OPC UA Client Specification Mapping

How the OPC UA Client connector maps to the OPC UA specification: which features it exposes, under which name, and which values are fixed.

Overview

This page lists the OPC UA specification items (OPC 10000 series, cited by Part) that matter to a client, and shows how the FrameworX OPC UA Client connector handles each one. It describes the released FrameworX 10.1.6 (Update 6a), OPC UA Client driver version 1.1.0.1. Sentences that start with "In the next FrameworX update" describe changes planned for the next update; until it is installed, the connector behaves as the rest of the row describes. Setting names are the ones shown on the Station and Point configuration.

Status values:

- **Configurable**: you set it in the connector.
- **Fixed**: the connector uses its own value, with no setting.
- **Fixed (automatic)**: the connector reads the value from the server.
- **Library default**: the connector does not set it; the default of the embedded OPC UA library applies.
- **Next update**: not available in 10.1.6; planned for the next FrameworX update.

Specification items

Transport and discovery

Specification term	FrameworX setting	Status	Value or default	Notes
`opc.tcp` (Part 6)	Station > URL	Configurable	Free text	Only `opc.tcp` is supported. A URL with another scheme (`opc.https`, `https`, `opc.wss` or `http`) is changed by the station editor into an invalid `opc.tcp` address, and the connection fails without a specific message. In the next FrameworX update, such a URL is refused with a clear message, in the station editor and at runtime, and the editor keeps it as typed.
GetEndpoints (Part 4)	Station > Discovery button	Configurable	Without a port, tries 4840, 49320, 62841, 4845 and 49380	Designer only. Lists URL, security mode and security policy of the endpoints the server returns. In the next FrameworX update, only `opc.tcp` endpoints are listed.
FindServers (Part 4)	Station > Discovery button	Next update	-	In 10.1.6, Discovery uses GetEndpoints only. In the next FrameworX update, Discovery also asks each server it reaches for the servers it knows and lists their `opc.tcp` endpoints. Designer only.
Endpoint selection (Part 4)	Discovery, row selection	Fixed	URL and a security flag	Only the URL is stored. Disable Security is set when the selected row uses mode None. The row's policy and mode are not stored.
EndpointUrl and DiscoveryUrl (Part 4)	Host Override	Configurable	Empty	Host Override replaces the host or port before connecting.

Security

Specification term	FrameworX setting	Status	Value or default	Notes
Application instance certificate (Parts 4 and 6)	Station > Certificate (Default / Custom); key and hash in the Designer certificate generator	Configurable	Key 1024 (default), 2048 or 4096 bits; SHA-1 (default) or SHA-256	The key size and the hash are chosen in the Designer certificate generator, not on the Station. With security on and no certificate, the client does not connect and keeps retrying, without a message that names the certificate. In the next FrameworX update, the Devices trace and the station status name the missing certificate, where it is expected and how to create it with the Certificate button of the Station. A server that offers only Basic256Sha256 needs a key of 2048 bits or more and SHA-256.
Trust list (Parts 2 and 4)	Certificate Default or Custom; trusted, issuers and rejected folders	Configurable	Default	Default trusts an unknown server certificate on the first connection and stores it. Custom accepts only the certificates in the trusted folder.
SecurityPolicy (Part 7)	Disable Security	Fixed	None, or the best policy the server offers	The policy itself is not selectable.

Automatic policy selection	None	Library default	The most secure policy the server offers that the client certificate supports	Use a 2048-bit SHA-256 certificate to reach Basic256Sha256 and newer policies. When the server advertises its endpoints on a port other than the one the Station uses (Host Override, NAT or port mapping), the connector takes the first endpoint the server lists.
MessageSecurity Mode (Part 4)	None	Fixed	None, or the best mode the server offers	Sign or SignAndEncrypt cannot be forced.
Anonymous user token (Part 4)	User Name left empty	Configura ble	Default	
UserName user token (Part 4)	User Name and Password	Configura ble	Empty	

Session

Specification term	FrameworX setting	Status	Value or default	Notes
Session timeout (Part 4)	None	Library default	10 min (600000 ms)	The server can revise the value.
Reconnection	None	Fixed	2, 4, 8, 16 and then 30 s (from 10.1.6)	Reconnection is handled by the connector itself.
Session keep-alive (Part 4)	None	Library default	Status read every 5 s	Each session reads the server's CurrentTime, State, SecondsTillShutdown and ShutdownReason every 5 s.
Sessions per Node	Use Single OPC Connection	Configura ble	On	On: one session for writes and status and another one for the items. Off: one more session and one more subscription per read group.

