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 FrameworX 10.1.6, driver version 1.1.0.1. Rows marked from 10.1.7 describe changes in FrameworX 10.1.7, driver version 1.1.0.6. 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.

Specification items

Transport and discovery

Specification term	FrameworX setting	Status	Value or default	Notes
`opc.tcp` (Part 6)	Station > URL	Configurable	Free text	The URL is used as typed. From 10.1.7, a URL with another scheme (`opc.https`, `https`, `opc.wss` or `http`) is refused with a clear message, in the station editor and at runtime.
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. From 10.1.7, only `opc.tcp` endpoints are listed.
FindServers (Part 4)	Station > Discovery button (from 10.1.7)	Configurable (from 10.1.7)	-	Designer only. From 10.1.7, Discovery also asks each server it reaches for the servers it knows and lists their `opc.tcp` endpoints. Before 10.1.7, only GetEndpoints was used.
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. From 10.1.7, 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	Configurable	Default	
UserName user token (Part 4)	User Name and Password	Configurable	Empty	

Session

Specification term	FrameworX setting	Status	Value or default	Notes
Session timeout (Part 4)	None	Fixed	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	Fixed	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	Configurable	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	Configurable	-	
NodeId in namespace 0, `ns=0;...` (Part 6)	Point > Address	Configurable	-	From 10.1.7, these points also update in subscription mode. Before 10.1.7, they stayed Uncertain in subscription mode and had to be read with polling.
NodeId `g=`, GUID (Part 6)	Point > Address	Configurable (from 10.1.7)	-	From 10.1.7, points with a `g=` address read and write their values. Before 10.1.7, the GUID text was sent as a string identifier and the server did not find the node. For a node whose identifier is text, use `s=`, not `g=`.
ExpandedNodeId `nsu=` (Part 6)	Point > Address (from 10.1.7)	Configurable (from 10.1.7)	-	From 10.1.7, the point follows the namespace URI, so it keeps its node when the server reorders its namespaces. Before 10.1.7, `nsu=` was not supported.
ExpandedNodeId `svr=` (Part 6)	Point > Address (from 10.1.7)	Configurable (from 10.1.7)	`svr=0` only	From 10.1.7, `svr=0` (the server of the Station) is accepted. An address that names another server is refused with a message. Before 10.1.7, `svr=` was not supported.
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. From 10.1.7, an address with `nsu=` follows the namespace URI instead.
MaxNodesPerBrowse (Part 5)	None	Fixed (automatic)	Read from the server	Used to limit Browse calls.
Arrays	Point > Modifiers > Array; tag `Item[0]`	Configurable	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	Configurable	-	Uses the member node, or the decoded field of the parent structure. Writing one member rewrites the whole structure. From 10.1.7, the Station option Structure Server Status (off by default) makes structures received by subscription take the quality and the source timestamp sent by the server; with it off, they show Good quality and the time of reception.

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	On from 10.1.7 (off before); on sends maxAge 0	From 10.1.7, 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 by an earlier version keeps reading from the device. Before 10.1.7, the setting applied to single reads only, and polled reads always sent maxAge 0.

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 unless Structure Server Status is on (from 10.1.7). 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	From 10.1.7, every point receives its own value, whatever the read group size. Before 10.1.7, in polling mode, keep ReadGroupMaxSize at or below 75% of the server's MaxNodesPerRead.
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; sampling fixed at 250 ms before 10.1.7	Before 10.1.7, data does not arrive faster below 250 ms, because the sampling interval is fixed at 250 ms. From 10.1.7, the Sampling Interval of the Station sets the sampling interval.
Revised PublishingInterval (Part 4)	Module Information > OPC Server Status; Device trace (from 10.1.7)	Fixed (automatic) (from 10.1.7)	Read from the server	From 10.1.7, the connector reads the publishing interval the server accepted, shows it in the OPC Server Status panel and writes it to the Device trace. Before 10.1.7, the revised value was not read, so a change made by the server was not shown.
SamplingInterval (Part 4)	Station > Sampling Interval (from 10.1.7)	Configurable (from 10.1.7)	250 ms	Before 10.1.7, fixed at 250 ms. Not used with Enable Read Polling. The server can revise the requested value; the connector writes the revision to the Device trace.
QueueSize (Part 4)	Station > Queue Size (from 10.1.7)	Configurable (from 10.1.7)	1	With 1, a change between two publishes replaces the previous one. A larger queue makes the server keep up to that many changes between two publishes. Before 10.1.7, fixed at 1. Not used with Enable Read Polling.
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. From 10.1.7, 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 and Guid becomes Guid (the Tag Provider used Text before). 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. `i=2258` without `ns=` becomes a string identifier.	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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