Update 5c

This was an interim update for FrameworX version 10.1 (superseded by the 10.1.5e release). Published on June 22, 2026. Version 10.1.5c (build 2056). It builds on Update 5 (May 2026), the largest single release in the product's history: .NET 10 runtime, deeply integrated AI authoring, industrial-ontology-aware Unified Namespace, three new database connectors, REST APIs, OIDC single sign-on, and a fully drivable Designer for AI assistants.

FrameworX 10.1 Update 5c — June 22, 2026

Update 5 was the largest single release in the product's history. The Update themes:

- **AI Integration** — Local AI service, in-product Chat, drivable Designer for any MCP client, AI Tutor with completion certificates, headless solution execution for automated testing, and cross-solution Display clipboard for AI-driven workflows.
- **AI Chat — Multi-Provider Support** — simultaneous support for Local AI, Anthropic Claude, OpenAI GPT-4o, Google Gemini, and Azure OpenAI, with streaming responses and richer conversation UX.
- **Industrial Ontology** — RDF/OWL imports and exports, semantic metadata on every Tag and UserType, one-click Knowledge Graph reports, new portable graph control.
- **New Connectors** — MongoDB and QuestDB as unified four-role/three-role drivers; Sorba.AI for machine-learning workloads; advanced MQTT Sparkplug B options, SiemensPlus (Cross-Platform Siemens Driver), and PEER Protocol / Microlok II support.
- **Enterprise IT & Security** — TServer and TWebServices Kubernetes probes, SolutionCenter API v1, Runtime REST API v1, OIDC / OAuth2 SSO, Tatsoft.FrameworX PowerShell module, command-line upgrader, and hardened electronic-signature workflows.
- **Visualization** — TRadialGauge, TLinearGauge, TKnowledgeGraph, TChatSession, restored Display Connectors, Trend Annotations, GIS/CAD Display generation, Visual Query Editor, Symbol Legend controls, and per-instance enumeration overrides.
- **OPC UA** — Full structured-data support for CODESYS and WAGO deployments (ExtensionObject UDT decoding), nested struct browsing in the Data Explorer, and a broad set of tag-import, certificate, and address-space improvements.
- **Solution Development & DevOps** — JSON import/export enhancements and MCP-driven workspaces, multi-language UI for Solution Center and Designer (12 languages included), 100% within-major compatibility from any 10.1.x release.
- **Platform** — Runtime on .NET 10 (LTS), iOS Camera, faster Display open, configurable runtime log rotation, and dozens of stability and reliability fixes.

See Update 5c - Detailed Release Notes for the complete change log.

AI Integration

- **Local AI platform service** — Local AI joins OPC Server, DataHub, MQTT Broker, and AI MCP as a configurable Data Server with a live reachability indicator. Bring your own OpenAI-compatible or Claude endpoint. See *Local AI - First Install Walkthrough*.
- **AI Chat in Displays and Scripts** — a new CHAT action verb, the TChatSession Display control, and the ChatRequest Script API wire AI conversations into any screen, task, or script.
- **Drivable Designer for any MCP client** — through DesignerMCP an AI assistant can browse the object model, read and write objects, capture screenshots, run wizards, and write into the live runtime; concurrent Designer instances are supported.
- **ConsoleMCP** — a file-based JSON workspace surface that needs no live Designer, with stdio and HTTP transports. Device tag-import wizards, configuration-grid checks, and cross-solution Display clipboard are fully automatable.
- **Headless solution execution** — AI agents and CI pipelines can start a solution headlessly with its full web client available, enabling end-to-end automated testing without a visible desktop.
- **AI Tutor inside the Designer** — a three-tier curriculum (Essentials, Intermediate, Advanced) with per-user progress and tier-completion certificates. See the AI Tutor docs hub.

Industrial Ontology and Unified Namespace

- **Ontology-aware Tags and UserTypes** — semantic metadata on every Tag, UserType, and member, with an RDF/OWL importer and UNS export to RDF/JSON, JSON-LD, Turtle, or N-Triples. See *Industrial Ontology Integration*.
- **Reference-target picker and inline start values** — pick StartValue paths from the Asset Tree with autocomplete, with per-instance inline start values and live per-tag values shown at the asset.
- **One-click Knowledge Graph reports** — the Asset Tree generates a shareable visual report of the UNS hierarchy, themed Light or Dark.
- **TKnowledgeGraph Display control** — renders ontology and asset relationships as graphs across WPF and HTML5, with a design-time preview. See *Knowledge Graph Control Reference*.

New Connectors

- **MongoDB** — a single driver in four roles: Device protocol, UNS TagProvider, Historian storage, and Dataset provider. See *MongoDB Database Connector*.
- **QuestDB** — a time-series driver in three roles: Device protocol, UNS TagProvider, and high-throughput Historian storage. Requires the .NET 10 runtime. See *QuestDB Time-Series Database Connector*.
- **Sorba.AI** — bidirectional MQTT machine-learning integration with 11 algorithm UserTypes pre-loaded.

