



GENESIS64

Distributed Servers Architecture



APPLICATION NOTE

September 2013

Description: Guide to design multiple FrameWorX Server architecture

OS Requirement: Windows 8 x64 (Professional or Enterprise Edition), Windows 7 x64 (Professional or Enterprise Edition), Windows Server 2012 x64, Windows Server 2008 R2 x64, Windows Vista x64 SP2 (Business, Ultimate, or Enterprise Edition), Windows Server 2008 x64

General Requirement: Advanced knowledge of GENESIS64

Introduction

Platform Services is a general term that is used for a group of services and applications that provides data to clients, and allows clients to configure application servers. The key piece of Platform Services is called FrameWorX server. It is the communication layer for ICONICS applications.

For large scale or regionally dispersed applications, you may need to distribute your load among multiple servers and exchange data among them. This document explains how to setup communication between FrameWorX servers with special regards to licensing and security.

Note that the previous concept of Backend and Middle-tier FrameWorX Servers was enhanced, so there is no longer a need to discern those in configuration.

Communication to Remote FrameWorX Server

Client application always connects to its Default FrameWorX server to retrieve any data. Typically, the default FrameWorX server then connects to local or remote OPC UA, OPC DA, OPC AE or OPC HDA servers and there is no need to go via another FrameWorX Server.

There are three main reasons why you would ask a remote FrameWorX server for data:

- For the required data provided by the FrameWorX server itself (such as BACnet, AssetWorX, GridWorX data, etc.), FrameWorX is the source of the data.
- Multiple server architecture has been applied and clients cannot directly connect to data servers, but must go through an entry point on the FrameWorX Server instead.
- The point license resides on the remote FrameWorX server. For better understanding of this reason please read the section below on Licensing.

If you need to request data from remote FrameWorX server, you can browse to the server data via the FrameWorX Network object in the Data Browser.

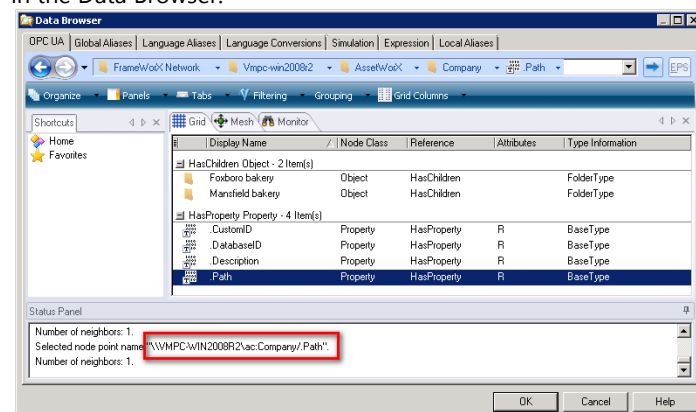


Figure 1 - Browsing Remote FrameWorX Server via FrameWorX Network

The syntax is the same as if you to browse your local data, but is prefixed by [\\servername](#). See the examples below:

Local: ac:Company/.Path

Remote: \\SERVER2\\ac:Company/.Path

Note that if you connect **directly** to a remote OPC Classic server such as OPC DA/AE/HDA server, the syntax is similar but the server node is in between the name of the point and the @ sign. See the example below:

Local: @ICONICS.Simulator.1\\SimulatePLC.Ramp.Value

Remote:
@\\SERVER2\\ICONICS.Simulator.1\\SimulatePLC.Ramp.Value

Local: @rgs64:MyRegister.Value

Remote: @rgs64:\\SERVER2\\MyRegister.Value

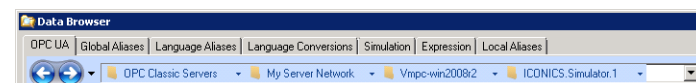


Figure 2 - Browsing Remote OPC Classic Servers directly

In case of such servers, you can connect to them through a remote FrameWorX Server as well, but it does not make sense unless you need to shift the license count to the other server. Naturally, the FrameWorX to FrameWorX communication costs a bit more resources than direct connection. The syntax would be following:

