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# Table of Contents

## About This Manual
- General ..............................................................................................................................9
- Document Conventions .....................................................................................................9
- Intended User ....................................................................................................................9
- Warning, Caution, Information, and Tip Icons .................................................................9
- Terminology .....................................................................................................................10
- Related Documentation ...................................................................................................11

## Section 1 - Introduction
- Product Overview ............................................................................................................13
- Description ......................................................................................................................13
- System Structure ............................................................................................................14
  - Node Types ....................................................................................................................15
  - Extensions ..................................................................................................................15
- Workflow .........................................................................................................................16
- Prerequisites ....................................................................................................................18

## Section 2 - Engineering
- Objects for Coupling .......................................................................................................21
- Creating OPC Gateways ...................................................................................................21
- Aspect Directory Object ................................................................................................25
- Export File .......................................................................................................................28

## Section 3 - Basic Settings
- Introduction .....................................................................................................................33
- Connectivity Server .........................................................................................................34
Table of Contents

Redundancy......................................................................................................................... 34
Configure Tool .................................................................................................................. 36
Windows Registry ............................................................................................................. 39
Plant Explorer Workplace ................................................................................................. 44
  Network Object............................................................................................................... 44
  OPC Data Source Definition ....................................................................................... 47
  OPC Data Access .......................................................................................................... 49
  OPC Event Collector, Service ....................................................................................... 51
  Alarm Collection Definition Object .............................................................................. 56
  Alarm and Event List Configuration ............................................................................. 61
Object Type Structure ....................................................................................................... 63
Faceplates Localization .................................................................................................... 64

Section 4 - SFC Viewer
Overview ............................................................................................................................ 69
Structure Diagram ............................................................................................................. 69
Structure Display ............................................................................................................. 70
Zooming ............................................................................................................................ 72
Jump Labels ....................................................................................................................... 73
Transitions / Actions ....................................................................................................... 74
  Transition Display ....................................................................................................... 74
  Action Display ............................................................................................................ 76
Forcing .............................................................................................................................. 77
Limitations ......................................................................................................................... 78

Section 5 - Uploader
General ............................................................................................................................... 79
Upload ............................................................................................................................... 79
Engineering Workflow when adding Tags ...................................................................... 84

Section 6 - Time Synchronization
AC 900F/800F/700F as the Time Master ........................................................................ 87
  AC 900F/800F/700F as the Time Master ....................................................................... 87
# Table of Contents

System time, local time, daylight saving time ................................................................. 87  
Synchronizing System 800xA ...................................................................................... 88  
Exception ....................................................................................................................... 90  
800xA as the Time Master ......................................................................................... 91  
  Time Master ............................................................................................................. 91  
  Connectivity Server ............................................................................................... 94  

## Revision History

Updates in Revision Index A ......................................................................................... 97
About This Manual

General

This document describes proper operation of the connectivity software “800xA for Freelance” in conjunction with the 800xA Plant Explorer, Freelance and Windows operating system. For latest information refer the corresponding Release Notes also.

Document Conventions

Microsoft Windows conventions are normally used for the standard presentation of material when entering text, key sequences, prompts, messages, menu items, screen elements, etc.

Intended User

This configuration manual is intended for installation engineers who are familiar with process control systems and Microsoft® Windows operating systems. As a rule, Microsoft Windows functions are not described in this manual.

Warning, Caution, Information, and Tip Icons

This publication includes Warnings, Cautions, and Information where appropriate to point out safety related or other important information. It also includes Tips to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:

Electrical warning icon indicates the presence of a hazard which could result in electrical shock.
Warning icon indicates the presence of a hazard which could result in personal injury.

Caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment/property.

Information icon alerts the reader to pertinent facts and conditions.

Tip icon indicates advice on, for example, how to design your project or how to use a certain function.

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, **fully comply** with all **Warning** and **Caution** notices.

### Terminology

A complete and comprehensive list of Terms is included in *System 800xA System Planning (3BSE041389*)*. The listing includes terms and definitions that apply to the 800xA System where the usage is different from commonly accepted industry standard definitions and definitions given in standard dictionaries such as Webster’s Dictionary of Computer Terms. Terms that uniquely apply to this instruction are listed in the following table.

<table>
<thead>
<tr>
<th>Term/Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>OPC Alarms and Events</td>
</tr>
<tr>
<td>AS</td>
<td>Aspect Server running the Aspect Directory</td>
</tr>
<tr>
<td>CBF</td>
<td>Freelance engineering tool Control Builder F</td>
</tr>
<tr>
<td>CS</td>
<td>Connectivity Server hardware</td>
</tr>
<tr>
<td>DA</td>
<td>OPC Data Access</td>
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</tbody>
</table>
A complete list of all documents applicable to the 800xA System is provided in *System 800xA Released User Documents (3BUA000263*)*. This document lists applicable Release Notes and User Instructions. It is provided in PDF format and is included on the Release Notes/Documentation media provided with the system. *System 800xA Released User Documents (3BUA000263*)* is updated with each release and a new file is provided that contains all user documents applicable for that release with their applicable document number. Whenever a reference to a specific instruction is made, the instruction number is included in the reference.

<table>
<thead>
<tr>
<th>Term/Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSI</td>
<td>Human System Interface</td>
</tr>
<tr>
<td>OPC</td>
<td>OLE for Process Control according to Standard OPC®</td>
</tr>
<tr>
<td>OPC Gateway</td>
<td>Abstract of OPC Server and Connectivity Server</td>
</tr>
<tr>
<td>OPC Server</td>
<td>Freelance OPC software</td>
</tr>
<tr>
<td>PLC file</td>
<td>Standard file format for Programmable Logic Control</td>
</tr>
<tr>
<td>RNRP</td>
<td>Redundant Network Routing Protocol</td>
</tr>
<tr>
<td>SFC</td>
<td>Freelance Step Sequence Control function block</td>
</tr>
</tbody>
</table>

### Related Documentation

<table>
<thead>
<tr>
<th>Category</th>
<th>Title</th>
<th>Description</th>
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<tr>
<td>Connectivity</td>
<td>800xA for Freelance, 6.0, Release Notes</td>
<td>2PAA112403*</td>
</tr>
<tr>
<td></td>
<td>800xA for Freelance, Installation</td>
<td>3BDD011810*</td>
</tr>
<tr>
<td></td>
<td>800xA for Freelance, Operation</td>
<td>3BDD011811*</td>
</tr>
<tr>
<td>Freelance</td>
<td>Freelance 2013, Release Notes</td>
<td>2PAA103593*</td>
</tr>
<tr>
<td></td>
<td>Freelance 2013 Rollup1, Release Notes</td>
<td>2PAA105400R0901</td>
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</table>
Section 1  Introduction

Product Overview

The Connectivity software **800xA for Freelance** links Freelance with **800xA Operation**.

