



RTAC R150 Technical Note

With the addition of firmware version R150-V0 to the RTAC product line, the following are some notes and additional comments about new additions or changes in the firmware. These items are compiled from the release notes found in *Appendix A: Firmware and Manual Versions* of the ACSELERATOR RTAC[®] SEL-5033 Software Instruction Manual. Please note that this document does not discuss each release note, but rather just those with additional context or conversation points. This information can also be found in the SEL-5033 instruction manual in the appropriate sections for the new or modified behavior.

Some new features or enhancements to existing features in R150-V0 include the following:

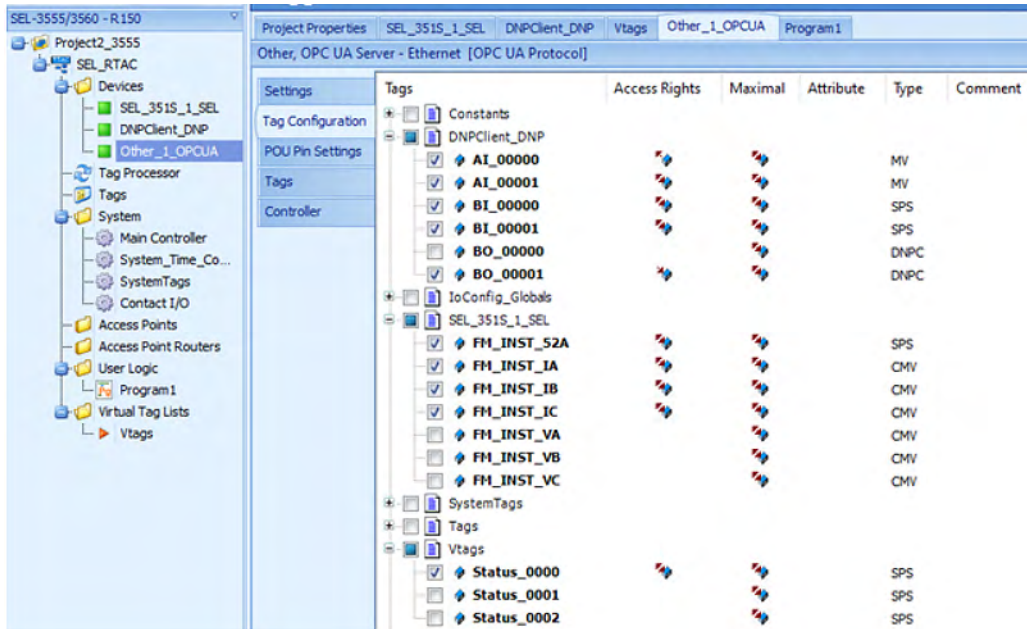
- Added support for OPC UA server.
- Enhanced MMS Server to support mode/behavior tags.
- Enhanced individual GOOSE transmit and receive messages to be processed on separate Ethernet interfaces.
- Enhanced MMS Client to support generic file collection.
- Added support for better than 1 μ s accuracy for PTP time synchronization.
- Added IEC 61131 functionality to trigger network audits from logic engine.
- Enhanced File System to include files that contain the same data from API interfaces.
- Enhanced Modbus client to issue broadcasts with Modbus server address of 0.
- Updated MMS Client to use remote control as default orCat value.
- [Cybersecurity Enhancement] Added the option on project send/activation to retain passwords in the active project instead of overwriting them with passwords from the configuration being sent/activated. Defaults to false.
- [Cybersecurity Enhancement] Added fingerprint API.
- ACSELERATOR RTAC software: Removed Device Store.
- ACSELERATOR RTAC software: Enhanced XML import to resolve naming conflicts when imported XML names match existing project item names.

The following are additional comments on new features and changes in the RTAC product line.

Added support for OPC UA server.

