

Technical Data Opc Server

General

The Tani OPC Server is a multi protocol and multi opc OPC server. It allows access to coltrollers and devives from various manufactuters. It is easily to configure. It offers a lot of diagnostics functions.

OPC Interfaces

- **OPC Pipe** Open interface
- **OPC UA** (Unified Architecture)
- **OPC DA** (Classic OPC over DCOM, available under Windows only)

The maximum number of OPC clients is depending on used resources only. A PC from 2014 can handle multiple hundred connections.

All OPC interfaces are working locally in one PC or over network.

in case of Classic OPC Classic please do not use DCOM over networks, but it will be supported.

OPC UA supports the fast binary protocol. Security is supported in all variants. Multicast discovery is supported.

Data access data items are supported up to 200K each.

OPC UA functionality and limitations

The OPC UA implementation conforms to the specification 1.04.

An internal discovery server is active on standard, it supports multicast discovery also. It can be used as a global discovery server. Alternatively an external discovery server can be configured.

AddNodes is supported with the following restrictions:

- AddNodes is possible only in Objects.Topics.Memory tree
- Reference type must be OpcUaId_Organizes
- NodeId can't be specified
- BrowseName can't contain .
- NodeClass must be Variable or Object
- NodeAttributes for Variable:
 - DisplayName: unspecified or equal to BrowseName
 - Description: unspecified or any text
 - Value: is ignored; new variables will always be initialized to 0 (if numeric) or "" (if string type)
 - DataType:
 - OpcUaType_Boolean
 - OpcUaType_SByte, OpcUaType_Byte
 - OpcUaType_Int 16/32/64, OpcUaType_UInt 16/32/64
 - OpcUaType_Float, OpcUaType_Double
 - OpcUaType_String
 - OpcUaType_DateTime
 - One of the structure types under Types -> DataTypes -> BaseDataType -> Structure -> UserStructures; these are the structures known to the PLC Engine core.
 - if the structure is given both here and via TypeDefinition, both settings must match
 - if unspecified, OpcUaType_Byte or the structure type of the TypeDefinition is used
 - ValueRank, ArrayDimensions: unspecified (= scalar), scalar or a one-dimensional array of any size
 - AccessLevel, UserAccessLevel: unspecified or (OpcUa_AccessLevels_CurrentRead | OpcUa_AccessLevels_CurrentWrite)
 - MinimumSamplingInterval: unspecified or 0
 - Historizing: unspecified or 0
 - WriteMask, UserWriteMask: unspecified or OpcUa_NodeAttributesMask_Value
- NodeAttributes for Object:
 - DisplayName: unspecified or equal to BrowseName
 - Description: unspecified or any text
 - EventNotifier, WriteMask, UserWriteMask: unspecified or 0

- TypeDefinition for Variable:
 - OpcUald_BaseDataVariableType
 - one of the structure types under Types -> VariableTypes -> BaseVariableType -> BaseDataVariableType -> UserStructures; these are the structures known to the PLC Engine core.
- TypeDefinition for Object:
 - OpcUald_FolderType

Traffic between different OPC interfaces (tunneling) is supported. It will be used for the OPC DA tunnels.

Controller Interfaces

All controllers will be connected over network. Often this is Ethernet, WLAN or other networks. All serial Ethernet and MPI Ethernet gateways for industrial controllers usage are supported.

Configuration Interfaces

The configuration can be done with the shipped configuration software or over OPC with the System topic.

The connection for the configuration is encrypted with TLS 1.2. The encryption can be switched off for usage in countries where encryption is forbidden.

Network Redundancy for connections to controllers and devices

Connections to devices and controllers are supporting network redundancy.

Double and triple redundancy can be selected.

Two redundancy operation modi are possible.

In **dynamic redundancy** any of the connections is working as master. If it breaks another connection becomes the master connection.

In **static redundancy** the first connection is the master. If it breaks another connection becomes the master. If the first connection works again it will become the master connection again.

The connections of the redundancy should work on different network adapters. The adapters need different IP subnets for properly work..

Controller Types and Controller Protocols

- Siemens **S7 1200 and 1500** family. The **optimized data blocks** are supported, all symbols and comments are browsed online.
- Siemens S7 over RFC1006 and Sinec H1. Supported are **S7 200, 300 and 400, Logo 8**. Siemens CP or the Ethernet interface onboard the CPU can be used. Mainstream MPI Gateways as Hilscher Netlink, Helmholtz Netlink, IBH Softec Netlink, INAT Echolink, Process Informatik S7Lan or Softing Netlink are supported, too. S7 compatible systems as VIPA Speed7 can be used, too.
- Siemens S5 over RFC1006, PLC Header, RAW or Sinec H1. Supported are Siemens CPs, INAT CPs, Helmholtz CPs, IBH Softec S5Net, Process Informatik S5Lan.
- Rockwell Compact Logix and Control Logix, all firmware versions.
- Mitsubishi Melsec Q families.
- BACnet devices. BACnet is common used in building automation
- Devices using the Modbus TCP protocol.
 - Modicon
 - Schneider
 - Wago
 - Beckhoff
 - Phoenix Contact
- All systems and devices which can be accessed with OPC UA or Classic OPC.
- Raw data.