Addressing

Specification term	FrameworX setting	Status	Value or default	Notes
NodeId `i=`, `s=`, `b=` (Part 6)	Point > Address	Configura ble	-	
NodeId in namespace 0, `ns=0;...` (Part 6)	Point > Address	Configura ble	-	In subscription mode these points stay Uncertain; read them with Enable Read Polling. In the next FrameworX update, they also update in subscription mode.
NodeId `g=`, GUID (Part 6)	Point > Address	Next update	-	In 10.1.6, the GUID text is sent as a string identifier and the server does not find the node, so a point with a `g=` address does not read or write, including one created by the tag import. In the next FrameworX update, points with a `g=` address read and write their values. For a node whose identifier is text, use `s=`, not `g=`.
ExpandedNodeId `nsu=` (Part 6)	Point > Address	Next update	-	Not supported in 10.1.6. In the next FrameworX update, a point addressed with `nsu=` follows the namespace URI, so it keeps its node when the server reorders its namespaces.
ExpandedNodeId `svr=` (Part 6)	Point > Address	Next update	-	Not supported in 10.1.6. In the next FrameworX update, `svr=0` (the server of the Station) is accepted, and an address that names another server is refused with a message.
NamespaceArray, index and URI (Part 5)	Address text	Fixed	Numeric index	With `ns=` the address stores the namespace index. If the server reorders its namespaces, the point targets another node or fails. In the next FrameworX update, an address with `nsu=` follows the namespace URI instead.
MaxNodesPerBrowse (Part 5)	None	Fixed (automatic)	Read from the server	It does not change how the connector browses.
Arrays	Point > Modifiers > Array; tag `Item[0]`	Configura ble	Modifier size	The point on element 0 receives the array and fills the tag elements. A write rewrites the whole array.
Structure members	Point on a UserType tag; Import address	Configura ble	-	Uses the member node, or the decoded field of the parent structure. Writing one member rewrites the whole structure. Structures received by subscription show Good quality and the time of reception, not the quality and timestamp sent by the server. In the next FrameworX update, the Station option Structure Server Status (off by default) makes them take the quality and the source timestamp sent by the server.

Read and write

Specification term	FrameworX setting	Status	Value or default	Notes
Read (Part 4)	Enable Read Polling; AccessType	Configurable	Off	Reads at the AccessType rate.
maxAge (Part 4)	Read From Device	Configurable	Off; on sends maxAge 0	The setting applies to single reads only. Polled reads always send maxAge 0, so they always read from the device. In the next FrameworX update, Read From Device is on by default and polled reads follow it too: on reads from the device, off lets the server answer from its cache. A node saved in 10.1.6 keeps reading from the device.
TimestampsToReturn (Part 4)	None	Fixed	Source for subscriptions; Both for polling and single reads	Session status reads use Neither.
SourceTimestamp and ServerTimestamp (Part 4)	Use Computer Timestamp	Configurable	Off	Off: scalars and arrays use the SourceTimestamp; structures received by subscription use the time of reception. On: the local time of reception.
StatusCode to quality (Part 4)	Tag quality	Fixed	Bad, Uncertain, Good	Only the severity is kept; sub-codes are not.
Write (Part 4)	AccessType (WriteEvent, WriteTrigger)	Configurable	-	One node per call, without status or timestamp. One retry on failure.

Server operation limits (OperationLimits)

Specification term	FrameworX setting	Status	Value or default	Notes
MaxNodesPerRead (Part 5)	None	Fixed (automatic)	Read from the server; read groups of 75% of the limit	In polling mode, keep ReadGroupMaxSize at or below 75% of the server's MaxNodesPerRead. In the next FrameworX update, every point receives its own value, whatever the read group size.
MaxMonitoredItemsPerCall (Part 5)	None	Fixed (automatic)	Read from the server; 100 when the server does not publish it	Batch size when monitored items are created.

