template on an Excel output in the report designer.

UPLOAD TEMPLATE

Name	File	Markers	Used by	Changed	
Open invoices layout	open-invoices-template.xlsx (7 KB)	<div> <div>{{Company.Logo}}</div> <div>{{Company.Name}}</div> <div>{{Data[. #]}}</div> <div>{{Data[. Balance]}}</div> <div>{{Data[. CardName]}}</div> <div>{{Data[. DocDate]}}</div> <div>{{Data[. DocNum]}}</div> <div>{{Data[. DocTotal]}}</div> <div>+3 more</div> </div>	1 output(s)	10/30/2026 10:45 PM admin	<div> PREVIEW WITH SAMPLE DATA </div> <div> DOWNLOAD </div> <div> REPLACE </div> <div> DELETE </div>

Marker reference

Administration › Excel templates

An Excel template is a workbook designed in Excel that CertiReport fills: layout, styles, formulas, charts and conditional formatting stay, marker cells receive the values. **Excel templates** in the navigation drawer (permission reports . design) manages them; the report designer picks one under **Workbook template** on an Excel output, and the theme and table options then do not apply.

Upload template: enter a **Name** (unique; pre-filled with the file name when left empty) and an optional **Description**, **Choose .xlsx** (at most 5 MB, otherwise “The file is larger than 5 MB.”) and click **Upload**. The workbook must contain at least one marker, otherwise it is refused: “The workbook has no markers such as `{{Company.Name}}` or `{{Lines[].DocTotal}}`; nothing would be filled.” The list shows each template’s file, its markers, how many report outputs use it and when it changed. **Preview with sample data** downloads the template filled with sample values to check the markers; **Download** returns the original file; **Replace** uploads a new file under the same name; **Delete** is refused while outputs use the template.

Markers in cells:

In a cell	Meaning
<code>{{Report.Name}}</code>	Report name; <code>{{Report.Code}}</code> the code
<code>{{Company.Name}}</code>	Company name as set up in CertiReport
<code>{{Company.Logo}}</code>	The company logo is placed over this cell (PNG or JPEG)
<code>{{Run.Date}}</code>	Run date and time; format the cell as a date in Excel
<code>{{Item.Label}}</code>	The item (business partner name); <code>{{Item.Key}}</code> its code, <code>{{Item.Recipient}}</code> its address
<code>{{Values.Name}}</code>	The value of variable <i>Name</i> , typed (dates stay dates)
<code>{{Header.Column}}</code>	A column of the first row of dataset Header; works for any dataset name
<code>{{Lines[].Column}}</code> }	A repeated row: the row holding such markers is copied once per row of dataset Lines, styles included
<code>{{Lines.Count}}</code>	Number of rows of dataset Lines
<code>=SUM(G12:G12)</code>	A formula whose range starts and ends on the repeated row grows with the inserted rows

A cell holding only a marker receives the typed value (dates, numbers) and keeps the cell’s own format; a marker inside text is replaced as text. `{{Lines[ ].#}}` numbers the repeated rows. Markers may also appear in sheet names. Everything else in the workbook is left as designed. When a template an output refers to has been deleted, the run produces the themed table instead and notes a warning on the run.

Templates are also available through the API: GET `/api/v1/excel-templates/{id}` and GET `/api/v1/excel-templates/{id}/preview` (chapter 10). They travel in the configuration export and are matched by name on import.

5.5.6 PDF (HTML template)

A PDF output renders a Scriban HTML template with headless Chromium (Google Chrome or Microsoft Edge installed on the engine server). The options on the output:

Option	Meaning
Page	A4, Letter, Legal or A3
Landscape	Page orientation
Verification code and QR in the footer	On by default: a verification code is recorded with the file and printed in the footer with a QR code to the public verify page
Sign with the company’s certificate	On by default: signed when the company has a signing certificate (chapter 4)
Watermark	Diagonal text across every page, for example DRAFT or COPY; empty = none
Open password	A Scriban expression, for example <code>{{ header.LicTradNum }}</code> ; empty = no password

Option	Meaning
Template	The HTML. Insert starter layout offers Statement (header, lines with running balance, totals) and Table per dataset (generic list) . Empty = the generic table layout

Template syntax errors are reported on save under *PDF template* and *PDF password*. The template model (company, report, run, values, datasets, header, rows), the helpers, certification, the verify page and signing are described in chapter 8.

5.5.7 Crystal Reports layouts

The five Crystal formats render an SAP Crystal Reports layout through the optional Crystal sidecar. On the output choose **Layout stored in the SAP B1 company** (pick a **Company to browse**, **Load layouts**, then search the **Layout** list of standalone reports and document layouts) or **.rpt file on the engine server** with the file path. **Same layout, another format** inserts a copy of the output with the same layout and parameter map: a PDF output is copied as **Excel, as printed**, any other Crystal format as **PDF (Crystal layout)**; change the format of the copy as needed. The **Parameter map** takes one CrystalParameter=Variable, CrystalParameter='literal' or CrystalParameter=From...To per line; **Read layout parameters** lists the layout's parameters with their mapping state (**mapped**, *variable X*, *layout default*, *filled by the engine*, **needs a mapping**). A Crystal output without a layout is reported on save: "Pick a layout from the company or enter the path of an .rpt file." The runtime requirements, the parameter syntax, DocKey@/ObjectId@ and the format fallbacks are in chapter 8.

5.5.8 Limits

Two limits at the bottom of the Outputs tab apply to every dataset of the report:

Setting	Default	Range
Maximum rows per dataset	50,000	1 to 1,000,000. A dataset that reaches the limit is cut and marked as truncated
Query timeout (seconds)	120	5 to 3,600

5.6 Checks before saving and publishing

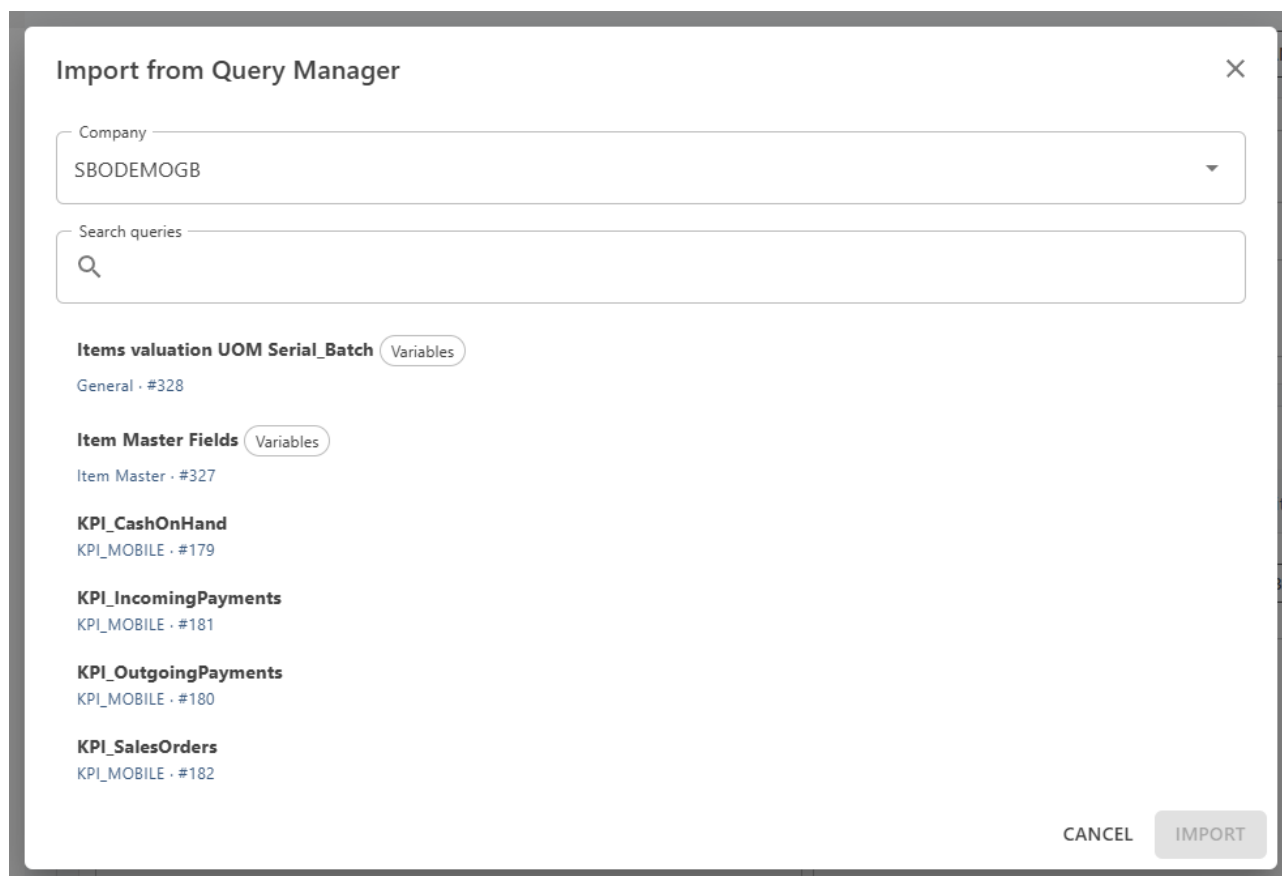
Save draft runs the static checks and lists the issues under the toolbar; **Publish this version** saves first and refuses while any red issue remains ("Fix the errors before publishing."). The server repeats the checks when publishing.

Where	Issue	Severity
Datasets	"Add at least one dataset."	Error
Outputs	"Add at least one output."	Error
<i>Dataset</i>	"Enter the SQL for at least one platform."	Error
<i>Dataset (HANA / SQL Server)</i>	A safety-guard finding (5.3.3)	Error
<i>Dataset (HANA / SQL Server)</i>	"@Name is used but not declared as a variable."	Error
Variables	"Variable X is declared more than once."	Error
Variable X	"Declared but not used in any dataset."	Warning
Variable X	"Default '...' is not a valid date expression."	Error
Variable X	"Rule '...' is not understood. ..."	Error
Variable X lookup	A safety-guard finding on the lookup SQL	Error
PDF template / PDF password	A Scriban syntax error	Error

Where	Issue	Severity
Crystal output	"Pick a layout from the company or enter the path of an .rpt file."	Error

A **Code** or **Name** left empty stops the save: "Enter a code and a name." A code already used by another report is refused: "A report with code SOA already exists."

5.7 Import from Query Manager



The Query Manager import dialog

Import from Query Manager reads a saved query from the company's SAP Business One Query Manager (table OUQR) and turns it into a dataset with typed variables.

1. Choose the **Company** (pre-selected when only one is active). User queries are listed by category with their internal key; queries that contain [%n] parameters carry the chip **Variables**. SAP's built-in system queries are not listed.
2. **Search queries** filters by name.
3. Select a query and click **Import**.

The converted SQL lands in the first empty dataset (or a new one) named after the query (cut to 60 characters), in the SQL text of the company's platform. When the report has no name yet, the query name becomes the report name and a code is derived from it (upper case, letters and digits, up to 20 characters). Variables that do not exist yet are added; notes from the conversion appear as messages. Review the result, then **Save draft**.

What the conversion does:

In the query	Result
[%0] ... [%9]	One variable per parameter, written as @Name

In the query	Result
/* SELECT FROM [dbo].[OCRD] T0 WHERE T0.[CardCode] = [%0] */ type hint	The field named for each parameter decides its variable
No hint	The column compared with the parameter (T0.[CardCode] = [%0]) is used; with nothing to go on the variable is ParamN, text, with the note "[%0] has no type hint; imported as text variable Param0. Set its type and lookup in the designer."
Field CardCode or ShortName	Variable BP <i>Business Partner</i> , concept Business Partner, picker Business Partners
ItemCode	ItemCode, picker Items
SlpCode	SalesEmployee (Integer), picker Sales Employees
GroupCode	GroupCode (Integer), picker Customer Groups
ItmsGrpCod	ItemGroup (Integer), picker Item Groups
WhsCode	Warehouse, picker Warehouses
PrjCode or Project	Project, picker Projects
BPLId	Branch (Integer), picker Branches
Currency	Currency, picker Currencies
DocDate, RefDate, TaxDate, DueDate, CreateDate	A Date variable with concept As-of date; when compared with >= or > it becomes FromDate (concept Period start, default @StartOfMonth(-1)), with <= or < it becomes ToDate (concept Period end, default @EndOfMonth(-1))
DocNum, DocEntry	Integer variables
Any other field	A text variable named after the field
A name used twice	Suffixed 2, 3, ...

For a HANA company the T-SQL habits of Query Manager are rewritten as well: [dbo]. is removed, [Column] becomes "Column", GETDATE() becomes CURRENT_DATE and ISNULL(becomes IFNULL((the last two are noted), and a TOP n is flagged with "TOP n is supported by HANA only directly after SELECT; check the converted query." Other T-SQL functions are left for you to adapt; the safety guard and a preview show what still needs work.

5.8 Starter reports

Starter reports
Ready-made SAP Business One reports for HANA and SQL Server, written against the standard tables. They are imported as drafts so you can adapt them to the customer's localisation and publish them from the designer.

← BACK TO REPORTS

- Statement of account** (Receivables)
Journal lines of one business partner between two dates with a running balance: header with address, VAT number and current balance. PDF statement and Excel.
STATEMENT - variables: BP, FromDate, ToDate - outputs: PDF (statement), Excel
Already here as v1; importing writes a new draft version only if the starter differs.
- Open invoices** (Receivables)
A/R invoices still open on the as-of date, with paid and balance amounts, grouped by currency with subtotals.
OPEN_INVOICES - variables: AsOfDate, BP (optional) - outputs: Excel
Already here as v1; importing writes a new draft version only if the starter differs.
- Receivables aging** (Receivables)
Open A/R balance per customer in buckets of 30 days by due date on the as-of date, with totals.
AR_AGING - variables: AsOfDate - outputs: Excel, PDF (table)
Already here as v1; importing writes a new draft version only if the starter differs.
- Overdue reminder** (Receivables)
Overdue invoices of one business partner with days overdue, for a reminder letter; meant for a business-partner schedule.
DUNNING - variables: BP, AsOfDate - outputs: PDF (letter), Excel
Already here as v1; importing writes a new draft version only if the starter differs.
- Sales by business partner** (Sales)
Invoiced sales less credit memos per customer between two dates, with document counts.
SALES_BY_BP - variables: FromDate, ToDate - outputs: Excel
Already here as v1; importing writes a new draft version only if the starter differs.
- Sales by item** (Sales)
Quantity and value invoiced per item between two dates, from invoice lines less credit memo lines.
SALES_BY_ITEM - variables: FromDate, ToDate - outputs: Excel
Already here as v1; importing writes a new draft version only if the starter differs.
- Incoming payments** (Cash)
Payments received between two dates with method, document total and customer.
INCOMING_PAYMENTS - variables: FromDate, ToDate - outputs: Excel
Already here as v1; importing writes a new draft version only if the starter differs.

SELECT ALL PREVIEW IMPORT 0 AS DRAFT(S) Imported reports are matched by code; the SQL is checked by the read-only guard on save.

The starter gallery

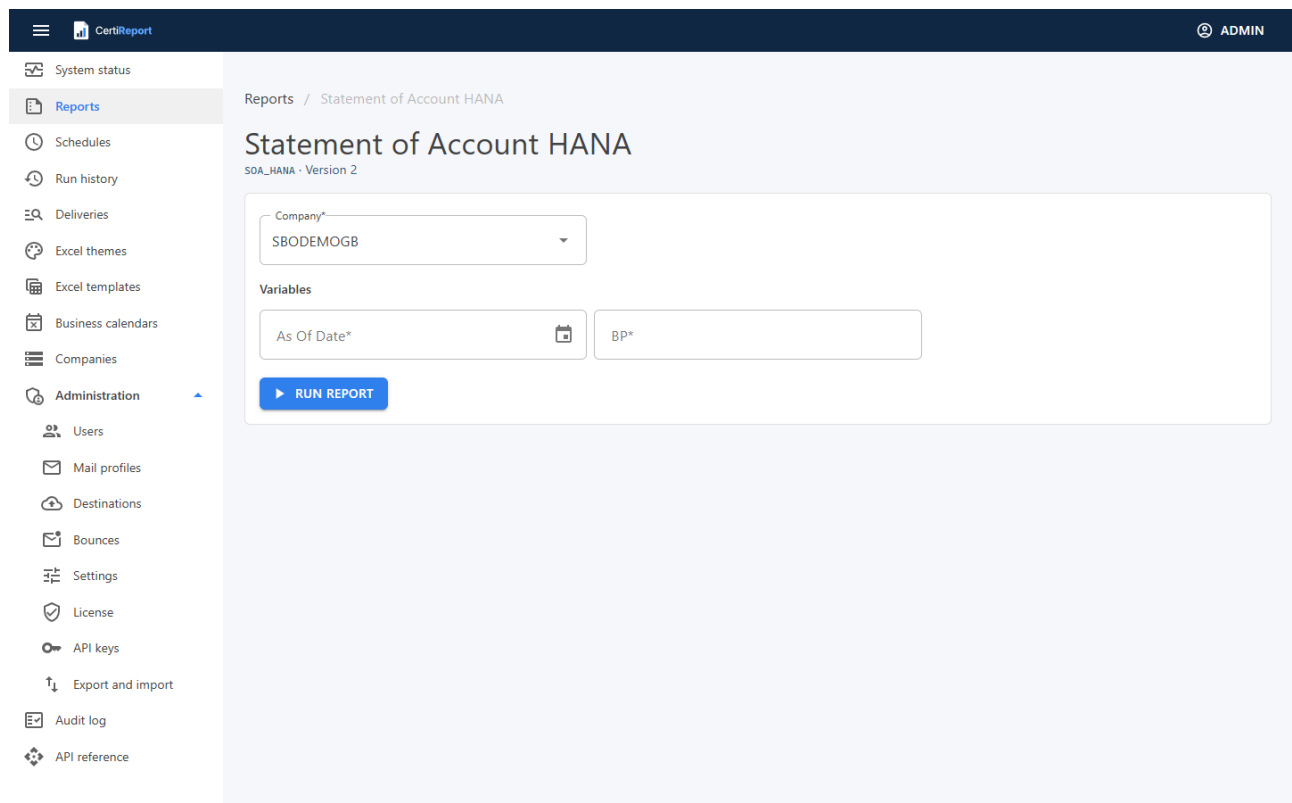
Starter reports (from the Reports page, permission reports.design) offers seven ready-made reports for HANA and SQL Server, written against the standard tables (OCRD, OINV, ORIN, ORCT, INV1, JDT1). They are imported as drafts so a designer can adapt them to the customer's localisation and publish them.

Code	Name	Category	Variables	Outputs
STATEMENT	Statement of account	Receivables	BP, FromDate, ToDate	PDF (statement), Excel
OPEN_INVOICES	Open invoices	Receivables	AsOfDate, BP (optional)	Excel
AR_AGING	Receivables aging	Receivables	AsOfDate	Excel, PDF (table)
DUNNING	Overdue reminder	Receivables	BP, AsOfDate	PDF (letter), Excel
SALES_BY_BP	Sales by business partner	Sales	FromDate, ToDate	Excel
SALES_BY_ITEM	Sales by item	Sales	FromDate, ToDate	Excel
INCOMING_PAYMENTS	Incoming payments	Cash	FromDate, ToDate	Excel

The starters use the concepts and date expressions described above: BP is a Customers picker linked to Business Partner, FromDate defaults to @StartOfMonth(-1), ToDate to @EndOfMonth(-1) with the rule ToDate >= FromDate, and AsOfDate to @Today.

Tick the starters you want (or **Select all**), **Preview** to see what would be created, updated or left unchanged, then **Import n as draft(s)**. The import goes through the configuration import (chapter 9): reports are matched by code, so a starter that is already present (“Already here as v2; importing writes a new draft version only if the starter differs.”) gets a new draft version only when it differs. The result line reads “n to create, n to update, n unchanged or skipped.” and the table below lists each report with its action. Open **Reports** afterwards to review each draft, run it against a company and publish it.

5.9 Running a report on demand



The run page

Run on the Reports page or in the designer opens the run page (permission reports.run). It shows the code, the version and the description; when the latest version is not the published one, an orange chip says so (for example **Draft: not the published version**) and that latest version is what runs.

1. Choose the **Company** (pre-selected when only one is active, otherwise the first whose connection test succeeded).
2. Fill the **Variables** (defaults are applied; 5.4.6).
3. Click **Run report**. Rules and required values are checked first (“Check the highlighted variables.”); the licence must allow runs for the company (chapter 4).

The run records a run with one item, trigger *Manual*, requested by you, in run history (chapter 7); it executes every dataset and writes every output of the report. On success the **Output** panel shows the elapsed time, a download button per file with its size, and one tab per dataset with the first 100 rows. A failure shows the error and the run is recorded as failed.

Watermarks. An on-demand run of a version that is not published is a preview: its PDF outputs are watermarked DRAFT, whatever the output’s own **Watermark** says, so the file cannot pass as issued. The

same mechanism stamps COPY on the PDFs of a scheduled item that is retried (chapter 7). PDFs of a published version carry the output's configured watermark, or none.

Files and downloads. Files are stored under %ProgramData%\CertiReport\files\yyyy\MM\<run id>\ (the data folder can be moved, chapter 10) and keep their SHA-256 hash. The download buttons call GET /api/v1/runs/{runId}/files/{fileId}, which needs the runs.view permission (an API key with that permission can fetch files too, chapter 10) and returns the file with its name and content type; once retention has removed the file the route answers 410 Gone with "The file has been removed by retention." The same files are reachable later from the run in run history (chapter 7).

There is no API route to start a report run on demand; scheduled runs can be requested through the schedules API (chapter 10).

5.10 Retiring and deleting

Retire a report that should no longer run with **Publish › Retire published version**; its history stays, schedules that still use it fail until a new version is published, and **Run** is disabled on the list once the latest version is retired. Delete a report only while nothing refers to it: no schedule and no run history. Reports move between systems through the configuration export and import (chapter 9).

6. Schedules

A schedule is the unit of automation in CertiReport: it bundles one or more published reports, supplies a value for every variable those reports need, fires on a cron trigger in a chosen time zone and delivers the output by e-mail, to a folder, to an SFTP server, a SharePoint library or a Teams channel, or simply keeps it in run history. Every firing is recorded as a run with one item per recipient (see chapter 7).

Schedules are created and edited under **Schedules** in the navigation menu. Seeing the list needs the permission `runs.view` (every role has it); creating, editing, pausing, running and deleting schedules needs `schedules.manage`, which the Administrator and Scheduler roles carry. The engine service (CertiReport.Engine) picks up a saved schedule within a minute and a “Run now” or test request within 15 seconds.

6.1 The Schedules page

The screenshot shows the CertiReport Schedules page. The left sidebar contains a navigation menu with items: System status, Reports, Schedules (highlighted), Run history, Deliveries, Excel themes, Excel templates, Business calendars, Companies, Administration (expanded), Users, Mail profiles, Destinations, Bounces, Settings, License, API keys, Export and import, Audit log, and API reference. The main content area is titled 'Schedules' and includes a '+ NEW SCHEDULE' button. Below the title is a table with the following data:

Name	Reports	Company	Trigger	Next run	Last run	
Daily Statement of Account	SOA_HANA	SBODEMOGB	0 0 7 * * ? Middle East Standard Time	10/31/2026 7:00 AM	Skipped	▶ RUN NOW HISTORY ⋮

Schedules

The page lists every schedule, sorted by name:

Column	Content
Name	The schedule name, a link to the editor. A paused schedule carries the chip Paused .
Reports	One chip per report code in the schedule, in schedule order
Company	The SAP Business One company the schedule runs against
Trigger	The cron expression and the time zone identifier
Next run	The next fire time computed by the engine, in your local time; “—” while the schedule is paused or has never been synchronised
Last run	The status chip of the last run (test sends are not counted) and when it completed; “Never” otherwise
(actions)	History for everyone; Run now and a menu with Send a test... , Pause or Resume and

Column	Content
	Duplicate for users with <code>schedules.manage</code>

Run now queues a run with the trigger Manual and opens its run page; the engine claims it within 15 seconds. The request is refused while another run of the same schedule is already queued (“A run is already queued for this schedule.”). **History** opens the run history filtered to this schedule (`/runs?schedule=<id>`).

Pause sets the schedule to disabled: the engine removes its Quartz trigger at the next synchronisation and the schedule does not fire until it is resumed; the next fire time is cleared. **Resume** enables it again and computes the next fire time. Both are written to the audit log as Disabled and Enabled.

Duplicate saves a copy under “<name> (copy)” (or “(copy 2)”, “(copy 3)” when the name is taken), paused, and opens it for editing (“Copy created, paused. Rename it and adjust it before resuming.”). A copy never fires until someone has looked at it and resumed it.

New schedule opens the editor (section 6.2). The page shows “No schedules yet. Publish a report, then create a schedule for it.” when there is nothing to list: a schedule can only contain published reports.

6.2 The schedule editor

The editor (`/schedules/new` or `/schedules/<id>`) has four tabs: **Reports**, **Variables (n)**, **Trigger** and **Delivery**. The header carries the buttons **Check**, **Save**, **Send a test** (saved schedules delivered by e-mail only) and **Delete** (saved schedules only).

Schedule editor, Reports tab

Check runs the dry run described in section 6.8 and shows its result above the tabs: the list of problems, the next three fire times and the items the schedule would produce. **Save** runs the same checks first and refuses to save while any of them is an error (“Fix the problems listed above first.”). A successful save shows “Schedule saved. The engine picks up changes within a minute.” and, for a new schedule, moves to its edit URL.

Delete asks for confirmation (“Delete <name>? Its run history is kept.”) and removes the schedule. Its runs stay in run history, detached from the schedule; a schedule with a queued or running run cannot be deleted (“A run of this schedule is in progress. Wait for it to finish.”).

Defaults for a new schedule: the first active company (by name) and that company’s time zone, the default mail profile (or the enabled profile with the lowest priority number), the cron expression `0 0 7 1 * ?` (1st of every month at 07:00), misfire policy “Run once as soon as it is back”, overlap policy “Skip this run”, no business calendar, delivery by e-mail with the subject `{ReportName} - {Company}` and the body “Please find attached the `{ReportName}` from `{Company}`.” followed by “This message was sent automatically by CertiReport.”, attachments on, oversize policy “Send several messages”, “Skip items with no data” on.

6.2.1 Reports tab

Field	Meaning
Schedule name	Required, at most 100 characters, unique among schedules (“A schedule named ‘...’ already exists.”)
Company	One of the active companies. Every report in the schedule runs against this company’s database with the dataset of its platform (HANA or SQL Server).
Enabled	Off creates the schedule paused
Reports in this schedule	One chip per report with its code, name and the published version number (v3); a report without a published version is shown in warning colour with “(not published)”. Close the chip to remove the report.
Add report	A drop-down of every report that has a published version and is not yet in the schedule

Next to each report chip there is one checkbox per output format the published version defines (Excel, CSV, PDF, Crystal formats). All boxes ticked means the schedule produces every output of the report; untick the ones this schedule should not produce or attach. This is how one report can go out as Excel to one audience and as PDF to another: two schedules, two format selections. At least one of the ticked formats must still exist on the report version, otherwise Check reports “None of the selected formats is an output of this report version. Choose at least one, or add the output to the report.” A report whose published version has been retired fails the check with “Not published. Publish it, or pin a version.”

A schedule always runs the latest published version of each report. (The data model allows a pinned version number, but the editor does not expose it.) Reports that share a variable concept, for example Business Partner, are bound together, so each recipient gets one e-mail with every report attached.

6.3 Variables: slots and bindings

The **Variables** tab lists one card per *slot*. A slot is a value the schedule must supply each time it fires:

- Variables of different reports that are linked to the same *concept* (for example BusinessPartner, see chapter 5) merge into one slot named after the concept, so the value is entered once and fed to every report. The card says “Shared by SOA.BP, OPENINV.CardCode”.
- A variable without a concept is a slot of its own, keyed `REPORTCODE.Variable` (for example `SOA.CurrencyMode`) and labelled “<variable label> (<report code>)”.

The card shows the data type, “, several values” for multi-value variables and “Required” when any of the merged variables is required. Where a concept slot feeds more than one report, **Bind separately** unlinks the variables so each report gets its own slot; the merged binding is dropped and the new slots take the default binding. The most demanding variable decides the merged slot: required if any is required, several

values if any accepts several, iterable if any is iterable. The lookup settings of the first variable that is not free entry drive the pickers.

Until you add reports the tab reads “Add reports first. Their variables appear here, merged by concept.” Concept slots are listed first, then unlinked variables in report order.

Every slot gets a default binding when it appears: a date expression for Date and DateTime slots (the variable’s default expression when it is one, else @Today), otherwise a fixed value. The **Binding** drop-down offers the kinds that fit the slot:

Binding	Offered for	Stored kind
Fixed value	Every slot	Fixed
Date expression (relative to the run date)	Date and DateTime slots	Expression
Derived from another date	Date and DateTime slots	Derived
Selection from the lookup	Slots whose variable source is not free entry (fixed list, SQL lookup, SAP B1 picker)	Selection
Iterate: one run per row of a query	Single-value slots	Iterate
Business partners: one run per partner, sent to its contact persons	Single-value String slots	BusinessPartners

Only one slot per schedule may iterate (an iterate query or a business-partner selection); a second one is refused by Check (“Only one value can iterate per schedule”). The iterating slot *fans out* the run into items: one item, one set of files and one e-mail per row.

6.3.1 Fixed value

Value takes the literal value; dates in the form yyyy-mm-dd (the field says so). For a multi-value slot the field is **Values, separated by commas**, and ; is accepted as a separator too. A required slot with an empty value fails the check (“Enter a value.”); at fire time a value that does not parse as the slot’s type fails the run (“‘x’ is not a valid integer.”).

6.3.2 Date expression

Expression offers the reference list of date expressions; **Or type one** accepts any expression in the same form. The text next to the fields shows what the expression evaluates to today (“Today that is Fri 31 Oct 2026”). At fire time the expression is evaluated relative to the fire date in the schedule’s time zone, so a schedule firing at 00:30 in Dubai on the 1st uses that date even though it is still the previous day in UTC.

Expression	Meaning
@Today	The run date
@Today(-1)	Days before (or after) the run date
@StartOfMonth(0)	First day of the month; -1 for the previous month
@EndOfMonth(-1)	Last day of the previous month
@StartOfWeek(0)	Monday of the week; -1 for the previous week
@EndOfWeek(-1)	Sunday of the previous week
@StartOfQuarter(-1)	First day of the previous quarter
@EndOfQuarter(-1)	Last day of the previous quarter
@StartOfYear(0)	1 January of the year; -1 for last year
@EndOfYear(-1)	31 December of last year
@LastBusinessDay	The last Monday to Friday before the run date

The number in brackets shifts by the unit of the function (days, months, weeks, quarters, years). An expression that does not parse fails the check with "'...' is not a valid date expression."