- **MQTT Sparkplug B publish-by-name** — name-based publishing decoupled from Store and Forward, so subscribers that join mid-session receive name-based DDATA.
- **SiemensPlus — Cross-Platform Siemens Driver** — a new Siemens driver built on a modern API foundation with native cross-platform support running on Windows, Linux, and Docker-hosted FrameworX deployments. The legacy driver remains fully supported.
- **PEER Protocol / Microlok II** (beta version) — new native driver for PEER Protocol-based devices, including Microlok II controllers used in rail and transit automation.

Visualization and Displays

- **TRadialGauge** — one portable gauge (Full, SemiCircle, CenterValue, BandedRange presets) replaces three legacy circular gauges across WPF and HTML5.
- **Symbol Legend** — symbols now support configurable legends: *Has Legend* shows the legend; the value displayed is configurable per symbol; tag enumerations can be overridden on a per-instance basis.
- **Operator range-validation warning** — when an operator enters a value outside a tag's configured min/max range, a clear warning is shown before the value is applied.
- **Display Connectors restored** — full clipboard, undo, and delete; endpoints snap to connectable shapes and auto-finalize; endpoint thumbs under the SelectionTool.
- **Trend Annotations** — operators place timestamped, commented markers directly on Trend Chart pens, shared with anyone reviewing the same time range.
- **Trend Chart improvements** — legends with position, move, context menu, and a HasLegend property, plus consistent WPF/HTML5 behavior for async loads, quality-gap rendering, persisted pen units, and printed-report symbols.
- **Visual Query Editor** — drag tables, joins, columns, and filters in the Datasets page with full Designer theming.
- **Dozens of Display fixes** — configurable TTextBlock MaxLength, image-flip and polyline-rotation fixes, faster Display open, pinch-to-zoom on mobile browsers, and improved symbol size and aspect-ratio handling.

OPC UA

- **Structured-data support for CODESYS and WAGO** — OPC UA devices that expose UDT tags as ExtensionObject — including CODESYS and WAGO PLCs — now decode all struct members correctly at runtime, including nested structures.
- **Nested struct browsing in Data Explorer** — the OPC UA Data Explorer now drills into nested struct hierarchies, making it straightforward to inspect and map deeply nested UDT members.
- **Tag import, certificate, and address-space reliability** — tag import handles connection failures and legacy configurations without crashing; custom certificate trust no longer re-prompts on subsequent connections; node identifiers containing commas are preserved correctly.

Import Wizards — GIS, CAD, and JSON

- **GIS and CAD tag importers** — GeoJSON, Shapefile, KML/KMZ, DXF, and DWG, with a GIS/CAD Display Generator that turns import sources into native Display geometry. See *AutoCAD / GIS Tag Importer*.
- **JSON Import / Export** — a re-platformed round-trip handles nested UserTypes and inheritance; a new opt-in Mirror Sync mode makes JSON exports a viable Git source of truth; large multi-file imports complete in seconds.

Enterprise IT, Security, and Deployment

- **OIDC / OAuth2 Single Sign-On** — identity-provider integration for Keycloak, Auth0, Microsoft Entra ID, and login.gov, with standards-based JWT validation and an SSO sign-in button on the client logon surface.
- **Kubernetes-grade health endpoints** — `/health` and `/ready` on TServer and TWebServices. See the IT Deployment Runbook.
- **SolutionCenter API v1.0** — a management-plane REST API (Solutions, Files, License, Machine, Server) with JWT/OIDC auth and an OpenAPI 3.1 spec. See SolutionCenter API Reference. *Availability note: the API surface shipped in this update, but activation is deferred to a future FrameworX release — the API cannot be enabled on 10.1.5 builds.*
- **Runtime REST API v1.0** — a data-plane REST API for live tag values, alarm state, and historian queries. See Runtime REST API Reference.
- **Tatsoft.FrameworX PowerShell module v1.0.0** — scripted enterprise deployment wrapping the installer, services CLI, and SolutionCenter API.
- **UpgradeSolution.exe** — a command-line upgrader for legacy 10.1.4 solutions with named backups and failure-safety.
- **Security hardening** — AutoLogOff duration, TPasswordBox and SecuritySecrets fixes, SQL-injection validation, hardened electronic-signature dialogs, and an opt-in parameterized-query prefix for Dataset authors.