Subscriptions and monitored items

Specification term	FrameworX setting	Status	Value or default	Notes
Subscription or periodic read	Enable Read Polling	Configurable	Off (subscription)	
PublishingInterval (Part 4)	Refresh Rate	Configurable	500 ms	Data does not arrive faster with a Refresh Rate below 250 ms, because the sampling interval is fixed at 250 ms.
Revised PublishingInterval (Part 4)	None	Next update	-	In 10.1.6, the connector does not read the publishing interval the server accepted, so a change made by the server is not shown. In the next FrameworX update, the connector shows the accepted interval in Module Information > OPC Server Status and writes it to the Device trace.
SamplingInterval (Part 4)	None	Fixed	250 ms	The same 250 ms for every point, whatever the Refresh Rate. In the next FrameworX update, the Station gets a Sampling Interval setting, 250 ms by default and not used with Enable Read Polling; when the server revises the requested value, the connector writes the revision to the Device trace.
QueueSize (Part 4)	None	Fixed	1	A change between two publishes replaces the previous one. In the next FrameworX update, the Station gets a Queue Size setting, 1 by default and not used with Enable Read Polling; a larger queue makes the server keep up to that many changes between two publishes.
DiscardOldest (Part 4)	None	Fixed	True	
MonitoringMode (Part 4)	None	Fixed	Reporting	
DataChangeFilter Trigger (Part 4)	None	Fixed	No filter sent	The server applies the specification default, StatusValue.
DataChangeFilter Deadband (Part 4)	None	Fixed	No filter sent	The tag deadband configured in FrameworX is not sent to the server.
Lifetime (Part 4)	None	Fixed	10 min	

MaxKeepAlive (Part 4)	None	Fixed	5 s	
MaxNotifications PerPublish (Part 4)	None	Fixed	0 (no limit)	
Priority (Part 4)	None	Fixed	0	
PublishingEnabled (Part 4)	None	Fixed	True	
Splitting items into subscriptions	ReadGroupMaxSize (Channel); Use Single OPC Connection; Use Single Read Group	Configurable	100 (0 to 10000); on; off	By default all items share one subscription, whatever ReadGroupMaxSize is. Read groups become separate subscriptions only with Use Single OPC Connection off. Use Single Read Group is enabled only with polling.

Data types

Specification term	FrameworX setting	Status	Value or default	Notes
Scalar types	Tag type	Fixed	-	The tag type sets the conversion. The UNS Tag Provider reports Float, DateTime, UInteger and Guid variables as Text. An Integer tag holds values up to 2,147,483,647, so a UInteger value above it does not fit. In the next FrameworX update, the tag import and the UNS Tag Provider give the same tag type to each OPC UA type (Float becomes Double, DateTime becomes DateTime, UInteger becomes Integer, Guid becomes Guid), and standard and server-specific types derived from a standard type are imported as their base type. A re-import keeps the type of an existing tag.
Structures, DataTypeDefinition (Part 3)	UserType through Import	Configurable	-	Structures are decoded from their DataTypeDefinition (OPC UA 1.04 or newer).
Arrays of structures	Import	Configurable	-	Decoded element by element.
Enumerations	Tag type	Fixed	Int32	The value arrives as Int32 and is stored as a number in an integer tag.
DateTime and time zone (Part 6)	None	Fixed	UTC on the wire	Reads convert to local time; writes send UTC.

FrameworX settings with no direct specification equivalent

FrameworX setting	What it does	Closest specification concept	Notes
Backup Station (Node > SecondaryStation)	Switches between the primary and the backup Station when the connection fails. Each Station has its own settings.	Non-transparent redundancy	
Address without `ns=`	The namespace is inferred from the first branch under Objects, reading the first 100 references only, so on a server with more nodes under Objects the inference can fail. `i=2258` without `ns=` becomes a string identifier. In the next FrameworX update, the inference reads past 100 references.	NodeId	Always write `ns=` in the address.
Stalled subscription detection	With no data, tags go Uncertain, the subscription is recreated after 10, 20 and 40 s, and then the session reconnects. The limit is 3 times the largest of 5 s, the Refresh Rate and the granted keep-alive.	Keep-alive and Lifetime	
AccessType ReadPollingRate	With polling, it is the read cycle. Without polling, it only triggers the session check.	Read	
AccessType ReadPolling (Never, Always, OnDisplayOrServer)	Never without AcceptUnsolicited: the item is not subscribed. OnDisplayOrServer: only items in use are subscribed, and a change recreates the subscription.	MonitoringMode	
AccessType ReadOnStartup and ReadTrigger	In subscription mode they only check the session and do not issue a Read.	Read	
AccessType WriteEvent and WriteTrigger	Decide when a tag change becomes a Write.	Write	
AcceptUnsolicited	Required to subscribe an item when ReadPolling is Never.	-	
Use Computer Timestamp	Replaces the source time with the local time of reception.	SourceTimestamp	The device time is not kept.
Host Override	Rewrites the host or port before connecting.	EndpointUrl	

Branch Separator	Path separator for string identifiers and the browse tree.	BrowsePath	
Bit modifier on the point	Reads or writes one bit. A write reads, modifies and writes the whole value.	-	The write is not atomic.
Use Single Read Group	Puts all points in one read group (polling only).	-	

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