6.3.3 Derived from another date

From picks another Date or DateTime slot; **Applied to it** takes an expression that is evaluated relative to that slot's value instead of the run date (@EndOfMonth(0) turns a start-of-month date into the end of the same month). Leave it empty to use the same date. The source must be a fixed, selected or expression value: "A derived value must come from a fixed, selected or expression value." A derived slot cannot build on another derived slot or on the iterating slot.

6.3.4 Selection from the lookup

Values lists the options of the variable's lookup, read from the company when the binding is chosen (a fixed list, the result of the SQL lookup, or the SAP B1 picker: customers, items, sales employees and so on). Multi-value slots allow several options. If the lookup cannot be read the single option "Lookup failed: <reason>" is shown instead; fix the company connection or the lookup SQL in the report designer.

6.3.5 Iterate: one run per row of a query

The iterate binding runs a query against the company at fire time and produces one item per row. Enter the query once per platform, **SAP HANA** and **Microsoft SQL Server**; the one matching the company's platform is used, at least one is required. The query may reference other bound values as @Name (the slot key), which are bound as parameters the same way report variables are. Only a single SELECT passes the safety guard that also protects reports (chapter 5); a query returning more than 20,000 rows is cut off at that number.

Field	Meaning
Value column	The column that supplies this slot's value for the row (required). Defaults to the variable name, or CardCode for business-partner pickers.
Label column	The column shown as the item's name in run history and available as {Label} (for example CardName)
Recipient column	The column holding the e-mail address(es) of the row; several addresses may be separated by ; or ,
Language column	The column holding the SAP Business One language code (LangCode) that selects the message variant (section 6.6.5)

When the slot's variable is an SAP B1 picker for customers, vendors or business partners, choosing Iterate pre-fills **Value column** CardCode, **Label column** CardName, **Recipient column** E_Mail and a starting query over OCRD for both platforms that also selects LangCode (customers that are not frozen and have a non-zero balance, ordered by code). Enter LangCode as the **Language column** yourself if the message has language variants, and adapt the query to your needs.

Check runs the query (dry run, 120-second timeout) and reports the row count, how many rows have no recipient and the first five problems with the rows; a query that returns nothing is a warning: "The query returned no rows, so the schedule would do nothing." Rows whose value column is empty, and rows that repeat a value, produce no item.

6.3.6 Business partners

The business-partner binding is an iterate binding whose rows the engine builds itself from SAP Business One: the partner's CardCode becomes the slot value, its name the label, the ticked contact persons' current e-mail addresses the recipients and its LangCode the language. In the subject and body, {Label} is the partner name and {Contacts} the contact persons' names.

Add business partners opens the picker dialog:

Control	Meaning
Search by code or name	Filters the partners read from the company; at most 200 are listed ("Only the first 200 are listed; narrow the search.")
Type	Customers (default), Vendors or Both
Active only	Hides frozen partners (shown as "<name> (inactive)" when visible)
Columns Code, Name, Email, Default contact	As held in SAP Business One
Add n	Adds the ticked partners; partners already on the schedule are listed as "<code> (already picked)" and cannot be ticked again

Each picked partner appears as a card with its contact persons as checkboxes labelled "<name> (default) (inactive) · <e-mail or 'no email'>". The default contact person (OCRD CntctPrsn) starts ticked when it is active; tick or untick from there, or remove the partner with the bin icon. The card explains what happens without contacts: "No contact persons in SAP Business One; the partner's own email is used (<address>)." or "No contact ticked: the partner's own email is used, but it has none."

Use the partner's own email when no ticked contact has one (on by default) falls back to the partner's E_Mail from OCRD when none of the chosen contacts has an address.

Partner groups adds whole SAP Business One partner groups (OCRG). Use **Load groups from SAP Business One** to list them with their type (Customers or Vendors) and member count. Every current member of the chosen groups is included at run time and sent to its default contact person (or its own e-mail); partners picked by hand keep their own contact choice. The members are added at fire time, so a partner that joins the group later is included automatically.

Addresses are re-read from SAP Business One at run time, so a contact's changed e-mail is honoured; the address captured at pick time is used only when the contact no longer exists. A partner that no longer exists still produces a row with the name captured at pick time. The check requires at least one partner or group ("Pick at least one business partner or partner group.").

6.4 Trigger

The screenshot shows the 'New schedule' interface in the CertiReport application. The left sidebar contains a navigation menu with items like System status, Reports, Schedules, Run history, Deliveries, Excel themes, Excel templates, Business calendars, Companies, Administration, Users, Mail profiles, Destinations, Bounces, Settings, License, API keys, Export and import, Audit log, and API reference. The main area is titled 'Schedules / New schedule' and has a 'CHECK' button and a 'SAVE' button. The 'TRIGGER' tab is selected, showing a 'Preset' dropdown, a 'Cron expression' field with '0 0 7 1 * ?', and a 'Time zone' dropdown set to '(UTC+02:00) Beirut'. Below these are two conditional dropdowns: 'If the engine was down at fire time' (set to 'Run once as soon as it is back') and 'If the previous run is still busy' (set to 'Skip this run'). A 'Business calendar' dropdown is set to 'None: every day is a business day'. A section titled 'Next five runs' lists the following dates and times: Sun 1 Nov 2026 07:00, Tue 1 Dec 2026 07:00, Fri 1 Jan 2027 07:00, Mon 1 Feb 2027 07:00, and Mon 1 Mar 2027 07:00.

Schedule editor, Trigger tab

6.4.1 Cron expression and presets

The trigger is a Quartz cron expression with six fields: seconds, minutes, hours, day-of-month, month, day-of-week (? where day-of-month or day-of-week is not used). **Preset** fills the **Cron expression** field with one of these:

Preset	Cron expression
Every day at 07:00	0 0 7 * * ?
Weekdays at 07:00	0 0 7 ? * MON-FRI
Every Monday at 08:00	0 0 8 ? * MON
1st of every month at 07:00	0 0 7 1 * ?
Last day of every month at 18:00	0 0 18 L * ?
First weekday of every month at 07:00	0 0 7 1W * ?
Every hour	0 0 * * * ?
Every 15 minutes	0 0/15 * * * ?

Edit the expression freely; it is validated with the same Quartz parser the engine uses and the error text is shown under the field. While the expression is valid, **Next five runs** lists the next five fire times in the schedule's time zone, each flagged when it falls on a non-business day of the chosen calendar and the policy is not **Run anyway** (section 6.4.4).

6.4.2 Time zone

Time zone lists the time zones of the server. The cron expression fires in this zone, {RunDate} and the date expressions are evaluated in it, and the Excel title block and Parameters sheet show the run time in it. A new schedule takes the company's time zone. An unknown identifier falls back to UTC.

6.4.3 Misfire and overlap

Field	Options	Stored value
If the engine was down at fire time	Run once as soon as it is back (default): one run for all the fire times missed while the engine was stopped, as soon as it starts	<code>MisfirePolicy.FireOnceNow</code>
	Skip that run : missed fire times are not run	<code>MisfirePolicy.Skip</code>
If the previous run is still busy	Wait, then run : the new fire waits until the running one finishes, then runs	<code>OverlapPolicy.Queue</code>
	Skip this run (default for new schedules): the fire is logged as skipped and nothing is recorded	<code>OverlapPolicy.Skip</code>

Quartz never runs two fires of the same schedule at once; with “Wait, then run” the second fire queues behind the first. With “Skip this run” the engine checks for a run of the schedule in status `Running` and, when it finds one, drops the fire with a warning in the engine log (“fired while a run was still in progress; skipped (overlap policy)”). A fire that Quartz recovers after an engine crash is not recorded twice: an existing run for the same fire time that is still queued or running is resumed, a finished one is left alone.

6.4.4 Business calendar and holiday policy

Business calendar picks one of the calendars maintained under **Business calendars** (section 6.5), or **None**: **every day is a business day**. When a calendar is chosen, **If the run falls on a non-business day** appears:

Option	Stored value	Behaviour
Skip that run	<code>HolidayPolicy.Skip</code>	A run is recorded with status <code>Skipped</code> and the note “Not run: 2026-12-25 is Christmas Day in calendar ‘UK’.” It counts as the schedule’s last run.
Run on the next business day at the same time	<code>HolidayPolicy.NextBusinessDay</code>	A run is queued for the same time of day on the next business day and shows “moved” in run history. A regular fire of the schedule on that day supersedes it (the moved run is cancelled with “Superseded by the scheduled run of the same day.”).
Run anyway	<code>HolidayPolicy.Run</code>	The calendar is ignored. Check warns: “A calendar is chosen but the policy is ‘run anyway’; choose skip or next business day for the calendar to matter.”

The fire date is taken in the schedule’s time zone. “Next five runs” and Check flag the affected dates with the reason (the holiday’s name, or “a Saturday”) and the policy (“skip the run”, “run on the next business day instead”). Schedules created before version 1.9.0 read as “Run anyway”.

6.5 Business calendars

The screenshot shows the 'Business calendars' page in the CertiReport administration interface. The left sidebar contains a navigation menu with items like System status, Reports, Schedules, Run history, Deliveries, Excel themes, Excel templates, Business calendars (highlighted), Companies, Administration (with a sub-menu arrow), Users, Mail profiles, Destinations, Bounces, Settings, License, API keys, Export and import, Audit log, and API reference. The main content area has a header 'Business calendars' with a sub-header explaining that weekend days and holidays can be used to skip or move runs. A table lists the calendars, with one entry 'Lebanon' showing 4 holidays, 2 upcoming, and 1 schedule. An 'ADD CALENDAR' button is in the top right.

Name	Holidays	Upcoming	Used by
Lebanon	4	2	1 schedule(s)

Business calendars

Business calendars in the navigation menu (/admin/calendars, permission `schedules.manage`) lists the calendars with the number of holidays, the number of upcoming holidays and how many schedules use each (“3 schedule(s)” or “—”). Click a row to edit it, **Add calendar** to create one.

- System status
- Reports
- Schedules
- Run history
- Deliveries
- Excel themes
- Excel templates
- Business calendars**
- Companies
- Administration**
 - Users
 - Mail profiles
 - Destinations
 - Bounces
 - Settings
 - License
 - API keys
 - Export and import
- Audit log
- API reference

A date is a business day when it is not a weekend day and not a holiday. The next business day search gives up after a year. Calendars travel in the configuration export (chapter 9).

6.6 Delivery

System status

Reports

Schedules

Run history

Deliveries

Excel themes

Excel templates

Business calendars

Companies

Administration

Users

Mail profiles

Destinations

Bounces

Settings

License

API keys

Export and import

Audit log

API reference

Schedules / New schedule

New schedule

CHECKSAVE

REPORTSVARIABLES (0)TRIGGERDELIVERY

Deliver by

Email

Mail profile

Internal relay (default)

When a row has no email address

Skip the item

To

Cc

Bcc

Fixed recipients, separated by ; (the iterate row's address or the partner's contact persons are added automatically)

Subject

{ReportName} - {Company}

INSERT

Message

FontSizeBBIUOLNormalListLinkImageQuoteUnlinkText

INSERT PLACEHOLDER

Please find attached the {Report name(s)} from {Company}.

This message was sent automatically by CertiReport.

PREVIEW MESSAGE

Placeholders appear as chips and are replaced by the item's values when the message is sent. Formatting is kept in the e-mail; a plain-text copy travels with it for clients that cannot show HTML.

Placeholder reference

Other languages

A business partner whose SAP Business One language has a variant gets that subject and message; everyone else gets the text above.

ADD LANGUAGE

Attach the report files

When the files exceed the mail profile's attachment limit

Send several messages, each under the limit

Mail profile 'Internal relay' allows 20 MB per message. A single file above the limit is left out when splitting.

Send download links instead of attachments

Skip items with no data

Require approval before sending

Send only when

{Header.Balance} <= 0

Optional condition on the item's values; items that fail it are skipped. Compare placeholders with =, <, >, >=, <=, contains, startswith, 'is empty' / 'is not empty'; combine with and, or, not and parentheses. Example: {SOA.Rows} > 0 and {Header.Currency} = 'USD'

File name

Statement_{Label}_{RunDateyyyyMM}

INSERT

Optional name for the files, without extension; placeholders as in the subject plus the report variables. Leave empty to use each report output's own file-name template.

Write back to SAP Business One

After each item is delivered, record it on the business partner through the company's Service Layer. Needs a value linked to the BusinessPartner concept and the Service Layer sign-in on the company page.

Write back

Schedule editor, Delivery tab

Deliver by chooses the channel:

Option	Stored channel	What the engine does with an item's files
Email	Email	Writes one e-mail per item to the outbox (section 6.6.1 to 6.6.6)
Copy to a folder	Folder	Copies the files to a local or UNC folder (section 6.6.7)
Upload to an SFTP server	Sftp	Uploads the files to an SFTP destination (section 6.6.8)
Upload to a SharePoint	SharePoint	Uploads the files to a SharePoint document library

Option	Stored channel	What the engine does with an item's files
library		destination
Post to a Teams channel	Teams	Posts one Adaptive Card per item to a Teams destination; the files stay in run history
Keep in run history only	None	Nothing is sent; the files are downloaded from the run page

Whatever the channel, the files are kept in run history and downloadable there until retention removes them (chapter 7).

6.6.1 E-mail: profile and recipients

Field	Meaning
Mail profile	One of the enabled mail profiles (Administration › Mail profiles, chapter 9); the default profile is marked “(default)”. Required.
When a row has no email address	What happens to an item whose iterate row or partner has no address: Skip the item (Skip, default), Send to the fallback address (SendToFallback) or Keep the file without sending (SaveOnly)
To	Fixed recipients, separated by ; or , ; the iterate row's address or the partner's contact persons are added automatically in front of them
Cc, Bcc	Fixed copies for every item
Fallback address	Shown for the fallback policy; required then

A schedule without a fan-out binding sends one message to the fixed recipients; Check requires either a fixed recipient or a recipient column (“Add a recipient, or take the recipient from the iterate query.”). With **Skip the item** an item without an address is skipped with the note “No recipient address.”; with **Keep the file without sending** it counts as succeeded with “No recipient address; files kept.”; with **Send to the fallback address** the fallback is put in front of the fixed recipients. Duplicate addresses are sent once.

6.6.2 Subject and message

Subject is a single line with placeholders; the **Insert** menu next to it inserts a placeholder at the caret. The **Message** is written in a rich-text editor (fonts Segoe UI, Arial, Calibri, Georgia, Tahoma, Times New Roman, Trebuchet MS, Verdana, Courier New; sizes 10 to 28 px; bold, italic, underline, strikethrough, text colour, highlight, headings 1 to 3, alignment, numbered and bulleted lists, indent, quote, link, clear formatting). Formatting is sent as HTML with a plain-text copy for clients that cannot show it; messages written before version 1.4 are shown as paragraphs and keep sending as before. Values inserted into the HTML are encoded, so a partner name containing & or < is shown as typed.

Placeholders appear as chips in the message and are inserted from the **Insert placeholder** menu, grouped by kind with a sample value next to each; date placeholders open a sub-menu of formats. They are replaced by the item's values when the message is sent. Dates and numbers follow the language of the message variant, or of the recipient's SAP Business One language, else the invariant culture.

6.6.3 Placeholders

The **Placeholder reference** panel under the editor lists every placeholder the schedule can use. The catalogue is built from the schedule's reports and bindings:

Placeholder	Group	Meaning	Example
{Company}	General	The SAP Business One company the schedule runs	OEC Computers

Placeholder	Group	Meaning	Example
		against	
{Schedule}	General	The name of this schedule	Daily Statement of Account
{ReportName}	General	The names of the reports in the schedule, comma separated	Statement of Account
{ReportCode}	General	The codes of the reports in the schedule	SOA
{RunDate}	General	The date and time the run fired, in the schedule's time zone; takes a format	30 October 2026
{Label}	Recipient	The business partner's name (CardName), or the label column of the iterate row. Only with a fan-out binding.	Maxi-Teq
{Recipient}	Recipient	The e-mail address(es) the item is sent to. Only with a fan-out binding.	norm.thompson@maxi-teq.co.uk
{Contacts}	Recipient	The ticked contact persons' names, comma separated. Business-partner bindings only.	Norm Thompson, Max Teq
{<slot key>}	Variables	The value bound to the slot for the item, for example {BusinessPartner} or {SOA.CurrencyMode}; date slots take a format	C20000
{<ReportCode>.Rows}	Report data	The number of rows the report returned for the item	12
{<Dataset>.Table}	Report data	The rows of the dataset as a table in the message: the first 25 rows; {Lines.Table:100} for more, at most 500	(table of rows)
{<Dataset>.<Column>}	Report data	Any column of the first row of a dataset of the report, for example {Header.Balance:N2}	1,250.00

Dates take a .NET format after a colon, numbers too ({Header.Balance:N2}). Without a format a date is shown as the culture's short date. Unknown placeholders expand to nothing. The date sub-menu offers:

Format	Example
default	short date of the message language
d MMMM yyyy	30 October 2026
dd/MM/yyyy	30/10/2026
yyyy-MM-dd	2026-10-30
MMMM yyyy	October 2026
MMM yyyy	Oct 2026
dddd, d MMMM yyyy	Friday, 30 October 2026

A {Dataset.Table} placeholder renders a styled HTML table (numeric columns right-aligned, numbers with thousands separators and up to two decimals, dates as dates, booleans as Yes/No) and a column-aligned text block in the plain-text copy; when rows are cut off the message says "n more rows in the attached file." The same placeholders serve the file-name template, the Teams card, the write-back activity text and the "Send only when" condition.

6.6.4 Preview message

Preview message shows the e-mail as it will be sent (To, Subject and the rendered HTML in a sandboxed frame). Placeholders are filled from the first sample item of the last Check when there is one, otherwise

with the catalogue's sample values; table placeholders show two sample rows. Each language variant has its own **Preview** button.

6.6.5 Other languages

A business partner whose SAP Business One language has a variant gets that subject and message; everyone else gets the default text. **Add language** lists the SAP Business One languages (OLNG) not yet used and creates a variant that starts as a copy of the default subject and message. Each variant has a **Language** drop-down, its own **Subject** with an Insert menu, its own rich-text editor, **Preview** and a bin icon (**Remove this language**).

The language of an item is the language column of the iterate row or the partner's LangCode; dates and numbers in the variant follow the language's culture:

Code	Language	Culture
1	Hebrew	he-IL
3	English	en-US
5	Polish	pl-PL
8	English (UK)	en-GB
9	German	de-DE
11	Danish	da-DK
12	Norwegian	nb-NO
13	Italian	it-IT
14	Hungarian	hu-HU
15	Simplified Chinese	zh-CN
16	Dutch	nl-NL
17	Finnish	fi-FI
18	Greek	el-GR
19	Portuguese	pt-PT
20	Swedish	sv-SE
22	French	fr-FR
23	Spanish	es-ES
24	Russian	ru-RU
25	Spanish (LA)	es-CO
26	Czech	cs-CZ
27	Slovak	sk-SK
28	Korean	ko-KR
29	Portuguese (BR)	pt-BR
30	Japanese	ja-JP
31	Turkish	tr-TR
32	Arabic	ar-SA
35	Traditional Chinese	zh-TW

Check reports a variant without a language, a language used twice and a variant without a subject. The sample items of the check show which message each item will get ("French message" or "default message").

6.6.6 Attachments, size limits and download links

Attach the report files (on by default) attaches the item's files. Off sends the message without attachments, for instance a message built entirely from {Dataset.Table} placeholders; the files stay in run history.

Every mail profile has an attachment limit (**Max attachment megabytes**, default 20; 0 means no limit). The help text under the policy field names the limit of the chosen profile ("Mail profile 'Office 365' allows 20 MB per message. A single file above the limit is left out when splitting."). **When the files exceed the mail profile's attachment limit** decides what happens to an item whose files together exceed it:

Option	Stored value	Behaviour
Send several messages, each under the limit (default)	Split	The files are packed first-fit in file order into as few messages as possible; the subject is suffixed " (1/3)", " (2/3)" and so on. A single file above the limit is left out and noted on the item ("Statement.pdf (24.1 MB) exceeds the 20 MB limit of mail profile '...' and was not attached."). If no file fits the item is skipped ("Not sent. ...").
Zip the files into one archive	Zip	The files are zipped into one archive named after the first file, stored and recorded with the item's files ("The files (31.4 MB) were sent as one zip archive (18.2 MB) to fit the 20 MB limit of mail profile '...'"); if the archive is still too large the item is skipped ("Not sent: even zipped the files are 24.1 MB, above the 20 MB limit Files kept.").
Send download links instead of the attachments	Link	The message is sent with one download link per file instead of the attachments (see below).
Do not send; keep the files in run history	Skip	The item is skipped with the note "Not sent: the files total 31.4 MB, above the 20 MB limit of mail profile '...'". Files kept."

Send download links instead of attachments replaces the attachments with links for every item, whatever the size. The message ends with "Download the files (links valid until 29 November 2026):" ("Download the file (link valid until ...):" for a single file) and one line per file with its name, size and link; the item notes "Download links sent instead of attachments; valid until ...". The links are served by the portal at <public address>/d/<token> without sign-in (a random 256-bit token per file) until the link expires or retention removes the file; downloads are counted on the run page. **Links valid for (days)** takes 1 to 365 (default 30). Download links need the portal's public address (Administration > Settings > Public address); Check warns when it is missing and every item fails at run time otherwise ("Download links need the portal's public address").

6.6.7 Folder

Folder takes a local or UNC path (\\fileserver\reports\statements). The engine's service account needs write access; the folder is created if needed and existing files with the same name are overwritten. Required for this channel.

6.6.8 Destinations: SFTP, SharePoint and Teams

The three destination channels send to a named destination maintained under **Administration > Destinations** (chapter 9): an SFTP server (password or private key, optional host-key pinning, base folder), a

SharePoint document library (Microsoft Entra application with client credentials, site URL and library name) or a Microsoft Teams channel (incoming webhook or Workflows URL). **Destination** lists the enabled destinations of the matching kind with their summary; when there is none the field says “No destination of this kind yet: add one under Administration → Destinations.”

For SFTP and SharePoint, **Folder** is a path template under the destination’s base folder or library, with the same placeholders as the file name (statements/{RunDate:yyyy}/{Label}); dates default to yyyyMMdd. Segments are split on / or \, characters a folder name cannot hold are replaced by _ and folders are created as needed; empty puts the files in the base folder. Check rejects a literal part holding : * ? " < > |. After the upload the item notes where the files went (“3 file(s) uploaded to ‘Finance SFTP’: statements/2026/Maxi-Teq”).

For Teams, the **Card title** (the subject) and **Card text** (plain text with placeholders) make one Adaptive Card per item with the facts Company, Schedule, Item (the label) and Run (the fire time), the file names and the button “Open the run in CertiReport” when the public address is set. The files themselves stay in run history. The subject is required for Teams (“Enter a subject: it is the card’s title.”).

Transient failures of a destination are retried twice (after 5 and 30 seconds); a failure after that fails the item, which can be retried from the run page. Check verifies that the destination still exists, is of the right kind and is enabled (a disabled destination is a warning: “runs will fail until it is enabled”).

6.6.9 Conditions: empty data and “Send only when”

Skip items with no data (on by default) skips an item whose every dataset returned no rows; the files are discarded and the item carries the note “No data for this item.”

Send only when is an optional condition on the item’s values. Items that fail it are skipped with “Condition not met: <condition>” in run history; the files are discarded. The condition language:

Element	Syntax
Operands	Placeholders in braces ({Header.Balance}, {SOA.Rows}, {Recipient}), quoted text ('USD' or "USD"), numbers (0, -12.5), dates as yyyy-MM-dd, true/false, bare words as text
Comparisons	= (or ==), < > (or !=), >, >=, <, <=, contains, startswith, endswith
Emptiness	{Recipient} is empty, {Header.Comments} is not empty
Logic	and, or, not, parentheses

Numbers compare numerically when both sides are numbers, dates as dates, anything else as text ignoring case; a missing placeholder compares as empty text. Example: {Header.Balance} < > 0 and {Header.Currency} = 'USD'. The field validates as you type and Check reports “The send condition is not valid: ...”.

6.6.10 Require approval before sending

Require approval before sending (not offered for “Keep in run history only”) holds every item after its files are produced: the e-mails wait in the outbox with status Held, folder copies, uploads, Teams cards and the SAP B1 write-back are planned but not carried out, and the run waits in run history with status AwaitingApproval until an administrator or scheduler (permission runs . approve) approves or rejects the whole run there (chapter 7). **Tell these approvers** takes addresses that receive an e-mail “Approval needed: <schedule> (<company>)” with a link to the run when the public address is set; each address must be valid. Test sends are never held. Check warns when approval is combined with “Keep in run history only”.

6.6.11 File name

File name names the attached files, without extension, with the same placeholders as the subject plus the report's own variables by name ({AsOf:yyyyMM}); dates default to yyyyMMdd. Example: Statement_{Label}_{RunDate:yyyyMM}. The format's extension is added, and items whose names would collide get the item key appended. Leave it empty to use each report output's own file-name template (chapter 5). Check rejects \ / : * ? " < > | in the literal part and warns when a fan-out schedule uses no placeholder at all.

6.6.12 Write back to SAP Business One

After each item is delivered, the engine can record it on the business partner through the company's Service Layer (URL, user, password and company database on the company page, chapter 4). The business partner is the slot linked to the BusinessPartner concept; without such a slot Check fails ("Write-back needs a variable linked to the BusinessPartner concept").

Field	Meaning
Write back	Turns the write-back on
Attach the files to the business partner (on)	Adds the item's files to the partner's Attachments tab (one Attachments2 entry; its number is shown on the run page as "B1 #123")
Log an activity (on)	Creates an activity on the partner with its own attachment entry holding the files
Activity text	Same placeholders as the subject; default {ReportName} {RunDate:MMMM yyyy} sent to {Recipient}. The first 60 characters become the activity's details; the notes list the run item and the file names.

At least one of the two actions must be on. The write-back runs after the e-mail is queued (or after approval), only when the item has files, and never for a test send. A failure is recorded as a note on the item ("Delivered, but the SAP B1 write-back failed: ...") and does not fail the run; an item without a single business partner notes "SAP B1 write-back skipped: the item has no single business partner." Check verifies that the company has a Service Layer sign-in.

6.7 Check and Save

Check and **Save** run the same dry run. Static checks come first; when they pass, the schedule is resolved for the next three fire times, the iterate query or business-partner selection is executed against the company and the results are shown above the tabs. Errors block saving; warnings do not.

Where	Check	Kind
Schedule	Name entered, company chosen	Error
Reports	At least one report; every report published ("Not published. Publish it, or pin a version."); selected formats exist on the version; the report still exists	Error
Trigger	Cron expression valid	Error
Trigger	Calendar chosen but policy "run anyway"	Warning
Trigger	Calendar no longer exists	Error
Trigger	A fire time falls on a non-business day ("2026-12-25 is Christmas Day in calendar 'UK': skip the run.")	Warning
Each slot	Required slot bound; fixed or selected value present;	Error

Where	Check	Kind
	expression present and valid; derived source chosen and of a fixed, selected or expression kind	
Iterate	Query present and a single SELECT; value column named	Error
Business partners	At least one partner or group	Error
Bindings	Only one iterating slot	Error
Run on <date> / <REPORT> on <date>	Value conversion of the bound values ("Run on 2026-11-01") and the cross-variable rules of each report, such as ToDate >= FromDate ("SOA on 2026-11-01"), for each of the next three fire times	Error
Delivery (e-mail)	Mail profile chosen and still existing; recipient or recipient column; fallback address when that policy is chosen; subject; link validity 1 to 365 days; variants with language and subject, no language twice	Error
Delivery (e-mail)	Mail profile disabled	Error
Delivery (e-mail)	Mail profile failed its last test	Warning
Delivery (e-mail)	Download links without a public address	Warning
Delivery (folder)	Folder path entered	Error
Delivery (destination)	Destination chosen, existing and of the right kind; Teams subject; folder template characters	Error
Delivery (destination)	Destination disabled	Warning
Delivery	Send condition valid; approver addresses valid; file name characters	Error
Delivery	Approval with "keep the files only"; file name without placeholder on a fan-out schedule	Warning
Write-back	At least one action; a BusinessPartner slot; the company's Service Layer sign-in	Error
Iterate / Business partners	Query failed or partners could not be read	Error
Iterate / Business partners	No rows; rows without a recipient ("3 of 120 rows have no recipient; policy: skip the item.")	Warning

When nothing is wrong the panel reads "Every required variable is bound and all rules pass for the next 3 run(s)." Below it, **Next runs** lists the three fire times and the right-hand side shows "One run with these values" or "n item(s) per run · m without recipient" with up to ten sample items: label, recipient, message variant and the slot values. Saving writes an audit entry (Created or Updated) with the name, cron, time zone, reports, binding kinds and channel.

6.8 Send a test

Send a test (editor header, or **Send a test...** in the list menu) saves the schedule first, then opens a dialog: one item is produced with real data and e-mailed to the address below only, with a **[Test]** subject prefix. Nothing goes to the real recipients, Cc or Bcc, and nothing is written back to SAP Business One.

Field	Meaning
Send to	One or more addresses separated by ; ; pre-filled with the signed-in user's e-mail address
Item to send	For fan-out schedules, one of the first ten items of the dry run ("The first 10 of 120 items are listed."); a single-item schedule shows "Item: ... (normally sent to ...)"

The dialog warns when the dry run has errors (“The schedule has problems; the test may fail: ...”). **Send test** queues a run with trigger Test and opens its run page; “Test queued. The engine picks it up within 15 seconds.” A test run shows the chip “Test · sent to ... only” in run history, is held back by no approval requirement, and does not count as the schedule’s last run or in failure alerts and the digest. Only schedules delivered by e-mail can send a test.

