Runtime Startup Reference

Configure and control all runtime options.

Reference **Solution** **Runtime** **UI** Startup | Build and Publish | Execution Profiles | Monitor

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Runtime Startup (Reference): Configure and control solution execution, specify execution profiles, and customize connection settings for all runtime scenarios.

Access: Runtime Startup

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Main Commands

Execution Controls

Command	Function	Status Indicators
Run Startup	Starts the application	Button changes to Stop
Stop	Stops the application	Button changes to Run
Online Configuration	Apply changes in real-time	Must be connected to runtime

Note: All changes must be saved before they appear in runtime when online configuration is enabled.

Execution Profiles

Select environment-specific configuration:

Profile	Purpose	Default Port
Development	Debugging enabled, dev tools active	3201
Validation	Testing environment	3301
Production	Optimized for production	3101
Custom	User-defined settings	3401

The default port is `3100 + the profile id` (Production 0, Development 1, Validation 2, Custom 3). Setting the **Port** field on a profile overrides the default.

The Production profile uses main configuration without overrides. Other profiles apply configured replacements at startup.

Startup Port Settings

Configure network ports for application access:

Setting	Description	Default
Main Port	Primary access port per profile	Profile-dependent
Auto Ports	Auto-select if main unavailable	Disabled
WA Port	Windows Authentication port	As configured
Windows Authentication	Require Windows auth only	Unchecked

SSL Port	HTTPS web access	3111
AutoStart/Windows Service	Run at system startup. Production profile only	Disabled

AutoStart Behavior

Windows Platform:

- Configures as Windows Service
- Starts without user login
- Runs under system account

Multiplatform on Remote Devices:

- Adds the solution to `AutoStartPrograms.txt` in the MachineSettings folder (see Runtime Installation Reference, Linux/Docker Startup)
- Starts with TWebServices
- Enables remote management

Enabling AutoStart

1. Open **Runtime Startup** and set the **Execution Profile** to **Production**. AutoStart is enabled only for the Production profile.
2. In **Startup Port Settings**, click **Setup** next to **AutoStart**. The **AutoStart Windows Service Settings** dialog opens and shows the current status of the service.
3. Click **Apply Settings**, then **Ok**. The runtime is installed as the Windows Service `TStartup-<SolutionName>`. Installing a service requires Administrator rights.
4. Check the result in **Services.msc**: the service is listed with Startup type **Automatic (Delayed Start)**. For the log-on account and the start delay, see Service Security Settings in Runtime Installation Reference.

To remove the service, open the same dialog and click **Remove Settings**.

Clients are started separately. The service has no user interface, so no display opens when it starts, on the server or on any other computer. To bring clients up automatically at boot, use AutoStartClient: see Installation Folders and Utilities Reference, AutoStartClient.exe.

SSL Certificate Configuration

When an SSL Port is configured, a TLS/SSL certificate is required to serve HTTPS connections on that port. Certificate settings are stored per port in `TServer.json` — changing the SSL Port number requires reconfiguring the certificate for the new port.

To open the certificate dialog: Click the button next to the **SSL Port** field.

Source	Description	Availability
Certificate File	Load a .pfx or .crt file from the file system	Local and remote
Certificate Store	Select a certificate by thumbprint from the Windows local machine store	Local only

Certificate File mode: Browse for a .pfx or .crt file. For .pfx files, enter the certificate password. When connected to a remote server, the file is uploaded automatically to the `Certificates\` subfolder in the server's machine settings directory.

Certificate Store mode: Enter the SHA-1 thumbprint of a certificate already installed in the Windows local machine store. This option is not available when connected to a remote server.

Validate Certificate: Checks the certificate and displays its subject, expiration date, and issuer. Only available when connected to a local server. Validation is required before saving.

Windows Authentication (WA) Configuration

Windows Authentication lets a user sign in to a runtime without typing a username or password, by reusing the Windows session they are already logged into on the client machine. It is intended for installations where the runtime and its clients live inside the same Active Directory domain.

Enabling WA

Under **Runtime / Startup**, enable **WA**. Rich Client and Smart Client connections then attach to that port and pass the client's Windows identity to the server instead of credentials. The web client connects via ip. port and wa=true.

From FrameworX 10.1.6, the Runtime Startup page generates the SmartClient URL and the RichClient command line with the Windows Authentication port, so a client launched from them connects with Windows Authentication without edits. In 10.1.5, add `port1=<port+1>` to the SmartClient URL by hand.

From FrameworX 10.1.6, the WA check boxes for the Rich Client and the Smart Client are available only when the selected profile uses Windows Authentication on a Windows solution. The choices are kept and apply again when Windows Authentication is turned back on.