800xA Operation – an essential part of the Industrial Extended Automation System 800xA – is intended for process visualization and operation. Freelance is the actual process control system. The Freelance process stations provide the functions for monitoring and controlling process variables such as flow, temperature, pressure, etc. as configured by the project engineer or planner. The 800xA Operation workstations are the operator stations from where operating and service staff can monitor the process, recognize possible malfunctions of the process devices, or intervene, if required.

Description

The **Connectivity** software benefits from the standard OPC® technology and its specified interfaces for data access and alarms/events. Only the transfer and conditioning of process variables, alarms and events taking into account the corresponding engineering data allow for efficient process management through **800xA Operation**.

**800xA for Freelance** can run in a Windows server operating system or Windows client operating system Enterprise edition on an off-the-shelf PC.

Refer to 3BUA000500 for more information.

For details about the operating system and hardware requirements please refer to the installation manual and the Freelance product documentation.
System Structure

The illustration below is an overview of the Industrial Extended Automation System 800xA with Freelance for process automation. Single or redundant connectivity servers provide the link between operation/visualization and automation.

Figure 1. System 800xA for Freelance
Node Types

**800xA for Freelance** basically cooperates with four **System 800xA** node types:

- **Engineering Workplace**

  The Freelance engineering tool Control Builder F (CBF) configures the Freelance process stations and OPC servers. It generates the PLE file containing static project data for configuring 800xA Operation.

- **Operator Workplace**

  Provides operation and visualization of Freelance function blocks and variables using faceplates. Another important feature is the fault diagnosis function for alarm and event message generation.

- **Connectivity Server**

  Communicates with Freelance controllers and provides real-time data access between 800xA-System-Operation and the control network via standard OPC DA/AE interfaces.

- **Aspect Server**

  The aspect server (Directory) provides basic database functionality and persistent data storage and manages the configuration data life cycle. Data is always related to the aspect directory and not to the individual aspect objects.

Extensions

The following extensions are possible:

- More Freelance process stations, multiple and/or redundant.
- More connectivity server nodes (OPC), multiple and/or redundant.
- More workplaces for operation and engineering.
- Redundant (n of m) aspect server.
- Additional servers for specific tasks.
- Redundant HSI network using RNRP.
- Control network with ring topology and rail switches.
The engineering workflow always starts in the Freelance engineering tool Control Builder F and ends up in 800xA Operation.

Figure 2. Workflow
The following relations exist between the system components:

1. Once the software has been installed and the system extension has been created, the Freelance object types are available in System 800xA. The object type “knows” how to extract Freelance information and operate, for example Freelance controllers. For this purpose, the object types contain standard aspects like faceplates, alarm list, event list, control connection, general properties etc.

2. Although loading the process station and OPC server using Control Builder F is actually no Connectivity software functionality, it is important for understanding the workflow. The same is valid for extending the Freelance project (application) with specific objects needed for the link to 800xA Operation.

3. On request, Control Builder F generates an export file .ple in the known PLCopen format. This file contains project configuration data that are required for the visualization in 800xA Operation. The measuring range, engineering unit and limit value are examples for such data.

4. When the uploader is started, the function blocks and variables of the project are instantiated using the object types available in the aspect directory. Subsequently, the instances are available in the control and functional structure of the hardware resources, gateway resources, function blocks, and variables.

5. The Freelance OPC Server is the “link” between the function blocks/variables in the process stations and the corresponding faceplates, graphic displays and trends in 800xA Operation. It provides 800xA Operation with the latest process values, alarms, and events and transmits control commands, individual controls, step sequences etc. to the process stations.
Prerequisites

Before you can execute the actions and tasks described later in this document, you have to install the below-listed ABB products including the corresponding hot fixes, roll-ups etc.:

- Extended Automation System 800xA 6.0
- Connectivity “800xA 6.0 for Freelance”
- Freelance 2013
- Freelance 2013 Rollup1 OPC Server

Additionally, you have to add the Connectivity software as an 800A system extension. For details about the above mentioned products, refer to the product-specific user manuals.
Freelance Project

Freelance “Control Builder F” is the engineering tool for configuring, commissioning and documenting the application programs of a Freelance System.

Engineering activities always start in the Freelance Engineering Tool and end up in 800xA Operation.

Engineering activities in 800xA Operation which collide with the rules defined for the Connectivity software 800xA for Freelance in terms of the data consistency and integrity are rejected.

In the Control Builder F Project Manager you can save, export, import, rename or delete projects. In the project tree, the project is actually configured, commissioned and documented. A second tree is available for planning the hardware components and network structure intended for automation.

The Freelance tags are created in the 800xA Plant Explorer Workplace using the Freelance project’s program or hardware structure and the function blocks and variables in it.

Prior to uploading a Freelance project always make sure that the tag names used in that Freelance project for the function blocks and variables are different from the names in other Freelance projects.

When naming a User-defined Function Block (UFB) or a Sequential Function Chart (SFC), observe the rules regarding the usage of special characters (see documentation OPC-Server, IEC1131 ....)

You can easily create a different name, for example by using a preceding index like 1, 2 ... for the tag name:
Project A: 1LAB .....P001
Project B: 2LAB .....P001

In 800xA Operation, identical tag names may cause malfunctions, e.g. when calling up faceplates, alarm displays etc.

With this version the uploader reports a warning if it detects an already existing tag in the aspect directory that belongs to a different Freelance project. The uploader does not change the tag name!

**Engineering Workflow**

You can start the engineering workflow by extending an already existing Freelance project (only once) with an additional object for coupling with 800xA Operation.

When you have made the above-mentioned extension or after each change of the application – e.g. by inserting or deleting function blocks etc. – you have to generate a new up-to-date PLE export file *name*.ple. After this you can start the Uploader and enter this export file name.
Objects for Coupling

In order to establish the coupling with 800xA, you (once) have to insert the required objects (OPC Gateways, Aspect Server AS).

Please note that the names used for the resources, object, nodes, etc. in the following instructions are just examples.

Creating OPC Gateways

Project Tree

In the CBF project tree, insert the appropriate number of D-GS gateway stations of type OPC Gateway under the CONF node.

1. Select the CONF node and navigate to insert > next level using the right mouse button.

2. Select the Gateway station D-GS object.

3. In the Configuration window, select the Type as OPC Gateway and enter a unique name for it, for example OPC1.

4. Press OK to confirm.
5. If required, add more OPC gateways of the same type, for example, for redundancy, load sharing etc.

Figure 3. Gateway station D-GS
The following figure shows how to configure (prepare) two redundant gateways, OPC1 and OPC2.

![Freelance Control Builder F.2013 - freelance - Configuration -](image)

**Figure 4. Configuring OPC1 and OPC2**

If these two gateways are intended for redundancy operation or are independent gateways for load sharing (other OPC items) is neither defined nor indicated in this place. The definition is done in the 800xA Service Structure (DA Service Provider),
at the CBF object in the project tree (800xA Aspect Server 800XA-AS, V8.1 and higher) and via the tag/variable list in the station view (RW attribute).