6.9 How the engine runs a schedule

The engine keeps three Quartz jobs for schedules, all running once per cluster:

Job	Interval	Purpose
ScheduleSyncJob	Every minute (cron 0 * * * * ?), and once at engine start	Registers each enabled schedule as a durable Quartz job with a cron trigger in the schedule’s time zone and misfire instruction; replaces the trigger when the cron, time zone or misfire policy changed; removes the trigger of a paused or deleted schedule; writes the next fire time shown in the list
RunScheduleJob	On each cron fire	Applies the overlap policy and the business calendar, records the run (Trigger = Schedule, requested by “scheduler”) and executes it
QueuedRunsJob	Every 15 seconds (cron 0/15 * * * * ?)	Claims runs queued by the portal or the API (Run now, Send a test, Retry failed, Retry item) and runs moved to the next business day whose time has come; a claim older than 30 minutes from a crashed node is taken over; at most 20 runs per pass

Executing a run (ScheduleExecutor):

1. The licence is checked for the company; without a usable licence the run fails with a “Licence:” error (chapter 4).
2. The shared slot values are resolved for the fire date and frozen on the run (**Resolved values** on the run page). The iterating query or partner selection is executed and one item per row is created with its own frozen values, label, recipient and language. A test run keeps only the chosen item.
3. The items run in parallel, up to the company’s **Max concurrent queries** (1 to 32), each with its own database context, so a slow or failing item never holds the others. For each item every report runs with the item’s values and the selected formats; a retried item is watermarked COPY on PDF outputs.
4. The item is skipped when every dataset is empty (if “Skip items with no data” is on) or the send condition fails; otherwise the files are stored under %ProgramData%\CertiReport\files\yyyy\MM\<run_id> and delivered through the channel. The e-mail is written to the outbox in the same transaction as the item’s result, under an idempotency key of run, item and attempt, so a crash can neither lose nor duplicate a message.
5. The run’s status is aggregated from its items, the schedule’s last run and next fire time are updated, approvers are mailed when the run waits, and failure alerts and the webhook are notified (chapter 7).

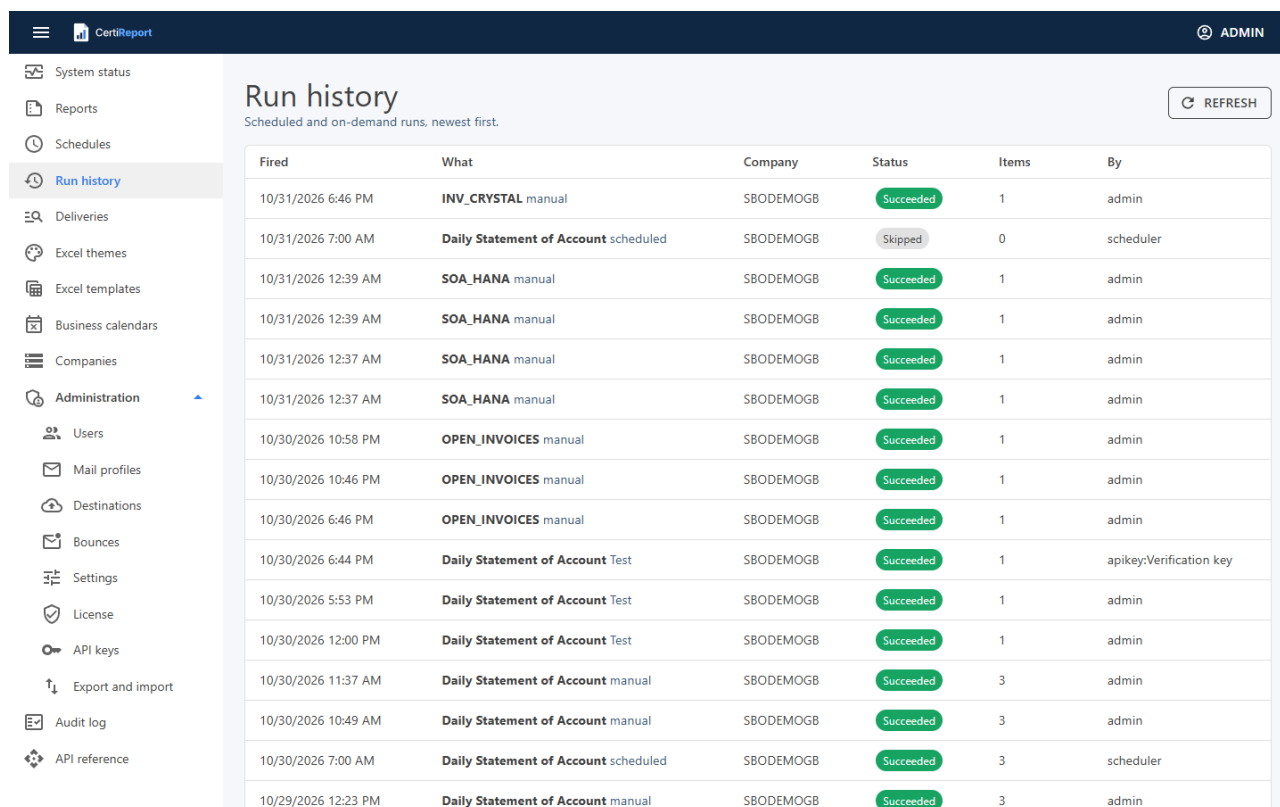
Output warnings from rendering (for example a Crystal format that the installed runtime lacks) are appended to the item’s note. The outbox dispatcher then sends the messages, as described in chapter 7.

7. Runs and deliveries

Every firing of a schedule, every “Run now”, every test send and every on-demand run from the report designer is recorded as a *run*. A run has one *item* per recipient (one for a schedule without a fan-out binding), each item has its files, and each e-mailed item has one or more messages in the *outbox*. This chapter describes where that record lives in the portal, what the states mean, how the mail is sent and retried, how bounces come back, and what the engine does to alert you and to clean up.

The pages **Run history** (/runs) and **Deliveries** (/deliveries) need the permission `runs.view`, which every role has. Retrying, resending and the schedule actions need `schedules.manage` (Administrator, Scheduler); approving or rejecting a held run needs `runs.approve`; the **Bounces** page under Administration needs `smtp.manage` (Administrator).

7.1 Run history



Fired	What	Company	Status	Items	By
10/31/2026 6:46 PM	INV_CRYSTAL manual	SBODEMOGB	Succeeded	1	admin
10/31/2026 7:00 AM	Daily Statement of Account scheduled	SBODEMOGB	Skipped	0	scheduler
10/31/2026 12:39 AM	SOA_HANA manual	SBODEMOGB	Succeeded	1	admin
10/31/2026 12:39 AM	SOA_HANA manual	SBODEMOGB	Succeeded	1	admin
10/31/2026 12:37 AM	SOA_HANA manual	SBODEMOGB	Succeeded	1	admin
10/31/2026 12:37 AM	SOA_HANA manual	SBODEMOGB	Succeeded	1	admin
10/30/2026 10:58 PM	OPEN_INVOICES manual	SBODEMOGB	Succeeded	1	admin
10/30/2026 10:46 PM	OPEN_INVOICES manual	SBODEMOGB	Succeeded	1	admin
10/30/2026 6:46 PM	OPEN_INVOICES manual	SBODEMOGB	Succeeded	1	admin
10/30/2026 6:44 PM	Daily Statement of Account Test	SBODEMOGB	Succeeded	1	apikey:Verification key
10/30/2026 5:53 PM	Daily Statement of Account Test	SBODEMOGB	Succeeded	1	admin
10/30/2026 12:00 PM	Daily Statement of Account Test	SBODEMOGB	Succeeded	1	admin
10/30/2026 11:37 AM	Daily Statement of Account manual	SBODEMOGB	Succeeded	3	admin
10/30/2026 10:49 AM	Daily Statement of Account manual	SBODEMOGB	Succeeded	3	admin
10/30/2026 7:00 AM	Daily Statement of Account scheduled	SBODEMOGB	Succeeded	3	scheduler
10/29/2026 12:23 PM	Daily Statement of Account manual	SBODEMOGB	Succeeded	3	admin

Run history

Run history lists the 200 most recent runs, newest first, scheduled and on-demand alike. The link **History** on the Schedules page opens the same list filtered to one schedule (/runs?schedule=<id>). **Refresh** reloads the list.

Column	Content
Fired	The fire time in your local time
What	The schedule name (or, for an on-demand run, the report code) and the trigger: “scheduled”, “manual”, “Test” or “api”. A run moved by a business calendar carries the chip moved with the original fire time in its tooltip.
Company	The company the run was executed against
Status	The run status chip (section 7.2)
Items	The number of items, followed by “n failed”, “n skipped” and “n awaiting approval” where

Column	Content
	applicable
By	Who requested the run: “scheduler” for cron fires, otherwise the user name of the person (or API key) who requested it

When runs are waiting for approval the header shows the chip **n awaiting approval**; click it to show only those runs, click again to show all. Click a row to open the run.

Each run carries one of four triggers:

Trigger	Shown as	Origin
Schedule	scheduled	A cron fire of the schedule, including runs moved to the next business day
Manual	manual	Run now on the Schedules page, Retry failed , Retry item , or an on-demand run from the report designer (the latter has a report code instead of a schedule)
Api	api	POST /api/v1/schedules/{id}/run with an API key
Test	Test	Send a test : a single item sent to the test address only

7.1.1 The life of a run

1. A cron fire, **Run now**, the API or **Send a test** records the run. A cron fire goes straight to execution on the node that fired it; the others wait in status Queued until the QueuedRunsJob claims them (every 15 seconds, up to 20 runs per pass, oldest fire time first). A run moved by the business calendar waits as Queued until its new fire time.
2. The executor sets the run to Running, freezes the shared values (**Resolved values**), reads the iterate rows or business partners and creates one item per row, all Queued.
3. The items run in parallel up to the company’s **Max concurrent queries**; each becomes Running, then Succeeded, Skipped, Failed or AwaitingApproval. Each e-mailed item writes its message to the outbox in the same transaction as its own result.
4. When every item has finished, the run takes the aggregated status (section 7.2), the schedule’s last run and next fire time are updated, and the failure alert, webhook and approval request are sent as needed.
5. The dispatcher sends the messages (section 7.4); bounces may come back later (section 7.5). **Retry failed**, **Retry item** and **Resend** add attempts and messages to the same run; **Approve and send** or **Reject** closes a waiting run.
6. Housekeeping removes the run after the retention period (section 7.10).

7.2 Run and item states

Runs and items share the RunStatus enumeration. The chip label is the enumeration name except where noted.

Status	Label	Meaning for a run	Meaning for an item
Queued	Queued	Recorded and waiting for an engine node to claim it (Run now, API, retry, a run moved to the next business day)	Waiting to be executed within its run
Running	Running	An engine node is executing it	Its reports are running or its delivery is being carried out
Succeeded	Succeeded	Every item succeeded or was skipped (also a run with no items)	Files produced and delivered, or kept where the policy says so
PartiallySucceeded	Partly succeeded	Some items succeeded or were skipped, others failed	not used

Status	Label	Meaning for a run	Meaning for an item
Failed	Failed	Every item failed, or the run failed before the items ran (resolution, licence, rendering set-up, missing schedule)	The reports or the delivery threw an error; the message is in the item's note
Cancelled	Cancelled	A run moved to the next business day that a regular run of the same day superseded ("Superseded by the scheduled run of the same day.")	not used
Skipped	Skipped	The fire date was a non-business day with the policy "Skip that run"	No data (SkipWhenEmpty), condition not met, no recipient with the Skip policy, or files above the attachment limit with the Skip policy
Awaiting Approval	Awaiting approval	At least one item waits for approval	Files produced; e-mail held in the outbox, other deliveries planned
Rejected	Rejected	An approver rejected the run (every item rejected)	Rejected; nothing was sent, the files stay

A run's status is aggregated from its items when they have all finished: **AwaitingApproval** if any item waits; **Succeeded** if every item is **Succeeded** or **Skipped** (or there are no items); **Rejected** if every item is rejected; **PartiallySucceeded** if at least one item succeeded or was skipped and others did not; otherwise **Failed**. The Schedules page shows the status of the last non-test run.

Items also keep an **Attempt** counter: it increases every time the item runs, and a PDF produced on a second or later attempt is watermarked COPY (chapter 8).

7.2.1 Reading item and mail status together

An item's own status says whether its files were produced and handed over; the mail status (section 7.4) says what became of its e-mail. The common combinations on the run page:

Item status	Email column	Meaning
Succeeded	Pending, Sending	Files produced; the message is queued or being sent right now
Succeeded	Sent	Delivered to the mail server at the time shown
Succeeded	Retrying	The mail server failed temporarily; the dispatcher tries again (section 7.4)
Succeeded	Not delivered	The dispatcher gave up; the item still counts as succeeded because its files exist. Use Resend .
Succeeded	Sent + Bounced or Delayed	The mail server accepted the message but the receiving side reported a failure or a delay (section 7.5)
Succeeded	(recipient in grey, no chip)	Delivered through a folder or destination, kept with "No recipient address; files kept.", or the channel is "Keep in run history only"
Awaiting approval	Held for approval	Waiting for an approver
Rejected	Not delivered	The held message was dead-lettered with "Rejected by <user> ..."
Skipped, Failed	(none)	No message was queued

7.3 The run page

Run history / Daily Statement of Account

Daily Statement of Account

Fired Friday, October 30, 2026 11:37 AM · SBODEMOGB · requested by admin

Succeeded

Resolved values

Item	Status	Rows	Files	Email	Completed
Maxi-Teq C20000	Succeeded	1	SOA_HANA_20261030_C20000.xlsx(98 KB) SOA_HANA_20261030_C20000.pdf(43 KB) SOA_HANA_20261030_C20000_data.xlsx(10 KB)	norm.thompson@maxi-teq.co.uk; max.teq@maxi-teq.co.uk; waelorna@gmail.com	11:37:46 AM
River Ltd. C26000	Succeeded	1	SOA_HANA_20261030_C26000_data.xlsx(4 KB) SOA_HANA_20261030_C26000.pdf(37 KB) SOA_HANA_20261030_C26000.xlsx(87 KB)	waelorna@gmail.com	11:37:46 AM
Aquent Systems C70000	Succeeded	1	SOA_HANA_20261030_C70000.pdf(38 KB) SOA_HANA_20261030_C70000_data.xlsx(4 KB) SOA_HANA_20261030_C70000.xlsx(88 KB)	troy.brown@aquent-sys.com; waelorna@gmail.com	11:37:46 AM

Run page

The run page (`/runs/<id>`) shows the schedule name (or report code) as title, “Fired <date and time> · <company> · requested by <user>” beneath it and the status chip. Further chips mark a test run (“Test · sent to <address> only”) and a run moved by the business calendar (“Moved from <date> by the business calendar”). While the run is queued or running the page shows “In progress. This page refreshes every 5 seconds.” and reloads every 5 seconds; it keeps reloading, without the banner, while any message of the run is still pending, sending or retrying.

An error of the run itself (not of a single item) is shown in a red banner: “Not run: 2026-12-25 is Christmas Day in calendar ‘UK’.”, “Licence: ...”, “A report of this schedule no longer exists.”, or the reason the bindings could not be resolved.

Resolved values expands to the JSON of the shared slot values frozen at fire time, for example `{"BusinessPartner": null, "FromDate": "2026-09-01", "ToDate": "2026-09-30"}`. A retry uses these frozen values, so it reproduces the original output even if run days later.

7.3.1 Items

Column	Content
Item	The label (partner name) with the burst key (CardCode) in grey, or “Single run” for a schedule without a fan-out binding; underneath, the item’s note (section 7.3.5)
Status	The item status chip
Rows	The number of rows all reports returned for the item
Files	One line per file: a download link (<code>/api/v1/runs/{run}/files/{file}</code>), opens in a new tab) or “<name> (removed)” once retention has deleted it; the size in KB; the verification code of a certified PDF as a link to <code>/verify/<code></code> ; a shield icon for a digitally signed PDF; “B1 #<entry>” when the file was attached in SAP Business One; a link icon with the download count when the file was sent as a download link (tooltip: valid

Column	Content
	until, downloaded n times; grey once expired)
Email	The mail status chip of the latest message of the item (section 7.4), a Bounced or Delayed chip with the server's diagnostic as tooltip, the address(es) the last message went to, and the last error of the message. Without a message, the planned recipient in grey.
Completed	The time the item finished
(actions)	Resend for an item whose message was sent or dead-lettered; Retry item for a failed or skipped item once the run has finished

7.3.2 Retry

Retry failed in the header appears when the run failed or has failed items. It re-queues every item in status **Failed** (and the run itself) with the frozen values; the items that succeeded or were skipped are left alone. The engine claims the run within 15 seconds ("Failed items re-queued."). Only runs of a schedule can be retried; for an on-demand run, run the report again from the designer ("Only scheduled runs can be retried. Run the report again instead."). A run that is still queued or running cannot be retried.

Retry item does the same for one item ("Item re-queued. The engine picks it up within 15 seconds."), and also accepts skipped items: use it when the item was skipped for a missing recipient that has since been entered in SAP Business One, or for a transient Service Layer or destination problem. Delivered items are not retried; use **Resend** ("Only failed or skipped items can be retried; use Resend for a delivered item."). An item of an on-demand run answers "Only items of scheduled runs can be retried. Run the report again instead."; while the run or the item is queued or running, "The run is still in progress." Both actions write **RetryRequested** to the audit log.

A retried item runs its reports again and queues a new e-mail; the new message has a new idempotency key (the attempt number is part of it), so the first message is never sent twice.

7.3.3 Resend

Resend sends the item's last message again as it was, with the same subject, body and files; the reports are not re-run. The dialog offers:

Option	Behaviour
Original recipients	To, Cc and Bcc of the run's own (first) message, whatever was resent since
Other addresses	The addresses typed in Send to , separated by ; ; Cc and Bcc are not used

The message is queued with status **Pending** through the same mail profile ("Message queued again.") and appears as the item's latest message; the item then shows the address the last message went to. A resend is refused while the last message is still being sent ("The last message of this item is still being sent."), when the item was never e-mailed ("This item was not e-mailed, so there is nothing to resend."), when **Other addresses** is chosen without an address ("Enter at least one address.") or when retention has removed one of the files ("The files are no longer available (removed by retention): ..."). The audit log records **ResendRequested** with the addresses.

7.3.4 Approval

A run of a schedule with **Require approval before sending** (chapter 6) stops in status **AwaitingApproval** with the panel **Waiting for approval**: "n item(s) have their files ready. Nothing has been sent, copied, uploaded or written back to SAP Business One. Open the files below to check them, then approve or reject the whole run." Users with runs . approve see **Note (optional)**, **Approve and send** and **Reject**; others read "An administrator or scheduler can approve or reject this run."

Approve and send releases the run: every held message becomes Pending and is sent by the dispatcher within seconds, folder copies, SFTP and SharePoint uploads and Teams cards are carried out now, and the SAP B1 write-back runs; each item takes the status of its delivery (“Approved. The messages are queued and the files are on their way.”). **Reject** asks “Reject this run?” with the text “Nothing will be sent. The files stay in run history for reference.” and the buttons **Reject** and **Keep waiting**; it sets every waiting item to Rejected with the note “Rejected by <user>: <note> Nothing was sent; the files stay in run history.” (“Rejected. Nothing was sent.”); the held messages are dead-lettered with the same reason. Either decision is shown on the page afterwards (“Approved by <user> on <date>: <note>”, or with a full stop when no note was entered) and recorded in the audit log (Approved, Rejected); the note is kept up to 2,000 characters. A run that is no longer waiting answers “This run is not waiting for approval.” The same decisions are available over the API (POST /api/v1/runs/{id}/approve and /reject).

Approvers named on the schedule receive “Approval needed: <schedule> (<company>)”: “The run of ‘<schedule>’ for <company> fired at <time> produced n item(s) that wait for your approval before anything is sent.”, followed by the link to the run when the public address is set or “Open the run in CertiReport (Run history) to approve or reject it.” otherwise. The request goes through the schedule’s mail profile, once per run.

7.3.5 Item notes

The item’s note (the grey text under its name) explains what happened. The texts the engine writes:

Note	Meaning
No data for this item.	Every dataset was empty and “Skip items with no data” is on
Condition not met: ...	The “Send only when” condition evaluated to false
No recipient address.	No address and the policy “Skip the item”
No recipient address; files kept.	No address and the policy “Keep the file without sending”
Waiting for approval.	The item is held
The files (31.4 MB) were sent in 2 messages to fit the 20 MB limit of mail profile ‘...’.	Split attachments
<file> (24.1 MB) exceeds the 20 MB limit of mail profile ‘...’ and was not attached.	A single file above the limit
The files (...) were sent as one zip archive (...) to fit the ... limit ...	Zipped attachments
Not sent: the files total ..., above the ... limit ... Files kept.	Oversize policy “Do not send” (or a zip still too large)
Download links sent instead of attachments; valid until <date>.	Links instead of files, optionally preceded by the size reason
n file(s) uploaded to ‘<destination>’: <location>	SFTP or SharePoint upload
No files to upload.	SFTP or SharePoint delivery of an item that produced no file (the item is skipped)
Card posted to ‘<destination>’. ...	Teams card
The schedule’s destination no longer exists. Pick one on the Delivery tab. / Destination ‘<name>’ is disabled.	The destination was deleted or disabled after the schedule was saved (the item fails)
SAP B1 write-back skipped: the item has no single business partner.	Write-back on, but no BusinessPartner value
Delivered, but the SAP B1 write-back failed: ...	Service Layer error; the item still succeeded

Note	Meaning
Rejected by <user>... Nothing was sent; the files stay in run history.	Rejected run
Any other text	The exception that failed the item, or a rendering warning (for example a Crystal format replaced by the closest one the runtime has)

Several notes are joined with spaces when more than one applies.

7.3.6 On-demand runs

A run started from the report designer (**Run**, chapter 5) is recorded in the same history with the report code instead of a schedule name and the trigger “manual”. It has no schedule, so it has a single item (“Single run”) with the values typed in the designer, the file is produced at once with the run in status **Running**, and the result is **Succeeded** or **Failed** with the error in the banner. An unpublished version is watermarked **DRAFT** so the file cannot pass as issued. On-demand runs are not delivered anywhere (download the files from the run page), cannot be retried or resent (“Only scheduled runs can be retried. Run the report again instead.”), do not appear on the Deliveries page or in the digest, and do not trigger failure alerts.

7.4 The outbox and the dispatcher

Every e-mail CertiReport sends (item messages, approval requests, failure alerts, digests, licence notices) is a row in the outbox (`cr.OutboxMessages`). An item’s message is written in the same database transaction as the item’s result, so a crash can neither lose nor duplicate it. The engine’s dispatch service runs every 10 seconds on every node and drains the queue in batches of 50.

Status	Label on the run page	Meaning
Pending	Pending	Due to be sent
Sending	Sending	Claimed by a node; an attempt is under way (a claim older than 10 minutes from a crashed node is taken over)
Sent	Sent	Accepted by the mail server; the time is shown next to the chip
RetryScheduled	Retrying	A transient failure; the next attempt is scheduled (see below)
DeadLettered	Not delivered	Given up after a permanent failure or after the last retry; the reason is shown under the chip
Held	Held for approval	Built, waiting for the run’s approval

The dispatcher works through the due messages oldest first. For each message it picks the schedule’s mail profile, or the default profile (then the enabled profile with the lowest priority number) when none is set or the profile is gone, and:

- waits as long as needed to stay under the profile’s **Max messages per minute** (default 30), counting the messages this node sent through the profile in the last minute;
- drops recipients that are on the suppression list (section 7.5) and refuses the message when nobody is left (“Not sent: every recipient is on the suppression list after bounces (...).”);
- builds the MIME message with the X-CertiReport-Id header and keeps its Message-ID so a bounce can be matched back;
- records the attempt in `cr.DeliveryAttempts` with the attempt number, time, outcome, profile, server response and node.

A transient failure (SMTP replies 4xx, connection refused, timeout, broken connection, protocol error, a disabled profile, Microsoft Graph unreachable or answering 429 or 5xx) schedules a retry after 1 minute, then 5 minutes, 15 minutes, 1 hour and 4 hours: six attempts in all, and when the sixth fails the message is dead-lettered. A permanent failure (SMTP 5xx, rejected credentials, a TLS handshake failure, a Graph refusal other than 429 or 5xx, no enabled mail profile at all, a missing attachment file) dead-letters the message at once. The item's Email column shows "Not delivered" with the server's reply; use **Resend** once the cause is fixed. Nothing resends automatically.

7.4.1 Delivery attempts and server replies

Every attempt is a row in `cr.DeliveryAttempts`: the message, the attempt number, the time, whether it succeeded, the mail profile used, the server's reply and the engine node that made it. The last reply is what the run page and the Deliveries page show under the mail status chip. The texts the sender writes for failures:

Reply	Cause	Retried?
The server rejected the credentials. ...	SMTP authentication failed	No
Microsoft Entra rejected the credentials: <error code>.	The app registration's client credentials were refused	No
TLS handshake failed. Check the security mode and port, or the server certificate. ...	Wrong security mode or port, or an untrusted certificate (see Validate server certificate on the profile)	No
The server refused the command (<code>): ...	An SMTP reply; 4xx replies are transient, 5xx permanent	4xx yes, 5xx no
Unexpected SMTP response: ...	Protocol error	Yes
Cannot connect to <host>:<port>. ...	Connection refused or host unreachable	Yes
No response from <host>:<port> within <n> seconds.	Timeout (the profile's Timeout seconds , default 60)	Yes
Microsoft Graph could not be reached: ...	Graph transport failure	Yes
Microsoft Graph refused the message (<status>). See the transcript.	Graph answered with an error status	429 and 5xx yes, others no
The app registration does not have the Mail.Send application permission with admin consent.	The Graph token carries no Mail.Send role	No
Mail profile '<name>' is disabled.	The schedule's profile was disabled after the message was queued	Yes
No enabled mail profile.	No profile is enabled at all	No
Not sent: every recipient is on the suppression list after bounces (...).	Every address bounced hard earlier	No
Could not find file ...	An attachment was removed before the message went out	No

A successful reply also carries "Not sent to suppressed address(es): ..." when some, but not all, recipients were dropped. Delivery attempts are removed together with their message by retention (section 7.10).

Messages the portal shows as "Retrying" are picked up as soon as their next attempt time has passed; the run page keeps refreshing while any message of the run is pending, sending or retrying.

7.4.2 Several engine nodes

The engine runs as a Quartz cluster: every `CertiReport.Engine` service that shares the metadata database is a node (its identity is the machine name unless `Scheduler:InstanceId` is set), writes a heartbeat every 30 seconds and appears on the dashboard. Cron triggers fire on exactly one node; a queued run is claimed by the first node that reaches it; the dispatcher on each node claims its own batch of due messages (status `Sending`, with the node's name) so two nodes never send the same message. A node that stops mid-work leaves claims behind: another node takes over a run claim after 30 minutes and a message claim after 10 minutes. Because a message's idempotency key is the run, item and attempt, a run that is recovered or retried never enqueues the same message twice; a resend gets a key of its own. The `DeliveryAttempts` row names the node that made each attempt, which is where to look when only one server cannot reach the mail server.

7.5 Bounces

A message accepted by the mail server can still fail later: the receiving server returns a delivery status notification to the sender mailbox. `CertiReport` reads that mailbox, marks the item's message as bounced and stops mailing addresses that bounce hard.

7.5.1 Settings

Under **Administration** › **Settings** › **Bounce mailbox**:

Field	Meaning
Read the bounce mailbox	Turns the reading on; the engine then checks every 10 minutes (at minute 5, 15, 25 and so on)
Mail profile whose mailbox receives the notifications	The profile whose sender mailbox gets the notifications; its sign-in is reused to read them
IMAP server, Port	For SMTP profiles: the IMAP host (guessed from the SMTP host when empty: <code>smtp.</code> becomes <code>imap.</code> , and <code>smtp.office365.com</code> or <code>smtp-mail.outlook.com</code> become <code>outlook.office365.com</code>) and port (default 993, which means implicit TLS; any other port uses STARTTLS). The profile needs a user name and password ("The mail profile has no sign-in; IMAP needs a user name and password."); a Microsoft 365 profile that sends by SMTP with OAuth cannot read by IMAP ("For a Microsoft 365 profile that sends by SMTP, read the bounces with a Microsoft Graph profile instead (IMAP OAuth needs a user sign-in).")
(Graph profiles)	Read through Microsoft Graph with the profile's app registration; it needs the Mail.ReadWrite application permission on the sender mailbox
Folder	The mailbox folder to read; empty means the inbox
Look back (days)	On the first check, notifications older than this are ignored (1 to 90, default 7). Later checks continue from the last check minus one hour.
Stop mailing an address after a hard bounce (on)	Adds the address of a 5.x.x notification to the suppression list
Save, Test mailbox, Check now	Save refuses to turn the reading on without a profile ("Choose the mail profile whose mailbox receives

Field	Meaning
	the notifications.”). Test signs in and reports the folder’s unread and total count (“Signed in to outlook.office365.com:993 as ...; folder ‘INBOX’ holds 3 unread of 1,204 messages.”, or “Signed in to <mailbox> through Microsoft Graph; folder ‘Inbox’ holds ...” for a Graph profile). Check now saves, then reads and processes the mailbox at once, even while the reading is off.

7.5.2 Processing

Each check reads at most 100 unread messages received since the last check. RFC 3464 multipart/report notifications and the free-text notifications some servers (such as Exchange) send are recognised; out-of-office replies and ordinary mail are left alone. A recognised notification is matched to the message it is about by the X-CertReport-Id header quoted in the returned headers, then by the original Message-ID, then by the latest message sent to that address within the last 14 days. Handled notifications are marked read; a notification whose Message-ID was seen before is skipped, so a failed mark-read does not record it twice.

For a matched message the outbox row is marked with the kind **Failed** (a permanent 5.x.x failure) or **Delayed** (a temporary 4.x.x problem the sending server keeps trying) and the detail “Undeliverable for <address> (5.1.1): <diagnostic>”; a failure is never downgraded to a delay. Run history and the Deliveries page show the chip **Bounced** or **Delayed** on the item.

Kind	Status codes	Shown as	Effect
Failed	5.x.x	Undeliverable on the Bounces page, Bounced on the item	The address is wrong or refuses mail; with the suppression option on it is no longer mailed
Delayed	4.x.x	Delayed	The sending server is still trying; nothing is suppressed, and a later failure notification upgrades the item to Bounced

7.5.3 The Bounces page

Bounces

Administration › Bounces (/admin/bounces) has two tables and the button **Check the mailbox now**, whose result is shown above them (“12 message(s) read, 3 notification(s), 3 matched to sent mail, 1 address(es) suppressed.”).

Suppressed addresses are the addresses CertiReport no longer mails: the outbox drops them from To, Cc and Bcc and refuses a message with no other recipient. The table shows the address, the reason, the number of bounces and, under **Since**, when and by whom it was added. Hard bounces add an address automatically with the reason “Hard bounce 5.1.1: <diagnostic>”, added by “bounce mailbox”; a further hard bounce raises its count. **Add an address** with a **Reason** and **Suppress** adds one by hand (the reason defaults to “Added by an administrator”; “Enter a valid e-mail address.” and “That address is already suppressed.” are refused); **Mail again** removes an address after confirmation (“Remove <address> from the suppression list?”). Both changes are written to the audit log.

Recent notifications lists the last 200 notifications: received time, recipient (with a **Suppressed** chip when it is on the list), kind (**Undeliverable** or **Delayed**), the enhanced status code (5.1.1), the schedule and item the notification was matched to (a link to the run, or “not matched”) and the diagnostic text.

