Contents

Author and Contact Information

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- Contact for any questions/updates/support on using the demo and extending it.

Prerequisites

- Windows 10 or later (Built using Windows SDK Version: 10.0.22000)
- Download Visual Studio 2022 Redistributable (Platform Toolset: Visual Studio 2022 (v143) for x64)
- https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170
- Download and install any OPC UA Client.
    - **Example**: https://www.unified-automation.com/downloads/opc-ua-clients.html

Installation of Application Files

- Download and copy the following files in the **same directory (Installation Directory)**.
    - opcua_ijt_demo_application.exe
    - Opc.Ua.AMB.NodeSet2.xml
    - Opc.Ua.Di.NodeSet2.xml
    - Opc.Ua.Ijt.Base.NodeSet2.xml
    - Opc.Ua.Ijt.Tightening.NodeSet2.xml
    - Opc.Ua.Machinery.NodeSet2.xml
    - Opc.Ua.Machinery.Result.NodeSet2.xml
    - Opc.Ua.NodeSet2.xml
    - Opc.Ua.Ijt.Tightening.Server.xml

Information

- This OPC UA Server Simulator exposes Assets, Results, and Events as per the following Companion Specifications:
    - OPC 40450-1 UA CS for Joining Systems - Part 1 - Base RC 1.00.0.
    - OPC 40451-1 UA CS for Tightening Systems - Part 1 - General RC 2.00.0.
- **Note:**
    - It does **not** simulate all the models yet. It is a preliminary application based on the Release Candidate version and more details would be available at a later stage once the Formal Release of the Companion Specification is published.

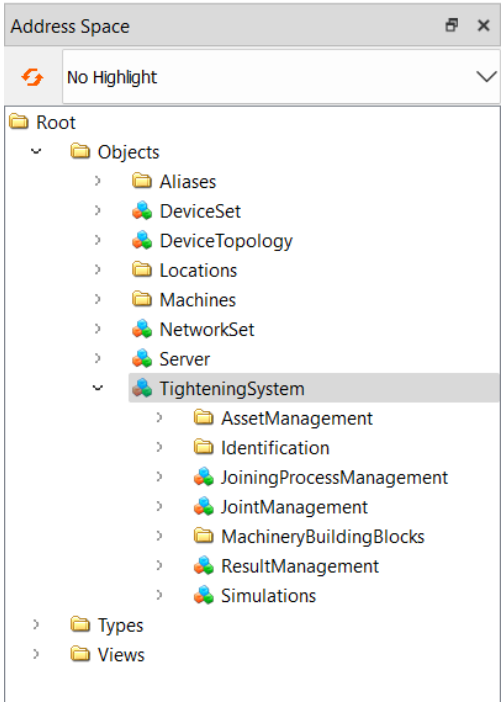
Running the application

- Ensure that the user has **Read/Write access** to the **Installation Directory**.
- Launch the binary file (**opcua_ijt_demo_application.exe**).
    - Run as Administrator or at least with **Read/Write** access.
- The **EndpointUrl** of the OPC UA Server is:
    - **opc.tcp://localhost:40451** or
    - **opc.tcp://YourComputerName:40451**.

Access data from OPC UA Client

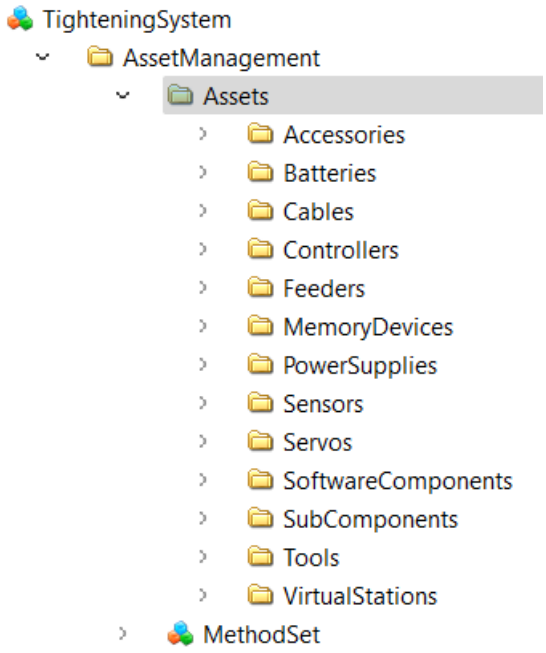
- Launch the OPC UA Client and connect to the given **EndpointUrl**.
- It will show the primary entry point: **TighteningSystem.**
- **All** the **Nodes** shown below are as per the **Companion Specification.**
- The **Simulations** node is the Application Node.