**Hardware Structure**

In the CBF hardware structure, add the corresponding number of OPC gateways to the Freelance network.

1. Select the **HWSYS object**, right-click **insert** and then select **GWY Gateway** from the menu.
2. In the next window, accept or change the object name, for example, GWY1.
3. Select the inserted gateway object and assign it to the D-GS gateway station in the project tree using the **Resource allocation** item.

Repeat steps 1 to 3 if you want to add more gateway objects of type GWY.

After the assignment, the name of the corresponding resource, e.g. OPC1, appears in the hardware structure before the gateway object. In the project tree, the display changes from OPC1[DG-S] to OPC1[GWY].

![Figure 5. Display Changes from OPC1[DG-S] to OPC1[OPC]](image)

a. In the CBF task bar, select the "Network" menu item.

b. In the “Network Configuration” window, enter a unique resource ID and IP address for all gateways.
Aspect Directory Object

Project Tree

With Freelance Version 8.1 and higher, you can add a new object representing the System 800xA Aspect Directory and defining the assignment of the OPC gateways (software) to the Connectivity servers (hardware). As a result, it is no longer necessary to specify the OPC server resource ID when initiating a data upload. With Version 8.1 and higher, this information is available in the export file.

1. Select the CONF node and then use the right mouse button to navigate to insert > next level.

2. Select the 800xA Aspect Server 800XA-AS object.

3. In the Configuration window, enter any name, for example 80X, and then enter the computer and project name.

4. Select the 800XA-AS node and then use the right mouse button to navigate to insert > next level.

5. Select the Connectivity 800XA-CS object.

6. In the Configuration window, enter any name for the Connectivity node, for example CS1.

Figure 6. Aspect Server Window
7. Enter the computer name of the primary Connectivity server and then select the gateway (right-click and [select]).

The **Select OPC-Gateway window** is only available if the resource has been assigned before (see Hardware Structure).

8. Enter the computer name of the secondary (redundant) Connectivity server, too, and select the gateway.

9. Press **OK** to confirm.

![Figure 7. Connectivity Server Window](image)
The following screenshot shows the CBF project tree for 800xA Operation with Freelance Version 8.1 and higher.

![CBF Project Tree Image]

*Figure 8. CBF Project tree*

If you want to create a second, redundant Connectivity node/server, add a new object CS2 with allocated gateways OPC3/OPC4 and computer names.
CONSERV21/CONSERV22 OPC. The hardware structure must be extended accordingly.

In the Freelance CBF project, you have to adapt the following system settings to the new number of OPC servers:

- CBF menu bar > System > Communication Configuration > Assign OPC gateways to process stations PS.
- Hardware Structure > Process Station > Parameter > System Limits > Number of GWY (VIS + GWY max. 10)

After plausibility checking, the project tree looks as shown below:

![Project tree after plausibility checking](image)

*Figure 9. Project tree after plausibility checking*

The file extension “.ple” stands for the file format (E)xtended PLCopen. In addition to the data provided in the PLC file .plc – which may be known to Control Builder F
from Process Portal B – this file also contains information for creating Freelance objects like gateways, hardware resources etc. in 800xA Operation.

a. Start the **Control Builder F** engineering tool.

b. Select **Project** from the menu bar and then click **Open ...** from the pull-down menu.

c. In the **Open project window**, select the desired project file name.pro.

d. Press **Open** to confirm.

![Project details]

**Figure 10. Control Builder F**

e. Select **Project** from the menu bar again and then select **Export ...** from the pull-down menu.

f. In the **Export project window** navigate to the **Save as type** listbox and select the name.ple file type.
g. In the **File name** field, enter the file name. We recommend to use a combination of the project name, date and serial number.

![Image of Export Project window]

**Figure 11. Export Project window**

h. Press **Save** to confirm.

i. If not otherwise specified, the *name*.ple export file is saved in the Freelance export directory (default setting).

   System drive:\Industrial IT\Engineer IT\Control Builder F\export\*.*ple
We recommend to store a copy of this PLE file one second data medium as a backup file.
Section 3  Basic Settings

Introduction

After having installed the 800xA System, Freelance, OPC Server and 800xA for Freelance, you have to make some configuration work and basic settings to allow for proper operation. Perform the below-listed steps one after the other:

Connectivity Server

– Make the redundancy settings.
– Specify the OPC resource ID.

Windows Registry

– Enable extended OPC status (Running/ComErr).

Plant Explorer Workplace

– Create a network object in the control structure.
– Run the Uploader (see Section 5).
– Define the OPC data source.
– Specify OPC data access.
– Specify OPC alarm and event collection.

Faceplates Localization (optional)
Connectivity Server

Redundancy

As redundant Connectivity servers are normally used, this chapter describes the required settings using the following example: Adjustment of the alias ID and resource ID in order to run Connectivity servers CS11 (CONSERV11) and CS12 (CONSERV12) in a redundant configuration.

Figure 12. Redundant Connectivity Servers
The used IDs are arbitrary numbers. They must be unique and within the permissible range of 1...256.

The OPC server resource ID must be input for each Connectivity server where the Freelance OPC server has been installed. Additionally, an alias ID has to be specified for a redundant configuration of servers.

During the setup procedure of the Freelance OPC Server software, the resource ID, IP address and subnet mask are entered as usual.

**Figure 13. Resource ID/IP Address**

The resource ID can be changed later if required using the Freelance Configure tool. The **Configure tool** icon will be available after having installed the Freelance OPC Server software.
Configure Tool

Configure Tool

Run the Freelance Configure tool on the connectivity server CS11 for entering the final resource ID an alias ID.

Windows Start Menu >ABB Configure

- Right click ABB Configure and run as administrator.

As UAC is enabled in SV6.0, ABB configure tool needs to be run as administrator.

In a UAC Enabled environment, double-clicking and directly opening ABB Configure may result in some functions not working correctly in the configure tool.

Input of an alias ID is required for redundant Connectivity server applications, only. For a single server leave the checkbox unchecked.

Both IDs form a so called Prog ID used by 800xA DA/AE services. Always perform the steps listed below prior to configuring 800xA Operation:

1. Run the Configure tool on the connectivity server CS11. Edit the right frame OPC Server F Options shown by the Configure tool user interface

2. Before you are allowed to enter the alias, the present OPC server resource ID has to be removed, even if the shown Resource ID is the one you want to use.
The same is valid if you want to modify an already existing resource ID or alias ID.