7.6 Deliveries

CertiReport
 ADMIN

- System status
- Reports
- Schedules
- Run history
- Deliveries
- Excel themes
- Excel templates
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- Administration
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Deliveries

Who got what, across every run: search by e-mail address, business partner, file name, subject or schedule, then open the run or send a message again.

From

To

Schedule ▼

☒ Problems only

SEARCH

Fired	Schedule - item	Recipient	Status	Files
10/30/2026 6:44 PM Test	Daily Statement of Account Maxi-Teq · SBODEMOGB	waelorna@gmail.com Sent 10/30/2026 6:44 PM	Succeeded	SoA_Maxi-Teq_20261030_C20000_data.xlsx SoA_Maxi-Teq_20261030_C20000.pdf SoA_Maxi-Teq_20261030_C20000.xlsx
10/30/2026 5:53 PM Test	Daily Statement of Account Maxi-Teq · SBODEMOGB	waelorna@gmail.com Sent 10/30/2026 5:53 PM	Succeeded	SoA_Maxi-Teq_20261030_C20000.pdf SoA_Maxi-Teq_20261030_C20000.xlsx SoA_Maxi-Teq_20261030_C20000_data.xlsx
10/30/2026 12:00 PM Test	Daily Statement of Account Maxi-Teq · SBODEMOGB	waelorna@gmail.com Sent 10/30/2026 12:00 PM	Succeeded	SOA_HANA_20261030_C20000_data.xlsx SOA_HANA_20261030_C20000.xlsx SOA_HANA_20261030_C20000.pdf
10/30/2026 11:37 AM	Daily Statement of Account Maxi-Teq · SBODEMOGB	norm.thompson@maxi-teq.co.uk: maxi.teq@maxi-teq.co.uk: waelorna@gmail.com Sent 10/30/2026 11:38 AM	Succeeded	SOA_HANA_20261030_C20000_data.xlsx SOA_HANA_20261030_C20000.xlsx SOA_HANA_20261030_C20000.pdf
10/30/2026 11:37 AM	Daily Statement of Account River Ltd. · SBODEMOGB	waelorna@gmail.com Sent 10/30/2026 12:32 PM	Succeeded	SOA_HANA_20261030_C26000.xlsx SOA_HANA_20261030_C26000_data.xlsx SOA_HANA_20261030_C26000.pdf

Deliveries

Deliveries (/deliveries) answers “who got what” across every scheduled run: it searches items rather than runs. On-demand runs from the designer are not included.

Filter	Meaning
Search	Free text matched, ignoring case, against the item's recipient, label and key (CardCode), its file names, the To and Subject of its messages and the schedule name. Enter searches. Empty lists the latest deliveries.
From, To	Fire date range (inclusive)
Schedule	One schedule
Problems only	Items that failed or were rejected, or whose message was dead-lettered, bounced or delayed

The table shows the first 200 matches, newest run first (“The first 200 matches are shown; narrow the search for older ones.”):

Column	Content
Fired	The fire time as a link to the run, with a Test chip for test runs
Schedule · item	The schedule name (or report code), the item label or “Single run”, the company, and the item’s note
Recipient	The address(es) the last message went to (or the planned recipient), the mail status chip, a Bounced or Delayed chip, the sent time and the last error
Status	The item status chip
Files	The files with download links, “(removed)” after retention, and the link icon for files sent as download links
(actions)	Resend (section 7.3.3) when the message was sent or dead-lettered; Open the run

Typical questions the page answers:

- Did customer C20000 receive its statement for September? Search the code or name, set the date range, open the hit.
- Which statements of last month bounced or were never delivered? Set the schedule and the date range and turn on **Problems only**.
- Who received the file Statement_Maxi-Teq_202609.pdf? Search the file name.
- Has anybody opened the download links of a run? The link icon shows the count per file.

The same search is available over the API: `GET /api/v1/deliveries?`

`q=<text>&from=<date>&to=<date>&scheduleId=<id>&problems=true&take=<n>` (at most 1,000 hits).

7.7 Download links

When a schedule sends download links instead of attachments (chapter 6), each file gets a random 43-character token and the message lists `<public address>/d/<token>` per file. The portal serves the file without sign-in while the link is valid, counts every download and records the last download time; the run page shows the count next to the link icon. A link that has expired answers “This download link for `<file>` has expired. Ask the sender for a new one.” (HTTP 410), one whose file retention has removed answers “`<file>` is no longer available: the file was removed by retention.” (410), and an unknown token answers 404. Links expire after the days set on the schedule (1 to 365, default 30); the file itself is kept for the run retention regardless. Without a public address the item fails with “Download links need the portal’s public address: set it under Settings → Public address.”

The message itself is the schedule’s normal subject and body followed by the heading “Download the file (link valid until 29 November 2026):” (or “Download the files (links valid until ...):” for several) and one entry per file in the form Statement_Maxi-Teq_202610.pdf (1.2 MB):
`https://reports.example.com/d/<token>`; in the HTML version each file name is the link. The expiry date is written in the language of the message. Links are issued per file: a retried item sends links to its files again with the validity counted from the retry (a file that already had a token keeps it); a resend reuses the same message body and therefore the same links.

7.8 Failure alerts and the webhook

After every run that is not a test completes (also after an approval decision), the engine evaluates the **Failure alerts** under **Administration › Settings**:

Field	Meaning
Alert e-mail addresses	Addresses separated by ; that receive an e-mail when a run fails; empty means no alerts
Also when some items of a run fail or are skipped by error	Alerts for PartiallySucceeded runs too (on by default when the setting was never saved)

The alert “[CertiReport] Failed: `<schedule>`” (or “PartiallySucceeded: ...”) travels through the schedule’s own mail profile when it has one, else the default profile. It names the schedule, company and fire time, the headline (“All 12 item(s) failed.”, “3 of 12 item(s) failed, 1 skipped.”, “The run failed before any item ran.”), the run’s error, a table of up to 25 failed and skipped items with their status and note, and a link to the run when the public address is set. The same addresses receive the licence notices (chapter 4).

Webhook: when a **Webhook URL** is set, the engine posts a JSON summary of every completed run (event: `run.completed`, run id, schedule, company, trigger, status, fired and completed times, error, item counts total/succeeded/failed/skipped, and the run URL) with the header `X-CertiReport-Event: run.completed`. With a **Signing secret** (stored encrypted) the body is signed with HMAC-SHA256 and the

signature sent as X-CertiReport-Signature: sha256=<hex>. A rejected or unreachable webhook is logged and never fails the run.

7.9 The weekly digest

Administration › Settings › Weekly digest sends one e-mail a week with the week's delivery statistics:

Field	Meaning
Send a weekly delivery digest	Turns the digest on
Digest e-mail addresses	Recipients separated by ;
Day	Day of the week (default Monday)
After (hour)	Hour of the server's local day after which the engine sends it (default 7); the digest job runs hourly at minute 20 and sends once per day at most
Mail profile	The profile to send with; empty uses the default profile
Save, Send now, Preview	Save refuses the digest without a recipient ("Enter at least one digest recipient, separated by ;"). Send now saves, then queues the digest for the past seven days at once ("Digest queued; the engine sends it within a minute."); Preview shows the subject and plain text below the buttons without sending

The digest covers the scheduled runs (tests excluded) of the past seven days. Subject: "[CertiReport] Weekly digest 24 Oct 2026 – 30 Oct 2026: 38 runs, 1,204 deliveries, 3 problems" (the problem count is the failed and rejected items, the dead-lettered messages and the hard bounces of the week; it is left out when it is zero). Body:

- a summary: scheduled runs with a breakdown by status, items delivered, skipped, failed and rejected, e-mails sent and not delivered, hard bounces received in the week, files produced with their total size, runs awaiting approval now and messages waiting in the outbox now;
- **By schedule:** up to 30 schedules with company, runs, delivered and failed items and the status of the last run, those with failures first;
- **Runs with failures:** up to 15 failed or partly succeeded runs with their date, status, failed item count and error, each linked to the run;
- **Awaiting approval:** up to 20 runs waiting for a decision, linked;
- a link to the Deliveries page.

Links appear when the public address is set.

7.10 Retention and housekeeping

Administration › Settings › Retention holds two values:

Setting	Default	Range	Effect
Keep runs and files (days)	400	1 to 3650	Runs whose fire time is older than this are deleted with their items, files, run folders, outbox messages and delivery attempts
Keep sent mail (days)	90	1 to 3650	Outbox messages that are Sent or DeadLettered and older than this are deleted with their delivery attempts

The engine's housekeeping job runs every 15 minutes on one node and, in each pass:

1. removes engine nodes that have not sent a heartbeat for seven days from the system status;

2. deletes up to 2,000 output files past their expiry date (every file is stamped with an expiry of 400 days when it is produced); the file row stays, so run history still lists the file as “(removed)”;
3. deletes up to 500 of the oldest runs beyond the run retention, except runs that are still queued or running, together with their files, empty run folders, outbox messages and attempts;
4. deletes finished mail (Sent or DeadLettered) created before the mail retention, with its attempts.

Deleted runs disappear from Run history and Deliveries. A file removed by retention can no longer be resent or downloaded through its link; the item, its note and its mail status remain until the run itself is removed. Back up the files folder (chapter 2) if the outputs must be kept longer than the retention.

7.11 Runs over the API

The HTTP API (/api/v1, reference under /api/docs, API key in the header X-Api-Key; chapter 10) exposes the same operations as the pages of this chapter. Enumerations are returned as names ("status": "Succeeded").

Method and path	Permission	Effect
GET /api/v1/schedules	runs.view	The schedule list (id, name, company, report codes, cron, time zone, enabled, next and last run)
POST /api/v1/schedules/{id}/run	schedule.manage	Queues a run with the trigger Api; answers 202 Accepted with { "runId": ... } and the run's location, or 409 Conflict when a run is already queued
POST /api/v1/schedules/{id}/test	schedule.manage	Body { "recipient": "a@example.com;b@example.com", "burstKey": "C20000" }; queues a test run (202) or answers 400 with the reason
GET /api/v1/runs?scheduleId=&take=	runs.view	The run list as on the Run history page; take defaults to 50, at most 500
GET /api/v1/runs/{runId}	runs.view	The run with its resolved values and items, including each item's files, mail status, last error, sent time, recipients and bounce
GET /api/v1/runs/{runId}/files/{fileId}	runs.view	Downloads a file of the run; 404 when the run or file is unknown, 410 Gone (“The file has been removed by retention.”) when retention deleted the file
GET /api/v1/deliveries?q=&from=&to=&scheduleId=&problems=&take=	runs.view	The delivery search of section 7.6
POST /api/v1/runs/{runId}/approve	runs.approve	Body { "note": "..." } (optional); 204 No Content, or 409 when the run is not waiting
POST /api/v1/runs/{runId}/reject	runs.approve	Same shape as approve

Runs queued over the API show “api” as their trigger and the API key's name as the requester.

7.12 Monitoring the pipeline

GET /metrics serves Prometheus gauges for an API key with the `system.view` permission (chapter 10). The ones that describe this chapter's pipeline:

Gauge	Labels	Meaning
certireport_runs_open	status = Queued, Running, AwaitingApproval	Runs not finished, by status
certireport_runs_24h	status (every run status)	Runs fired in the last 24 hours
certireport_run_items_24h	status	Run items of the last 24 hours
certireport_last_scheduled_run_age_seconds		Seconds since a scheduled run last completed; -1 when none
certireport_outbox_messages	status (every outbox status)	Messages in the outbox; sent and dead-lettered ones count until retention removes them
certireport_outbox_sent_24h		Messages sent in the last 24 hours
certireport_outbox_oldest_pending_age_seconds		Age of the oldest message still Pending or RetryScheduled; 0 when none
certireport_bounces_24h		Bounce notifications recorded in the last 24 hours
certireport_suppressed_addresses		Addresses on the suppression list
certireport_run_files, certireport_run_files_bytes		Report files kept in run history and their total size
certireport_engine_nodes	state = online, offline	Engine nodes; a node is online while its last heartbeat is less than 2 minutes old (each node writes one every 30 seconds)
certireport_engine_heartbeat_age_seconds		Seconds since the newest heartbeat of any node; -1 when no node is registered

An alert on `certireport_outbox_oldest_pending_age_seconds` growing beyond a few minutes catches a mail server that stopped accepting mail; one on `certireport_last_scheduled_run_age_seconds` catches an engine that is no longer firing. The dashboard (**System status**, chapter 3) shows the engine nodes and whether any is online.

7.13 Permissions in this chapter

Action	Permission	Roles
See Run history, run pages, Deliveries; download files	<code>runs.view</code>	All roles
Run now, Send a test, Pause, Resume, Duplicate; Retry failed, Retry item, Resend	<code>schedules.manage</code>	Administrator, Scheduler
Approve and send, Reject	<code>runs.approve</code>	Administrator, Scheduler
Bounces page, bounce mailbox settings	<code>smtp.manage</code>	Administrator

Action	Permission	Roles
Retention, failure alerts, digest and webhook settings	Administration › Settings (chapter 9)	Administrator

7.14 Troubleshooting

What you see	Where to look
A run stays Queued	No engine node is online (System status), or the engine is waiting for a pending migration after an upgrade. The QueuedRunsJob claims runs every 15 seconds; a claim from a crashed node is taken over after 30 minutes.
A scheduled run never appears although the next run time has passed	The schedule is paused, or its cron expression is invalid (the engine skips such rows); check Next five runs in the editor. A run moved to the next business day waits until that day.
The run is Skipped with “Not run: ... is ... in calendar ...”	The business calendar and the policy “Skip that run” (chapter 6)
Items are Skipped with “No data for this item.”	The reports returned no rows for that item; turn off Skip items with no data if an empty file should still go out
Items are Skipped with “No recipient address.”	The iterate row or partner has no e-mail; change the policy When a row has no email address or fix the address in SAP Business One, then Retry item
The run Failed with “Licence: ...”	The licence does not cover this company (chapter 4)
The item succeeded but the Email column says Not delivered	The dispatcher gave up; the reply under the chip says why (section 7.4.1). Fix the profile or address, then Resend .
The Email column says Retrying for a long time	Transient failures with backoff up to 4 hours between attempts; look at the mail profile’s Test and the server reply
The Email column says Bounced	The receiving server returned a hard failure; the address is on the suppression list if that option is on. Correct the address in SAP Business One and Resend to other addresses, or Mail again on the Bounces page once fixed.
Held for approval and the run says Awaiting approval	The schedule requires approval; an approver must decide on the run page
Files show “(removed)”	Retention deleted them; the run is older than Keep runs and files (days) or the file passed its 400-day expiry
A download link answers “expired” or “removed”	The link’s validity (1 to 365 days) passed, or retention removed the file
“Approval needed” e-mails never arrive	The approvers’ addresses are on the schedule, but the message travels through the schedule’s mail profile; check the outbox state of the run and the profile
No failure alerts arrive	Alert e-mail addresses under Settings is empty, or the alert waits in the outbox like any other

What you see

Where to look
message

8. PDF templates, certification and Crystal Reports

A report output (chapter 5) can be a PDF rendered from an HTML template, or a file produced by a SAP Crystal Reports layout. This chapter covers both: the Scriban template model and its helpers, how the engine turns HTML into a PDF, the verification code and the public **Verify a document** page, signing with a company certificate and protecting a file with an open password, and the Crystal sidecar with its layouts, parameter map and formats.

Everything described here is set per output in the **Outputs** tab of the report designer (**Reports** › **report** › **Outputs**). The output formats that go through the renderers are:

Format in the designer	What produces it	Section
PDF (HTML template)	Scriban template, headless Chromium, PDFsharp for signing and password	8.1 to 8.4
PDF (Crystal layout)	Crystal sidecar, format pdf	8.5 to 8.8
Excel, as printed (Crystal layout)	Crystal sidecar, format xlsx (page-based)	8.8
Excel, data only (Crystal layout)	Crystal sidecar, format xlsxData (record-based)	8.8
Excel 97-2003 (Crystal layout)	Crystal sidecar, format xls	8.8
CSV (Crystal layout)	Crystal sidecar, format csv	8.8

Excel (.xlsx) and CSV outputs that do not involve a layout are written directly by the engine and are described in chapter 5.

8.1 PDF output from an HTML template

8.1.1 The output editor

Choose **PDF (HTML template)** as the **Format** of an output. The output panel then shows the page options, the certification and signing switches, the watermark and open-password fields, and the template editor.

≡
ADMIN

- System status
- Reports
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- Excel themes
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- Mail profiles
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- Bounces
- Settings
- License
- API keys
- Export and import
- Audit log
- API reference

Reports / Statement of account

Version 1.0 Draft

IMPORT FROM QUERY MANAGER
SAVE DRAFT
PUBLISH ▾
▶ RUN

Code*
STATEMENT
Upper-case, e.g. SOA

Name*
Statement of account

Category
Receivables

Description
Journal lines of the business partner between the two dates with a running balance. Header: name, address, VAT number, currency and current balance.

DATASETS (2)
VARIABLES (3)
OUTPUTS (2)
PREVIEW

Format

PDF (HTML template) ▾

File name

Statement_{BP}_{ToDate:yyyyMM}

Placeholders: {ReportCode} {Company} {RunDate:yyyyMMdd} and any variable, e.g. {BP} {ToDate:yyyyMM}

Page

A4 ▾

Landscape ☐

Verification code and QR in the footer ☒

Sign with the company's certificate ☒

Watermark

DRAFT

Open password

{{ header.LicTradNum }}

Scriban expression; empty = no password

Template

INSERT STARTER LAYOUT ▾

Scriban in HTML: company.name, company.logo, report.name, run.date, values.Name, datasets.Name (rows), header (first row of 'Header'), rows (first dataset); helpers money, number, is_date, is_number, date.to_string. The footer with page numbers and the verification QR is added by the engine.

```
<!doctype html>
<html lang="{{ run.language ?? 'en' }}">
<head>
<meta charset="{{ utf-8 }}">
```

Report designer, PDF output with its page options and template

Field	Meaning	Default
File name	File name with placeholders; {ReportCode}, {Company}, {RunDate:yyyyMMdd} and any variable, for example {BP} or {ToDate:yyyyMM}. The extension .pdf is added.	{ReportCode} _{RunDate:yyyyMMdd}
Page	Paper size: A4, Letter, Legal or A3.	A4
Landscape	Landscape orientation.	off
Verification code and QR in the footer	Certifies the file: a verification code is generated, printed in the footer with a QR code and recorded with the file (section 8.3).	on
Sign with the company's certificate	Signs the PDF with the certificate whose thumbprint is set on the company (section 8.4). Without a thumbprint on the company nothing is signed.	on
Watermark	Text printed diagonally across every page by the starter templates, for example DRAFT or COPY. Empty means none.	empty
Open password	Scriban expression evaluated per file, for example {{ header.LicTradNum }}. Empty means the file is not password protected (section 8.4.3).	empty
Template	The Scriban/HTML template. Leave it empty for the generic table layout, or use Insert starter layout and adapt the result.	empty

Insert starter layout offers two templates (section 8.1.5): *Statement (header, lines with running balance, totals)* and *Table per dataset (generic list)*. Inserting a starter replaces the current template text.

8.1.2 Page geometry and the footer

The engine renders the template as a print page with `PrintBackground` on, so CSS background colours and the starter templates' banded rows survive. Margins are fixed: 14 mm at the top, 12 mm left and right, 16 mm at the bottom, or 24 mm at the bottom when the output is certified (the footer then holds the QR code). The template's own `@page` margin is ignored (`PreferCSSPageSize` is off); both starters set `@page { margin: 0 }` so that nothing fights the engine's margins.

The footer is added by the engine, not by the template, on every page:

- on the left, the CertiReport mark and, when the output is certified, the QR code (14 mm square) with the text *Verify:* followed by the code and, when a public URL is set (section 8.3.2), the verification URL on a second line;
- on the right, the company name, the issue date and time (d MMM yyyy HH:mm, UTC, invariant culture) and *Page X of Y*.

Nothing is drawn in the header area.

8.1.3 Watermarks

The **Watermark** text of the output is passed to the template as `run.watermark`. The two starter templates draw it as a large, rotated, semi-transparent text in the page centre; a template of your own must include a similar block if it should show a watermark.

The engine overrides the watermark in two cases:

- an on-demand run of a report version that is not published is watermarked DRAFT (the output's own watermark is replaced);
- a retried schedule item (second or later attempt) is watermarked COPY.

8.1.4 Sandbox and rendering rules

Templates run in a sandbox:

- no `include`: the template loader is disabled;
- loops are bounded to 200,000 iterations in total and recursion to 32 levels;
- unknown variables evaluate to empty rather than raising an error (`StrictVariables` is off, relaxed member access is on);
- the page rendered by the browser cannot load anything from the network or disk: every request that is not `data:` or `about:` is aborted. Images, fonts and styles must therefore be inline or `data:` URIs. `company.logo` and `brand.mark` are provided as `data:` URIs for this reason;
- one page render may take `Rendering:RenderTimeoutSeconds` (default 120) and at most `Rendering:MaxConcurrentPages` (default 2) render at the same time per engine (section 8.5.4).

Formatting follows the culture of `run.language` (the item's language from the schedule, for example `fr` or `ar`); when no language is set, the invariant culture is used. This affects `money`, `number`, `date_fmt` and Scriban's own `date.to_string`.

8.1.5 The starter templates

Table per dataset (generic list). A header with the report name, the company name, the run date and the item label; the company logo on the right when the company has one; a line listing every variable with its

value; then one section per dataset with its row count and a table of all columns. Numeric cells are right-aligned and formatted with money; dates are printed as dd/MM/yyyy. This is also the layout used when the template is left empty.

Statement (header, lines with running balance, totals). Designed for a statement of account with two datasets, Header (one row) and Lines:

- the business partner box shows header.CardName (falling back to run.label, values.BusinessPartner, values.BP or values.CardCode), then header.CardCode and header.Address when present;
- the period box shows values.FromDate or values.PeriodStart to values.ToDate, values.PeriodEnd or values.AsOfDate, the issue date and header.Currency;
- the table lists datasets.Lines (or the first dataset when there is no Lines) with every column; a totals row prints header.Balance when the header has such a column;
- a note gives the line count, the generation time and, when the output is certified, the verification code.

Both starters are plain HTML with embedded CSS and can be edited freely; the model and helpers below are what they draw on.

8.2 The template model and helpers

The engine builds one model per file and pushes it as the global scope of the template. Member names are used as written (no renaming), so header.CardName and datasets.Lines keep the SAP column names of the dataset.

8.2.1 Objects

Member	Type	Content
company.name	text	The company name as entered under Companies .
company.logo	text or null	The company logo as a data: URI (image/png when the content type is unknown), or null when the company has no logo. Use it as .
report.code	text	The report code.
report.name	text	The report name.
run.date	date	The run instant (UTC).
run.label	text or null	The item label of the schedule item (for example the business partner name); null on an on-demand run.
run.recipient	text or null	The item's recipient address.
run.language	text or null	The item's language code; also selects the formatting culture.
run.verify_code	text or null	The verification code when the output is certified.
run.verify_url	text or null	{PublicUrl}/verify/{code} when a public URL is set, otherwise null.
run.watermark	text or null	The effective watermark (output setting, DRAFT or COPY).
brand.mark, brand.lockup	text	CertiReport mark and lockup as data: URIs.
brand.navy, brand.blue	text	The brand colours #0F2742 and #2F80ED.
values.<Name>	typed	Every variable of the report by name, with its typed value.
datasets.<Name>	array of	The rows of each dataset; each row is an object whose

Member	Type	Content
	objects	members are the columns.
<code>columns.<Name></code>	array of text	The column names of each dataset, in query order.
<code>rows</code>	array of objects	The rows of the first dataset (empty array when there is none).
<code>header</code>	object	The first row of the dataset named Header (case-insensitive); when there is no such dataset, the first row of the first dataset; an empty object when there are no rows.

Values are normalised before they reach the template: database nulls become null, `DateOnly` and `DateTimeOffset` values become dates, binary columns become base64 text, GUIDs become text and nested lists become arrays.

8.2.2 Helpers

Helper	Usage	Result
<code>money</code>	<code>{{ cell \ money }}</code>	The value with two decimals and thousands separators in the current culture; empty for null.
<code>number</code>	<code>{{ cell \ number 3 }}</code>	The value with the given number of decimals.
<code>date_fmt</code>	<code>{{ cell \ date_fmt "yyyy-MM-dd" }}</code>	A date formatted with a .NET format string; without a format, the culture's short date pattern. Non-dates are printed as text; null gives an empty string.
<code>is_date</code>	<code>{{ if (cell \ is_date) }}</code>	True for dates.
<code>is_number</code>	<code>{{ if (cell \ is_number) }}</code>	True for integer and decimal values.

Scriban's built-in functions are available as well; the starters use `date.to_string '%d %B %Y'`, `object.keys`, `array.first`, `.size` and the `??` operator.

8.2.3 Checking a template

A template that does not parse stops the run with *Template error*: followed by the Scriban messages. Run the report on demand from the designer (chapter 5) to check the result; the file is watermarked DRAFT until the version is published.

8.3 Certification and the verify page

8.3.1 Verification codes

When **Verification code and QR in the footer** is on, the engine generates a code for every PDF file: 12 random characters from the Crockford base-32 alphabet (0-9, A-Z without I, L, O and U), shown as XXXX-XXXX-XXXX. The code is printed in the footer with a QR code (error-correction level M) and stored with the file in run history together with the file's SHA-256 hash, size and whether it was signed. The hash is calculated after signing and encryption, so it identifies the file exactly as it was delivered.

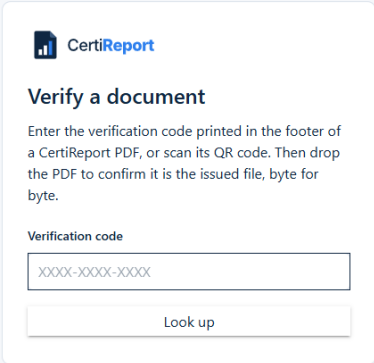
Codes typed or scanned by a user are normalised before lookup: letters are upper-cased, separators are ignored, and O, I and L are read as 0, 1 and 1.

8.3.2 Public URL

Administration › Settings › Public address › Public URL of the portal is the address printed in the verification link and encoded in the QR code, for example `https://reports.example.com`. With it, the footer shows `https://reports.example.com/verify/XXXX-XXXX-XXXX` and the QR code opens that page. Without it, the footer shows the code only and the QR code encodes the code itself. The setting must be an absolute `http` or `https` address; a trailing slash is removed.

8.3.3 The Verify a document page

The page `/verify` (and `/verify/{code}`, opened by the QR code) is public: it needs no sign-in and shows nothing but the facts below.



SAP Business One reporting

The public verification page after a successful lookup

1. Enter the code in **Verification code** (XXXX-XXXX-XXXX) and click **Look up**, or press Enter. Opening `/verify/{code}` looks the code up at once.
2. For a known code the page shows *Issued by <company>*, the report name (or the schedule name when the run belongs to a schedule) and the file name, *Issued <date> UTC · <size> KB*, whether the file is *Digitally signed* or *not digitally signed*, and the SHA-256 hash.
3. Under **Compare a file**, click **Choose the PDF you received** and select the file (up to 64 MB). The file is hashed on the server and not stored.
4. The result is either **Authentic**. *The file is identical to the one issued by <company>* or **Does not match**. *The file differs from the issued document. It may have been edited, re-saved, or belong to another code.*

An unknown or malformed code shows *No document was issued with this code. Check the characters (0 and O, 1 and l are the same), or contact the sender.*

The comparison is byte for byte: a PDF that was opened and re-saved by a reader, or that had a form field filled in, no longer matches even though its content looks the same.

8.3.4 The verification API

Route	Method	Purpose
/api/v1/verify/{code}	GET	Details of the document issued with the code: code, companyName, reportName, fileName, issuedAt, size, sha256, isSigned. 404 when the code is unknown.
/api/v1/verify/{code}	POST, multipart form with a file part	The same fields plus matches: whether the uploaded file's SHA-256 equals the issued file's. 404 when the code is unknown.

Both routes are anonymous and rate-limited to 30 requests per minute per client address (HTTP 429 beyond that). The code in the answer is the normalised form (XXXX-XXXX-XXXX). Nothing else about the run or the company is exposed, and the issued file itself is never returned.

8.4 Signing and open password

8.4.1 Certificate requirements

Signing uses a certificate installed on each engine server. On the company page (**Companies** › **company**), panel with the logo and certificate; chapter 4) enter the **Signing certificate thumbprint** and click **Check**. The requirements:

- the certificate must be in the Personal store (My) of the Local Machine; the engine also looks in the Personal store of the current user, which only helps when the service runs as that user;
- it must have a private key, and the service account of the CertiReport Engine (and of the Portal, for on-demand runs) needs read access to that key. In the Certificates console, use *All Tasks* › *Manage Private Keys* on the certificate and grant *Read* to the service account or gMSA;
- the thumbprint may be pasted with spaces or colons; non-hexadecimal characters are removed;
- expiry is reported by **Check** (*Found, but it has expired*) but does not stop signing.

Check answers one of: *No certificate: PDFs are not signed*, *No certificate with this thumbprint in the Local Machine or current user Personal store*, *Found, but its private key is not available to this account; grant the service account read access to the key*, *Found, but it has expired*, or *Found with a usable private key*, with the subject, issuer and expiry date. CertiReport.Engine.exe check (chapter 2) repeats the same check for every active company on the engine server.

8.4.2 What signing does

When **Sign with the company's certificate** is on and the certificate is found, the engine signs the PDF (SHA-256 digest) through PDFsharp with the reason *report name issued by company*, the location *company* and the application name *CertiReport*. The signature field is invisible (a 2 pt square in a corner of the first page); Acrobat and other readers show it in the signature panel and report the document as signed and unmodified. *isSigned* is recorded with the file and shown on the verify page.

When the output asks for a signature but it cannot be applied, the run item receives a warning and the file is delivered unsigned:

Warning	Cause
<i>The company's signing certificate was not found in the machine store; the PDF was not signed.</i>	The thumbprint on the company matches no certificate on the engine server.
<i>The signing certificate has no private key available to the service; the PDF was not signed.</i>	The certificate is there but the service account cannot read its private key.

A company without a thumbprint produces unsigned PDFs silently, whatever the output switch says.

8.4.3 Open password

Open password takes a Scriban expression that is evaluated against the same model as the template, for example `{{ header.LicTradNum }}` (the business partner's tax number from the Header dataset) or `{{ values.CardCode }}`. The trimmed result is the user password of the PDF; an empty result means no protection.

The file is encrypted with AES-256 (PDFsharp's encryption version 5). The user password opens the document; a random owner password is generated per file and discarded, and the permissions *modify document* and *annotations* are denied. Encryption and signing can be combined on the same output; both are applied in one pass after the page render, and the hash recorded for verification is taken from the finished file.