Tightening System Entry Point - AddressSpace View

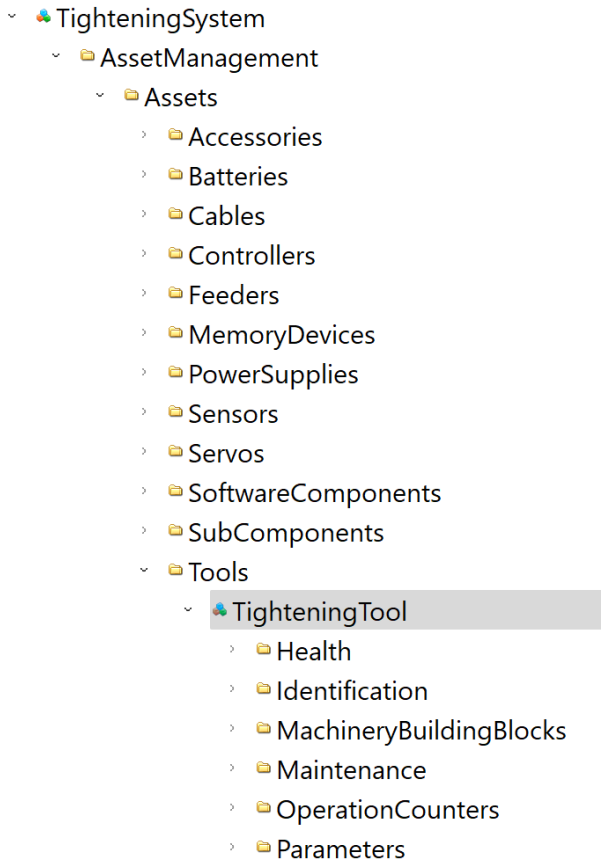


Asset Simulation

Browse the respective Asset Nodes from the address space and subscribe/read the respective data.

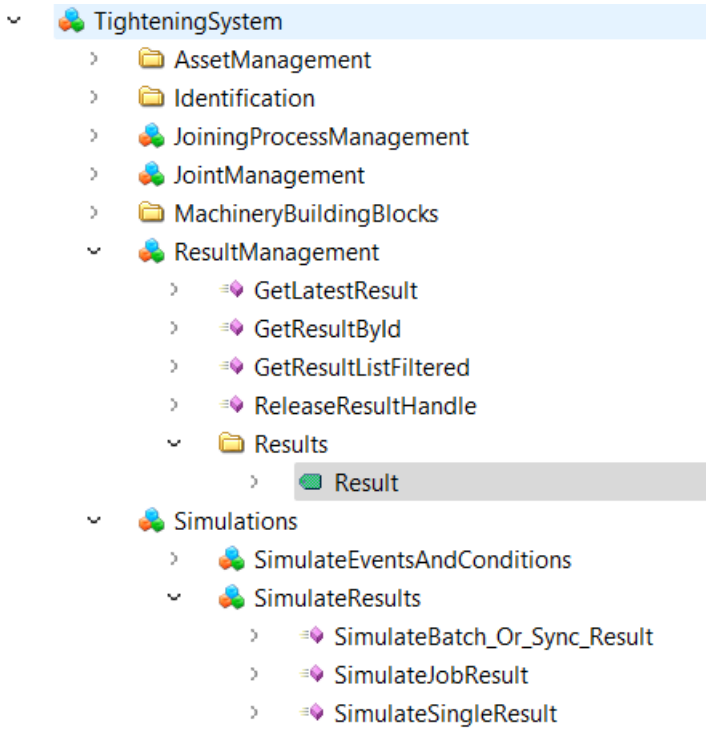


Example Asset View



Result Simulation

- **Result Access Options:**
  - Subscribe to the **Result variable** shown below.
  - Subscribe to **events** by subscribing the **Server** node in the Event View.
  - Result Management Methods are NOT IMPLEMENTED in the simulator.
- **Simulation Options**
  - Use the following **three methods** to simulate different types of **Results**. A new **Result** is generated upon the execution of the following **methods**.
    - SimulateBatch_or_Sync_Result
    - SimulateJobResult
    - SimulateSingleResult
  - The simulated data is similar to the examples defined in the Annexure sections of the Companion Specification.



- To generate a new Result, execute the **SimulateSingleResult method** shown above.
- The outcome can be view in the **Data Access View** or **Event View** if the respective **Result variable or Event is subscribed.**