Remote OPC Classic data via Remote FrameWorX Server:

\\SERVER2\\@ICONICS.Simulator.1\\SimulatePLC.Ramp.Value

\\SERVER2\\@rgs64:MyRegister.Value



GENESIS64

Distributed Servers Architecture



APPLICATION NOTE

September 2013

Security

The concept of client security is the same as in a simple one machine scenario. If the security is not active, no authentication is required and everything is allowed for everyone. If the security is active and an application/user needs to read/write data or perform any application action, its security context is checked and only allowed operations are enabled.

Runtime

If a client application through its default FrameWorX server needs any data from another FrameWorX server, then an identity which is predefined in client's Platform Services Configuration dialog is going to be used for the authentication against the remote FrameWorX server security. This identity must exist in the security of the remote FrameWorX server so that the name and password match.

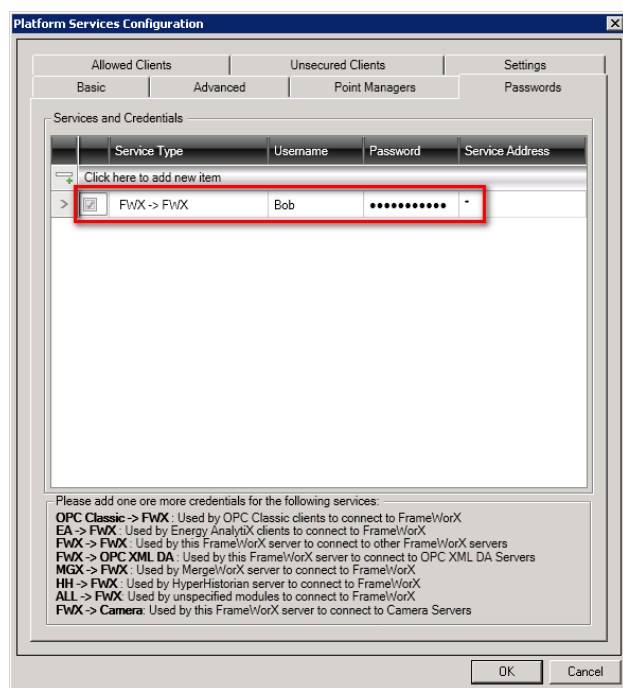


Figure 3 - Specify User Account for Remote FrameWorX Server authentication

For example, if your GraphWorX64 retrieves data from remote AssetWorX, it uses FrameWorX to FrameWorX communication. If you enable security on the remote machine, you have to specify a username and password for FrameWorX to FrameWorX communication in the default FrameWorX server Platform Services Configuration. This user account (for example, Bob, which must exist in the remote FrameWorX security configuration) will be used when the default GraphWorX64

FrameWorX Server communicates with the FrameWorX Server on the remote machine. All limitations of Bob's account will be applied to the default FrameWorX server machine as if the machine logged into the remote security server as Bob himself.

If you enable security on the default FrameWorX server machine as well, limitations of the local security user who is logged in (e.g. Alice) will be applied on top of Bob's limitations. In other words, Alice will never be able to access more data than Bob, but she can be even more restricted.

Configuration

If Workbench is used to connect to a remote FrameWorX server in order to edit the remote FrameWorX server project, a server login dialog needs to be used to authenticate against the remote FrameWorX server security.

Licensing

- Application or Client licenses** such as Client Stations, HyperHistorian Enterprise Servers or GraphWorX64 Client Stations will be counted only once in the license server specified for the default FrameWorX server which the client or application directly uses.