![Configure window](image)

*Figure 14. Configure window*

3. Select the resource ID (defined during OPC server setup) displayed in the *Existing resources* input field.

4. Click **Remove**.

Enter the resource ID and the alias ID by:

1. Check the **Configure separate Alias ID** checkbox.
2. Enter the new **resource ID** as 55 and **alias ID** as 88

![Configuration Wizard](image1)

*Figure 15. New resource ID*

3. Click **Add**. CS11 and CS12

![Configuration Wizard](image2)

*Figure 16. Existing Resources*
4. Change over to the redundant connectivity server CS12 and repeat the above steps using a different **resource ID** as 56 and the same **alias ID** as 88.

If the OPC server software is updated at a later time the before-mentioned IDs must be re-assigned. Prior to uninstalling, all IDs have to be removed from each Connectivity server. Use the Configure tool for this purpose.

After having modified the OPC Server resource ID with the Configure tool, re-entry of the **PPA connectivity registry key** is required, as its value was set to “0”.

### Windows Registry

If the server has lost its connection to all AC 900F/AC 800F process stations assigned to it, you can achieve an OPC server status change from “Running” to “Communication error” by registration. A possible reason for such an error could be a defective Ethernet card or broken data line.
800xA Operation cyclically scans the OPC Server status and enables the data path to this server in case of an error. Hence, all clients are prompted to communicate with the process stations via the redundant server.

Each Connectivity server where the Freelance OPC server software has been installed requires the indication of the registry key.

**Windows Registry**

1. Click **Start > Run** to view the **Run dialog**.
2. Type **regedit** in the **Open** list box.
3. Confirm with **OK**.

![Figure 18. Run Dialog box](image)
4. Select **My Computer > HKEY_LOCAL_MACHINE > SOFTWARE > Hartmann & Braun > Freelance > OPCServer**

![Registry Editor](image)

**Figure 19. Registry Editor**

5. Double-click the value name **PPAConnectivity** and change its value from 0 to 1.

6. Confirm with **OK**.

7. Restart your computer to ensure the registry entry becomes effective.

   When updating or upgrading the OPC Server software or modifying the OPC Server resource ID settings with the Configure tool, the key value is automatically set to 0. Hence, reentry of the key and a reboot are required.

**Windows Firewall**

Windows Firewall is turned on after Automatic/Manual installation of 800xA SV6.0 on Connectivity Servers running on Windows Server operating system (Refer *System 800xA 6.0 Manual Installation (2PAA112455*) for details.)
Support of Internet Protocol Security (IPsec)

Freelance Connect can be run on 800xA Systems configured for IPsec.

For the same, CBF Node and all DigiVis Nodes of Freelance System must be included as part of 800xA Domain.

To join 800xA domain, CBF Node and all DigiVis Node(s) shall need '2 Nos. network interfaces'. One for communication on Freelance Control Network and other for communication on 800xA Client Server Network.

Refer below typical configuration required to run Freelance Connect on 800xA IPSec enabled system:

Figure 20. 800xA IP Security with Freelance Connect
Additionally, the following procedures shall be applicable in respective nodes:

**Freelance CBF Node**
1. Configure 800xA IndustrialITUserGroup as member of Local PC Administrators Group.
2. Login as 800xA User.

**Freelance All DigiVis Nodes**
1. Configure 800xA IndustrialITUserGroup as member of Local PC Administrators Group.
2. Login as 800xA User.
   
   HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon
   
   Set as : DomainName\UserName, Password

**800xA Domain Controller Node**
In 800xA IPsec Configuration tool, perform the below steps:
1. Select the Applicable connection security rule as **AC800F/AC900F/AC700F Controller**.
2. Provide the Freelance controller IP Address in the **Subnet or IP Address** field.
3. Click on **Add** button to add a new exemption rule. For Multiple controllers, additional entry with respective IP Address is required.
4. Click on **Configure** to apply the required port exemption settings into the Windows Firewall- connection security rules.
Refer *System 800xA Installation and Upgrade Getting Started* manual for more details on IP Security Configuration tool.

![IPSec Configuration Tool](image)

*Figure 21. IPSec Configuration Tool*

**Plant Explorer Workplace**

**Network Object**

An OPC data link via the Connectivity Server can be established by inserting an AC 800F network object into the control structure representing the Freelance control network.

1. Select the root domain object in the control structure.
2. Right-click and then choose **New Object** .. from the context menu.
3. Open the **Common** tab.

![Network Object Diagram]

Figure 22. Network Object

4. Open the **Object Types**, **Control System**, **Freelance Connect**.
5. Select the **Freelance Network** object.
6. Enter a network name, For example **Network A**.
7. Click **Create** in order to create the Freelance Network node.

![Image of Control Structure](image)

*Figure 23. AC 800F Network Object*

At this point, start the Uploader (see **Section 5 Uploader**, in order to receive the Freelance OPC gateway objects for further settings.

The Uploader inserts Freelance objects into the control structure under the network node. The objects will be added to the function structure, too.

Continue with settings for OPC data access by selecting the first gateway object e.g. located below the network node.
OPC Data Source Definition

First configure the *OPC Data Source* aspect located on each OPC Gateway node. With this, an OPC server will be allocated to the Freelance network as the data source.

a. Select **Control Structure** and **OPC Gateway** object *OPC1*.

b. Open the **Freelance OPC Data Source Definition** aspect.

c. Select the **Connectivity** tab and then click **New**.

![Figure 24. OPC Data Source Definition](image)

The redundant gateway OPC2 does not require configuration.

8. Maintain or modify the name as *New Service Group*.

9. Click **Add**.
10. Select both connectivity servers OPCSERV11 and OPCSERV12 as the service providers.

![Figure 25. OPCSERV11 and OPCSERV12 Connectivity Servers](image)

11. Click **OK** twice and confirm with **Apply**.

   A new service group containing two service provider should have been added to the service structure under the OpcDA_Connector node as shown in Figure 26.
Now the DA service provider have to be configured. Start with selecting the service provider OPCDA_Provider_CONSERV11

1. Select Service Structure and click the Service Provider Definition aspect.
2. Open the **Special Configuration** tab.

![Figure 27. Special Configuration tab](image)

3. Click **Refresh**.

4. Open the **OPC Server Identity, ProgID** list box.

5. Select the **Freelance2000OPCServer.Alias.88.1** as **ProgID**.

6. Click **Apply**.

   Change over to **OPCDA_Provider_CONSERV12** and repeat the above steps using the same **ProgID Freelance2000OPCServer.Alias.88.1**.

   Make sure that the service group redundancy feature is **enabled**.

7. Select the **Service Group** object.

8. Click the **Service Group Definition** aspect and open the **Special Configuration** tab.

9. Make sure that the **Allow parallel redundancy** checkbox is selected.

   Check that both OPCDA service providers are operating in the Service state.
10. Open the **OPC Server Identity, ProgID** list box.

![Figure 28. OPC Server Identity, ProgID list box](image)

If a service provider does not indicate the Service state, restart the provider/service.