Communicates via Ethernet.

Logger

The OPC Server contains a logger for diagnostics purposes during plant startup. The logger can be configured. The system load can be big if all controller ; data are logged.

Limits

Maximum number of configurable connections: 1000.

Maximum length of a single item: 4GB.

Maximum number of elements each connection: 4 Million.

Maximum number of elements (Items): 16 Million.

Maximum OPC groups each connection: 100.

Maximum number of passive connection for each port is 999.

The OPC synchronous functions returning a bad quality immediately if the PLC connection is not established.

Changes in controller configuration will be checked all 10 seconds.

Fields can be up to 64K in length each.

Multi dimensional arrays can have up to seven dimensions.

Simulation of plc connections

Connections and their data can be simulated.

Read data creates the elements with value zero. Write will change the content. The changed values will be returned as new data.

Limits:

- Strings can be written up to 16 bytes
- Suffixes will not be handled
- Date and time are supported limited

Depending on the license the limits can be less.

Speed

The throughput will be mainly limited by the controller speed or the reaction time of OPC applications.

Read requests to the controller will be optimized as much the controller is supporting this. For that elements will be collected to blocks reading more than requested, but not for inputs and outputs. These optimizing can be affected by configuration separately for each connection. Optimizing can be switched off, too.

Write requests to the controller are collected or handled in that order the application did called the system.

On OPC all optimizing the individual OPC uses is supported.

The normal time in cyclic controller requests is 50ms. It can be faster if the controller polling interval is set to zero.

Only data are sent to OPC which did change in the controller between two read requests.

Field and text optimizings

The from version 1.8 existing field optimizings will prevent reading the long fields too often, the index is requested on standard only. This optimizing bases of the fact that the index does not change too frequently.

Usage of memory

- Program code: A minimum of 6MB is used. The exactly memory usage is depending of the internal behavior of the operating systems. So dynamic libraries are loaded once for all running instances using them. Example: If the standard library is not loaded already it will use additional 4MB of memory.
- User data: The minimum data usage is 2MB internally. Additional the controller data are held in memory for comparing new data. Each item uses the length of data and additional 64 bytes. Each configured connection occupies 4KB.

Usage of computation time

The consumed computation time is depending on the load with communication. Most the time it will be waited for controller data or OPC application reaction.

All software is working with events. This maximizes the throughput and minimizes the usage of computation time.

Multiple CPU are supported. Up to ten CPU will be used, the main work will be handled by three CPU.

Installation

The installation does depending on the product install multiple parts separately. On uninstall not all products are deleted automatically. But all installed products can be deleted over the menu or the software part in the system control manager.

The user settings will be preserved and not deleted during uninstall.

Operating systems

- Windows 7, 8, 8.1, 10 - anniversary update and creators update also. Older versions as XP and Vista also. 64 and 32 bit.
- Windows Server 2008, 2012 and 2016.
- Linux on the Raspberry and Odroid computers (64 and 32 bit).
- Linux on many Phytex devices.
- Linux on the Wiesemann & Theis pure.box 3, pure.box 5.
- Linux on a PC with Debian, Ubuntu, Suse, Arch, Centos, Redhat and other Distributions.
- Linux 64 Bit as [Docker](#) Container.

- OPC DA will require Microsoft Windows. All from Microsoft supported operating systems for Intel and all user languages will be supported. The latest service pack must be present.
- Under Windows the OPC server are working as service, Linux runs them as daemon.
- The Raspberry version supports all Linux distributions offered for this platform.
- All other will run under lot of operation systems also, mostly Linux based.
- Under Linux the OPC Server needs a POSIX compatible System. The Standard Library needs V2.2 as minimum. The configuration software is bases on KDE 5 and is needing the kdelibs. Please use actual distributions like Debian, Ubuntu, Suse, Redhat or similar.
- Tested is: Windows Intel 32 and 64 bit, Linux Intel 32 and 64 Bit, Linux MIPS CPU, Linux ARM 32 and 64 Bit CPU.
- Running in virtual machines is supported. Docker containers are supported, too.
- Windows 7 needs as minimum service pack 1 for using the drivers.
- All configurations are compatible to all OPC servers, also over operating systems.