Feature	In Use	Remain
GENESIS64 Developer Stations	1	1
GraphWorX64 Developer Stations	0	2
AlarmWorX64 Developer Stations	0	2
HyperHistorian Developer Stations	0	1
GraphWorX64 Client Stations	0	3
TrendWorX64 Client Stations	0	1
AlarmWorX64 Client Stations	0	1
GridWorX Client Stations	0	2
Workbench Client Stations	1	1
AlarmWorX64 Logger Servers	0	1
AlarmWorX64 Servers	1	0
TrendWorX64 Logger Servers	0	1
MonitorWorX Enterprise Servers	0	1

Figure 4 - Application Licenses Deducted from the Default FrameWorX Server

- Tag count** such as GENESIS64 Tags will be deducted only in the license server specified for the FrameWorX server the data are requested from. In other words, if an application requests data from a remote FrameWorX server, the tag count license of its own default FrameWorX server is not exploited.



GENESIS64

Distributed Servers Architecture



APPLICATION NOTE

September 2013

	In Use	Remaining	Total
GENESIS64 Tags	9	55	64
HyperHistorian Tags	0	500000	500000

Figure 5 - Tag Count License Deducted from the Target FrameWorX Server

E.g. A client application such as GraphWorX64 connected via its default FrameWorX server through a hierarchy of other FrameWorX servers will consume the Client Stations and GraphWorX64 Client stations license from its default FrameWorX server license server but the requested points will be counted only in the license server of the endpoint FrameWorX, which supplies the actual data.

Note: There is one exception. If you are for some reason going to access data in our new clients such as GraphWorX64 through wrappers such as ICONICS FrameWorX Server OPC Wrapper, it will consume license points from the client's default FrameWorX license, as well as of the endpoint FrameWorX server.

E.g. if in GraphWorX64 you use the syntax "`@\\RemoteServer\\ICONICS.FwxServerOPC.1\\item.Value`" instead of accessing the remote data directly using the syntax "`\\RemoteServer\\item`"

Overall Deployment Model

Figure 6 shows an overall deployment model, which provides both full 3 layer architecture, but also shows some alternative levels of connectivity using 1 or 2 layers.

1. **Single Server Node (data):** CLNT003 would connect via path A3 to FrameWorX on DTSVR201 to get data from a PLC via path G1
 - o **Licensing Note:** If CLNT003 requests any data all points will be licensed on DTSVR201.
2. **Single Server Node (alarms):** CLNT002 would connect via path A2 to FrameWorX on BESVR101, FrameWorX connects via OPC A/E and path D1 to the Alarm Server

also on BESVR101, which in turn uses path E1 to get data from a PLC, E2 to get BACnet data, etc.

3. **Single Server Node (historian):** CLNT002 would connect via path A2 to FrameWorX on BESVR101, FrameWorX connects via OPC UA or HDA and path D2 to the Hyper Historian also on BESVR101, which in turn uses path E1 to get data from a PLC, E2 to get BACnet data, etc.
4. **Two Server Nodes:** CLNT002 would connect via path A2 to FrameWorX on BESVR101, FrameWorX connects via OPC A/E and path D1 to the Alarm Server and via OPC UA or HDA and path D2 to the Hyper Historian both also on BESVR101, which in turn uses path F1 to connect to FrameWorX on DTSVR201, which uses path G1 to get PLC data, G2 to get BACnet data, etc.
5. **Three Server Nodes:** CLNT001 would connect via path A1 to FrameWorX on the FESVR001, which in turn would connect via path C1 to the FrameWorX on BESVR101, this FrameWorX connects via OPC A/E and path D1 to the Alarm Server and via OPC UA or HDA and path D2 to the Hyper Historian both also on BESVR101, which in turn uses path F1 to connect to FrameWorX on DTSVR201, which uses path G1 to get PLC data, G2 to get BACnet data, etc.
 - o **Licensing Note:** If CLNT001 requests data through B1-B4 the points will be counted on FESVR001. If CLNT001 requests data through C1 the points will be counted on FESVR001. If CLNT001 requests data through C1 plus F1 the points will be counted on DTSVR201.
6. **N-Server Nodes:** In principle there can be any number of layers of servers, where a FrameWorX connects to a FrameWorX on a lower level