TLS on the WA port

From FrameworX 10.1.6, TLS on the Windows Authentication port is optional and is switched on at the server: set `"EnableSSL": true` inside the `appSettings` object of `TServer.json` in the `MachineSettings` folder (by default `C:\Users\Public\Documents\FrameworX\MachineSettings\`), then restart the runtime.

```
{
  "appSettings": {
    "EnableSSL": true
  }
}
```

The https SmartClient URL comes from the **SSL Port** option and the SmartClient **SSL** option on this page, so a TLS setup needs both the server switch and those options. The Secure Gateway has its own switch, `LocalEnableSSL`, described in SecureGateway Services Reference.

In 10.1.5, the switch is in `TServer.exe.config`. A server moving to 10.1.6 sets `EnableSSL` in `TServer.json` instead.

How it works

WA does not validate a password — it trusts the Windows/AD logon that the OS already performed. Two preconditions must hold for login to succeed:

1. The user must be **currently logged into Windows** on a machine that can reach the domain controller.
2. The user account must **exist in Active Directory**.

If the AD lookup fails, authentication fails — there is no local-password fallback in WA mode.

Permission resolution

After the AD identity is resolved, the user doesn't have to exist in the solution. Instead, the user's AD group membership is matched against the **Windows Group Permission** mappings configured in the Security module (for example, `DOMAIN\Engineers` permission `Engineering`). If a matching permission exists in the solution, the session is granted that permission; otherwise the session falls back to **Guest**. The session itself is held in memory on the server, WA never writes the user into the Runtime Users database.

From FrameworX 10.1.6, a Windows group whose name contains spaces, for example `Plant Operators`, also matches a permission named with underscores in place of the spaces, `Plant_Operators`. The name exactly as configured is always tried first, so permissions whose names already match keep resolving as before.

WA vs LDAP

LDAP is an *interactive* flow that collects username and password in the login dialog and forwards them to the directory server for validation, returning the group on success (which then feeds the same permission-mapping step). LDAP therefore works for users who are *not* currently logged into a Windows domain session, while WA works only for users who already are. WA can be used behind IIS or against a runtime hosted outside IIS — IIS is not a requirement. Refer to Security Runtime Users Reference for more information.

Port conflicts and AutoPorts limits

Auto Ports protects against the most common port collision: two FrameworX runtimes for the same solution trying to bind the same port. When the setting is enabled and another FrameworX runtime on the same solution already holds the configured port, the launcher probes forward and binds the next free port instead. Disabled by default; enable it per profile in the Startup Port Settings above.

What Auto Ports does not cover. The mechanism only detects another live FrameworX runtime. It does not bump the port when:

- A previous FrameworX process died without releasing the port (orphan process).
- The port is held in TCP `TIME_WAIT` (about 30 seconds after a clean stop).
- A non-FrameworX listener is on the same port (another web server, a debug tool, an unrelated service).
- The runtime was just stopped from inside Designer and an internal reference still pins the prior port.

In any of these cases startup fails with a port-in-use error even with Auto Ports enabled.

Recovery when Auto Ports cannot help

1. **Identify the process holding the port** (PowerShell):
   `Get-NetTCPConnection -LocalPort <port> | Select-Object OwningProcess`
   Then `Get-Process -Id <PID>` to see what it is.
2. **If it is a stale FrameworX process, end it**:
   `Stop-Process -Id <PID> -Force`
3. **If the port is in `TIME_WAIT`**, wait about 30 seconds and retry the runtime startup.
4. **If a different process owns the port** (a non-FrameworX listener you want to keep), change the configured **Port** on the Runtime Startup page to a free value, or restart Designer to release any ports held by Designer-side helpers.

Command-Line Service Management (TManageServices.exe)

The **AutoStart** dialog calls `TManageServices.exe`, the utility in the product root folder that installs and removes every FrameworX Windows service. To use it from a script (SCCM, Intune, PowerShell, Ansible), see TManageServices CLI. On Linux/Docker, run the runtime with `systemd` instead (see the Linux/Docker Startup section of Runtime Installation Reference).

For end-to-end IT deployment patterns, see IT Deployment RunBook.