The password is not stored anywhere by CertiReport. Make sure the expression yields a value the recipient knows, and avoid it on outputs that go to a folder or destination where nobody can supply a password.

8.5 Crystal Reports: components and detection

8.5.1 How Crystal rendering works

Crystal layouts are rendered by a separate process, the Crystal sidecar `CertiReport.CrystalHost.exe` (64-bit) or `CertiReport.CrystalHost32.exe` (32-bit), a .NET Framework 4.8 program that uses the SAP Crystal Reports runtime for .NET Framework installed on the server. The engine starts one sidecar process per layout render, sends the request as JSON on standard input and reads the result from standard output; a crash in SAP's native runtime therefore fails only that file, not the engine. The sidecar replaces every database connection of the layout and its subreports with an ODBC connection to the company database before running it.

The sidecar is an optional feature of the installer (*Crystal Reports layouts*, feature `CrystalHost`), offered only when a Crystal runtime is registered on the machine. The setup does not ship SAP's runtime; install it from SAP (SAP Crystal Reports runtime engine for .NET Framework, 32-bit or 64-bit, any 13.0 service pack) before or after CertiReport. The sidecar binds at run time to whichever 13.0 assembly version is in the Global Assembly Cache (13.0.2000.0 up to SP 20, 13.0.3500.0 from SP 21, 13.0.4000.0 for recent packs), so no particular service pack is required.

8.5.2 Runtime detection

The engine reads the registry key `HKLM\SOFTWARE\SAP BusinessObjects\Crystal Reports for .NET Framework 4.0` in both registry views:

Runtime	Registry view	Version value
64-bit	64-bit view	<code>Crystal Reports\CRRuntime64Version (or Version)</code>
32-bit	32-bit view (WOW6432Node)	<code>Crystal Reports\CRRuntime32Version (or Version)</code>

A runtime counts only when its `Crystal Reports` subkey exists; the 64-bit setup leaves an almost empty key in the 32-bit view, which is ignored. When both runtimes are present the 64-bit sidecar is used; otherwise the sidecar that matches the registered runtime. The summary (*64-bit 13.0.40 and 32-bit ...*, or *no SAP Crystal Reports runtime for .NET Framework registered*) is shown under **Administration › Settings › Rendering** and by `CertiReport.Engine.exe` check.

8.5.3 Checking the installation

Administration › Settings › Rendering lists the **PDF browser** (*Found* with the path of the Chrome or Edge executable the engine would start, or *Not found* with “Install Microsoft Edge or Google Chrome on each engine server, or set Rendering:BrowserPath.”) and the **Crystal sidcar**:

- **Not installed**: the optional feature is not installed on this server (“Optional feature of the installer; needs the SAP Crystal Reports runtime for .NET Framework (32-bit or 64-bit, any 13.0 service pack).”);
- **Check** starts the sidcar with the `info` command and shows *Ready* with *Crystal runtime <file version>, <bitness>-bit; registered: <summary>; formats: <list>*, or *Problem* with the sidcar’s error.

The screenshot shows the 'Administration › Settings › Rendering' panel in the CertiReport interface. The left sidebar lists various system components, with 'Settings' highlighted. The main content area is divided into two sections. The top section, 'Webhook URL', contains a text field with 'wael.h@sapcandies.com' and a 'SAVE' button. Below it, a 'Signing secret' field is masked with dots. The bottom section, 'Bounce mailbox', has a toggle switch for 'Read the bounce mailbox' which is turned on. It includes a dropdown for 'Mail profile whose mailbox receives the notifications' set to 'Internal relay · support@certicons.com', an 'IMAP server' field with 'imap.office365.com', and a 'Port' dropdown set to '993'. There is also a 'Folder' field set to 'Inbox' and a 'Look back (days)' dropdown set to '7'. At the bottom of this section are 'SAVE', 'TEST MAILBOX', and 'CHECK NOW' buttons. A red error message at the very bottom of the panel reads: 'Could not read the mailbox: The requested name is valid, but no data of'.

Settings, Rendering panel with the PDF browser and the Crystal sidcar check

The checks run on the portal server; every engine server needs the same components. `CertiReport.Engine.exe` check performs them on the engine server and prints, for the sidcar, one of *Not installed (optional feature)*; *Crystal outputs are unavailable*, *.NET Framework 4.8 is required and not installed*, *No SAP Crystal Reports runtime for .NET Framework is installed (32-bit or 64-bit)*, or the runtime version, bitness and formats.

Formats listed by the check are those the runtime exports natively; a format followed by * (for example `xlsx*`) is only available through a fallback (section 8.8.2).

8.5.4 Configuration keys

Settings under **Rendering**: in `appsettings.json`, the registry (`HKLM\SOFTWARE\CertiReport` and `... \Engine`) or environment variables (chapter 10):

Key	Meaning	Default
<code>Rendering:BrowserPath</code>	Chromium-based browser executable for PDF output.	empty: Google Chrome, then Microsoft Edge, found through App Paths and the usual installation folders

Key	Meaning	Default
Rendering:MaxConcurrentPages	PDF pages rendered at the same time per engine.	2
Rendering:RenderTimeoutSeconds	Seconds one PDF page render may take.	120
Rendering:CrystalHostPath	Path of the sidecar executable.	empty: CrystalHost\CertiReport.CrystalHost.exe (or CertiReport.CrystalHost32.exe) next to the engine, or . . \Engine\CrystalHost seen from the portal
Rendering:CrystalTimeoutSeconds	Seconds one layout render may take before the sidecar is killed.	300

The browser is started once per process in headless mode (60 seconds to start) with a private user-data folder under %TEMP%\CertiReport\browser- <pid>, and restarted on the next render if it disconnects. Chrome is tried before Edge because Edge's headless mode is blocked by policy on some machines. Without any browser the item fails with *No Chromium-based browser found for PDF output. Install Google Chrome or Microsoft Edge on the engine server, or set Rendering:BrowserPath to a Chromium executable.*; when every candidate fails to start, with *No browser could be started for PDF output.* followed by the list of attempts.

8.5.5 Database connection for the sidecar

The sidecar reaches the company database over ODBC with the company's user name and password (the same read-only user as the datasets). The connection string is built from the company settings unless **Companies > <company> > Crystal Reports layouts > ODBC connection string for the Crystal sidecar** is filled in:

Platform	Default connection string
SAP HANA	DRIVER={HDBODBC};SERVERNODE=<server>;DATABASENAME=<tenant>;CURRENT SCHEMA=<schema> (the DATABASENAME part only when the company's additional options contain databaseName=...)
SQL Server	DRIVER={ODBC Driver 17 for SQL Server};SERVER=<server>;DATABASE=<database>

The ODBC driver named in the string must be installed on the engine server in the bitness of the sidecar (the 64-bit HANA client installs the 64-bit HDBODBC). Tables of the layout that are qualified with another schema, such as SAP's development schema in system layouts, are moved to the company schema; command tables are left untouched.

8.6 Layouts: from the company or from a file

8.6.1 The output editor

Choose one of the Crystal formats as the output's **Format**. The panel shows:

8.6.2 Layouts stored in the company

CertiReport lists the Crystal entries of the company's Report and Layout Manager: rows of table RDOC with `Category = 'C'` and a non-empty `Template`, joined to RTYP for the type name. Standalone reports (type RCRI) are listed first, then document and system layouts by type and name. Standalone reports run on their own; the other types are document layouts that expect `DocKey@` and `ObjectId@` (section 8.7.4).

A stored layout is referenced by its `DocCode` (1 to 8 letters, digits or underscores; anything else fails with *'<code>' is not a valid layout code*); the layout name at the time it was picked is kept for display. When a run needs the layout, the engine reads `RDOC.Template`, accepts the raw `.rpt` (an OLE compound file), the same as a hexadecimal string (with or without `0x`) or as base64, and writes it to the cache:

```
%ProgramData%\CertiReport\layouts\cache\<company id>\<DocCode>_<UpdateDate  
yyyyMMddHHmmss>.rpt
```

(`{Paths:Data}\layouts\cache` when the data folder was moved.) The file name includes the layout's `UpdateDate`, so a layout saved again in SAP Business One is fetched again on its next run and the older copies of the same `DocCode` are deleted. A `Template` in an unknown encoding fails with *The stored layout is not a Crystal Reports file (unknown encoding)*; a `DocCode` that is not a Crystal layout fails with *Layout <code> does not exist in <company> (or is not a Crystal layout)*.

Stored layouts always need a company: the schedule's company at run time, **Company to browse** in the designer.

8.6.3 Layout files

A file layout is any `.rpt` the engine server can read under the service account. The path is checked when the run starts (*Layout file not found on the engine server: <path>*). Keep layouts in a folder the service account can read, for example `%ProgramData%\CertiReport\layouts`; the path is the same for every engine server, so copy the file to each of them.

8.7 Parameters and the parameter map

8.7.1 How parameters are filled

Before rendering, the engine offers every report variable to the layout under the variable's own name, then applies the **Parameter map**. For each parameter of the layout the sidecar then looks for a value:

1. a supplied value under the full parameter name, or, for SAP Business One decorated names (`Items@SELECT * FROM OITM`), under the part before `@` with or without the `@` (`Items` or `Items@`);
2. otherwise an engine-filled value (section 8.7.2);
3. otherwise the layout's own default value (the first default, or all defaults for a multi-value parameter);
4. otherwise, when the parameter is not optional, the run fails with *Missing parameter values: <names>. Map them in the Crystal output of the report*.

Parameters that belong to a subreport link are fed by the main report and are skipped.

Values are converted to the parameter's type: dates from a date value or from text in ISO (`2026-10-29`, `2026-10-29T08:00:00`), day-first (`29/10/2026`, `29.10.2026`, `29-10-2026`, `29102026`), `yyyyMMdd`, `MM/dd/yyyy` or time formats, and failing those any date the invariant culture or the server's own culture can read (an unreadable date fails with *'<text>' for <parameter> is not a date; use 2026-10-29, 29/10/2026 or 29.10.2026*); numbers and currency to decimal; booleans from `true/false`; everything else to text. A list variable fills a multi-value parameter; for a single-value parameter the first element is used.

8.7.2 Parameters filled by the engine

SAP Business One fills these parameters itself when it prints a layout; the sidecar does the same, so they need no mapping and are shown as *filled by the engine*:

Parameter	Value
Schema@	The company schema or database name.
UserCode@, PrintByUserName@	CertiReport
ExtParam@, Package@	empty
ObjectID@	The value mapped for ObjectID@ (case difference in some layouts).
<Name>@JOINFROM <table> where ...	1=1 (select everything) unless mapped.

8.7.3 Reading the layout's parameters

Click **Read layout parameters** (enabled once a layout is picked or a path entered). For a stored layout, **Company to browse** must be set. The table (**Parameter, Type, Mapping**) lists each parameter with its short name (an ellipsis @... marks a decorated SAP name; the full prompt text is shown as a tooltip), its type (String, Number, Currency, Date, DateTime, Time, Boolean, with *list* for multi-value and *range* for range parameters) and its mapping state:

State	Meaning
<i>from subreport <name></i>	Linked from the main report; nothing to do.
<i>filled by the engine</i>	One of the parameters of section 8.7.2.
mapped	A line of the parameter map names it (full or short name).
<i>variable <name></i>	No mapping, but a report variable has the same short name and will be used.
<i>layout default</i>	No mapping and no variable, but the layout has a default or the prompt is optional.
needs a mapping	None of the above: the run will fail until a map line is added.

Below the table, *Tables: ...* lists the first twelve tables (or command <alias> entries) of the layout, with an ellipsis when there are more. The sidecar never echoes the password stored in a system layout's connection string.

8.7.4 Map line forms

Each line of **Parameter map** is CrystalParameter=Value; lines without = are ignored, leading and trailing spaces are trimmed, parameter names are matched case-insensitively, and the part before @ of a decorated name is enough. The right-hand side takes three forms:

Form	Example	Meaning
Variable name	CardCode=BP	The value of variable BP.
Literal in quotes	ObjectId@='13' or ObjectId@="13"	The text between the quotes. Single and double quotes are both accepted (since 1.20.1; earlier versions took double quotes only); the opening and closing quote must match.
Range From..To	Period=FromDate..ToDate	A range parameter from the first value to the second; either side may be a variable, a quoted literal or

Form	Example	Meaning
		empty for an open bound (Period=FromDate..).

A variable name that does not exist supplies no value: the parameter then falls back to the engine-filled value, the layout default or *Missing parameter values* (section 8.7.1), exactly as if the line were absent.

Document layouts: DocKey@ and ObjectId@. Document layouts (invoice, order, delivery and so on) select the document through two parameters. DocKey@ is the DocEntry of the document and ObjectId@ the SAP Business One object type. A report that prints the AR invoice layout INV20004 (*AR Invoice (Item) - CR (GB)*) therefore has a dataset such as `SELECT ... FROM OINV WHERE "DocEntry" = @DocEntry`, an integer variable DocEntry and the map

```
DocKey@=DocEntry
ObjectId@="13"
```

The layout then renders the invoice with its lines, totals and subreports. The object types of the common documents:

Document	ObjectId@
AR invoice	13
Sales order	17
Delivery	15
AR credit memo	14
Purchase order	22
AP invoice	18
Incoming payment	24

A schedule that iterates over documents (chapter 6) binds DocEntry to each document in turn and produces one file per document.

8.8 Formats, file names and limitations

8.8.1 One render, several formats

Outputs that share the same layout and parameter map are rendered by one sidecar call: the query runs once and every requested format is exported from the same result. The sidecar answers with the page count and a detail line *connections replaced: <n>; parameters: <list>*; the detail reaches the run item as a warning only when a format had to be replaced (section 8.8.2). Schedules can restrict which formats of a report they deliver (chapter 6); only the formats asked for are produced.

File names follow the output's **File name** template (or the schedule's file-name template, chapter 6) with the extension of the produced format; a fan-out item adds its key before the extension unless the name already contains it. When two outputs of a run would produce the same name (for example *Excel, as printed* and *Excel, data only* from the same template), the later one gets a tag before the extension: *_printed*, *_data*, *_layout* (Crystal PDF) or the format name, then a number when still not unique.

Crystal files are recorded in run history with their SHA-256 hash and size like any other file, but they carry no verification code and no signature: certification and signing apply to HTML-template PDFs only.

8.8.2 Formats and fallbacks

Format	Crystal export type tried, in order	Extension
pdf	PortableDocFormat	.pdf
xlsx (as printed)	XLSXPagebased, then ExcelWorkbook, then Excel	.xlsx, .xlsx, .xls

Format	Crystal export type tried, in order	Extension
xlsxData (data only)	XLSXRecord, then ExcelWorkbook, then ExcelRecord	.xlsx, .xlsx, .xls
xls	Excel, then ExcelRecord	.xls
csv	CharacterSeparatedValues	.csv

Older runtimes lack the page-based and record-based XLSX exports. The sidecar then takes the next export type in the row, changes the extension accordingly, and the run item receives the warning *Crystal: ... <format> exported as <type> (older runtime)*. A format with no candidate at all fails with *The installed Crystal runtime cannot export <format>*.

8.8.3 Timeouts and errors

Message	Cause
<i>The Crystal sidecar is not installed (<path>). Select the Crystal Reports feature in the installer.</i>	The executable is missing on the engine server.
<i>No SAP Crystal Reports runtime for .NET Framework is installed on this server (32-bit or 64-bit).</i>	No runtime is registered (section 8.5.2).
<i>The SAP Crystal Reports runtime for .NET Framework (64-bit) is not installed on this server (CrystalDecisions.... not found).</i>	The sidecar started but could not load SAP's assemblies in its bitness.
<i>The Crystal render did not finish within <n> seconds.</i>	Rendering:CrystalTimeoutSeconds elapsed; the sidecar process tree is killed.
<i>The Crystal sidecar exited with code <n>: ...</i>	The process ended without a JSON answer; the text is its standard error.
<i>The Crystal output has no layout: pick one from the company or enter an .rpt path.</i>	Neither a stored layout nor a file path is set.
<i>A layout stored in the company needs a company to load it from.</i>	A stored layout was described or run without a company.
<i>Layout file not found on the engine server: <path> / Layout not found: <path></i>	The .rpt path does not exist for the engine (or, from the sidecar, for the portal server).
<i>Missing parameter values: <names>. Map them in the Crystal output of the report.</i>	A required parameter has no mapping, no variable of the same name and no layout default (section 8.7.1).
<i>The installed Crystal runtime cannot export <format>.</i>	No export type of the format row is available (section 8.8.2).

In run history these messages appear in the item's note prefixed with *Crystal:*.

8.8.4 Limitations

- **Print proxy layouts.** Layouts that depend on SAP Business One's print proxy, that is system reports fed from the PLD__ITEMS table that the client fills before printing, do not run outside Business One. Document layouts that read the document tables directly (such as the standard INV20004) do run.
- **Connections.** Every connection in the layout is replaced by the company's ODBC connection; a layout that deliberately reads a second database cannot be rendered.
- **Bitness.** The ODBC driver must exist in the sidecar's bitness; a 64-bit runtime cannot use a 32-bit-only driver.
- **No certification.** Crystal files carry no verification code and are not signed (section 8.8.1).

- **Engine servers.** File layouts, the sidecar, the runtime and the ODBC driver must be present on every engine server that may run the schedule.

9. Administration

The **Administration** group of the navigation holds the pages an administrator uses to run the installation: users and roles, API keys, mail profiles, delivery destinations, the bounce list, portal-wide settings, the configuration transfer between systems and the audit log. The Excel themes and templates and the business calendars live in the same part of the menu; themes and templates are summarised in section 9.7 and described in chapter 5, calendars in chapter 6, companies and licensing in chapter 4.

Page	Route	Permission needed
Users	/admin/users	users.manage
API keys	/admin/api-keys	users.manage
Mail profiles	/admin/mail	smtp.manage
Destinations	/admin/destinations	smtp.manage
Bounces	/admin/bounces	smtp.manage
Settings	/admin/settings	users.manage
Export and import	/admin/transfer	users.manage
Audit log	/admin/audit	audit.view
Excel themes, Excel templates	/admin/excel-themes, /admin/excel-templates	reports.design
Business calendars (chapter 6)	/admin/calendars	schedules.manage
Companies (chapter 4)	/admin/companies	companies.view to see, companies.manage to edit
License (chapter 4)	/admin/license	users.manage

Every change made on these pages is written to the audit log (section 9.9); secrets (passwords, client secrets, private keys, webhook URLs) are stored encrypted with the Data Protection key ring and never shown again.

9.1 Users and roles

9.1.1 Roles and permissions

CertiReport has six fixed roles. A user or an API key holds any combination of them; the permissions of the roles add up.

Role	Description shown in the portal
Administrator	Full access, including users, companies and mail settings.
Report designer	Creates and edits reports and their SQL.
Scheduler	Creates and manages schedules.
Runner	Runs reports on demand.
Viewer	Sees run history and downloads output.
Auditor	Reads the audit log and run history; changes nothing.

The permissions each role grants:

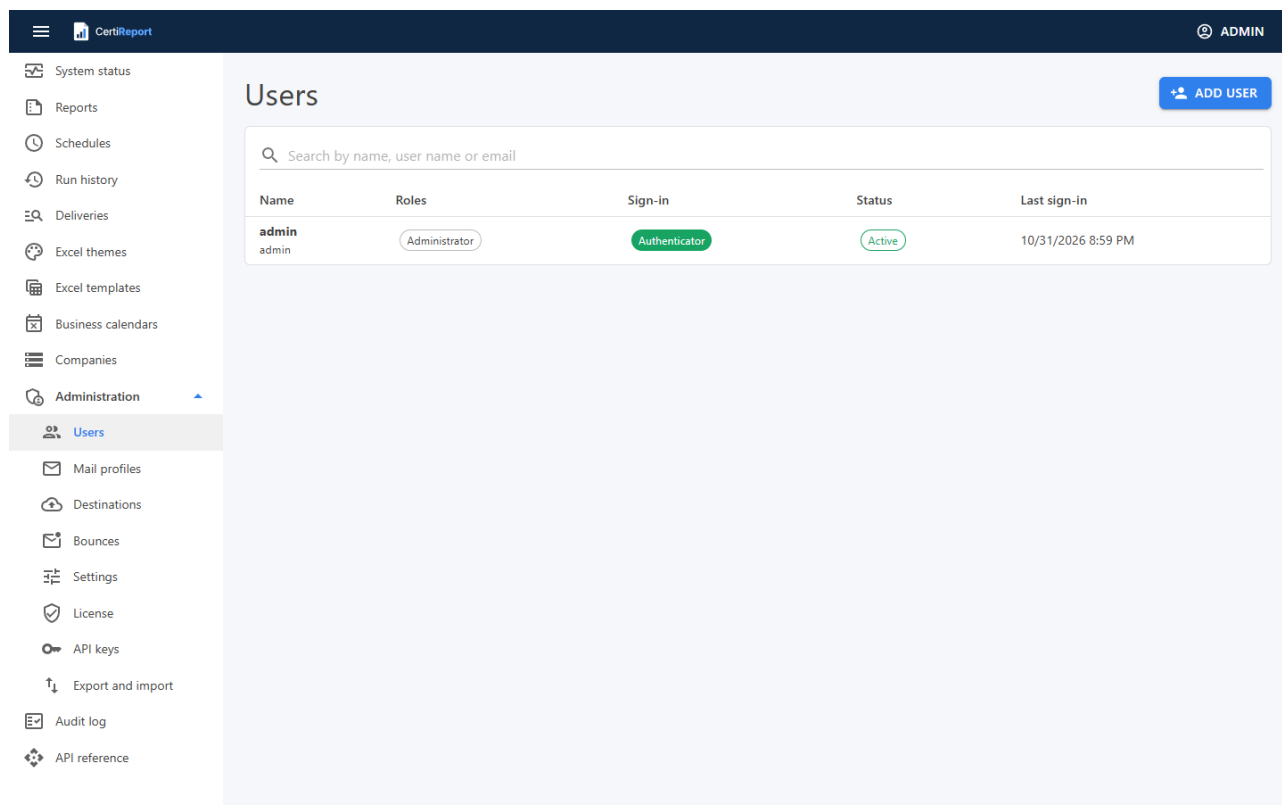
Permission	What it allows	Administrator	Report designer	Scheduler	Runner	Viewer	Auditor
system	Dashboard and system status,	yes	yes	yes	yes	yes	yes

Permission	What it allows	Administrator	Report designer	Scheduler	Runner	Viewer	Auditor
m.view	/metrics						
users.manage	Users, API keys, settings, export and import	yes	—	—	—	—	—
companies.view	See companies (for example to pick one in the designer)	yes	yes	yes	—	—	—
companies.manage	Create and edit companies, licensing	yes	—	—	—	—	—
smtp.manage	Mail profiles, destinations, bounces	yes	—	—	—	—	—
audit.view	Audit log	yes	—	—	—	—	yes
reports.design	Report designer, Excel themes and templates	yes	yes	—	—	—	—
reports.run	Run reports on demand	yes	yes	yes	yes	—	—
schedules.manage	Schedules	yes	—	yes	—	—	—
runs.view	Run history, deliveries, downloads	yes	yes	yes	yes	yes	yes
runs.approve	Approve or reject a run held by <i>Require approval before sending</i>	yes	—	yes	—	—	—

The permissions are the authorisation policies of the portal pages and the API; a page or route is available when at least one of the caller's roles grants its permission.

9.1.2 The Users page

Administration › Users lists every account with its display name, user name and e-mail, its roles, how it signs in (*Authenticator* when the authenticator app is set up, *Password only* otherwise, plus a *Windows* chip when a Windows account is linked), its status (*Active*, *Locked out*, *Deactivated*) and the last sign-in. The search box filters by name, user name or e-mail. Click a row to open the account.



Administration, Users list

9.1.3 Creating a user

1. Click **Add user**.
2. Fill in **User name** and **Display name**.
3. Optionally enter **Email**. It is used for *Sign in with Microsoft* (the Entra account's e-mail address must match an active user) and for sending reports to this user.
4. Optionally enter **Windows account** as DOMAIN\user for *Sign in with Windows*.
5. Leave **Active** on.
6. Tick the roles. A new account starts with **Viewer**.
7. Click **Create user**.

The page then shows *Temporary password for <user name>* in a box: 16 characters with at least one capital, one lower-case letter and one digit, generated once and shown only now. Hand it to the user; they must change it at first sign-in (chapter 3). The password is not sent by e-mail.

Users who sign in with Windows or Microsoft only still receive a temporary password; they do not need it unless they also sign in with a password.

9.1.4 Editing an account

Open the account to change its fields and roles and click **Save changes**. Switching **Active** off deactivates the account: it can no longer sign in, and Windows or Microsoft sign-in with its account is refused (*Your Windows account is not linked to an active CertiReport user*). The **Account actions** panel offers:

Button	Effect
Reset password	After confirmation, generates a new temporary password (shown once) and makes the user change it at the next sign-in. The current password stops working.
Reset authenticator	After confirmation, removes the user's authenticator app. The user is asked

Button	Effect
	to set it up again at the next sign-in (section 9.1.5).
Unlock	Lifts the lock-out that five failed sign-ins impose for 15 minutes and resets the failed-attempt counter.
Sign out everywhere	After confirmation (<i>End all of <name>'s open sessions?</i>), ends all the user's open sessions; the sign-out takes effect within a minute.

Every action is recorded in the audit log under entity type *User* (actions *PasswordReset*, *MfaReset*, *Unlocked*, *SignedOutEverywhere*).

9.1.5 Resetting MFA

When a user has lost the phone with the authenticator app:

1. Open **Administration** › **Users**, then the user's account.
2. Click **Reset authenticator** and confirm *Remove <name>'s authenticator app? They will set it up again at next sign-in.*
3. Tell the user to sign in with their password; the portal walks them through pairing a new authenticator (chapter 3).

If the user has also forgotten the password, click **Reset password** as well and hand over the temporary password.

9.2 API keys

API keys let other systems call the HTTP API (chapter 10): list schedules, queue a run or a test send, read run history, download the configuration bundle, scrape `/metrics`. A key is sent in the `X-Api-Key` header, or as `Authorization: ApiKey <key>`. The **API reference** link on the page opens `/api/docs`.

The screenshot shows the 'API keys' management interface in the CertiReport Administration portal. The sidebar on the left contains various system management options, with 'API keys' highlighted. The main content area features a 'New key' form with fields for 'Name' (set to 'Integration server'), 'Expires' (set to 'In a year'), and 'Roles' (with 'Scheduler' selected). Below the form is a table listing existing API keys.

Name	Key	Roles	Created	Expires	Last used	
Verification key	cr_359B6sjh...	Scheduler	10/30/2026 admin	10/30/2027	10/30/2026 6:44 PM	DISABLE DELETE

Administration, API keys with a newly created key

9.2.1 Creating a key

1. Open **Administration** › **API keys** and click **Create key**.
2. Enter a **Name** (for example *Integration server*).
3. Choose **Expires**: *In 30 days*, *In 90 days*, *In a year* (the default) or *Never*.
4. Tick the **Roles** the key should carry. The default is **Scheduler**; the roles grant exactly the permissions of section 9.1.1, so a key that only reads run history needs **Viewer**, a key that queues runs **Scheduler** or **Runner**, a key that exports the configuration **Administrator**, and a key for Prometheus any role (all grant `system.view`).
5. Click **Create**.

The key is shown once in a green box: *Copy the key now. It is shown only once; CertiReport stores a hash of it.* Use the copy icon or select the text. The box also shows an example call:

```
curl -H "X-API-Key: cr_..." https://reports.example.com/api/v1/schedules
```

Keys have the form `cr_` followed by 40 random characters. CertiReport stores the SHA-256 hash and the first 11 characters (the prefix shown in the list as `cr_XXXXXXXXXX...`); the full value cannot be recovered. If it is lost, create a new key and delete the old one.

9.2.2 Managing keys

The list shows each key's name, prefix, roles, creation date and creator, expiry (*Never* when none), last use, and the chips *Disabled* or *Expired*. **Disable** stops the key at once without deleting it; **Enable** restores it. **Delete** asks for confirmation (*Requests with this key stop working at once*) and removes it. An expired, disabled or unknown key is refused with HTTP 401; a successful use updates *Last used* (at most once a minute). Creating, enabling, disabling and deleting a key are recorded in the audit log under entity type *ApiKey*.

9.3 Mail profiles

A mail profile is a mail server and a sender address that schedules deliver through; it is also used for failure alerts, the weekly digest, approval notifications and licence notices. **Administration** › **Mail profiles** lists the profiles with their **Priority**, name (with *Default* and *Disabled* chips), server (host : port, or *Microsoft Graph*), sign-in kind (*None (relay)*, *Password*, *Microsoft OAuth2*), **From** address and the result of the last test (*OK*, *Failed*, *Not tested*). Lower priority numbers are tried first.

- System status
- Reports
- Schedules
- Run history
- Deliveries
- Excel themes
- Excel templates
- Business calendars
- Companies
- Administration
 - Users
 - Mail profiles**
 - Destinations
 - Bounces
 - Settings
 - License
 - API keys
 - Export and import
 - Audit log
 - API reference

9.3.1 Fields of a profile

Field	Meaning	Default
Name	Shown in schedules and settings.	–
Send through	SMTP server or Microsoft Graph (Microsoft 365, over HTTPS) .	SMTP server
Server, Port	SMTP host and port.	–, 587
Encryption	<i>Automatic (STARTTLS, or TLS on port 465), STARTTLS, required, STARTTLS when offered, TLS from the start (port 465), None.</i>	Automatic
Sign-in	<i>User name and password, None (anonymous relay) (SMTP only) or Microsoft Entra app (OAuth2).</i> Microsoft Graph requires the Entra app.	User name and password

Field	Meaning	Default
Tenant ID, Application (client) ID	For the Entra app: the directory ID or domain (contoso.onmicrosoft.com) and the application ID (a GUID).	–
User name / Mailbox	The SMTP user, or, for SMTP with OAuth2, the mailbox to send as (defaults to the From address).	–
Password / Client secret	Stored encrypted; when editing, leave it empty to keep the stored value.	–
From address, From name, Reply-to	The sender as recipients see it.	–
Messages per minute	Sending rate the outbox respects for this profile (1 to 10,000).	30
Recipients per day	Daily cap (1 to 1,000,000).	10,000
Max attachment size (MB)	Limit per message (1 to 150); schedules decide what happens above it (chapter 6).	20
Priority	Lower is tried first when a schedule has no profile of its own (1 to 1000).	100
Timeout (seconds)	SMTP timeout (5 to 600). SMTP only.	60
HELO name	Name announced to the SMTP server; empty uses the machine name. SMTP only.	empty
Validate the server's certificate	Turn off only for an internal relay with a private certificate; a warning is shown while it is off. SMTP only.	on
Default profile for new schedules	Only one profile is the default; setting it clears the flag on the others. The default profile also sends alerts and digests.	off
Enabled	Disabled profiles are not used for sending.	on

9.3.2 Presets

On a new profile, **Start from a preset** fills the typical values:

Preset	Sets
Microsoft 365 (Graph)	Microsoft Graph transport, Entra app sign-in, 30 messages per minute, 10,000 recipients per day.
Microsoft 365 (SMTP OAuth2)	SMTP smtp.office365.com:587, STARTTLS required, Entra app sign-in, the same limits.
Google Workspace	SMTP smtp.gmail.com:587, STARTTLS required, user name and password, 20 messages per minute, 2,000 recipients per day. Google requires an app password (2-step verification on).
Internal relay	SMTP port 25, STARTTLS when offered, no sign-in.