1. Click the **Service Provider Definition** aspect and open the **Configuration** tab.
2. Uncheck the **Enable** checkbox and then click **Apply**.
3. Check the **Enable** checkbox again and then click **Apply**.

**OPC Event Collector, Service**

In order to be able to hand over Freelance alarms and events, an AE service group has to be defined in the service structure under the event collector node.

1. Select **Service Structure** and **Event Collector, Service**
2. Right-click and then choose **New Object ..** from the context menu.
3. Enter the name of the AE service group, e.g. **SG_OPC_AE**
4. Click **Create**. After this, the AE service provider have to be specified for the service group.
   a. Select the new object and click the **Service Group Definition** aspect.
   b. Open then **Configuration** tab.
   c. Click **Add**.
   d. Enter the service provider name as **CONSERV11** and then click **OK**.
   e. Enter the service provider name as **CONSERV12** and then click **OK**.
   f. Confirm with **Apply**. The configuration of the AE Service Group for redundant Connectivity Server looks as shown in **Figure 30**:
g. Select the new object, for example CONSERV11, and then click the Service Provider Definition aspect.

h. Open then Configuration tab and the Node list box.

i. Select the appropriate node (computer name).
j. Click **Apply**.

![Configuration tab](image1.png)

**Figure 31. Configuration tab**

Repeat the node assignment for the redundant Service Provider CONSERV12.

a. Select the **Service Group** object again.

b. Click the **Service Group Definition** aspect.

c. Open the **Special Configuration** tab and the **Alarm Server** list box.

d. Select either of the ProgIDs ending with the Freelance OPC Server resource ID 055 or 056.

![Special Configuration tab](image2.png)

**Figure 32. Special Configuration tab**
Section 3 Basic Settings

**OPC Event Collector, Service**

**E. Click Apply.**

The display of the Alarm Server ProgID may disappear later on. However, the function is still available, as the ID is stored internally. In order to verify if the selection has been carried out or not you may temporary disable the active service provider. The ProgID will be displayed again.

**Collection Definition**

The collection definition is a sub-item of the OPC AE Event Collector Service. The definition is the final step of the AE configuration.

a. Select the **Service Group Object** again and open the **Service Group Definition** aspect

b. Open the **Special Configuration** tab

c. Move to the **Collection Mapping** frame and click **New**

d. Click **Apply** and then click **Upload**

![Figure 33. Special Configuration tab](image-url)
After clicking on the [New] button in Collection Mapping frame an Alarm Collection object in Library Structure is created. With the [Upload] button an aspect is created for each Alarm Category on this object.

Verify that both OPC AE services are operating in the correct mode (different to the DA service). Select the Service Group Definition aspect and open the Status tab.

![Figure 34. Service Group Definition aspect](image)

Make sure that both nodes are “Registered”. One node operates in “Service” mode and takes over the master role (X in column M). The other node is in “Standby” mode.

If the state is “Undefined” for both providers, disable and enable the service by using the Enable check box located on the Configuration tab. For execution press Apply after a configuration change.

Check the control network adapter and associated cables to see if the state of one node remains in “Synchronizing” mode for more than a few minutes

**Alarm Collection Definition Object**

Each connected OPC server has his own Alarm Collection Definition object for individual alarm configuration like priority mapping.

1. Select the Library Structure
2. Open Alarm & Event and Alarm Collection Definitions folder
3. Select the **Freelance 2000 OPCAEserver 055** object

![Figure 35. Library Structure](image1)

4. Double-click the **Alarm Priority Mapping** aspect

![Figure 36. Alarm Priority Mapping aspect](image2)
5. Set **Priority Level** to 5
6. Click **Set Default** and then **Apply**
7. Select the **Alarm Collection Definition** aspect

![Diagram showing library structure]

**Figure 37. Alarm Collection Definition aspect**

8. Click the first **Un-categorized Condition Events** Category Group
9. Assign it as Process Alarm (see also the Freelance OPC AE Server object, use this as example for configuration).

10. Click **Apply**

11. Assign all Un-Categorized Condition Events as Process Alarms, System Alarms or Acknowledge (see also Freelance OPC AE Server object, use this as example for configuration or see following picture)

**Figure 38. Un-categorized Condition Events**
Retention Freelance Alarms after Restart of Aspect Server/Alarm Manager Service

While creating New Collection Definition object when configuring Event Collector Service, perform the following for newly created Alarm Definition aspect of respective Freelance OPC Server instance in Library Structure:

1. Right-click **Alarm Collection Definitions**.
2. Select **Config View** from the list.
3. Select **Support Refresh** check box under **OPC Alarm Server** and then click **Apply** to save the changes as shown in Figure 40.

Figure 40. Configuring OPC Alarm Collection Definitions

**Alarm and Event List Configuration**

1. Open **Alarm & Event List Configurations** folder.
2. Open Freelance Alarm & Event List Configurations folder.
3. Select the Freelance Alarm List object.
4. Select the Alarm and Event List Configuration aspect.
5. Open the Filter tab.

6. In order to filter for all OPC server alarms un-check and check the Process Alarms check box.
7. Un-check and check the System Alarms check box.
8. Click Apply.
Object Type Structure

Freelance object types will be inserted to the Object Type Structure with adding the Connectivity Software as 800xA System extension. The object types are placed below the “Freelance Connect” node in a reserved branch/area of the structure. Object types of user defined function blocks UFB and structured variables created by the uploader during the upload process will be stored to the reserved area too.

You must not delete, rename and remove object types and the related aspects. The uploader requires the object types for creating instances.

Project specific extensions to present object types and types created by the uploader are permissible and common practice. Trend displays, alarm/event lists etc. are examples for possible extensions.

Figure 42. Object Type structure
Faceplates Localization

The faceplates delivered with the object types are provided with English and German texts by default. The displayed language is determined by the Windows language settings (made under Regional Options). If you would like to see text in another language, proceed as follows:

Example: Analog Function Blocks

1. Open the Object Type Structure,
2. Select Control System > Freelance Connect > Freelance Configuration Elements.
3. Select Function Blocks > Analog Object Type Group.
4. In the Aspect window, select the Freelance_NLS_Analog aspect (Category = NLS Resource Manager).
5. Click Add and select the desired language, for example French (France)
Figure 43. Analog Function Blocks

6. Change over to the chosen language.

7. Select a resource Id
8. Overwrite the default text (English) with the translated text.
9. Repeat these steps for all resource IDs.

10. Click **Apply** to accept all changes.
11. Change the language settings in the Windows Regional Options to **French**.
12. Close and re-open the Plant Explorer Workplace.

13. Select the object in the control structure.

14. Select the Faceplate aspect to see the translated text.

All texts which are not translated will remain in the default language (English).

