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Usage of New Data Types Introduced in Allen-Bradley/Rockwell Logix Firmware Version 32 Can Have Undesirable Side Effects

SUMMARY

Product: ABCIP Operations Integration Server (OI ABCIP) G-2.0(v7.0): when used in conjunction with ControlLogix/CompactLogix/GuardLogix firmware v32 PLCs.

SITUATION

Logix firmware version 32 introduced the following new data types (Figure 1):

- Unsigned data types: USINT, UINT, UDINT, ULINT
- 64-Bit data types: LREAL, ULINT

These data types are for internal controller use only and cannot be read by external clients!

See the AVEVA Technology matrix for additional details: <https://gcsresource.aveva.com/TechnologyMatrix/Report/Details/295>

Name	Style	Data Type
▸ UDT_Tag[0].DINT_0	Decimal	DINT
▸ UDT_Tag[0].DINT_1	Decimal	DINT
▸ UDT_Tag[0].INT_0	Decimal	INT
▸ UDT_Tag[0].INT_1	Decimal	INT
▸ UDT_Tag[0].REAL	Float	REAL[8]
UDT_Tag[0].REAL_0	Float	REAL
UDT_Tag[0].REAL_1	Float	REAL
▸ UDT_Tag[0].STRING_0		STRING
▸ UDT_Tag[0].SINT_0	Decimal	SINT
▸ UDT_Tag[0].SINT_1	Decimal	SINT
▸ UDT_Tag[0].TIMER_0		TIMER
▸ UDT_Tag[0].TIMER_1		TIMER
▸ UDT_Tag[0].LINT_0	Decimal	LINT
▸ UDT_Tag[0].LINT_1	Decimal	LINT
▸ UDT_Tag[0].SINT	Decimal	USINT[8]
▸ UDT_Tag[0].INT	Decimal	UINT[8]
▸ UDT_Tag[0].LINT	Decimal	ULINT[8]
▸ UDT_Tag[0].STRING		STRING[8]
▸ UDT_Tag[0].STRING_1		STRING
▸ UDT_Tag[0].UDINT_0	Decimal	UDINT
▸ UDT_Tag[0].UDINT_1	Decimal	UDINT
▸ UDT_Tag[0].UINT_0	Decimal	UINT
▸ UDT_Tag[0].UINT_1	Decimal	UINT
▸ UDT_Tag[0].USINT_0	Decimal	USINT
▸ UDT_Tag[0].USINT_1	Decimal	USINT
▸ UDT_Tag[0].ULINT_0	Decimal	ULINT
▸ UDT_Tag[0].ULINT_1	Decimal	ULINT
▸ UDT_Tag[0].UDINT	Decimal	UDINT[8]
▸ UDT_Tag[0].UINT	Decimal	UINT[8]
▸ UDT_Tag[0].USINT	Decimal	USINT[8]
▸ UDT_Tag[0].ULINT	Decimal	ULINT[8]
▸ UDT_Tag[1]		UDT
▸ Monitor Tags / Edit Tags /		

Figure 1: Example Controller Tags utilizing the new data types

SYMPTOMS

An external application, such as OI ABCIP, that is accessing such data types from the PLC using the ABCIP Communication driver can encounter communication errors. OI ABCIP reports errors in the System Management Console (SMC) Log Viewer. For example:

- Rejected LOGIX5000 ITEM = <tagname>.<element> on plc ABCIP.<ENB_CLX>.<Backplane>.<Logix_PLC>
- Invalid item <tagname>.<element>, not defined in processor
- Invalid item <tagname>.<element>, member <element> not found in structure
- Encountered the following error in reply message <messageID> when reading from ABCIP.<ENB_CLX>.<Backplane>.<Logix_PLC>
 - ExtSTS = 01: Unknown extended status
 - ExtSTS = 18: Unknown extended status
- Failed to add block <ID> with base name <tagname>.<element> in ABCIP.<ENB_CLX>.<Backplane>.<Logix_PLC>
 - ExtractStructInfo STS=02: Insufficient resources

***Please note:** there can be other causes for the same errors above, as they are not necessarily exclusive to this condition.

Potential PLC side effect:

- **PLC may encounter a major fault with code: Type 01 – Code 61 – Non-recoverable Fault with saved Diagnostic Information** (Figure 2)

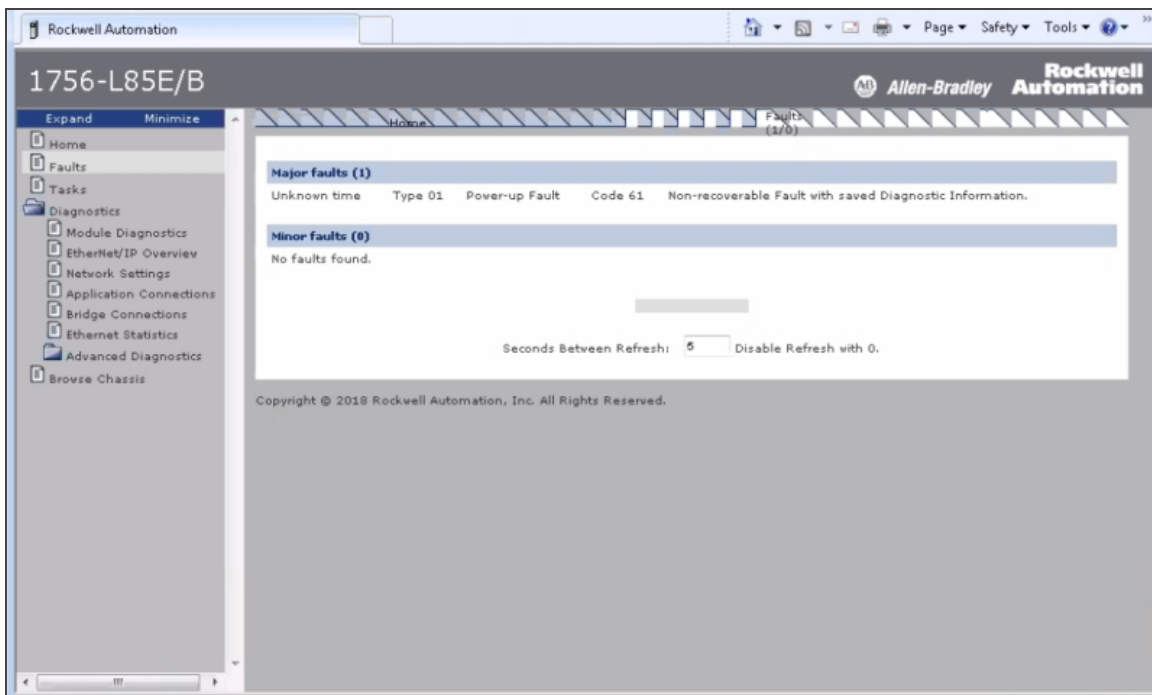


Figure 2: PLC web interface showing major fault status

ACTION

- Immediately stop accessing these unsupported data types
- Modify the data types in the PLC to be types that support external read accessibility

IMPORTANT

- Avoid using these data types in areas that can be exposed to client applications.
- An official validation of these new data types shall be performed once Rockwell software makes them publicly available.
- **RSLinux v4.12.00** also does not support reading these types, which is the current release as of the date of this publication.

Reference: <https://compatibility.rockwellautomation.com/GeneratedReleaseNote.aspx?v1=59238&v2=59238&o=&pdf=0>

Please refer to the Technology Matrix (<https://gcsresource.aveva.com/TechnologyMatrix>) for the latest support information on these and other products.