9.3.3 Configuring SMTP

1. Click **Add profile**, optionally pick a preset.
2. Enter **Name**, keep **Send through** at *SMTP server*, fill **Server** and **Port** and choose the **Encryption**.
3. Under **Sign-in** choose *User name and password* and enter both, or *None (anonymous relay)* for a relay that accepts the engine server's address.
4. Enter **From address**, **From name** and, if replies should go elsewhere, **Reply-to**.

5. Open **Limits and advanced settings** if the provider imposes a rate or the relay uses a private certificate.
6. Click **Test sign-in**, then **Send test message** (section 9.3.5).
7. Switch on **Default profile for new schedules** for the main profile and click **Add profile**.

9.3.4 Configuring Microsoft 365

Both Microsoft 365 variants use an application registered in Microsoft Entra ID with a client secret (client-credentials flow, no user signs in). In the Entra admin centre: register an application, create a client secret, note the directory (tenant) ID and the application (client) ID, then grant the application permission the transport needs and give admin consent:

Transport	Application permission	Also needed
Microsoft Graph	Mail.Send	Limit the app to the sender mailbox with an Exchange Online application access policy. The message is posted to <code>https://graph.microsoft.com/v1.0/users/<From address>/sendMail</code> as a MIME message, so attachments and headers travel unchanged.
SMTP (OAuth2)	SMTP.SendAsApp	SMTP AUTH must be enabled for the mailbox, and the app's service principal must be granted access to the mailbox in Exchange Online. Token scope <code>https://outlook.office365.com/.default</code> .

Then in CertiReport:

1. Click **Add profile** and choose **Microsoft 365 (Graph)** or **Microsoft 365 (SMTP OAuth2)**.
2. Enter **Tenant ID** and **Application (client) ID**; the info box repeats which permission the app needs.
3. Enter the **Client secret** (stored encrypted).
4. For the SMTP variant, set **Mailbox** when the mailbox to send as differs from the From address.
5. Enter **From address** (a mailbox the app may send from) and **From name**.
6. **Test sign-in**: for Graph this acquires a token and reports *Token acquired; the app may send mail through Microsoft Graph*; then **Send test message**.

If the bounce mailbox (section 9.6.6) is to be read through the same app, it also needs `Mail.ReadWrite` on the sender mailbox.

9.3.5 Testing a mail profile

The **Test** panel works on the values currently in the form, saved or not (the form must be complete; otherwise *Complete the profile first: ...*):

- **Test sign-in** connects and authenticates without sending.
- **Send a test message to** is prefilled with your own e-mail address; **Send test message** sends a short message through the profile. The test is recorded in the audit log (*TestMessageSent*).

The result is shown as a green or red bar with a **Transcript** (passwords removed): the SMTP dialogue or the Graph request and response, which is what to send to the mail administrator when a test fails. Each test updates the *Last test* column of the list.

Delete on an existing profile asks for confirmation. A profile that still has messages in the outbox cannot be deleted (*Messages in the outbox use this profile. Disable it instead.*); switch **Enabled** off and delete it once the retention has removed the messages.

9.3.6 Which profile sends

A schedule names its mail profile on the Delivery tab (chapter 6); a new schedule is preset with the default profile. When a message names no profile, the outbox picks one among the enabled profiles: the default profile first, then the lowest **Priority** number. A profile that is named by a schedule is used even when it is disabled, which is why the schedule checks refuse to save a schedule whose profile is disabled (*Mail profile '...' is disabled.*). Disable a profile to keep its settings while taking a server out of the automatic choice; when no enabled profile is left, messages are dead-lettered with *No enabled mail profile*.

Situation	Profile used
Schedule with a profile	That profile.
Schedule without a profile	The default profile; when none is marked default, the enabled profile with the lowest priority number.
Failure alerts, approval mails	The profile of the schedule the run belongs to, otherwise the default profile (same fallback).
Licence notices	The default profile (same fallback).
Weekly digest	The profile chosen under Settings › Weekly digest , otherwise the default profile.
Bounce mailbox	The profile chosen under Settings › Bounce mailbox ; its mailbox is read, nothing is sent.

9.4 Destinations

Destinations are named places a schedule can deliver to besides e-mail and folders: an SFTP server, a SharePoint document library, or a Microsoft Teams channel. They are picked on the schedule's Delivery tab (chapter 6); the schedule adds the folder template (`statements/{RunDate:yyyy}/{Label}`) under which files are placed. **Administration › Destinations** lists each destination with its kind, a summary of where it points, how many schedules use it, and the last test result.

Administration, destination editor

Common to every kind: **Name**, **Kind** (fixed once the destination is saved), **Enabled**, and under **Advanced** the **Timeout (seconds)** (5 to 600, default 60). Transient failures at delivery time are retried twice (after 5 and 30 seconds) before the run item is marked as failed.

9.4.1 Adding an SFTP server

1. Click **Add destination**, enter a **Name** and choose **SFTP server: upload the report files**.
2. Enter **Host** and **Port** (default 22) and the **User name**.
3. Choose the **Sign-in: Password** with the **Password**, or **Private key** with the **Private key (PEM)** pasted into the field (OpenSSH or PKCS#8 format) and, when the key is protected, its **Key passphrase**. Both are stored encrypted; when editing, leave them empty to keep the stored values.
4. Enter the **Base folder** (for example /reports); schedules put their files under it, and an empty value means the account's home folder.
5. Optionally enter the **Host key fingerprint (SHA256)** as `ssh-keygen -l -f key.pub` shows it (SHA256:...). When set, the connection is refused unless the server's key matches (*The server's host key does not match the configured fingerprint*); the comparison ignores the SHA256: prefix, padding and case. When empty, any host key is accepted.
6. Click **Test destination**: it signs in and makes sure the base folder exists. Then **Add destination**.

9.4.2 Adding a SharePoint library

Uploads go through Microsoft Graph with an Entra application (client credentials). Register the application as for Microsoft 365 mail (section 9.3.4) and grant it the application permission `Sites.Selected` with write access granted on the site, or `Sites.ReadWrite.All`, with admin consent.

1. Click **Add destination**, enter a **Name** and choose **SharePoint document library: upload the report files**.
2. Enter the **Site URL** (<https://contoso.sharepoint.com/sites/finance>; must be https).
3. Enter the **Document library** name as shown in SharePoint; empty uses the site's default library.
4. Enter **Tenant ID, Application (client) ID** (a GUID) and the **Client secret**.
5. Click **Test destination**: it signs in with the app and looks up the site and the library. Then **Add destination**.

At delivery time the engine creates each missing folder level of the schedule's folder template, uploads the files (large files in upload sessions, chunk by chunk) and records the folder's web address on the run item.

9.4.3 Adding a Teams channel

1. In Teams, add the **Workflows** app to the channel and choose *Post to a channel when a webhook request is received*, or create a classic incoming webhook. Copy the URL.
2. In CertiReport click **Add destination**, enter a **Name** and choose **Microsoft Teams channel: post a card per item**.
3. Paste the **Webhook URL** (must start with <https://>). It carries the channel's token and is stored encrypted; when editing, leave it empty to keep the stored URL.
4. Click **Test destination**: it posts a test card to the channel. Then **Add destination**.

Each run item posts one Adaptive Card (version 1.4, understood by both webhook kinds) with the subject as title, the message as text, company, schedule and item facts, the file names and a link to the run when the public URL (section 9.6.1) is set. The files themselves stay in run history; nothing is attached to the card.

9.4.4 Testing and deleting

Test destination checks the values in the form (the form must be complete; otherwise *Complete the destination first: ...*) and records the attempt in the audit log (*Tested*) and in the *Last test* column, with the time it took. **Delete** asks for confirmation; a destination that schedules still deliver to cannot be deleted (*Schedules deliver to this destination: <names>. Change them first.*). A schedule whose destination is disabled is saved with a warning and its runs fail until the destination is enabled again.

9.5 Bounces

Administration › Bounces shows what the bounce mailbox (section 9.6.6) has read and the addresses CertiReport no longer mails. **Check the mailbox now** reads the mailbox immediately and reports *<n> message(s) read, <n> notification(s), <n> matched to sent mail, <n> suppressed*; each check is recorded in the audit log (*BounceMailbox Checked*).

Administration › Settings holds the portal-wide settings in the metadata database and the rendering checks. Four groups have their own **Save** button: the general settings in the left column (public address, retention, failure alerts and webhook, saved together by the **Save** at the foot of the panel), the weekly digest inside that panel (its own **Save**, **Send now** and **Preview**), the bounce mailbox below it, and the backups in the right column (section 9.6.8, chapter 2). The rendering checks (section 9.6.7) are read-only.

Public URL of the portal (Portal:PublicUrl) is the address users and recipients reach the portal at, for example `https://reports.example.com`. It is printed in the verification link and QR code of certified PDFs (chapter 8), used for the download links of schedules that send links instead of attachments, and for

the links in failure alerts, digests, approval mails and Teams cards. It must be an absolute http or https address; a trailing slash is removed. Leave it empty to print the verification code only.

9.6.2 Retention

Field	Setting key	Default	Effect
Keep runs and files (days)	Retention:RunDays	400	Runs older than this are deleted with their items, files, folders and outbox messages.
Keep sent mail (days)	Retention:OutboxDays	90	Sent or dead-lettered outbox messages older than this are deleted.

Both accept 1 to 3650 days. The engine's housekeeping applies them every 15 minutes, also deleting files whose own expiry has passed. Shortening the retention takes effect at the next housekeeping run and cannot be undone.

9.6.3 Failure alerts

Alert e-mail addresses (Alerts:Recipients) receive an e-mail through the default mail profile when a run fails; separate addresses with ; or ,. The switch **Also when some items of a run fail or are skipped by error** (Alerts:OnPartial, on by default) extends this to runs that completed with failed or skipped items. The message has the subject [CertiReport] <status>: <schedule>, summarises how many items failed (*All 12 item(s) failed, 3 of 12 item(s) failed, 1 skipped*), lists up to 25 items with their errors and links to the run. Leave the field empty for no alerts.

9.6.4 Weekly digest

The digest is one e-mail per week with the week's runs by status, items delivered, skipped, failed and rejected, e-mails sent and not delivered, hard bounces, files produced, a table per schedule, the runs with failures and the runs awaiting approval, each with a link to the portal.

Field	Default
Send a weekly delivery digest	off
Digest e-mail addresses	– (separate with ;)
Day	Monday
After (hour)	7 (server local time; the engine sends once the hour has passed on that day)
Mail profile	empty: the default profile

Save stores the digest settings (Digest:Settings). **Send now** saves and queues the digest at once (*Digest queued; the engine sends it within a minute*). **Preview** shows the subject and the text of the digest that would be sent, without sending it.

9.6.5 Webhook

Webhook URL (Webhooks:Url): after every run the engine posts a JSON summary with the event run.completed to this http or https address. **Signing secret** (Webhooks:Secret, stored encrypted): when set, each post carries the header X-CertiReport-Signature: sha256=<HMAC-SHA256 of the body> so the receiver can verify it. Leave the URL empty to disable the webhook.

9.6.6 Bounce mailbox

The engine can read delivery status notifications from the mailbox that sends the reports, every 10 minutes, mark the run item's e-mail as bounced or delayed, and suppress addresses that bounce hard (section 9.5).

1. Switch on **Read the bounce mailbox**.
2. Pick the **Mail profile whose mailbox receives the notifications**. Only enabled profiles are offered.
3. For an SMTP profile, enter the **IMAP server** and **Port** (default 993). The mailbox is read with the profile's user name and password; an empty server is guessed from the SMTP host (smtp.office365.com and smtp-mail.outlook.com become outlook.office365.com, smtp.<domain> becomes imap.<domain>). For a Microsoft Graph profile the mailbox is read through Graph with the profile's app, which then needs the Mail.ReadWrite application permission on the sender mailbox.
4. Set the **Folder** (empty means the inbox) and **Look back (days)** (1 to 90, default 7): on the first check, notifications older than this are ignored.
5. Keep **Stop mailing an address after a hard bounce** on unless hard bounces must not suppress addresses.
6. Click **Save**. **Test mailbox** signs in and opens the folder; **Check now** saves and reads the mailbox immediately.

9.6.7 Rendering

The **Rendering** panel shows whether a **PDF browser** (Google Chrome or Microsoft Edge) is installed on the portal server (*Found or Not found*) and lets you **Check** the **Crystal sidecar** (*Not installed, Ready* with the runtime version, bitness and formats, or *Problem*). Chapter 8 describes both; as the panel says, these checks run on the portal server and engine servers need the same components.

9.6.8 Backups

The **Backups** panel (described in chapter 2) saves the settings the engine's nightly backup and the backup command use (Backups:Settings):

Field	Default
Backup folder	empty: %ProgramData%\CertiReport\backups; otherwise an absolute local or UNC path the service account can write to
Archives to keep	14 (1 to 365)
Nightly at (hour)	2 (server local time)
Back up every night	off
Include the generated report files	on

Back up now writes one archive immediately and the panel lists the archives in the folder with their size and time. Backups are recorded in the audit log under *Backup*.

9.7 Excel themes and templates

Both pages need the reports.design permission and are part of the report designer's world; chapter 5 describes how an Excel output uses them.

Excel themes (/admin/excel-themes) define how Excel outputs look: colours, fonts, borders, number and date formats, title block, totals row, freeze and filter options, clean-up rules (readable captions for SAP field names, hidden columns) and print setup. The list shows the built-in themes, which one is the **Default** (used by outputs that pick none), and how many outputs use each. **New theme from** creates a theme based on an existing one; **Copy** duplicates a theme; **Make default** changes the default.

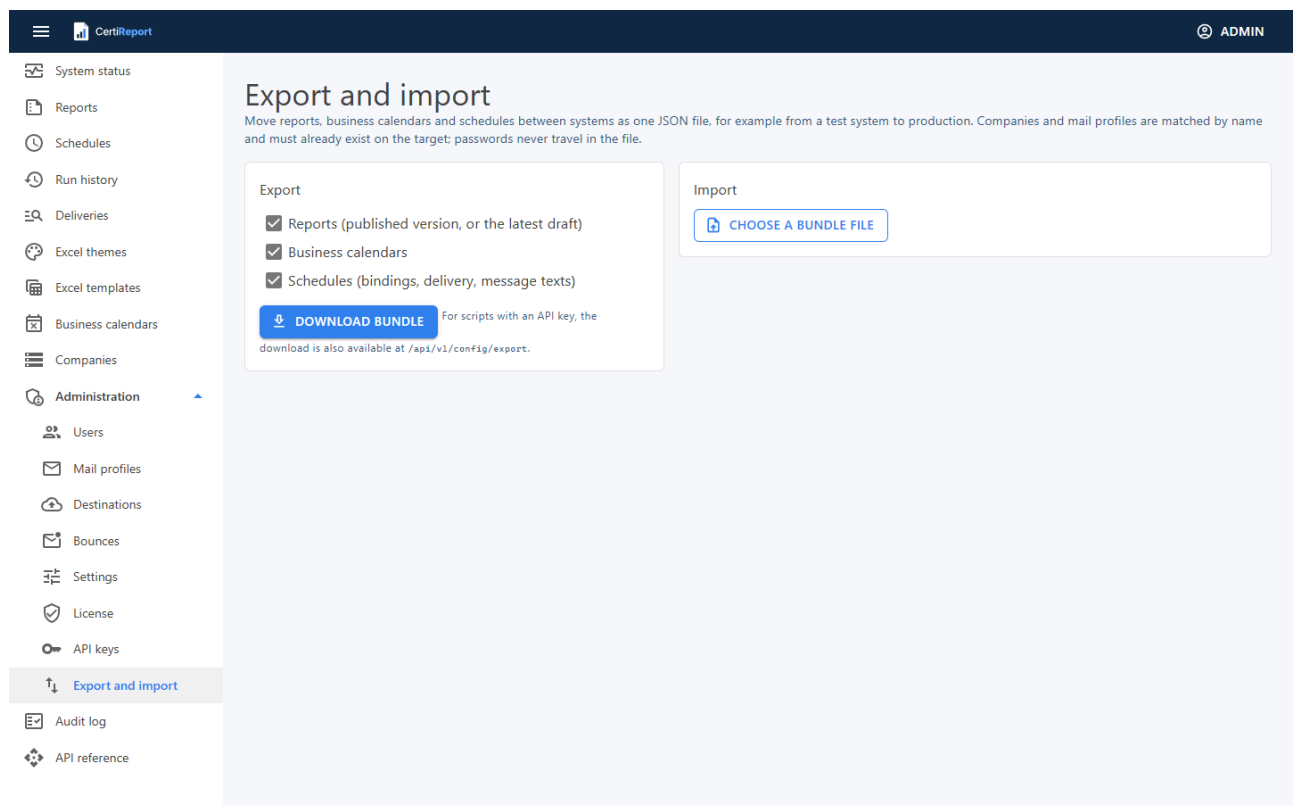
Excel templates (/admin/excel-templates) are workbooks designed in Excel (.xlsx, up to 5 MB) that CertiReport fills with report data through marker cells: {{Report.Name}}, {{Report.Code}}, {{Company.Name}}, {{Company.Logo}}, {{Run.Date}}, {{Item.Label}}, {{Item.Key}} and {{Item.Recipient}}, {{Values.Name}} for a variable, {{Header.Column}} for the first row of a

dataset, `{{Lines[ ].Column}}` for a row repeated per dataset row and `{{Lines.Count}}`. **Upload template** adds a workbook with a name and description; each row lists the file, the markers found, the outputs using it and offers **Preview with sample data**, **Download**, **Replace** and **Delete**. The **Marker reference** panel at the foot of the page lists every marker and its meaning.

Themes and templates travel in the configuration bundle (section 9.8) and are matched by name on import.

9.8 Export and import between systems

Administration › Export and import moves a configuration from one installation to another, typically from a test system to production, as one JSON file (a *bundle*). Companies, mail profiles and destinations are referenced by name and must already exist on the target under the same name; no password or secret ever travels in the file.



Administration, Export and import after a preview

9.8.1 What a bundle contains

Section	Content	Matched on import by
Concepts	Custom concepts (code, name, data type)	code
Reports	Code, name, category, description, the published version (or the latest draft when none is published) with its definition, datasets, outputs and variables	code
Excel themes	Name, description and definition of every stored theme (included with the reports)	name
Excel templates	Name, description, file name and the workbook (base64) (included with the reports)	name
Business calendars	Name, description, weekend days and holidays	name
Schedules	Name, company name, cron expression and time zone,	name

Section	Content	Matched on import by
	misfire and overlap policy, enabled flag, calendar and holiday policy, mail profile name, reports with pinned versions and formats, bindings, unlinked variables and the delivery definition (destination by name)	

The bundle also records who exported it, when, from which system and with which CertiReport version; this is shown when a file is chosen for import.

9.8.2 Exporting

1. Tick what to include: **Reports (published version, or the latest draft), Business calendars, Schedules (bindings, delivery, message texts)**. Custom concepts are always included; Excel themes and templates travel with the reports.
2. Click **Download bundle**. The file is named `certireport-config-<yyyyMMdd-HHmm>.json`.

Scripts can fetch the same file with an administrator API key from `GET /api/v1/config/export?reports=true&schedules=true&calendars=true`.

9.8.3 Importing

1. On the target system, make sure the companies, mail profiles and destinations the schedules refer to exist under the same names.
2. Click **Choose a bundle file** and select the JSON (up to 50 MB). The page shows when, by whom and from where it was exported and how many reports, calendars, schedules and custom concepts it holds.
3. Choose the options: **Publish imported report versions that were published on the source** (on by default) and **Keep imported schedules enabled (otherwise they start paused)** (off by default).
4. Click **Preview**. Nothing is changed; the result lists every object with its **Kind, Name, Action** and **Detail**, and a summary *<n> to create, <n> to update, <n> unchanged or skipped*. Problems are highlighted.
5. Click **Import**. When the preview found problems the button stays disabled until **Import what can be imported** is ticked; the problem objects are then skipped and the rest imported.

The actions and what they mean:

Action	Meaning
<i>Create</i>	The object does not exist on the target and is created.
<i>Update</i>	The object exists and differs. A report gets a new version (<i>new version after <n>, published or , draft</i>); a theme, template, calendar or schedule is overwritten.
<i>Unchanged</i>	The object exists with the same content (a template with the same bytes, a report with the same definition).
<i>Skipped</i>	Not imported: a report whose concept does not exist here, a schedule whose company or destination is missing (<i>Add it under the same name first</i>), a schedule whose report is missing, or a template whose content is not valid base64.
<i>Note</i>	Information only, for example <i>Mail profile '...' does not exist here; the default profile is used</i> .
<i>Failed, Saved as draft</i>	The save or the publish on the target failed; the detail holds the error.

Imported schedules start paused unless the option says otherwise, so a production system never starts sending because of an import; enable them from the schedule page after checking the bindings. A schedule whose calendar is missing is imported without a calendar (noted in the detail). A report's Excel theme and

workbook template are re-pointed to the target's theme or template of the same name; when none exists, the output falls back to the default theme or to the themed table.

9.9 Audit log

Administration › Audit log (permission `audit.view`: administrators and auditors) lists the latest 200 entries of the audit trail: a running number, when, who, what (the action and the entity type) and, where recorded, the **Details** with the JSON state **Before** and **After** the change. The **Show** filter narrows the list to *Users*, *Companies* or *Mail profiles*; *Everything* shows all entity types.

#	When	Who	What	Change
79	10/31/2026 9:01 PM	admin	Checked BounceMailbox	► Details
78	10/31/2026 9:01 PM	admin	Updated Setting	► Details
77	10/31/2026 6:46 PM	admin	Created Report	► Details
76	10/31/2026 12:56 PM	admin	Activated License	► Details
75	10/31/2026 11:21 AM	admin	Imported Configuration	► Details
74	10/31/2026 11:21 AM	admin	Created Report	► Details
73	10/31/2026 11:21 AM	admin	Created Report	► Details
72	10/31/2026 11:21 AM	admin	Created Report	► Details
71	10/31/2026 11:21 AM	admin	Created Report	► Details
70	10/31/2026 11:21 AM	admin	Created Report	► Details
69	10/31/2026 11:21 AM	admin	Created Report	► Details
68	10/31/2026 11:07 AM	admin	Created Backup	► Details
67	10/31/2026 11:07 AM	admin	Updated Setting	► Details
66	10/31/2026 1:22 AM	admin	Exported Configuration	► Details
65	10/31/2026 1:22 AM	admin	Exported Configuration	► Details
64	10/31/2026 12:36 AM	admin	Updated Setting	► Details
63	10/31/2026 12:36 AM	admin	Updated Setting	► Details
62	10/31/2026 12:36 AM	admin	Checked BounceMailbox	► Details

Administration, Audit log

Entity types written to the log: User, ApiKey, Company, Smtpprofile, DeliveryDestination, Report, Schedule, BusinessCalendar, ExcelTheme, ExcelTemplate, Setting (every value saved under **Settings**, with the value before and after), License, Configuration (the export and the import summary), Run (approvals, rejections, retry and resend requests), Backup, Digest, BounceMailbox and SuppressedAddress. Typical actions are *Created*, *Updated*, *Deleted*, *Enabled*, *Disabled*, *Published*, *PasswordReset*, *TestMessageSent*, *Tested*, *RunRequested*, *TestRequested*, *Approved*, *Rejected*, *Exported*, *Imported*, *Activated*, *Removed* and *Checked*. Passwords and secrets are never part of the recorded state; a company snapshot only records whether its password changed.

9.9.1 The hash chain

Each entry stores the hash of the previous entry and its own SHA-256 (upper-case hexadecimal) over the previous hash, the timestamp (UTC in ISO 8601 round-trip form, truncated to the microsecond as the database stores it), the user, the entity type and ID, the action and the before and after JSON, joined by the unit separator character (U+001F). Writers from the portal, the engine and every cluster node take a database advisory lock while appending, so the chain stays linear. An entry that is edited, or an entry removed from the middle, breaks the chain of everything after it.

Verify integrity reads the whole log in order and reports *All <n> entries are intact* or *The chain is broken at entry <id>: it was changed or an entry before it was removed*. Run it as part of an audit; the check is read-only.

9.9.2 Reading the log

- The **#** column is the entry's position in the chain; it only grows.
- **Who** is the signed-in user name; `apikey:<name>` for a change made through the API with a key; `service:<machine>` for entries the engine writes on its own (nightly backups, bounce mailbox checks); `anonymous` for the first administrator created by the setup wizard or by `create-admin` before anyone is signed in.
- Open **Details** to compare **Before** and **After**; fields that did not change are repeated, so a diff is easy to see.
- Users' own account actions are logged under *User* as well: *PasswordChanged*, *MfaEnabled*, *MfaDisabled* and *RecoveryCodesRegenerated*.
- Sign-ins and failed sign-ins, run executions and deliveries are not audit entries: they are in the run history and the portal logs (chapter 10).

9.9.3 Keeping the log

The audit log is part of the metadata database and is included in every CertiReport backup (chapter 2); retention does not delete audit entries. Exporting the table for an external auditor is done from the database (table `cr.AuditLog` in the embedded PostgreSQL, chapter 10); the columns `PreviousHash` and `Hash` allow the chain to be re-verified outside CertiReport with the recipe of section 9.9.1.

10. Technical reference

This chapter is for the people who install, operate and integrate CertiReport: how the services fit together, where every setting and file lives, what the command line and the REST API offer, how to monitor the installation, and what to do when something goes wrong. The chapters before it explain the portal pages; this one explains what runs underneath them.

10.1 Architecture

10.1.1 Services and ports

A CertiReport server runs three Windows services. The setup installs them under `C:\Program Files\CertiReport` and starts them with delayed automatic start, so the database is up before the two application services ask for it.

Service	Display name	Folder	Role	Endpoint
CertiReport. Portal	CertiReport Portal	Portal\	Blazor web portal, REST API (/api/v1), API reference (/api/docs), health probes, setup commands	<code>http://*:8080</code> (installed), <code>http://localhost:5080</code> (development); HTTPS on the configured port when a certificate is set
CertiReport. Engine	CertiReport Engine	Engine\ (optional Engine\CrystalHost\)	Clustered Quartz.NET scheduler, report runs, outbox dispatch, housekeeping, backups, digest, licence notices, bounce mailbox	health probes only, <code>http://localhost:5091</code>
CertiReport. Database	PostgreSQL	pgsql\ (binaries), %ProgramData%\CertiReport\pgdata (cluster)	Embedded PostgreSQL 18 that holds the metadata database certireport	<code>localhost:5444</code>

Both application services run under the account chosen in setup (NT AUTHORITY\NetworkService by default, a gMSA such as `DOMAIN\svc-certireport$` in production). The Service Control Manager restarts a crashed service after 60 seconds on the first, second and third failure, with the failure count reset daily. The setup also creates a Windows Firewall rule for the HTTP port (CertiReport Portal (HTTP)) and, when HTTPS is configured, one for the HTTPS port, and registers the Event Log source CertiReport in the Application log.

Both services are published self-contained (.NET 10, win-x64); no .NET runtime needs to be installed. The Crystal sidecar `CertiReport.CrystalHost.exe` (64-bit runtime) or `CertiReport.CrystalHost32.exe` (32-bit runtime) is a .NET Framework 4.8 program and is the only component that depends on a framework already present on the server.

The install folder also holds `sql\` (the scripts `hana-readonly-user.sql` and `sqlserver-readonly-user.sql`, see 10.8.8) and `license\` (the EULA and `THIRD-PARTY-NOTICES.txt`).

10.1.2 Code layout

The solution is divided into projects that the rest of this chapter refers to by name:

Project	Content
CertiReport.Domain	Entities: companies, reports, variables, concepts, schedules, bindings, runs, outbox, audit
CertiReport.Application	Use-case contracts, permissions and roles, binding and delivery definitions
CertiReport.Infrastructure	EF Core metadata database and migrations (including the Quartz job store), services, health check
CertiReport.Hosting	Shared service setup: registry configuration provider, Serilog, Data Protection, Windows service lifetime
CertiReport.Portal	Web portal, REST API, setup commands
CertiReport.Engine	Scheduler service, jobs, outbox dispatcher, prerequisite check
CertiReport.Rendering	Scriban templates, Chromium PDF, signing and verification codes, Service Layer client, Crystal sidecar driver
CertiReport.CrystalHost	Optional .NET Framework 4.8 sidecar for Crystal Reports layouts

10.1.3 Data flow of a scheduled run

1. **Registration.** Every minute the engine's `ScheduleSyncJob` compares the enabled schedules in `cr.Schedules` with the Quartz triggers in the job store. Each enabled schedule becomes one durable job and one cron trigger in the schedule's time zone, with the misfire policy the schedule asks for (`Fire once now` or `Skip`). A schedule saved in the portal is therefore live within a minute on every engine node; a disabled or deleted schedule loses its trigger the same way. The next fire time is written back to the schedule for the list.
2. **Fire.** Quartz fires the trigger on one node of the cluster. `RunScheduleJob` checks the overlap policy (a schedule with `Skip` is not started while a run of it is still `Running`), applies the business calendar (`skip`, or `move to the next business day`), records a `Run` row in `cr.Runs` with the trigger `Schedule` and the fire time, and hands the run to the `ScheduleExecutor`. A fire that was already recorded (the node crashed in the middle of it and Quartz recovered the job) is not recorded twice.
3. **Queued runs.** `Run now`, `Retry failed` and `POST /api/v1/schedules/{id}/run` do not talk to Quartz: they insert a queued run, and `QueuedRunsJob` (every 15 seconds) claims it for one node. A claim older than 30 minutes with the run still queued is taken over by another node.
4. **Items.** The executor resolves every slot: fixed values, date expressions relative to the fire time, lookups, derived dates, and the iterate or business-partner binding that yields one item per row. The items run in parallel up to the company's **Max concurrent queries**, each with its own database context. For each item the datasets run as parameterised `SELECTs` on the company database, the outputs are rendered (Excel, CSV, PDF through Chromium, Crystal through the sidecar), the files are written under `files\yyyy\MM\<run id>` with their SHA-256, and a `RunItem` with its `RunFile` rows is saved. The e-mail is written to `cr.OutboxMessages` in the same transaction as the item, so a crash can neither lose nor duplicate a message. Folder copies, destination uploads, Teams cards and the SAP B1 write-back follow; a schedule with **Require approval before sending** stores them as held delivery instead and the run waits in `AwaitingApproval`.
5. **Dispatch.** The `OutboxDispatchService` wakes every 10 seconds on every node, claims up to 50 due messages for its node, throttles to the mail profile's messages per minute, drops suppressed addresses and sends through SMTP or Microsoft Graph. Every attempt is recorded in `cr.DeliveryAttempts`. A transient failure (SMTP 4xx, Graph 429 or 5xx, an unreachable server) is retried after 1 minute, 5 minutes, 15 minutes, 1 hour and 4 hours; after the fifth failed attempt, or on a permanent failure, the message is dead-lettered.
6. **Afterwards.** The run's status is set from its items (`Succeeded`, `PartiallySucceeded`, `Failed`, `Skipped`), the schedule's **Last run** is updated, the failure alert is mailed when configured, and the webhook receives a `run.completed` post. Bounces that arrive in the bounce mailbox are matched

to the message by its Message-ID within ten minutes. Housekeeping removes the run and its files when the retention period has passed.