All function blocks or variables organized under Object Type Groups refer to the texts saved under the Group Object. This means the individual function blocks and variables have no own NLS aspect.
Section 4  SFC Viewer

Overview

The “SFC Viewer” is an aspect system for 800xA Operation allowing the operator to display SFC structures with live data for active steps and transitions on operator workplaces without requiring additional installation of a controller configuration tool. The viewer aspect belongs to the SFC object type by default.

Structure Diagram

The structure diagram in 800xA Operation is used for visual tracking of sequential control processes and for displaying details of steps, actions, and transitions. The general display of the sequence control is based on the IEC 1131-3 standards. The default colors for the SFC Viewer animation can be changed project specific to comply with the customers’ needs.

The structure diagram is called up using the SFC Viewer aspect:

- Network structure of the sequence is displayed with default view.
- Calling up detailed displays for transitions and actions.
- Zoom levels allow for zooming in or out in the network structure
Structure Display

When the structure diagram is opened, the network structure of the chain is set up. The active step or steps in progress are shown in green. When the structure diagram is opened, the zoom level is initially set to the default level with active step or steps on the top.
Using the horizontal and vertical scroll bars, the display area can be moved over the entire structure like a magnifying glass. All identifiers for transitions and steps are shown in the detailed display. Within a step symbol, the step number and, if configured appropriately, two lines of step text are given.

The detailed display in 800xAOperation is updated automatically as the sequence is further processed. The currently active step always remains in the display. The transitions and steps are sensitive push buttons, which allow further detailed displays to be opened. Clicking on the push button opens another display window containing the associated detail information (transition and action display).
Zooming

The right mouse button is used to open a context menu.

![Figure 48. Structure Diagram, Context Menu](image)

This context menu allows for the following selection:

**Table 1. Context Menu Functions**

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoom -</td>
<td>Selection of zoom - allows to make the elements smaller.</td>
</tr>
<tr>
<td>Zoom +</td>
<td>Selection of zoom + allows to make the elements greater.</td>
</tr>
<tr>
<td>Zoom &gt;</td>
<td>The submenu allows to select a specific zoom level.</td>
</tr>
<tr>
<td>Whole Structure</td>
<td>Displays the entire network structure.</td>
</tr>
</tbody>
</table>
Jump Labels

Jump labels are used wherever logical and graphical improvements to the clarity of a chain structure are required. The jump labels are set by the user in the SFC editor. The text identifier at the branching label identifies the target step (e.g. B5_NP0) that follows this logic connection.

The arrow pointing to the step represents the entry into the step and indicates the source step (e.g. B2T_L).

Table 1. Context Menu Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default Size</td>
<td>Displays the elements in their default size in the structure window.</td>
</tr>
<tr>
<td>Auto Scroll</td>
<td>The detailed display is updated automatically as the sequence continues to be processed. Unselection allows to move manually over the network structure.</td>
</tr>
</tbody>
</table>

Figure 49. Structure Diagram with Jump Labels
Transitions / Actions

Transition Display

The transition display shows the binary incoming stepping criteria for the selected transition. Depending on the status of the variable, criteria that are met are shown in green and criteria not met are shown in red.

The transition display can be switched between a display from a function plan perspective and a display in list form.

![Figure 50. Display in List Form (Text Display)](image-url)
Figure 51. Display from Function Plan Perspective

Table 2. Transition Display Elements

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logic</td>
<td>&amp; AND</td>
</tr>
<tr>
<td></td>
<td>&gt;=1 OR</td>
</tr>
<tr>
<td></td>
<td>NOT Not</td>
</tr>
<tr>
<td>Type</td>
<td>Criteria type:</td>
</tr>
<tr>
<td></td>
<td>- Transition [T]</td>
</tr>
<tr>
<td>Signal</td>
<td>Name of variable</td>
</tr>
</tbody>
</table>
Action Display

The action diagram shows the command outputs for a step, or the use of an output signal and displays the complete configuration for a step.

**List:**

This list displays all action variable names configured for the corresponding step.

![Image of Action Display]

*Figure 52. Action Display, List*

**Selections**

*Table 3. Buttons inside the Transition/Action Displays*

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator guide mode/autoscroll</td>
<td>![Symbol]</td>
<td>Push button for selecting auto refresh for this window when changing step or transition.</td>
</tr>
<tr>
<td></td>
<td>![Symbol]</td>
<td>Push button for “freezing” the data for the selected step or transition (no operator guidance).</td>
</tr>
</tbody>
</table>
Forcing

The SFC Viewer allows for forcing or block transitions inside the structure diagram in a Manual Mode of Operation. When manual mode is selected from the faceplate, two options - Force Forward, Block are available from the context menu (right-click) of each transition. The Blocked State of the transition is indicated with a yellow cross mark and the normal state of the transition indicated in grey color. Using these options, it is possible to Tipp/Jog to alternate Branches in a Manual Mode.

### Table 3. Buttons inside the Transition/Action Displays

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transition display</td>
<td><img src="image" alt="Symbol" /></td>
<td>Push button for selecting transition display from function plan perspective (graphical).</td>
</tr>
<tr>
<td>Transition filtering</td>
<td><img src="image" alt="Symbol" /></td>
<td>Push button for displaying the open, unfulfilled criteria.</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Symbol" /></td>
<td>Push button for displaying all criteria for a transition.</td>
</tr>
</tbody>
</table>
Limitations

- Limitation to 8 steps and 16 transition that can work in parallel at the same time.
- No live data are displayed for actions.
- Only Boolean signals can be displayed in the transition display.
- Only **AND** and **OR** operands are supported by Freelance Control Builder F.
Section 5  Uploader

General

The Uploader creates for each Freelance tag (function block, variable) the corresponding tag object (800xA object) in the 800xA Plant Explorer Workplace, using the information from the PLE file.

In the 800xA Control Structure, the tags generated by the Uploader reside under the Freelance gateway(s). The gateways are assigned to a Freelance project.

The 800xA objects are instances of the types (object types) located in the object type structure. These types are entered in the object type structure when the Connectivity software is installed and added as 800xA System extension.

Upload

With Freelance Version 8.1 and higher and when the 800xA aspect server object (800XA-AS) is available in the project tree, the export file contains the resource IDs of the configured gateways.

If the Uploader cannot find the corresponding object type when creating a function block or variable, it registers this event in its log file as a warning.

If the Synchronize the project checkbox is not checked, the quick delta-upload based on changes in the PLE file is executed

When a project is uploaded for the first time, the Uploader works in synchronize mode, as no comparison with a PLE file is possible at this point. All further uploads will be executed in delta mode (standard mode), if not otherwise selected.

1. Open the Control Structure.
2. Select Root Domain / the Freelance network object.
3. Double-click the **Uploader** aspect to open the aspect as a separate window and pin it.

   ![Tip icon]

   It is recommended to use the pop-up and not the preview window. This allows you to navigate to other aspects while uploader is running.