Execution Environment

Execution Path Settings

Option	Description	Use Case
Direct File Access	Local file access	Single-user development
Solution Server	TWebServices connection	Multi-user collaboration
Path/Use Solution Path	Override default path	Redundancy configuration

DataHub Service

Setting	Function
Publish to DataHub	Share objects with remote DataHub
DataHub Settings	Configure connection parameters

DataHub Settings:

- **Alias**: Solution identifier
- **Primary/Secondary Host**: Server addresses
- **Port**: TCP communication (default: 30001)
- **AccessKey**: Authentication

Built-in Broker Settings

Setting	Function
Publish to MQTT Broker	Make UNS visible to MQTT clients
TMQTT Broker Settings	Configure security and options

Startup Modules

Select modules to activate at startup:

Module	Function	Impact
Devices	Enable device communication	Required for field data
Alarms	Enable alarm processing	Required for notifications
Historian	Enable data logging	Required for trending
Datasets	Enable database access	Required for queries
Reports	Enable report generation	Required for documents
Scripts	Enable script execution	Required for logic
Displays	Launch WPF client locally	Opens TRichClient
OpenBrowser	Launch web client	Opens default browser
OPC Server	Enable OPC DA/UA server	External access

Redundancy Settings

Configure high-availability environment:

Setting	Description	Format
Primary Server IP/Port	Main server address	IP:Port
Secondary Server IP/Port	Backup server address	IP:Port
Timeout	Switchover delay	Seconds
On Primary Startup	Recovery behavior	Switch/Keep
Replication	Data to replicate	Alarm/Tag Historian

Recovery Options

- **Switch back to primary**: Auto-return when available. The returning Primary waits as STANDBY for the /TimeAutoSwitch time before it takes over; the history the Secondary recorded meanwhile is replicated to it only during that wait. See Redundancy Reference > Automatic failback and replicated history.
- **Keep secondary active**: Manual switchback required

Command Lines and URLs

Startup Command Line

```
TStartup.exe /solution:"path\solution.dbsln" /profile:1 /OnlineConfig:true /port1:3201
```

Parameters:

- `/solution:` - Solution file path
- `/profile:` - 1=Dev, 2=Val, 3=Custom; omit for Production. The value is a number: a name such as `/profile:Development` is read as Production.
- `/OnlineConfig:` - Enable online changes
- `/wa` - Windows Authentication
- `/port1:` - Override port

Client Access

Client	Command/URL	Options
Rich Client	`TRichClient.exe /port1:3101`	NoSplash, ViewOnly
Smart Client	`http://IP:Port/smartclient`	SSL available
HTML5 Client	`http://IP:Port/html5`	SSL available

Network Access Example

Accessing HTML5 from Other Devices:

- Server IP: 192.168.0.8
- Port: 3201
- URL: `http://192.168.0.8:3201/html5`

Direct Monitor Access:

```
http://ServerIP:Port/html5/?Monitor=Runtime
```

Startup Procedure

Step-by-Step Process

1. **Launching TStartup.exe**
   - Loads the Solution
   - Reads Solution Configuration
   - Parses Command Line Parameters
   - Activates Main Process TServer.exe
2. **Starting Real-Time Database**

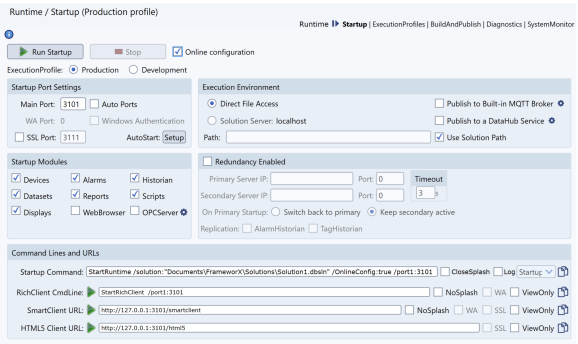
    - TServer.exe loads objects into memory
    - Establishes communication service
3. **Modules Startup**
    - Each module reads configuration
    - Establishes connection with main process
4. **Applying Execution Profiles**
    - Development: Local SQLite database
    - Production: SQL server connection
5. **Designer Connection**
    - Automatic connection for monitoring
6. **Client Display Access**
    - Remote computers can connect
7. **Online Changes**
    - Apply without runtime disruption

Platform-Specific Features

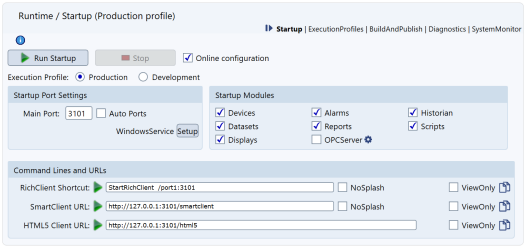
Windows-Only Features:

- Windows Authentication
- Windows Service configuration
- OPC Classic (COM) components, such as the OPC HDA connector
- Reports saved as HTML or PDF
- Specific security features

Runtime Startup Page when All Features are enabled



Runtime Startup Page, when Basic Modules Filter is Selected



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