10.2 Configuration

10.2.1 Precedence

Both services read their configuration from four layers; a later layer overrides an earlier one:

1. `appsettings.json` next to the executable (shipped defaults; do not edit, the setup replaces it on upgrade).
2. The registry: every string value under `HKLM\SOFTWARE\CertiReport` (shared by both services), then under `HKLM\SOFTWARE\CertiReport\Portal` or `HKLM\SOFTWARE\CertiReport\Engine` (per service). The value **name** is the configuration key, with `:` as the section separator, for example a value named `ConnectionStrings:Metadata` or `Kestrel:Endpoints:Http:Url`. The setup writes these values; you can add others with Registry Editor and restart the service.
3. Environment variables, with `__` (two underscores) in place of `:`, for example `ConnectionStrings__Metadata`. Environment variables of a Windows service are the machine-wide ones.
4. The command line of the executable.

The registry layer is specific to CertiReport (`CertiReport.Hosting`); the other three are the standard .NET configuration sources.

10.2.2 Settings

Key	Service	Default	Meaning
<code>ConnectionStrings:Metadata</code>	both	written by setup to the registry: <code>Host=localhost;Port=5444;Database=certireport;Username=certireport;Password=<generated></code> (the shipped <code>appsettings.json</code> holds the development string on port 5445, which the registry value overrides)	Npgsql connection string of the metadata database. Readable in the registry by Administrators, SYSTEM and the service account only. Required; the service refuses to start without one.
<code>Kestrel:Endpoints:Http:Url</code>	Portal	<code>http://localhost:5080</code> in <code>appsettings.json</code> ; setup writes <code>http://*:<HTTP_PORT></code>	Address the portal listens on.
<code>Https:Port</code>	Portal	empty	With <code>Https:CertificateThumbprint</code> , serves HTTPS on this port with the certificate from the Local Machine Personal store. Setup writes both from <code>HTTPS_PORT</code> and <code>HTTPS_CERT_THUMBPRINT</code> .
<code>Https:CertificateThumbprint</code>	Portal	empty	Thumbprint of the HTTPS certificate; non-hexadecimal characters are ignored. A

Key	Service	Default	Meaning
			configured but missing certificate stops the portal (it never falls back to HTTP only).
Kestrel:Endpoints:Health:Url	Engine	http://localhost:5091	Address of the engine's health probes.
AllowedHosts	both	Portal *, Engine localhost	Host header filter.
Database:MigrateOnStartup	both	Portal true, Engine false	Whether the service applies pending migrations in the background at start. The engine waits for the portal to do it.
Scheduler:MaxConcurrency	Engine	10	Quartz thread pool size: jobs (schedule fires, system jobs) running at once on one node.
Scheduler:Clustered	Engine	true	Quartz clustering with a check-in every 20 seconds and a misfire threshold of 60 seconds. Leave on even for one node.
Scheduler:InstanceId	Engine	the machine name	Quartz instance id and outbox node id. Set it only when two engines run on one machine.
Rendering:BrowserPath	both	empty	Chromium-based browser for PDF output. Empty: Google Chrome, then Microsoft Edge, from the App Paths registry key and the usual Program Files folders.
Rendering:MaxConcurrentPages	Engine	2	PDFs rendered at the same time per node.
Rendering:RenderTimeoutSeconds	Engine	120	Seconds a single PDF page render may take.
Rendering:CrystalHostPath	both	empty	The Crystal sidcar executable. Empty: CrystalHost\CertiReport.CrystalHost.exe (or CertiReport.CrystalHost32.exe for a 32-bit runtime) under the engine folder.
Rendering:CrystalTimeoutSeconds	Engine	300	Seconds one sidcar run may take.
DataSources:HanaClientPath	both	C:\Program Files\sap\hdbclient\dotnetcore\v8.0	Folder with Sap.Data.Hana.Net.v8.0.dll of SAP HANA Client 2.x (64-bit).
Paths:Data	both	%ProgramData%	Root of the data folders

Key	Service	Default	Meaning
		\CertiReport	(10.3).
Paths:Pgsq1	Portal	empty	PostgreSQL folder with bin\pg_dump.exe for backups. Empty: the installed pgsq1\ next to the application folders, then a stock PostgreSQL installation.
Authentication:RequireMfaForAdministrators	Portal	true	Administrators who sign in with a password must enrol an authenticator app.
Authentication:Windows:Enabled	Portal	false	Adds Sign in with Windows (Negotiate: Kerberos or NTLM). Users are matched on the DOMAIN\user account stored on their user record.
Authentication:Entra:TenantId, :ClientId, :ClientSecret	Portal	empty	All three together add Sign in with Microsoft (OpenID Connect against login.microsoftonline.com/<tenant>/v2.0, callback path /signin-entra). Users are matched on e-mail and linked on first sign-in; accounts are never created.
License:HardwareId	both	computed	Overrides the Hardware ID (containers and tests only).
License:PublicKey	both	embedded vendor key	PEM text or file path of another licence public key. For the test suite only; never set it on a customer installation.
Serilog:*	both	see 10.3.2	Serilog reads the Serilog section after the built-in levels, so Serilog:MinimumLevel:Override:CertiReport set to Debug raises the detail of the product's own logging.

Everything else an administrator sets (public URL, retention, alerts, webhook, digest, backups, bounce mailbox, licence) lives in the metadata database (cr.AppSettings) and is edited in the portal under **Administration › Settings, Administration › License** or by the commands in 10.4; see 10.7 for the keys.

10.2.3 Environment variables

Variable	Meaning
any key in the form Section__Key	Overrides the configuration key Section:Key (10.2.1), for example ConnectionStrings__Metadata.
CERTIREPORT_HARDWARE_ID	Overrides the Hardware ID, like License:HardwareId.

Variable	Meaning
CERTIREPORT_LICENSE_PUBLIC_KEY	Overrides the licence public key, like <code>License:PublicKey</code> (tests only).
CERTIREPORT_METADATA	Used by dotnet ef at design time only.
CERTIREPORT_TEST_PG, CERTIREPORT_LOAD_ITEMS	Test suite: throwaway database server and load-test size.

10.2.4 Setup memory

The setup remembers its answers under `HKLM\SOFTWARE\CertiReport\Setup` so that an upgrade only needs the parameters that change: `HttpPort`, `ServiceAccount`, `UseEmbeddedDb`, `DbPort`, `AdminUser`, `DesktopShortcut`, `InstallCrystal`, `InstallFolder`, `Version` and `DatabaseService` (`CertiReport.Database`). Passwords are never stored. The installer properties themselves (`HTTP_PORT`, `SERVICE_ACCOUNT`, `USE_EMBEDDED_DB`, `DB_PORT`, `DB_SUPERUSER_PASSWORD`, `METADATA_CONNECTION`, `ADMIN_USER`, `ADMIN_PASSWORD`, `HTTPS_PORT`, `HTTPS_CERT_THUMBPRINT`, `PUBLIC_URL`, `DESKTOP_SHORTCUT`, `INSTALL_CRYSTAL`, `InstallFolder`) are described in chapter 2.

10.3 Folders and files

10.3.1 The data folder

Runtime data lives under `%ProgramData%\CertiReport (Paths:Data)`. The setup creates the folder and grants the service account full control; the services create any missing subfolder at start.

Folder or file	Content	Kept on uninstall
logs\	portal-yyyyMMdd.log and engine-yyyyMMdd.log (10.3.2)	yes
keys\	The Data Protection key ring shared by Portal and Engine: XML key files, encrypted with DPAPI for the local machine. Everything the product stores encrypted (company and Service Layer passwords, mail profile secrets, destination secrets, webhook secret) needs these keys.	yes
files\yyyy\MM\<run id>\	Generated report files, one folder per run. The row in <code>cr.RunFiles</code> holds the relative path, size and SHA-256.	yes
layouts\cache\	Crystal layouts fetched from SAP B1 (RDOC), keyed by layout code and update date; refreshed when the layout changes in B1.	yes
pgdata\	The embedded PostgreSQL cluster: <code>postgresql.conf</code> with a managed block written by setup (<code>listen_addresses = 'localhost'</code> , the port, logging), <code>PG_VERSION</code> , data files and <code>pgdata\log\postgresql-<day>.log</code> (one file per weekday, truncated when the week comes round).	yes
backups\	Default backup folder when none is set under Administration > Settings > Backups . Archives are <code>CertiReport-backup-yyyyMMdd-HHmmss.zip</code> with <code>manifest.json</code> , <code>metadata.dump</code> (pg_dump custom format), <code>keys/</code> and optionally <code>files/</code> .	yes
setup-token.txt	Only on an installation where no user exists yet: the token that protects <code>/setup</code> , readable by Administrators and the service account. Deleted when the first administrator	–

Folder or file	Content	Kept on uninstall
	exists.	

The install folder `C:\Program Files\CertiReport` holds the program files only and is replaced on upgrade.

10.3.2 Logs

Each service writes a rolling text log with Serilog:

- File: `logs\portal-yyyyMMdd.log` and `logs\engine-yyyyMMdd.log`; a new file every day or when a file reaches 50 MB (`_001`, `_002` suffixes); the 30 newest files are kept.
- Line format: `2026-10-31 07:15:00.123 +00:00 [INF]`
`CertiReport.Engine.Scheduling.LicenseJob: Licence notice queued: ...`, followed by the exception, if any.
- Levels: Information and above for CertiReport, Quartz, the hosting lifetime and EF Core migrations; Warning and above for everything else from Microsoft. Override with the Serilog section (10.2.2).
- Windows Event Log: when running as a service, events of level Warning and above go to the Application log under the source CertiReport as well. When started from a console (for example `CertiReport.Engine.exe check`), the log goes to the console instead.
- PostgreSQL: `pgdata\log\postgresql-<Mon..Sun>.log`.
- Setup: the MSI log (`/log` on the setup command line) holds the output of `db-setup`, `create-admin` and `set-public-url`.

10.4 Command line

The commands are verbs of the two service executables. Run them from an elevated prompt; they read the same configuration as the service, so they connect to the installed database. Options follow the form `--name value`. Every command returns exit code 0 on success.

10.4.1 CertiReport.Portal.exe db-setup

Run by the setup as LocalSystem. Initialises the embedded PostgreSQL cluster on first install, registers and starts the CertiReport.Database service, creates the role and database `certireport` with a generated 32-character password and stores the connection string in `HKLM\SOFTWARE\CertiReport`. Idempotent: with a working stored connection string it changes nothing.

Option	Default	Meaning
<code>--pgsql <folder></code>	<code>..\pgsql</code> relative to the portal folder	PostgreSQL binaries (<code>bin\pg_ctl.exe</code>).
<code>--data <folder></code>	<code>%ProgramData%\CertiReport\pgdata</code>	Cluster data directory.
<code>--port <n></code>	5444	Port the server listens on (localhost only).
<code>--service-account <account></code>	NT AUTHORITY\NetworkService	Account the database service runs as; it gets full control of the data directory.
<code>--superuser-password <pw></code>	none	Required on first install, and again to reset the application role when the stored connection string stops working.

Exit code 1 on failure, with the message `Database setup failed: ...` and a hint to the setup log and `pgdata\log`. A cluster created by a failed run is discarded so the next attempt starts clean.

10.4.2 CertiReport.Portal.exe create-admin

Run by the setup after db-setup. Applies pending migrations (retrying up to 15 times while the database starts), then creates the first administrator when no user exists. With users present it prints Users already exist; the administrator account from setup is not applied. and exits 0, so an upgrade never overrides live accounts.

Option	Meaning
--user <name>	User name (required).
--password <password>	Password (required; 12 characters or more with upper case, lower case and a digit).
--email <address>	Optional e-mail address.

Exit code 2 for a usage error, 1 when the account could not be created (the Identity validation messages are printed).

10.4.3 CertiReport.Portal.exe set-public-url

CertiReport.Portal.exe set-public-url https://reports.example.com

Stores the portal's public address (**Administration** › **Settings** › **Public address**), the base of verification links, QR codes, download links and the links in e-mails and Teams cards. The scheme must be http or https; a trailing slash is removed. Run by the setup when PUBLIC_URL is given. Exit code 2 for a usage error.

10.4.4 CertiReport.Portal.exe backup

CertiReport.Portal.exe backup [--to <folder>] [--keep <n>] [--no-files]

Writes one archive while the services run. Without --to and --keep the settings saved under **Administration** › **Settings** › **Backups** apply (folder, default %ProgramData%\CertiReport\backups; archives to keep, default 14). --no-files leaves the report files out; the database dump and the key ring are always included. Older archives beyond the kept count are deleted after the backup. Exit code 1 with Backup failed: ... on error.

10.4.5 CertiReport.Portal.exe restore

CertiReport.Portal.exe restore --from <archive.zip> [--yes] [--no-files]

Without --yes the command only prints what the archive holds (machine, date, version, database name) and exits 3. With --yes it replaces the database (pg_restore --clean --if-exists --single-transaction), writes the key files over the existing ones and merges the report files into the files folder (--no-files restores the database and keys only). Stop CertiReport.Portal and CertiReport.Engine first; leave CertiReport.Database running. Exit code 2 when the archive is missing, 1 with Restore failed: ... on error. After a restore on another server the secrets protected by the key ring must be entered again (see docs/backup-restore.md and chapter 2).

10.4.6 CertiReport.Portal.exe license

Command	Effect	Exit code
license	Prints the state, Hardware ID, companies active of licensed, customer, edition, licence id, validity and grace days, and the reason when something is wrong.	0 when the licence is usable (Valid, Expiring, Grace), 3 otherwise
license --file <key.lic>	Activates the key in the file (same checks as Activate in the portal), then	2 file not found, 1 refused (the reason is printed)

Command	Effect	Exit code
	prints the state.	
<code>license --request [--companies <n>]</code>	Prints the licence request text to send to <code>licensing@certicons.com</code> . Without <code>--companies</code> the larger of the active and the licensed count is requested, at least 1.	0
<code>license --remove</code>	Removes the installed licence, then prints the state.	as <code>license</code>

10.4.7 CertiReport.Engine.exe check

Prints one line per prerequisite of the server it runs on and exits 1 when something required is missing:

```
[OK ] Metadata database: Reachable and up to date
[OK ] Data folder: C:\ProgramData\CertiReport
[OK ] PDF browser: C:\Program Files\Google\Chrome\Application\chrome.exe
[OK ] Crystal sidecar: Runtime 13.0.40.xxxx (64-bit; registered: ...); formats:
Pdf, Excel, ...
[OK ] Company SBODEMOGB: Connected (OEC Computers)
[OK ] Company SBODEMOGB: signing certificate: ...
[WARN] Company SBODEMOGB: Service Layer: ...
All required prerequisites are in place.
```

Line	OK	WARN	FAIL
Metadata database	reachable, no pending migrations	reachable, migrations pending (the portal applies them)	unreachable: check <code>ConnectionStrings:Metadata</code> and the <code>CertiReport.Database</code> service
Data folder	writable	–	not writable
PDF browser	path of Chrome or Edge	none found: PDF outputs will fail	–
Crystal sidecar	not installed (optional) or runtime version, bitness and formats	–	.NET Framework 4.8 missing, no SAP runtime registered, or the sidecar did not answer
Company <i>name</i> (each active company)	connected, read-only user	connected but the user can change data	connection failed (the test message)
Company <i>name</i> : signing certificate	found with private key	–	missing or no private key access
Company <i>name</i> : Service Layer	sign-in succeeded	sign-in failed	–

10.4.8 Exit codes

Code	Meaning
0	Success (for <code>license</code> : the licence is usable).

Code	Meaning
1	The command failed; the message is on standard error. For check: at least one FAIL line.
2	Usage error or a named file was not found.
3	restore without --yes (preview only); license when the licence is not usable.

10.5 REST API

10.5.1 Authentication

Every endpoint under `/api/v1` except the verification endpoints requires authentication. Two schemes are accepted:

- **API key** (for integrations): a key created under **Administration › API keys** (chapter 9), sent as the header `X-API-Key: cr_...` or `Authorization: ApiKey cr_...`. A key is `cr_` followed by 40 random characters; only its SHA-256 hash and the first 11 characters (the prefix shown in the list) are stored. The key's roles become the caller's roles, so the same permission policies apply as for a signed-in user. A key that is unknown, disabled or past its expiry gets **401 Unauthorized** with `WWW-Authenticate: ApiKey`.
- **Portal cookie** (for the browser): a signed-in user calling the API from the same browser session. A cookie user who still has to change a password or enrol an authenticator gets **403 Forbidden**.

A missing permission is **403 Forbidden**; a missing or invalid credential is **401**. Request and response bodies are JSON; enumerations are serialised as names (`"status": "Succeeded"`). Errors come back as problem details (`application/problem+json`) with the message in detail.

10.5.2 Endpoints

Method and path	Permission (roles)	Request	Response
GET <code>/api/v1/system/status</code>	<code>system.view</code> (every role)	–	<code>SystemStatus:</code> <code>productVersion,</code> <code>databaseReachable,</code> <code>databaseError,</code> <code>pendingMigrations[]</code> <code>, companyCount,</code> <code>reportCount,</code> <code>scheduleCount,</code> <code>engineNodes[]</code> (<code>id,</code> <code>machineName,</code> <code>version, startedAt,</code> <code>lastHeartbeatAt,</code> <code>isOnline), setup[]</code> (the getting-started steps: <code>title, done,</code> <code>detail, link,</code> <code>optional),</code> <code>setupComplete</code>
GET <code>/metrics</code>	<code>system.view</code>	–	Prometheus text format (10.6.2)
GET <code>/api/v1/schedules</code>	<code>runs.view</code> (every role)	–	array of <code>scheduleListItem:</code> <code>id, name,</code> <code>companyName,</code> <code>reportCodes[]</code> ,

Method and path	Permission (roles)	Request	Response
			cronExpression, timeZoneId, isEnabled, nextFireAt, lastRunAt, lastRunStatus
POST /api/v1/schedules/ {id}/run	schedules.manage (Administrator, Scheduler)	–	202 Accepted with { "runId": "..." } and a Location of /api/v1/runs/{runId }; the engine picks the run up within 15 seconds (trigger Api). 409 Conflict when a run is already queued or the licence refuses it
POST /api/v1/schedules/ {id}/test	schedules.manage	{ "recipient": "a@example.com", "burstKey": null }	202 Accepted with { "runId" }: one item (the first, or the one with burstKey) is produced and e-mailed to the address only, subject prefixed [Test]. 400 for schedules not delivered by e-mail or a missing address
GET /api/v1/runs? scheduleId=&take=	runs.view	query: optional schedule, take 1 to 500 (default 50)	array of runListItem: id, fireTimeUtc, trigger, status, scheduleName, reportCode, companyName, itemCount, succeededItems, failedItems, skippedItems, completedAt, requestedBy, error, testRecipient, deferredFromUtc, awaitingItems, decidedBy, decidedAt, decisionNote
GET /api/v1/runs/{runId}	runs.view	–	runDetail: run (as above), resolvedValuesJson, items[] (id, burstKey, label, recipient, status, attempt, rowCount,

Method and path	Permission (roles)	Request	Response
			error, completedAt, files[], mailStatus, mailError, mailSentAt, mailTo, mailBounce, mailBounceDetail); each file: id, fileName, size, sha256, exists, verifyCode, isSigned, b1AttachmentEntry, linkExpiresAt, downloadCount. 404 when unknown
GET /api/v1/runs/{runId}/files/{fileId}	runs.view	–	The file with its content type and name; 404 unknown, 410 Gone when retention removed it
POST /api/v1/runs/{runId}/approve	runs.approve (Administrator, Scheduler)	{ "note": "..." } (optional)	204: the held messages are sent and the planned deliveries carried out. 409 when the run is not waiting for approval
POST /api/v1/runs/{runId}/reject	runs.approve	{ "note": "..." } (optional)	204: nothing is sent, the files stay in run history. 409 as above
GET /api/v1/deliveries? q=&from=&to=&scheduledId=&problems=&take=	runs.view	query: free text (addresses, item labels, file names, subjects, schedule names), date range (yyyy-MM-dd), schedule, problems=true for failed, rejected, undelivered or bounced items only, take 1 to 1000 (default 200)	array of deliveryHit: runId, itemId, fireTimeUtc, trigger, scheduleName, reportCode, companyName, burstKey, label, recipient, status, note, files[], mailStatus, mailTo, mailSentAt, mailError, mailBounce
GET /api/v1/excel-templates/{id}	reports.design (Administrator, Report designer)	–	The uploaded workbook
GET /api/v1/excel-templates/{id}/preview	reports.design	–	The workbook filled with sample data (template-preview.xlsx)
GET /api/v1/config/export?	users.manage (Administrator)	query flags, all true by default	certireport-config-yyyyMMdd-HH:mm.json: the transfer bundle (no

Method and path	Permission (roles)	Request	Response
reports=&schedules=&calendars=			secrets)
GET /api/v1/license	users.manage	–	licenseStatus: state (Missing, Invalid, Valid, Expiring, Grace, Expired), installed, claims (id, customer, edition, companies, hardwareId, graceDays, validFrom, validTo, graceUntil), hardwareId, companiesUsed, companiesEntitled, daysToExpiry, runsAllowed, canAddCompany, reason, isOk
POST /api/v1/license/check	users.manage	{ "token": "<key>" }	licenseCheck: ok, error, claims; nothing is installed
POST /api/v1/license	users.manage	{ "token": "<key>" }	204 activated; 400 with the reason
DELETE /api/v1/license	users.manage	–	204
GET /api/v1/license/request?companies=	users.manage	optional count	text/plain: the licence request
GET /api/v1/verify/{code}	none (public, 30 requests per minute per address)	–	verificationResult: code, companyName, reportName, fileName, issuedAt, size, sha256, isSigned, matches (null). 404 for an unknown code
POST /api/v1/verify/{code}	none (public)	multipart/form-data with the field file	the same result with matches true or false after a byte-for-byte comparison with the issued file
GET /d/{token}	none (the token is the secret)	–	A file sent as a download link instead of an attachment; 410 Gone with a text message when the link has expired or retention removed the file; 404 for an unknown

Method and path	Permission (roles)	Request	Response token
-----------------	--------------------	---------	-------------------

The permission names and the roles that grant them are those of chapter 9: `system.view` and `runs.view` for every role (Administrator, Report designer, Scheduler, Runner, Viewer, Auditor), `reports.design` for Administrator and Report designer, `schedules.manage` and `runs.approve` for Administrator and Scheduler, `users.manage` for Administrator only.

10.5.3 API reference and OpenAPI

`/api/docs` serves an interactive API reference (Scalar) built from the OpenAPI document at `/openapi/v1.json`. Both require a signed-in user or an API key with `system.view`. The reference lists every endpoint above except `/d/{token}`, which is excluded from the description.

10.5.4 Examples

Status of the installation

```
curl -H "X-API-Key: cr_XXXXXXXXXXXXXXXXXX"
https://reports.example.com/api/v1/system/status
```

Queue a run of a schedule and follow it

```
curl -X POST -H "X-API-Key: cr_..."
https://reports.example.com/api/v1/schedules/0199a0b1-.../run
# -> 202 {"runId":"0199a0b2-..."}
curl -H "X-API-Key: cr_..." https://reports.example.com/api/v1/runs/0199a0b2-...
```

Send one item of a schedule to a test address

```
curl -X POST -H "X-API-Key: cr_..." -H "Content-Type: application/json" \
-d '{"recipient":"me@example.com"}'
https://reports.example.com/api/v1/schedules/0199a0b1-.../test
```

Approve a run held for approval

```
curl -X POST -H "Authorization: ApiKey cr_..." -H "Content-Type:
application/json" \
-d '{"note":"Checked the totals"}'
https://reports.example.com/api/v1/runs/0199a0b2-.../approve
```

Problems of the last week

```
curl -H "X-API-Key: cr_..." "https://reports.example.com/api/v1/deliveries?
from=2026-10-24&to=2026-10-31&problems=true"
```

Download an output file

```
curl -OJ -H "X-API-Key: cr_..."
https://reports.example.com/api/v1/runs/0199a0b2-.../files/0199a0b3-...
```

Verify a certified PDF (no key needed)

```
curl https://reports.example.com/api/v1/verify/7K3M-9Q2X-B4RT
curl -F "file=@statement.pdf"
https://reports.example.com/api/v1/verify/7K3M-9Q2X-B4RT
```

Licence state and activation

```
curl -H "X-API-Key: cr_..." https://reports.example.com/api/v1/license
curl -X POST -H "X-API-Key: cr_..." -H "Content-Type: application/json" \
-d '{"token":"$(cat CertiReport-License.lic)"}'
https://reports.example.com/api/v1/license
```

```
# Prometheus scrape
curl -H "X-API-Key: cr_..." https://reports.example.com/metrics
```

10.5.5 Webhook

When **Administration > Settings > Webhook** holds a URL, the engine posts a JSON summary with the event `run.completed` after every run, with the header `X-CertiReport-Event: run.completed` and, when a secret is set, `X-CertiReport-Signature` holding the HMAC-SHA256 of the body. The HTTP client gives up after 15 seconds; a failed post is logged, it does not affect the run.

10.6 Health, metrics and monitoring

10.6.1 Health endpoints

Endpoint	Where	Answer
GET /health/live	portal (<a href="http://<server>:8080">http://<server>:8080), engine (http://localhost:5091)	200 Healthy whenever the process answers; no checks are run.
GET /health/ready	portal and engine	200 Healthy when the metadata database answers (metadata-db check), 503 Unhealthy otherwise.

The endpoints need no authentication. The engine's endpoint listens on `localhost` only; change `Kestrel:Endpoints:Health:Url` under `HKLM\SOFTWARE\CertiReport\Engine` to probe it from another machine.

10.6.2 Metrics

GET `/metrics` (API key or cookie with `system.view`) returns gauges in the Prometheus text format (text/plain; version=0.0.4), read from the metadata database on every scrape. Counters by status are emitted for every enumeration value, so dashboards never miss a series.

Gauge	Labels	Meaning
certireport_info	version	Always 1; the product version.
certireport_database_up	–	1 when the metadata database answers, 0 otherwise (then nothing else is emitted).
certireport_engine_nodes	state = online, offline	Engine nodes by heartbeat state (online: heartbeat younger than 2 minutes).
certireport_engine_heartbeat_age_seconds	–	Seconds since the newest engine heartbeat; -1 when no node ever registered.
certireport_schedules	state = enabled, paused	Schedules.
certireport_companies	–	Companies configured.
certireport_reports_published	–	Reports with a published version.
certireport_runs_open	status = Queued, Running, AwaitingApproval	Runs not finished.
certireport_runs_24h	status (every run status)	Runs fired in the last 24 hours.
certireport_run_items_24h	status	Run items of the last 24 hours.

Gauge	Labels	Meaning
certireport_last_scheduled_run_age_seconds	–	Seconds since a scheduled run last completed; -1 when none.
certireport_outbox_messages	status = Pending, Sending, Sent, RetryScheduled, DeadLettered, Held	Messages in the outbox (sent and dead-lettered stay until retention).
certireport_outbox_sent_24h	–	Messages sent in the last 24 hours.
certireport_outbox_oldest_pending_age_seconds	–	Age of the oldest message still waiting (Pending or RetryScheduled); 0 when none.
certireport_bounces_24h	–	Bounce notifications recorded in the last 24 hours.
certireport_suppressed_addresses	–	Addresses on the suppression list.
certireport_run_files, certireport_run_files_bytes	–	Report files kept in run history and their total size.

Alerts worth setting: certireport_engine_nodes{state="online"} == 0,
certireport_outbox_oldest_pending_age_seconds > 3600,
certireport_outbox_messages{status="DeadLettered"} rising,
certireport_runs_24h{status="Failed"} > 0.

10.6.3 Engine nodes and heartbeat

Every engine writes a heartbeat row to `cr.EngineNodes` (instance id, machine, version, process id, start time) every 30 seconds. The dashboard and `/api/v1/system/status` show a node as offline when its heartbeat is older than 2 minutes; housekeeping removes nodes that have been offline for 7 days. Several engines on different servers form one Quartz cluster through the shared job store: a schedule fires on exactly one node, Run now requests are claimed by one node, and outbox messages are claimed per node.

10.6.4 The engine's own jobs

Job (Quartz key in group system)	Cron	What it does
schedule-sync	0 * * * * ? (every minute, and once at start)	Registers enabled schedules as Quartz triggers, removes stale ones.
queued-runs	0/15 * * * * ? (every 15 seconds)	Claims and executes runs queued from the portal or the API, and runs moved to the next business day once their time has come.
housekeeping	0 0/15 * * * ? (every 15 minutes)	Removes engine nodes offline for 7 days; deletes expired files, runs older than Keep runs and files (days) (default 400) with their items, files, folders and outbox messages, and sent or dead-lettered mail older than Keep sent mail (days) (default 90), in batches of 500 runs.
backup	0 10 * * * ? (hourly at :10)	Takes the nightly backup once per day after the configured hour, when Back up every night is on.

Job (Quartz key in group system)	Cron	What it does
digest	0 20 * * * ? (hourly at :20)	Sends the weekly digest once on the configured day after the configured hour.
license	0 15 7 * * ? (daily at 07:15 server time)	Mails the failure-alert addresses at 30, 14, 7 and 1 days before expiry and once a week while runs are blocked or the licence is in grace.
bounces	0 5/10 * * * ? (every 10 minutes)	Reads the bounce mailbox and records delivery status notifications.

The outbox dispatcher is not a Quartz job: it is a background service on every node that runs every 10 seconds and drains the queue in batches of 50.