   ![Warning icon]

   Abstain from parallel starting the uploader as the uploader log file can only be written from one instance.

4. In the **Control structure** window, click **Ellipsis (....)** to the right of the **PLC Filename** input field.

   ![Control Structure window]

   **Figure 54. Control Structure**

   ![Example of using Ellipsis to open input field]

   ![Example of PLC Filename input field with ellipsis button]
5. In the selected folder, search for the appropriate file name.ple. If not otherwise specified during the data export, you can find this file in the Freelance export directory under:

   System drive:\Industrial IT\Engineer IT\Control Builder F\Export\..

6. Click **Open**.

![Figure 55. Choose PLC file exported by CBF Dialog box](image)

7. Click **Start**.

   The Uploader is started and creates the corresponding 800xA objects in the Plant Explorer Workplace using the PLE file.
The progress bar and the ready message in the dialog window indicate completion of the upload.

8. Wait until the **Start** and **View logfile** become active again. The Uploader inserts the objects that are relevant for 800xA Operation, i.e. for operation and visualization, into the Control Structure and the Functional Structure. Alternatively, it is possible to manually abort the Upload operation.
When Manually aborted, the next upload operation with same PLE file should be initiated with **synchronising the project** option enabled, to avoid inconsistency between 800xA Objects & *.PLE File.

![Control Structure](image)

*Figure 57. Control Structure*

The Uploader internally saves the PLE file. At the next upload, the Uploader compares the current PLE file with this saved file (delta upload) and accepts only changes.

After adding components to an existing structure datatype variable, modification to this variable is recommended. Without this modification one must select the synchronize mode for the upload. This handling has to be considered also for User defined function blocks.

Different types of messages may appear in the dialog window as follows:

- Fatal error: Abort of uploading
- Error: No abort, must be checked and corrected
- Warning: No abort, can be checked and corrected
- Note: No abort, no action required
In Synchronize mode, the aspect directory is compared with the entire contents of the PLE file. This is, for example, required after the installation of a new Connectivity software version or after changing the tag assignment to OPC gateways.

The upload time in synchronize mode and number of objects can be reduced considerably when indicating only those tags (function blocks, variables) with "OPC: R = Read" that are needed for operation, process graphics and historian archives etc. in 800xA System. The declaration is done in the CBF Station View. Please see OPC gateway columns of tag list and variable list.

After uploading the PLE file into 800xA, if tags are deleted/modified in control structure manually, next upload of same ple file, without "Synchronising the project" option, may result in duplicate tags in functional structure.

In such cases, where manual deletion/ modification of tags are done in control structure, it is recommended to perform the next upload operation with "Synchronizing the project" option enabled. This way duplication of tags in functional structure can be avoided.

**Engineering Workflow when adding Tags**

In certain Engineering workflows, it is observed that some of the active alarms from Freelance tags are not represented in the 800xA Alarm list.

When adding new Tags to a system, if the added tags are downloaded to the Freelance controller and OPC Gateway before the modified Project (*.Ple) file is uploaded in 800xA, any active alarms generated by those added tags are not visible in the 800xA Alarm list as they do not have those objects created yet in 800xA.

These active alarms are not visible in the alarm list, even after uploading the modified Project file (*. Ple) in 800xA. The alarms from these newly added tags are captured and listed only when

(i) the current alarm becomes inactive and active again (or)

(ii) if the Freelance OPC Server / Connectivity Server is restarted.

This leads to a condition where the alarm list does not display all of the active freelance tag alarms.
To be sure that no alarm is active at the Controller level that is not seen in 800xA, it is necessary to restart each "Event Collector, Service Group" configured for Freelance Connect.

This way, all the missing alarms (if any) are captured in the alarm list and mapped to the corresponding objects in Control structure.

Recommended workflow for future tag additions:

The corrective action is to always follow the engineering workflow described below when adding tags in a running system.

1. Add tags in Freelance CBF.
2. Save the Project without loading Controller/ OPC Gateway (Connectivity Server).
3. Export to PLE File.
4. Upload the PLE File in 800xA using Freelance uploader.
5. Wait until import in 800xA has finished.
6. Load the controller first and then OPC Gateway from Freelance CBF.

Please Refrain from operating the Freelance Faceplates after Step4 (upload) until step 6 is completed.

This way, it is ensured that the objects are created in 800xA control structure, before any live alarms are captured by Freelance OPC AE Server. Also all alarms from Freelance controllers are mapped correctly to the objects in control structure and shown in the alarm list.
The Freelance AC 900F/800F/700F controller as the time master synchronizes system 800xA Operation via the connectivity server. Synchronization takes place from “bottom to top”.

AC 900F/800F/700F as the Time Master

In general the controller with the lowest resource ID (often the one with the lowest IP address) automatically gets the time master function for other controllers. On connecting a radio clock to a controller, this one becomes the time master in the Freelance system independent of its resource ID. All Freelance controller (AC 900F, AC 800F, AC 700F and DCP10/02) of a Freelance system are harmonized in respect of the time synchronization.

Furthermore all PCs (Control Builder F, DigiVis, OPC Server F) connected to the controllers need to be synchronized by this controller (Adjustment on set-up). If a Freelance PC is not time-synchronized the representation of the curves, trends, alarm, events etc. will not perform correctly.

System time, local time, daylight saving time

The system time (UTC = Greenwich Mean Time GMT) is used for all time stamps in the process stations. Local time is calculated from the system time and the time zone. The time zone is unified project-wide and is transferred to all stations on bootstrapping and initialization. The system time is used inside the process stations only. The local time is available to the user (e.g. for regular daily events).
If time stamps are expected from 800xA Operation that are not available within the Freelance system, the appropriate data within the OPC server are expanded with this time stamp.

In addition to the time synchronization the settings regarding the time zone and daylight saving time of controllers and PCs have to be identically within a Freelance system.

For details please refer to section 4 of the *Freelance Engineering Manual (3BDD012503*)

**Synchronizing System 800xA**

The time synchronization of 800xA Nodes (clients, domain controller, aspect directory...) takes place by using the Freelance connectivity server as time master. This gateway PC needs to be synchronized by the Freelance OPC Server (software) installed and operating on this node. The OPC server will be synchronized by a Freelance controller.

From the perspective of 800xA the connectivity server is the time master (synchronized by a Freelance controller).

**Connectivity Server**

Achieve the below configuration to the Connectivity Server (to both PCs in case of redundancy) to assign it as the time master within system 800xA.

**Windows Start Menu >ABB Configure**

a. Right click **ABB Configure** and run as administrator.

As UAC is enabled in SV6.0, ABB configure tool needs to be run as administrator

b. Select **general settings** and then click *Enable time synchronization*.

In order to call up the **Configure Tool**, at least the Freelance OPC server software should have been installed on this PC. The dialog is automatically shown the first time when running the OPC server setup.