OPC UA (Open Platform Communications, Unified Architecture) has been a common request for several years as a protocol to add to the RTAC, and firmware version R150-V0 adds support for OPC UA server for SEL-3350, SEL-3555, and SEL-3560 Automation Platforms. OPC UA is a robust modern protocol (supporting automatic tag discovery and other features) that differs from the original DCOM-based “OLE for Process Control” protocol implementation that was introduced in the 1990s in that it is platform-independent (not limited to Microsoft Windows implementations) and is now guided by the vendor-neutral governing body known as the OPC Foundation. Unfortunately, the OPC UA protocol is

not directly compatible with OPC Classic installations (such as those present in legacy Windows software-based protocol solutions sold on SEL-3332 and SEL-3351 devices), so existing software installations would need to be upgraded to communicate via OPC UA. Presently, a single OPC UA server instance supporting ten simultaneous connections can be added to an ACSELERATOR RTAC project configured for a type of SEL-3555 or SEL-3350. This OPC UA server instance provides a simple Tag Configuration interface containing a list of all Devices, Tag Lists, and Programs in a project and the tags and internal variables configured within each. A check box beside either the Device or individual tags allows for easy addition of specific project data to the OPC UA server instance.



Enhanced MMS Server to support mode/behavior tags.

Firmware version R150-V0 includes support for mode and behavior tags as defined in IEC 61850-7-4 Annex A for all modes. The MMS Server will respond to requests as specified by the behavior tag. Behavior tags in the logic engine are driven by the mode tag in the logical node and the parent logical device. This results in behavior processing occurring at a logical node level, which means that each logical node can operate independently or be driven by the logical device. If mode/behavior tags are not defined for a logical node, it will be assumed to be “on.” Mode tags can be managed either from the MMS protocol interface or via the logic engine. This allows mode to be managed from SCADA connections, contact I/O, or HMI screens if users choose to configure the RTAC in that manner.

Mode/behavior is enabled in firmware version R150-V0 regardless of the class file version of the CID file for the RTAC. All new IEC 61850 features will work for all class file versions. With the release of R150-V0, there is a new class file version, 7, for the RTAC CID file. This class file version only enables the MMS Server for R150-V0 and later firmware revisions. The primary difference between class file version 6 and 7 for the RTAC relates to the control model of mode data objects in LN0 logical nodes. Class file version 7 has these mode data objects set to direct operate enhanced security instead of status only.

Enhanced MMS Client to support generic file collection.

Firmware version R150-V0 includes support for the MMS Client to collect any file from an MMS file server. In versions prior to R150-V0, the MMS Client automatically searches for COMTRADE files on an MMS Server; in R150-V0

and later, users can configure the MMS Client to collect all files in a specified directory or individual files. Once these files are collected, they can be accessed via any of the mechanisms to access the RTAC file system, such as the web interface, MMS file server, FTP/SFTP server, or fileIO via the logic engine.

Added support for better than 1 μ s accuracy for PTP time synchronization.

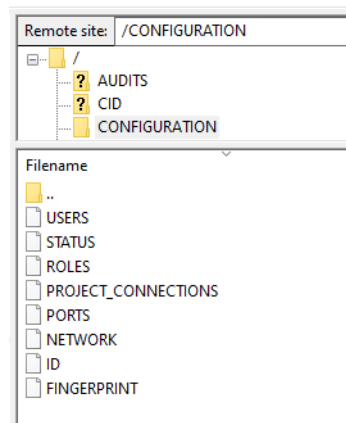
Starting in firmware version R150-V0, the SEL-3555 and SEL-3350 hardware variants support the capability to synchronize their clocks to better than 1 μ s accuracy via PTP time synchronization, providing another time synchronization method to support synchrophasor applications. On the SEL-3350, this is supported on any of the rear Ethernet interfaces (ETH 1–ETH 4)

Enhanced Modbus client to issue broadcasts with Modbus server address of 0.

A feature included in traditional Modbus RTU protocol allows for Broadcast Messages that can be issued simultaneously to all devices present in a multi-drop communication network. These messages are limited to the Write Single/Multiple Coil and Holding Register function codes (0x05, 0x06, 0x0F, and 0x10) and provide a simple mechanism to, for example, update a set point value simultaneously on multiple devices. This can improve data update performance in various control schemes using multiple Modbus protocol devices (e.g., inverter controllers) all acting in conjunction with a single common set point. In firmware version R150-V0, this feature has been added to Modbus client devices by allowing the use of server Modbus address 0. A Modbus Broadcast device is typically configured as a multi-drop serial client that coexists on a serial port with several other standard Modbus clients using Modbus server addresses 1–247. A Modbus Broadcast client ignores any polls configured on it and will only issue write messages for configured Coil and Holding register tags upon activation in user logic.