Platform — .NET 10, HTML5, and Mobile

- **Runtime on .NET 10 (LTS)** — the first release where runtime executables, Web Contents, and Designer Web ship on .NET 10; Designer remains on .NET Framework 4.8. Absorbed at no charge for every 10.x customer.
- **Configurable runtime log rotation** — log file size limits and daily-archive retention are now configurable per runtime process, supporting long-running unattended deployments.
- **HTML5 Web Client** — DataGrid column persistence, mobile-browser loading, pinch-to-zoom, DateTimePicker and TrendChart fixes, and a new HTTP image-serving endpoint for embedded viewers.
- **Mobile** — first iOS Camera integration (QR/barcode scanning and photo capture) for the Mobile FX Client; PDF viewer renders correctly on mobile.
- **Stability** — connection-stability improvements, Solution Merging reliability, runtime health endpoint with execution profile, and broader unattended-service robustness.

Reports, Scripts, and Toolkit

- **Reports** — Save as PDF / XPS / HTML on .NET 10 deployments, a new Alarm Linear Gauge, correct Trend Chart rendering in printed reports, and Report Server startup resilience.
- **Scripts** — bundled libraries for OAuth2 SMTP (Gmail, Microsoft 365), namespace and Script-Class compile fixes, the TK toolkit reorganized into sub-namespaces (existing `TK.X` scripts keep working), and new helpers including `TK.ApplyImageBytesToShape` and `@Server.Retentive.Snapshot()`.

Devices and Protocols

- **OPC UA** — Full ExtensionObject structured-data decoding for CODESYS and WAGO, nested struct browsing, address-space comma preservation, certificate improvements, and tag-import resilience.
- **ControlLogix** — byte-swap correctness, reliable large imports, Program-scope tag communication, and L5K import.
- **Siemens** — clarified S7 STRING length handling, automatic legacy address migration, and a consistent XML importer.
- **MQTT** — TLS 1.1/1.2 connection, Sparkplug B publish-by-name, and shared-dialog certificate upload.
- **Other drivers** — PEER Protocol / Microlok II, DNP3, SLC/PLC5, PI, BACnet, TwinCAT, Modbus, and ValueSimulator fixes, with case-insensitive driver lookup and tripwire diagnostics.
- **Runtime, Historian, and Alarms** — connection-stability and redundancy fixes, with the AssetTree path preserved when enabling Historian, Alarm, or Device on nested tags.

Solution Development and DevOps

- **Multi-Language UI** — Solution Center and Designer localization with Claude-powered `.mui` translation tooling.
- **Within-major compatibility** — every 10.1.x solution opens and runs on 10.1.5 without migration; Solution Center multi-version routing handles mixed installs.
- **ConsoleMCP workspaces** — file-based JSON workspaces with renames, clean-snapshot imports, and headless TServer launches for CI sandboxes.
- **DesignerMCP authoring loop** — canvas selection plus flip/rotate verbs, `ui_action` v1.1, a `context_menu` verb, and more reliable JSON-RPC streaming.
- **RuntimeMCP** — pre-auth binding introspection and TagProvider runtime state for AI-driven runtime exploration.
- **WebData module** — REST (all verbs), GraphQL, and MCP-client access from inside the runtime, with a WebData Tools tab in Data Explorer.

Designer

This release closes more than one hundred Designer usability and reliability items — including a Check for Latest Update surface and new About page, DataGrid edit-buffer safety, tag-rename reference repair, Cross Reference navigation, EngWrapper API enumeration support, and many crash, popup, and exception fixes.

Documentation

New pages on docs.tatsoft.com: IT Deployment Runbook, AI Tutor hub, Industrial Ontology Integration, AutoCAD / GIS Tag Importer, Local AI - First Install Walkthrough, MongoDB and QuestDB connector references, Knowledge Graph Control Reference, SolutionCenter API Reference, Runtime API Reference, Tatsoft.FrameworX PowerShell Module Reference, and the Predefined Script Tasks — Client Lifecycle Matrix.

Breaking Changes and Deprecations

- **TRadialGauge** supersedes three legacy circular gauges. The legacy controls remain available for existing solutions — no migration required.
- **Knowledge Graph control rename** — the preview-period `TOntologyChart` is now `TKnowledgeGraph`, with no back-compatibility alias. Released GA solutions are unaffected.
- **Script TK toolkit** is reorganized into sub-namespaces; existing `TK.X` scripts continue to work.

Lifecycle and Support

FrameworX 10.1 Update 5c ships on **2026-06-22** with the platform's standard within-major-version 100% compatibility commitment — every 10.1.x solution opens and runs without migration or rework.

Update 5c is a **free upgrade for every FrameworX 10.x customer**. Tatsoft absorbs the runtime transition from .NET 8 to .NET 10 (LTS) so every deployment lands on a Microsoft-supported runtime at the same time, without a budget conversation.

The full lifecycle policy, version support phases, and end-of-support dates for older FrameworX and FactoryStudio versions are documented on the Product Lifecycle and End of Support page.

- Update 5c - Detailed Release Notes