The requested IP address and subnet mask must match to the settings applied to the control net Ethernet adapter of this PC. The subnet mask has to be the same as configured for other Freelance devices, like controllers, engineering station etc.
System 800xA Nodes

Now disable the Windows W32 Time Services for time synchronization and use the System 800xA Afw Time Service instead. Perform the below adjustment on each PC with 800xA software (clients, connectivity server, aspect directory...).

Disable Windows W32 Time Services
1. Right-click My Computer icon.
2. Select Manage at the context menu.
3. Expand Services and Applications and then click Services.
4. Search for Windows Time in the list and then double-click it.
5. Open the General tab and verify the Startup type is disabled and service status is stopped.
6. If the W32 time service is already running, stop it by clicking Stop.

Enable 800xA Afw Time Services
The 800xA Afw time service needs to be enabled on each PC with 800xA software. Below the basic steps (for details please refer to the 800xA user manual)

Configure Time Service Providers
1. Service Structure / Services / Time, Service.
2. Configuration: Set Enabled.
3. Special Configuration: Set Server Running and do not set clients allowed to set time.
4. Basic, Service Group Configuration.
5. Ensure all other Time Service Providers from other time servers have been deleted (check Basic Service Group entries).
6. Verify the service provider status. One should be in Service state and the other one in Standby.
Configure Afw Time Clients

1. Node Administration Structure / Node Administer.
2. All Nodes / Node Group: Select Node and open the Time Server Client Configuration aspect.
3. Enable Time Sync Running on all nodes.
4. Enable Allowed to set time on Freelance Connectivity Servers.
5. Disable Allowed to set time on all other nodes.

Restart the Connectivity Server(s) for the changes to take effect.

Exception

The domain server controller i.e. domain server needs a special configuration, because very often neither 800xA software nor Freelance software is installed on this PC.

For time synchronization an individual “link” has to be established between the domain server DS (time client) and the connectivity server CS (time server). Different to the other nodes the Windows W32 time services will be used for synchronizing the domain server.

Below the registry settings that apply to the Connectivity server and Domain Server depending on the Windows operating System.

For details, refer to section 5 of the System 800xA user documentation 3BSE034463*.

Select My Computer >HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\ <Reg_Key>
Operating System Settings.

<table>
<thead>
<tr>
<th>Reg_Key</th>
<th>Value</th>
<th>Type</th>
<th>DS</th>
<th>CS</th>
<th>Other Nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameters</td>
<td>Type</td>
<td>REG_SZ</td>
<td>NTP</td>
<td>NoSync</td>
<td>NoSync</td>
</tr>
<tr>
<td>Parameters</td>
<td>NtpServer</td>
<td>REG_SZ</td>
<td>both IP address of red CS</td>
<td>-/-</td>
<td>-/-</td>
</tr>
<tr>
<td>Config</td>
<td>AnounceFlags</td>
<td>REG-DWORD</td>
<td>10</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>TimeProviders NtpClient</td>
<td>Enable</td>
<td>REG-DWORD</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TimeProviders NtpServer</td>
<td>Enable</td>
<td>REG-DWORD</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Desired status of the Windows Time Service.

<table>
<thead>
<tr>
<th>Time Service</th>
<th>DS</th>
<th>CS</th>
<th>Other Nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Startup Type</td>
<td>Automatic</td>
<td>Automatic</td>
<td>Disabled</td>
</tr>
<tr>
<td>Status</td>
<td>Started</td>
<td>Started</td>
<td>Stopped</td>
</tr>
</tbody>
</table>

**800xA as the Time Master**

System 800xA as the time master synchronizes Freelance controllers via the connectivity server. Synchronization takes place from “top to bottom”.

This use case describes the configuration for mixed systems. From the perspective of Freelance, 800xA Operation is the time master, even if it synchronized by a radio clock connected to AC 800M or AC 870P.

**Time Master**

The time of the connectivity server is distributed through OPC-Server to the controller. The configuration has to be done in Freelance Control Builder.

1. Open the **Config window** on OPC-Gateway station.
2. Enable the **Ext. time server** checkbox.

3. Configure the IP addresses.

Three controller can be connected. In case the first one fails the next one takes over.

![Configuration window](image-url)

*Figure 58. Configuration window*
The configuration is identical for the redundant gateway GWY2 (OPC2).

Time distribution between controller works automatically. This handles a broadcast message of the active controller.

All controllers have to be in the same network. The broadcast message is not passed-through a router. Download the OPC Gateway node(s) with the new configuration settings.

In order to configure time synchronization of CBF Engineering node open Control Builder F Configure Tool

1. Click Start > Program > ABB Industrial IT > Engineer IT > Control Builder F > Configure.
2. Select General Settings.
3. Enable time synchronization.
4. Click OK.

Restart CBF Engineering Node and OPC Gateway Node (Connectivity Server) for the changes to take effect.
5. Open the web diagnostic tool and then check Controller Status.

Below the sub-item “TimeSync status” the active Server (ID=70) is shown.

**Connectivity Server**

Achieve the below configuration to the Connectivity Server (to both PCs in case of redundancy) to assign it as the time master within system 800xA.

1. Select Windows Start Menu > ABB Configure

2. Right click ABB Configure and run as administrator.

   As UAC is enabled in SV6.0, ABB configure tool needs to be run as administrator.

3. Select general settings and then click Disable time synchronization.
Figure 61. AC800F Window
Revision History

The following table lists the revision history of this User Manual.

The revision index of this User Manual is not related to the 800xA 6.0 System Revision.

<table>
<thead>
<tr>
<th>Revision Index</th>
<th>Description</th>
<th>Date</th>
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<tbody>
<tr>
<td>-</td>
<td>Published for 800xA System Version 6.0.</td>
<td>August 2014</td>
</tr>
<tr>
<td>A</td>
<td>Published for 800xA System Version 6.0.3</td>
<td>September 2016</td>
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</table>

Updates in Revision Index A

The following table shows the updates made in this Release for 800xA 6.0.3.

<table>
<thead>
<tr>
<th>Updated Section/Sub-section</th>
<th>Description of Update</th>
</tr>
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<tbody>
<tr>
<td>Section 1, Introduction</td>
<td>Changed “Windows 8.1” to “Windows client operating system”.</td>
</tr>
<tr>
<td></td>
<td>Changed “Windows 2012 R2 Server” to “Windows server operating system”.</td>
</tr>
<tr>
<td></td>
<td>Added a note, on Page 13.</td>
</tr>
<tr>
<td>Section 3, Basic Settings</td>
<td>Changed “Windows 2012 Server” to “Windows Server operating system” on Page 41.</td>
</tr>
<tr>
<td>Section 6, Time Synchronization</td>
<td>Changed “Windows 2012 Server and Windows 8 settings” to “Operating System Settings” on Page 91</td>
</tr>
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