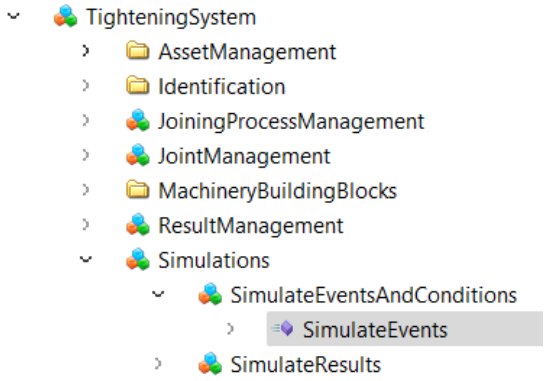
Example Result View

Server	Node Id	Display Name	Value	
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result	Result	Double click to display value	ExtensionObject
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	ResultContent	Double click to display value	Variant
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	ResultMetaData	Double click to display value	ExtensionObject
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	AssemblyType	1	Byte
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	AssociatedEntities	Double click to display value	ExtensionObject
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	Classification	1	Byte
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	CreationTime	2023-11-30T13:50:47.089Z	DateTime
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	Description	"en", "SINGLE TIGHTENING RESULT"	LocalizedText
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	ExternalConfigurationId		String
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	ExternalRecipeId		String
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	FileFormat	{"}	String
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	HasTransferableDataOnFile	false	Boolean
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	InternalConfigurationId		String
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	InternalRecipeId		String
Tightening System - Simulation	NS1|String|TighteningSystem/ ResultManagement/Results/Result/...	InterventionType	0	Byte

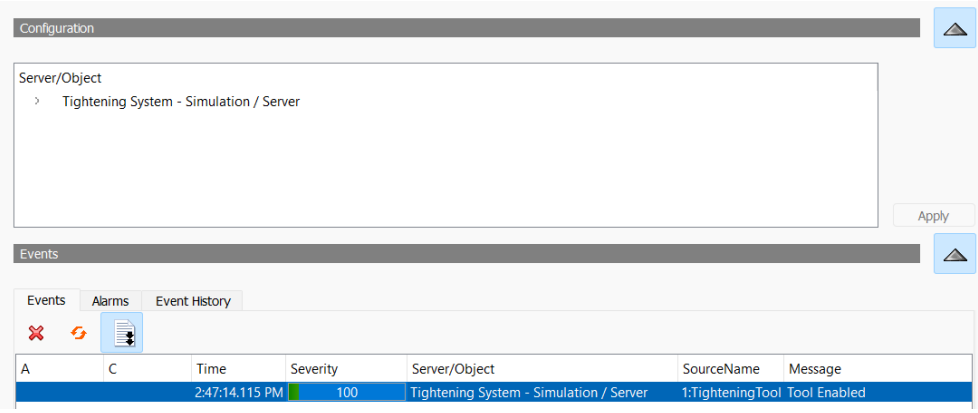
Event Simulation

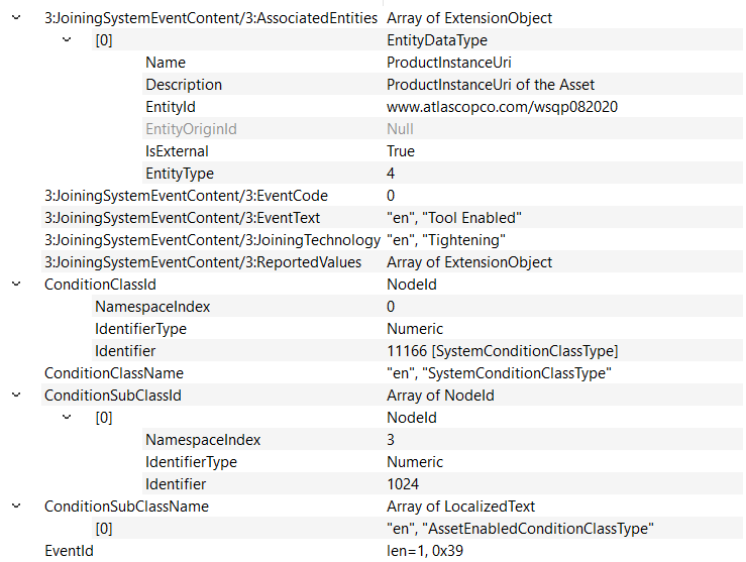
Only a few events are added to the simulator. Execute the **SimulateEvents method** as shown below to generate few types of events.

Note: Additional types of events would be added to the simulator in the future. The **content** of the Events would be similar for any type of event from a joining system.



Example Events View

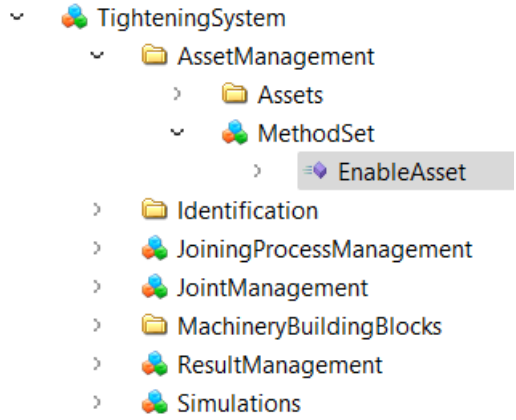




Command Simulation

An example simulation of **EnableAsset** is provided. It takes the input of the ProductInstanceUri of the Tool.

Few error cases can be simulated when input argument is empty or invalid. A respective error is shown in the output arguments.



Example Command View