GENESIS64

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September 2013

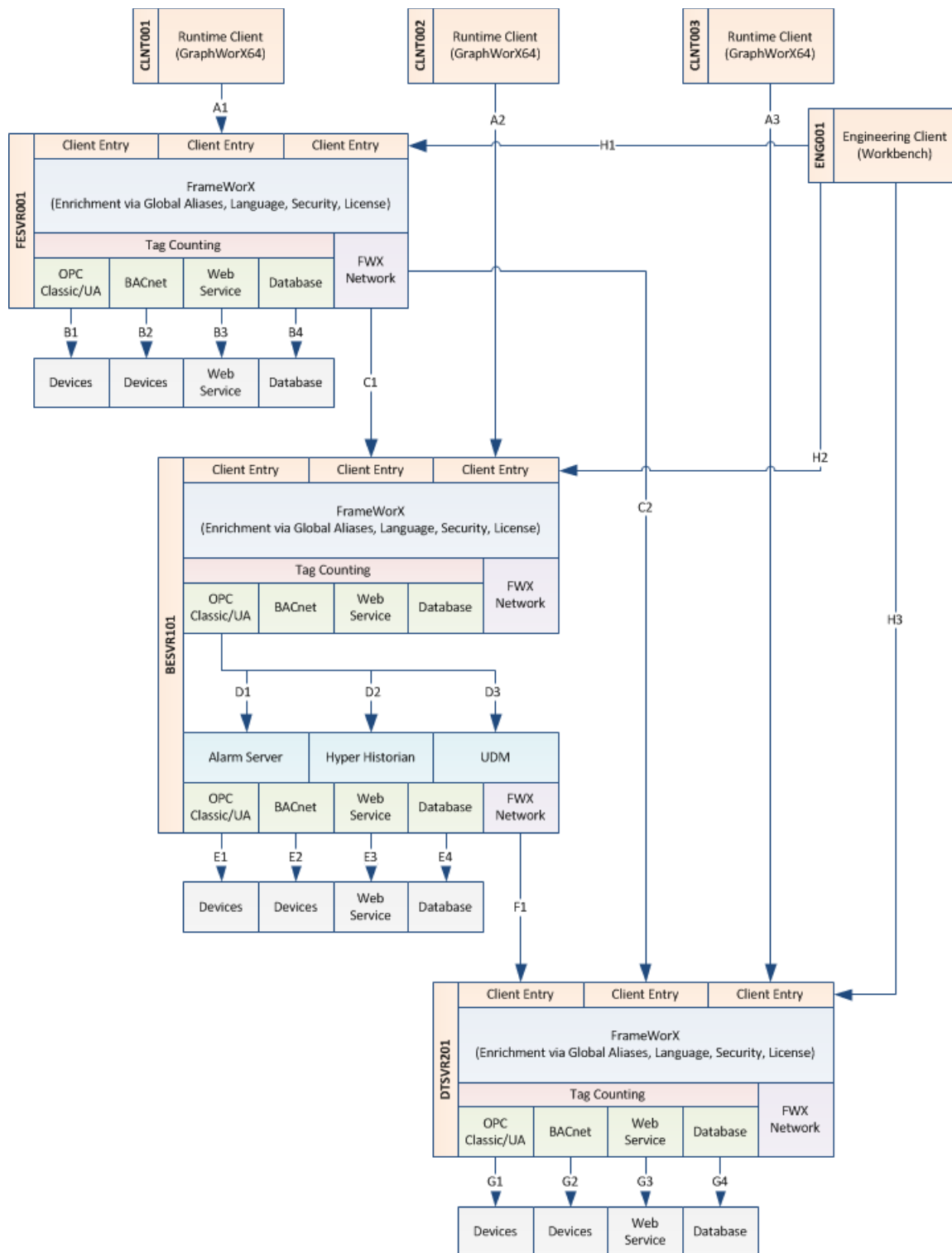


Figure 6 - Overall Deployment Model