10.6.5 What to watch in the logs

Message (engine log)	Meaning
Scheduler started as instance <name>	The node joined the cluster.
Waiting for N metadata migration(s) to be applied before starting the scheduler	The portal has not migrated the database yet (start the portal, or run create-admin).
Metadata database unreachable; scheduler start postponed	The database service is down or the connection string is wrong.
Schedule '<name>' fired while a run was still in progress; skipped (overlap policy)	Overlap policy Skip in effect.
Schedule '<name>': <date> is <reason>; run skipped (calendar policy)/... run moved to <date>	Business calendar in effect.
Outbox dispatch skipped: metadata database unreachable	Mail is not sent until the database is back.
Nightly backup failed: ..., Weekly digest not sent: ...	The job ran but the task failed; the message says why.
Licence notice not sent: no failure-alert addresses under Settings	Set addresses under Administration › Settings › Failure alerts .
Retention: removed N expired file(s), N old run(s), N finished mail message(s)	Housekeeping did its work.
No users exist yet. Open /setup in the portal and enter the setup token from <file> (portal log)	Fresh installation without ADMIN_PASSWORD; the first administrator is created through /setup.

10.7 Database schema overview

The metadata database is PostgreSQL (certireport, owner certireport). CertiReport's tables live in the schema cr; the Quartz job store tables (qrtz_*) live in the database's default schema (public). Migrations are tracked in cr. "___EFMigrationsHistory". Every instant is stored in UTC (timestamp with time zone); identifiers are time-ordered GUIDs (version 7) generated by the application; enumerations are stored as their names. Tables derived from AuditableEntity carry CreatedAt, CreatedBy, ModifiedAt, ModifiedBy and use PostgreSQL's xmin as the concurrency token.

10.7.1 Identity and security

Table	Content
cr.Users	Portal users (ASP.NET Core Identity): user name, password hash, security stamp, DisplayName, IsActive, MustChangePassword, WindowsAccount (unique), TwoFactorEnabled, lockout fields, LastSignInAt, Culture.
cr.Roles, cr.UserRoles, cr.RoleClaims, cr.UserClaims, cr.UserLogins, cr.UserTokens	Identity tables with short names. Roles is seeded with the six built-in roles; UserLogins holds Entra links; UserTokens holds authenticator keys and recovery codes.
cr.ApiKeys	API keys: Name (unique), Prefix (unique, first 11 characters), Hash (SHA-256), Roles (comma separated), IsEnabled, CreatedAt, CreatedBy, ExpiresAt, LastUsedAt.
cr.AuditLog	Hash-chained audit entries: At, UserName, EntityType, EntityId, Action, BeforeJson, AfterJson, PreviousHash, Hash (SHA-256 over the entry and the previous hash).

10.7.2 Companies and reports

Table	Content
cr.Companies	SAP B1 companies: Name (unique), Dialect (Hana, SqlServer), Server, DatabaseName, UserName, ProtectedSecret, AdditionalOptions, Service Layer URL, user, protected secret, company database and certificate trust, SigningCertificateThumbprint, Logo and its content type, CrystalConnectionString, MaxConcurrentQueries (default 4), TimeZoneId, IsActive, last test results (LastTestedAt, LastTestSucceeded, DetectedCompanyName, DetectedVersion, IsReadOnlyUser).
cr.Concepts	Variable concepts: Code (unique), Name, DataType, IsSystem. Seeded with BusinessPartner, PeriodStart, PeriodEnd, AsOfDate, AgingBuckets, CurrencyMode.
cr.Reports	Reports: Code (unique), Name, Category, Description.
cr.ReportVersions	Numbered versions per report (unique ReportId + Number): Status (Draft, PendingApproval, Published, Retired), DefinitionJson (datasets per dialect, outputs, templates), PublishedAt, PublishedBy, ApprovedBy.
cr.ReportVariables	Variables of a version (unique ReportVersionId + Name): Label, ConceptId, DataType, IsRequired, Cardinality (Single, Multi, Iterable), SourceJson, DefaultExpression, RulesJson, SortOrder.
cr.ExcelThemes	Named Excel looks: Name (unique), Description, DefinitionJson.
cr.ExcelTemplates	Uploaded workbook templates: Name (unique), FileName, Content, Size, Sha256.

10.7.3 Schedules

Table	Content
cr.Schedules	Name (unique), CompanyId, CronExpression, TimeZoneId,

Table	Content
	MisfirePolicy (FireOnceNow, Skip), OverlapPolicy (Queue, Skip, Parallel), IsEnabled, CalendarId, HolidayPolicy (Run, Skip, NextBusinessDay), DeliveryJson (channel, mail profile, message, variants, condition, file name, attachment policy, destinations, approval, write-back), NextFireAt, LastRunAt, LastRunStatus.
cr.ScheduleReports	Reports of a schedule (unique ScheduleId + ReportId): PinnedVersion (null = latest published), OutputFormatsJson (null = all), SortOrder.
cr.ScheduleBindings	One binding per slot: ConceptId or VariableOverride (REPORTCODE.Variable for an unlinked variable), Kind (Fixed, Expression, Selection, Iterate, Derived, BusinessPartners), ValueJson.
cr.BusinessCalendars	Name (unique), WeekendDaysJson, HolidaysJson ({ date, name } list).

10.7.4 Runs and files

Table	Content
cr.Runs	One firing or on-demand execution: ScheduleId, CompanyId, ReportId and ReportVersion (on-demand runs), Trigger (Schedule, Manual, Api, Test), FireTimeUtc, ResolvedValuesJson, Status, StartedAt, CompletedAt, Error, RequestedBy, TestRecipient, TestBurstKey, ClaimedBy, DeferredFromUtc, DecidedBy, DecidedAt, DecisionNote. Indexed by schedule and fire time, report and fire time, and status.
cr.RunItems	Burst items of a run (unique RunId + BurstKey): Label, Recipient (several addresses separated by ;), Language, ValuesJson, Status, Attempt, RowCount, StartedAt, CompletedAt, Error, HeldDeliveryJson.
cr.RunFiles	Files of an item: FileName, ContentType, StoragePath (relative to files\), Size, Sha256, CreatedAt, ExpiresAt, VerifyCode (unique), IsSigned, B1AttachmentEntry, DownloadToken (unique), LinkExpiresAt, DownloadCount, LastDownloadedAt.

10.7.5 Mail and delivery

Table	Content
cr.SmtpProfiles	Mail profiles: Name (unique), Transport (Smtp, MicrosoftGraph), host, port (587), Security, ValidateServerCertificate, HelloName, TimeoutSeconds (60), AuthKind (None, Password, OAuth2Microsoft), UserName, ProtectedSecret, TenantId, ClientId, from address and name, ReplyTo, MaxMessagesPerMinute (30), MaxRecipientsPerDay (10 000), MaxAttachmentMegabytes (20; 0 = no limit), Priority, IsDefault, IsEnabled, last test.
cr.OutboxMessages	Transactional outbox: IdempotencyKey (unique: run, burst key and attempt), RunId, RunItemId, SmtpProfileId, To, Cc, Bcc, Subject, PayloadJson (body and attachment references), Status (Pending, Sending, Sent, RetryScheduled, DeadLettered, Held), AttemptCount, CreatedAt, NextAttemptAt, SentAt, LastError, MessageId, Bounce, BounceDetail, BouncedAt, ClaimedBy, ClaimedAt.
cr.DeliveryAttempts	One row per send attempt: OutboxMessageId, Attempt, At,

Table	Content
	Succeeded, SmtplibProfileId, Response (the server's reply), NodeId.
cr.DeliveryDestinations	SFTP, SharePoint and Teams destinations: Name (unique), Kind, SettingsJson (never a secret), ProtectedSecrets, IsEnabled, last test.
cr.Bounces	Delivery status notifications: OutboxMessageId, RunItemId, Recipient, Kind (Failed, Delayed), StatusCode (such as 5.1.1), Diagnostic, Subject, SourceMessageId, ReceivedAt.
cr.SuppressedAddresses	Addresses no longer mailed: Address (unique, lower case), Reason, BounceCount, AddedAt, LastBounceAt, AddedBy.

10.7.6 Operations

Table	Content
cr.EngineNodes	Heartbeats: Id (Quartz instance id), MachineName, Version, ProcessId, StartedAt, LastHeartbeatAt.
cr.AppSettings	Key/value settings set in the portal, value stored as JSON: Portal:PublicUrl, Retention:RunDays (default 400), Retention:OutboxDays (default 90), Alerts:Recipients, Alerts:OnPartial (default true), Webhooks:Url, Webhooks:Secret (protected), Digest:Settings, Digest:LastSent, Backups:Settings, Backups:LastNightly, Bounces:Mailbox, Bounces:LastChecked, License:Token, License:LastNotice. Every change is audited.
public.qrtz_job_details, qrtz_triggers, qrtz_cron_triggers, qrtz_simple_triggers, qrtz_simprop_triggers, qrtz_blob_triggers, qrtz_calendars, qrtz_paused_trigger_grps, qrtz_fired_triggers, qrtz_scheduler_state, qrtz_locks	The Quartz.NET 3 job store (scheduler name CertiReport): one durable job and cron trigger per enabled schedule in group schedules, the system jobs in group system, cluster state and locks. Do not edit; the engine rebuilds the schedule triggers from cr.Schedules.

The backup archive contains the whole database (pg_dump --format=custom), so the Quartz tables and cr.AppSettings travel with it.

10.8 Security

10.8.1 Identity and sessions

Portal accounts are ASP.NET Core Identity users stored in cr.Users. Passwords need at least 12 characters with an upper-case letter, a lower-case letter and a digit; no symbol is required. The sign-in cookie CertiReport.Auth is HttpOnly, SameSite=Lax, valid for 8 hours with sliding expiration. The security stamp is re-validated every minute, so a password reset, a deactivation or **Sign out everywhere** ends every open session within a minute. A deactivated user (IsActive off) cannot sign in by any method. The account guard sends a signed-in user to **Change password** when an administrator set the password, and

administrators who signed in with a password only to **Set up authenticator** while `Authentication:RequireMfaForAdministrators` is on.

10.8.2 MFA and external sign-in

The authenticator app (TOTP) is the second factor; recovery codes are issued at enrolment (chapter 3). **Sign in with Windows** (`Authentication:Windows:Enabled`) authenticates with Negotiate and signs in the user whose **Windows account** matches; **Sign in with Microsoft** (the `Authentication:Entra` settings) uses OpenID Connect and links the Entra identity to the existing user with the same e-mail address at first sign-in. Neither creates accounts; a refused external sign-in is logged as `<Provider> sign-in refused for <account>`: no active CertiReport user is linked. External sign-ins bypass the authenticator step because the identity provider is trusted for it.

10.8.3 Lockout and rate limits

- An account locks for 15 minutes after 5 failed sign-ins (also for new users).
- POST requests to `/account/*` and `/setup` are limited to 10 per minute per client address; `/api/v1/verify/*` to 30 per minute per client address. Beyond that the portal answers 429 Too Many Requests without queueing.
- The first-run page `/setup` is protected by the one-time token in `setup-token.txt` (compared in constant time) and disappears once a user exists.
- Return URLs after sign-in are accepted only when they are local paths, to prevent open redirects.

10.8.4 Response headers and HTTPS

Every response carries `X-Content-Type-Options: nosniff`, `X-Frame-Options: DENY`, `Referrer-Policy: strict-origin-when-cross-origin`, `Permissions-Policy: camera=(), microphone=(), geolocation=(), payment=()` and `Cross-Origin-Opener-Policy: same-origin`. Outside the Development environment the portal sends HSTS and uses a generic error page (`/error`).

HTTPS is enabled with `Https:Port` and `Https:CertificateThumbprint` (setup properties `HTTPS_PORT` and `HTTPS_CERT_THUMBPRINT`). The certificate must be in the Local Machine Personal store and the service account needs read access to its private key (certificate console, **Manage Private Keys**). The portal then listens on both the HTTP and the HTTPS port; a configured but missing certificate stops the service with `Https:CertificateThumbprint <thumbprint> was not found in the Local Machine Personal certificate store`. rather than serving HTTP only. For a reverse proxy in front of the portal, set the public address (**Administration > Settings**) to the proxy's address so verification and download links are right.

10.8.5 Secrets and Data Protection

Nothing secret is stored in clear text. Company database passwords, Service Layer passwords, mail profile passwords and client secrets, destination secrets (SFTP password or private key, SharePoint client secret, Teams webhook URL) and the webhook secret are protected with ASP.NET Core Data Protection (purpose `CertiReport.Secrets.v1`, application name `CertiReport`). The key ring is persisted to `%ProgramData%\CertiReport\keys` and each key is encrypted with DPAPI for the local machine, so both services on the same server can read it and nobody can read it elsewhere. Consequences:

- Back up `keys\` with the database (the backup archive does); without it the database is restorable but every stored secret is lost.
- After a restore on a different machine, enter the secrets again (chapter 2). API keys keep working because only their hashes are stored.

- The keys are encrypted for the machine they were created on, so an engine on a second server cannot read secrets protected on the first; the portal and the engine that uses its secrets belong on the same server.

The metadata connection string, with the generated database password, is kept in the registry under HKLM\SOFTWARE\CertiReport, readable by Administrators, SYSTEM and the service account.

10.8.6 API keys and audit

API keys are shown once at creation and stored as SHA-256 hashes with an 11-character prefix for lookup; they can be disabled, deleted and given an expiry (default 365 days) and act with the roles chosen for them. Every change to a company, report, schedule, user, setting, licence, API key or other tracked entity is written to cr.AuditLog as a hash chain: each entry's Hash covers the entry and the previous entry's hash, so editing or deleting history breaks the chain, which **Administration > Audit log** detects (chapter 9).

10.8.7 SQL safety

Report SQL is a single SELECT only, checked by the safety guard (ScriptDom on SQL Server, a token check on HANA), and variables are bound as parameters (@Name on SQL Server, positional ? on HANA), never pasted into the text. Scriban PDF templates run sandboxed: no includes, no file or network access, and the rendered page can load only inline and data: content.

10.8.8 Read-only database users

The guard is a convenience; the real protection is the database user. Create a read-only user for every company with the scripts installed under C:\Program Files\CertiReport\sql: hana-readonly-user.sql creates CERTIREPORT_RO with GRANT SELECT ON SCHEMA "<company>" and a password that does not expire; sqlserver-readonly-user.sql does the same for SQL Server. The connection test on the company page reports whether the user can change data (Connected to <company>, but the user can change data. Use a read-only user for reporting (see installer\sql).), and CertiReport.Engine.exe check repeats the warning. The Service Layer user for write-back needs only the rights to add attachments and activities.

10.9 Troubleshooting

Symptom	Cause	Fix
Setup fails; MSI log says A database superuser password is required to create the database (setup option "Database superuser password" or DB_SUPERUSER_PASSWORD=..).	First install with the embedded database and no superuser password.	Run the setup again with a password on the Options page or DB_SUPERUSER_PASSWORD=.
Setup fails with Port 5444 is already in use by PID <n> (<name>). Stop that program or choose another database port.	Another PostgreSQL or program listens on the database port.	Stop it or install with DB_PORT=<free port>.
Setup fails with Service CertiReport.Database did not start. Server log (...): ...	The cluster could not start; the server log's FATAL lines are quoted.	Read %ProgramData%\CertiReport\pgdata\log; typical causes are a missing Visual C++ runtime (put vc_redist.x64.exe in the setup's prereqs) or a data

Symptom	Cause	Fix
		directory the service account cannot write. The half-created cluster is discarded, so rerun the setup.
Setup fails with Could not connect as superuser postgres: check the password and the service log.	Upgrade or repair with the wrong superuser password while the stored connection string no longer works.	Use the password given at first install, or reset it with <code>psql</code> on the cluster.
A service does not start; Event Log says Connection string 'Metadata' is not configured. Set it in appsettings.json, the registry (HKLM\SOFTWARE\CertiReport) or the environment variable ConnectionStrings__Metadata.	The registry value ConnectionStrings:Metadata is missing (external database installs with an empty METADATA_CONNECTION).	Create the string value under HKLM\SOFTWARE\CertiReport and restart the services.
The portal does not start; Event Log says Https:CertificateThumbprint ... was not found in the Local Machine Personal certificate store.	HTTPS is configured but the certificate is not in LocalMachine\My.	Import the certificate or clear Https:Port and Https:CertificateThumbprint under HKLM\SOFTWARE\CertiReport\Portal.
Engine log repeats Waiting for N metadata migration(s) to be applied before starting the scheduler	The portal has not applied the migrations (not running, or Database:MigrateOnStartup off).	Start CertiReport.Portal; the engine starts its scheduler as soon as the schema is current.
Engine log repeats Metadata database unreachable; scheduler start postponed, /health/ready answers 503	CertiReport.Database is stopped or the connection string is wrong.	Start the service; check ConnectionStrings:Metadata; run CertiReport.Engine.exe check.
Dashboard says the engine is offline although the service runs	No heartbeat for 2 minutes: the engine cannot reach the database, or two nodes share one Scheduler:InstanceId.	Check the engine log; give each node its own instance id (default: machine name).
Portal log: No users exist yet. Open /setup in the portal and enter the setup token from C:\ProgramData\CertiReport\setup-token.txt	The setup ran without ADMIN_PASSWORD, or the database was recreated.	Open /setup, paste the token from the file and create the administrator.
Sign-in refused and the account says it is locked	5 failed attempts within the lockout window.	Wait 15 minutes, or let an administrator reset the password under Administration > Users .
429 Too Many Requests on	More than 10 sign-in posts or 30	Wait a minute; for a shared

Symptom	Cause	Fix
sign-in or verification	verification calls per minute from one address.	proxy address consider a reverse proxy that forwards client addresses.
API call answers 401 with WWW-Authenticate: ApiKey	Key missing, unknown, disabled or expired.	Send X-Api-Key: cr_...; check the key under Administration › API keys and its expiry.
API call answers 403	The key's roles do not grant the permission, or a cookie user must change a password or enrol MFA first.	Give the key a role that grants the permission (10.5.2); complete the account step in the browser.
Company test: SAP HANA Client not found (C:\Program Files\sap\hdbclient\dotnetcore\v8.0\Sap.Data.Hana.Net.v8.0.dll). Install SAP HANA Client 2.x (64-bit) on this server, or set DataSource:HanaClientPath ...	The HANA client is not installed on the portal or engine server.	Install SAP HANA Client 2.x (64-bit) on every server that runs the portal or the engine, or point DataSource:HanaClientPath at it.
Company test: Connected, but '<db>' is not an SAP Business One company database (table OADM not found or not readable).	Wrong database or schema name, or the user has no rights on it.	Correct Database (SQL Server) or Schema (HANA) and grant SELECT.
Company test: No response from <server> within 20 seconds.	Firewall or wrong host and port.	Check the server address (hana01:30015, SQL01\B1) and the network path from the CertiReport server.
Company test: option error names a fragment such as NDB and asks for databaseName=NDB	Additional options contains a fragment without =.	Write every option as name=value.
Run fails with Licence: No licence installed. ... or Licence: company '<name>' is not covered by the licence (N of M active companies are licensed). ...	No usable licence, or more active companies than licensed.	Activate or extend the licence under Administration › License (chapter 4), or deactivate a company.
PDF outputs fail; check says No Google Chrome or Microsoft Edge found; PDF outputs will fail. Install one or set Rendering:BrowserPath	No Chromium-based browser on the engine server.	Install Chrome or Edge, or set Rendering:BrowserPath under HKLM\SOFTWARE\CertiReport\Engine.
Run error No browser could be started for PDF output. ... although a browser is installed	The browser cannot run under the service account (policy blocks headless Edge, profile folder not writable).	Install Google Chrome (tried first) or set Rendering:BrowserPath to it; check the browser's group

Symptom	Cause	Fix
check says .NET Framework 4.8 is required and not installed or No SAP Crystal Reports runtime for .NET Framework is installed (32-bit or 64-bit)	The Crystal feature is installed but its prerequisites are not.	policies. Install .NET Framework 4.8 and SAP's Crystal Reports runtime for .NET Framework on the engine server.
Crystal run fails with The stored layout is not a Crystal Reports file (unknown encoding).	The RDOC.Template of the chosen layout is not an .rpt (for example a PLD layout).	Pick a Crystal layout (type C) in the designer, or use an .rpt file on the engine server.
Crystal run fails with Layout <code> does not exist in <company> (or is not a Crystal layout).	The layout was deleted or renamed in SAP B1.	Pick the layout again in the designer.
A document layout renders empty or the designer shows ObjectId@ as "needs a mapping"	DocKey@ and ObjectId@ are not both mapped.	Map DocKey@=<DocEntry variable> and ObjectId@="13" (the B1 object type: 13 invoices, 17 orders, 15 deliveries, 14 credit notes, 22 purchase orders, 18 AP invoices, 24 incoming payments).
Item shows No recipient address. or No recipient address; files kept.	The iterate row or business partner has no e-mail and the schedule's policy is to skip.	Fix the address in SAP B1 or the iterate query, or choose a fixed recipient on the Delivery tab.
Item shows Not sent: the files total <size>, above the <n> MB limit of mail profile '<profile>'. Files kept.	The attachment limit of the mail profile with the policy Skip .	Choose Split , Zip or Download links on the Delivery tab, or raise the profile's limit.
Mail stays RetryScheduled and then DeadLettered; the attempt says The server refused the command (4xx 5xx): ...	The mail server refuses the message (authentication, sender, size, relay).	Read the attempt's response on the run page; test the mail profile under Administration › Mail profiles ; 4xx is retried five times, 5xx is final.
Mail dead-lettered with No enabled mail profile.	Every mail profile is disabled or deleted.	Enable a profile and resend the item from run history.
Mail dead-lettered with Not sent: every recipient is on the suppression list after bounces (...)	The address bounced hard earlier.	Correct the address in SAP B1 and remove it under Administration › Bounces .
Download link answers This download link for <file> has expired. Ask the sender for a new one. or... the file was removed by retention.	The link's validity (default 30 days) or the run retention has passed.	Resend the item (a new link is issued) while the files exist; raise Keep runs and files (days) if needed.
Run item: Download links need the portal's public	Download links or approval mails without a public URL.	Set the public address under Administration › Settings or with

Symptom	Cause	Fix
address: set it under Settings → Public address.		set-public-url.
Backup fails with pg_dump.exe was not found. Set Paths:Pgsq1 to the PostgreSQL folder that holds bin\pg_dump.exe.	External PostgreSQL without the embedded binaries.	Install the PostgreSQL client tools and set Paths:Pgsq1 under HKLM\SOFTWARE\CertiReport.
Backup settings refuse the folder: Enter an absolute folder path, e.g. D:\Backups\CertiReport or \nas\backups\certireport.	A relative path was entered.	Enter an absolute local path or UNC path the service account can write to.
restore prints the archive summary and exits 3	--yes was not given.	Stop the Portal and Engine services and run the command again with --yes.
Bounce mailbox test: For a Microsoft 365 profile that sends by SMTP, read the bounces with a Microsoft Graph profile instead (IMAP OAuth needs a user sign-in).	IMAP with OAuth2 is not supported.	Create a Microsoft Graph mail profile for the same mailbox and choose it as the bounce mailbox.
SFTP destination test: The server's host key does not match the configured fingerprint.	The server's key changed or the pinned fingerprint is wrong.	Verify the server's fingerprint and update the destination.
Teams destination: The Teams webhook URL is missing or not https.	The webhook URL field is empty or uses http.	Paste the incoming webhook or Workflows URL (https://...).
Schedule save refused: Fix these problems first: ...	The pre-save checks found an error (unbound slot, invalid cron or expression, rule violation, disabled mail profile).	Open Check on the schedule; each message names the tab and the field.
Report version cannot be published: A different user must approve a version submitted for approval.	Four-eyes publishing.	Let another user with the design permission publish it.
Weekly digest or licence notice never arrives	No recipients, or the hour has not passed in server local time.	Set recipients under Administration › Settings (failure alerts for licence notices); the jobs run hourly at :10 (backup), :20 (digest) and daily at 07:15 (licence).

10.10 Glossary

Term	Meaning
Approval (run)	Schedule option Require approval before sending : the run produces its

Term	Meaning
	files and waits in <code>AwaitingApproval</code> ; an Administrator or Scheduler approves or rejects it from the run page or the API.
Binding	How a schedule supplies a slot's value at fire time: fixed value, date expression, selection from the variable's lookup, derived from another date slot, iterate (one item per row of a query) or business partners picked from SAP B1.
Bounce	A delivery status notification received in the bounce mailbox: <code>Failed</code> (permanent, 5.x.x) or <code>Delayed</code> (temporary, 4.x.x). Hard bounces put the address on the suppression list.
Burst, burst key	A run that produces one item per value of the iterating slot (for example one statement per business partner); the burst key is the item's value, such as the <code>CardCode</code> .
Business calendar	Weekend days and holidays; a schedule picks one and a holiday policy (run anyway, skip, next business day).
Certified PDF	A PDF whose SHA-256 is kept with a verification code printed in its footer with a QR code to <code>/verify/{code}</code> ; optionally signed with the company's certificate.
Company	An SAP Business One company database (HANA schema or SQL Server database) that reports run against, with its own read-only user, time zone, Service Layer and signing certificate. Licences count active companies.
Concept	The meaning of a variable independent of its name in a report (<code>BusinessPartner</code> , <code>PeriodStart</code> , <code>PeriodEnd</code> , <code>AsOfDate</code> , <code>AgingBuckets</code> , <code>CurrencyMode</code>). Variables that share a concept across a schedule's reports merge into one slot.
Cron expression	Quartz six-field schedule such as <code>0 0 7 1 * ?</code> (07:00 on the first of every month), interpreted in the schedule's time zone.
Data Protection key ring	The keys in <code>%ProgramData%\CertiReport\keys</code> that encrypt stored secrets, DPAPI-bound to the machine.
Date expression	A default or binding such as <code>@StartOfMonth(-1)</code> or <code>@EndOfMonth(-1)</code> , evaluated relative to the fire date.
Dead-lettered	An outbox message that failed permanently or exhausted its five retries; it is not sent again unless resent from run history.
Deferred run	A run moved from a holiday or weekend to the next business day (<code>DeferredFromUtc</code> holds the original time); a regular run on that day supersedes it.
Delivery attempt	One try to send an outbox message, with the server's reply, recorded in <code>cr.DeliveryAttempts</code> .
Destination	A named SFTP server, SharePoint library or Teams channel a schedule can deliver to besides e-mail and folders.
Digest	The weekly e-mail summarising the week's runs, deliveries, bounces and problems, sent by the engine on the chosen day after the chosen hour.
<code>DocKey@, ObjectId@</code>	Crystal parameters of SAP B1 document layouts: the document's <code>DocEntry</code> and object type (13 invoices, 17 orders, ...); mapped from report variables so a schedule can run over documents.
Download link	A link <code>{PublicUrl}/d/{token}</code> sent instead of an attachment, valid for a number of days (default 30) and counted on the run page.

Term	Meaning
Edition	The licence tier claimed in the key (Standard, Professional, Enterprise), shown on the licence page.
Engine node	One running CertiReport .Engine instance, identified by its Quartz instance id (the machine name) and shown with its heartbeat on the dashboard.
Export bundle	The JSON file from Administration › Export and import (or /api/v1/config/export) with custom concepts, reports, Excel themes and templates, calendars and schedules; companies, mail profiles and destinations are referenced by name only, and no secret travels in it.
Failure alert	E-mail to the addresses under Settings › Failure alerts when a run fails (optionally also on partial success); the same addresses receive licence notices.
Fire time	The instant a trigger was due (FireTimeUtc), the reference for date expressions and the run's position in history.
Grace	The days after a licence's expiry (lic_grace) during which everything still runs; the licence state is Grace.
Hardware ID	SHA-256 over the Windows MachineGuid and host name, shown as six groups of five characters; a licence is bound to it. Changes when Windows is reinstalled or the server renamed.
Held delivery	Folder copies, uploads, Teams cards and write-back planned for an item of a run awaiting approval, carried out on approval.
Housekeeping	The engine job every 15 minutes that applies retention and removes stale engine nodes.
Idempotency key	The unique key of an outbox message (run, burst key, attempt) that prevents a retried run from enqueueing the same message twice.
Item	One unit of a run (RunItem): the files and the e-mail for one burst key, with its own status, row count and error.
Iterate	The binding kind whose query yields one item per row, with columns for the value, a label, the recipient address and the recipient language; only one slot of a schedule may iterate.
Licence states	Missing, Invalid, Valid, Expiring (30 days or less), Grace, Expired. Runs are allowed in Valid, Expiring and Grace.
Mail profile	A mail server and sender identity (SMTP or Microsoft Graph) with throughput and attachment limits.
Metadata database	CertiReport's own PostgreSQL database certireport (configuration, schedules, runs, users, settings, outbox).
Misfire policy	What a schedule does when a fire was missed (engine down): Fire once now or Skip.
Outbox	The table of e-mails waiting to be sent, written in the same transaction as the run item; the dispatcher sends, retries and dead-letters from it.
Overlap policy	What a schedule does when it fires while a run is still in progress: Queue, Skip or Parallel.
Parameter map	The Crystal output's Parameter=Variable, Parameter="literal" or Parameter=From. . To lines that feed a layout's parameters.
Public URL	The address users and recipients reach the portal at (Settings › Public address), the base of verification links, QR codes and download links.
RDOC	The SAP B1 table that stores Report and Layout Manager entries; Crystal

Term	Meaning
	layouts (type C) are read from it and cached under layouts\cache.
Retention	Days to keep runs with their files (default 400) and finished mail (default 90).
Run	One firing of a schedule or one on-demand execution, with trigger Schedule, Manual, Api or Test.
Sidecar	CertiReport.CrystalHost.exe (or CrystalHost32.exe), the .NET Framework 4.8 process the engine starts per Crystal render because SAP's runtime is native code.
Signing certificate	A certificate in the Local Machine Personal store of the engine server whose thumbprint is set per company; the engine signs the company's PDFs with it (PKCS#7).
Slot	A value a schedule binds once: one per shared concept across its reports, or one per unlinked variable (SOA.CurrencyMode).
Starter	One of the ready-made SAP B1 reports under Reports > Starter reports , imported as a draft to adapt and publish.
Suppression list	Addresses that are no longer mailed after a hard bounce (or added by an administrator).
Test send	A run with trigger Test: one item produced with real data and e-mailed to a chosen address only, subject prefixed [Test], no Cc, Bcc or write-back.
Transfer bundle	See export bundle.
Variant	A subject and message of a schedule in another SAP B1 language (OLNG); a business partner whose language has a variant receives it.
Verification code	The 12-character code XXXX-XXXX-XXXX (Crockford base-32) printed on a certified PDF and looked up on /verify.
Version (report)	An immutable numbered snapshot of a report: Draft, Pending approval, Published, Retired. Editing a published version starts a new draft.
Write-back	After an item is delivered, the files are attached to the business partner in SAP B1 and/or an activity is logged, through the company's Service Layer.