Enhanced File System to include files that contain the same data from API interfaces.

Starting in firmware version R150-V0, a new folder, named Configuration, appears on the RTAC file system. This folder allows the content from API interface responses to be collected on demand via the RTAC file system. If the “USERS” file is collected, the content will reflect the current users on that RTAC at the time of collection. Access to these files is managed by account role accessed. These files can be accessed via the FTP/SFTP, MMS File server, and SEL server. This feature, when invoked by the SEL server file **SHOW** command, allows for configuration monitoring via tools like trip wire.



[Cybersecurity Enhancement] Added the option on project send/activation to retain passwords stored in the active RTAC project instead of overwriting them with passwords from the configuration being sent/activated. Defaults to false.

Starting in firmware version R150-V0, when a project is sent via ACSELERATOR RTAC software or activated via the web interface or API interface, this option allows for protocol passwords in the RTAC to be retained from the configuration that is currently active in the RTAC instead of using the protocol passwords contained in the project that is being sent/activated to the RTAC. This helps facilitate use cases such as those where passwords for IEDs are rotated but certain changes may need to be made in the office, which would previously result in the device passwords being overwritten by the protocol passwords based on the office configuration. Project changes can now be sent to the RTAC with the option to retain the rotated passwords in the RTAC.

[Cybersecurity Enhancement] Added fingerprint API.

Firmware version R150-V0 introduces a new fingerprint API interface that allows for easy detection of changes to the settings or configuration of the RTAC. It is based on the following items and will change when any of following items change:

- Project Settings
- Password Vault Entries
- Logic Engine Application
- Advanced Settings
- Ethernet Settings
- Hosts
- URL Whitelist Settings
- Web Proxy Settings
- Website Settings
- X.509 Certificates
- CA Certificates
- SSH Authorized Keys
- SSH Host Keys
- LDAP Settings
- User Accounts
- RADIUS Settings
- HMI Diagrams
- Licensed Features
- Firmware ID (FID)
- Serial Number

SEL-3505 Firmware Compatibility Updates

SEL-3505 units manufactured after June 6, 2022, and those with serial number 1221570000 or later, are only compatible with firmware revisions R148-V5, R149-V2, R150-V0, or later. This is due to a minor hardware component change in the SEL-3505 that requires updated firmware. Customers with firmware locks on SEL-3505 devices will need to update their special specs. A last-time buy letter was sent to customers in April 2022 with this upcoming change notification.

ACSELERATOR RTAC software: Removed Device Store.

ACSELERATOR RTAC software: Enhanced XML import to resolve naming conflicts when imported XML names match existing project item names.

Starting in ACSELERATOR RTAC software version 1.34.150.15000, the Device Store is no longer present. XML import is the recommended tool for sharing parts of RTAC configurations between projects. Using XML for project templates has several benefits over the Device Store method, such as the following:

- ▶ Device Store only supported protocol devices. XML templates support devices, tag lists, custom user logic, GVLs, and all other project elements.
- ▶ Device Store templates could only be imported to a project that shared the same firmware version from which they were originally exported. XML template files can be re-imported into a project of any firmware version.
- ▶ Device Store templates were stored in an encrypted binary format. XML template files are stored in plain text, allowing for offline manipulation or generation of settings prior to import.

Additionally, some enhancements to XML import functionality have been made to facilitate sharing content between RTAC projects:

- ▶ XML definitions imported to a project are now automatically assigned a unique name within the project, even if the name of the XML template collides with an existing project element.
- ▶ XML definitions containing settings that generate ACSELERATOR RTAC settings errors due to conflicts with existing project elements (such as conflicting serial port utilization) are set to unused or unique values.

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