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  - Technical Editor of VDMA OPC UA Industrial Joining Technologies Working Group.
- 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, Events, Commands as per the following Companion Specifications:
  - <https://reference.opcfoundation.org/IJT/Base/v100/docs/>
  - <https://reference.opcfoundation.org/IJT/Tightening/v200/docs/>

## Running the application

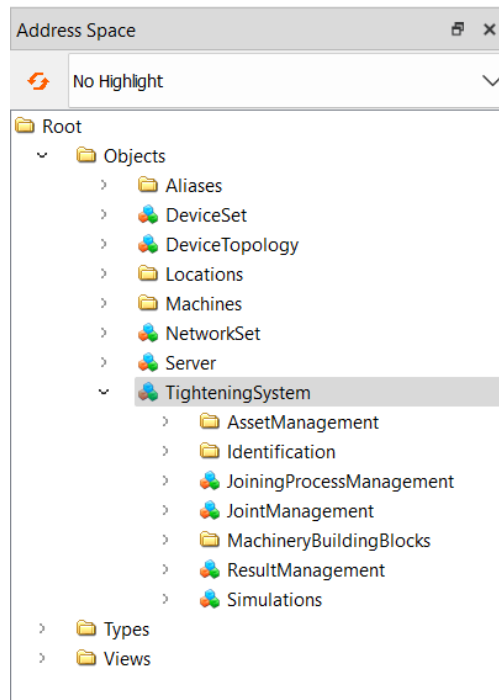
- Ensure that the user has **Read/Write** access to the **Installation Directory**.
- Launch the binary file (**opcua\_ijt\_demo\_application.exe**).
  - Run as Administrator or at least with **Read/Write** access.
- The **EndpointUrl** of the OPC UA Server is:
  - **opc.tcp://localhost:40451** or
 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

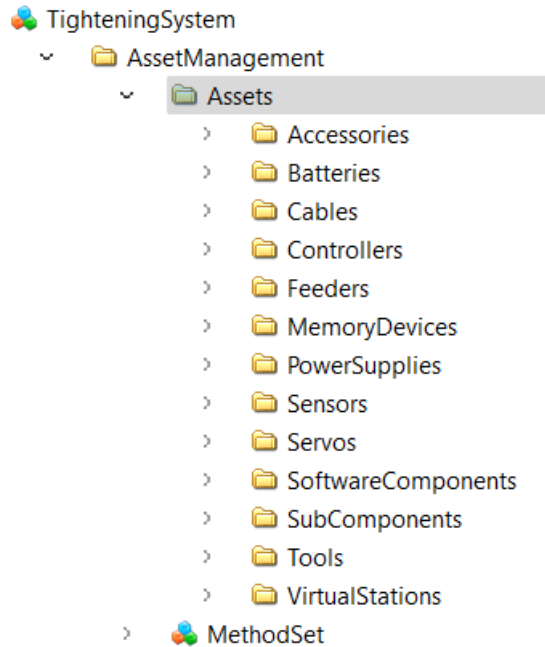
- All the **Nodes** shown below are as per the **Companion Specification**.
- The **Simulations** node is the Application Node.

### Tightening System Entry Point - AddressSpace View

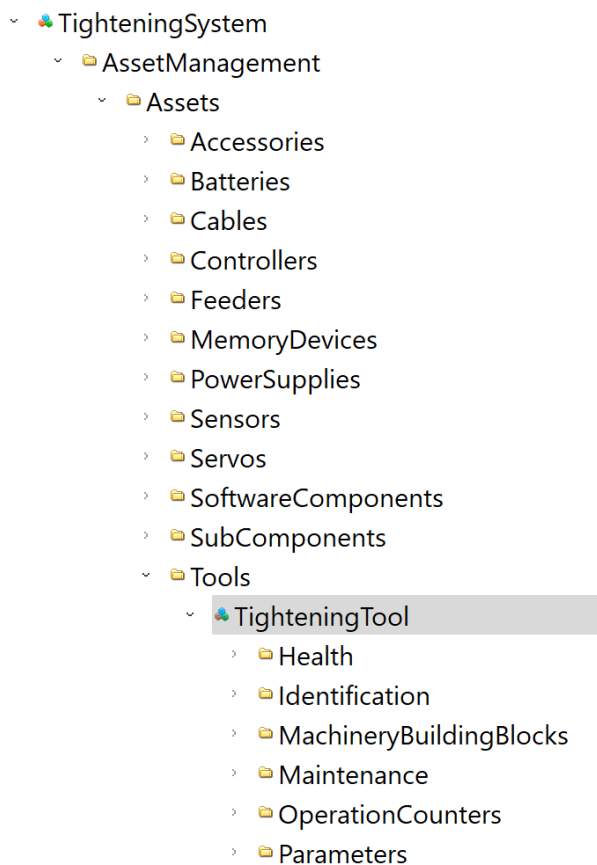


## Asset Simulation

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

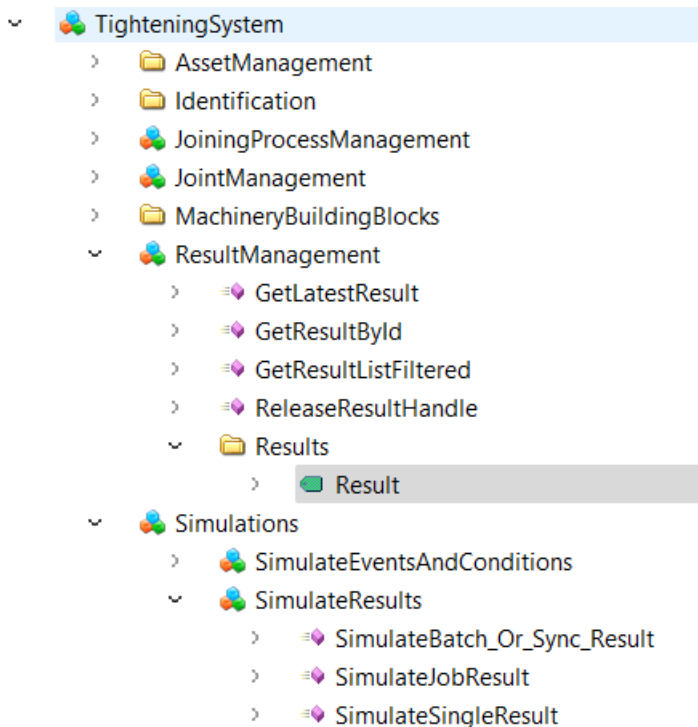


## Example Asset Address Space View



## Result Simulation

- **Result Access Options:**
  - Subscribe to the **Result variable** shown below.
  - Subscribe to **events** by subscribing the **Server** node in the Event View.
- **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 visualized in the **Data Access View** or **Event View** if the respective **Result variable or Event is subscribed**.

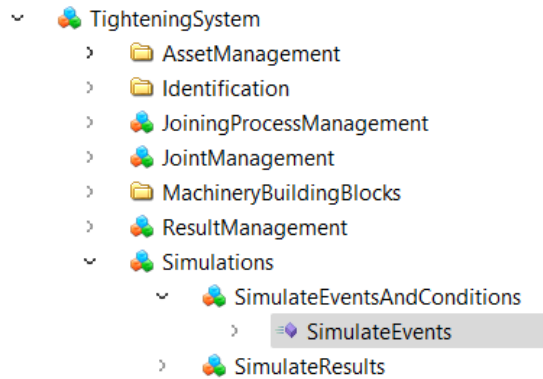
## Example Result Data Access View

#	Display Name	Value	Datatype
1	Result	Double click to display value	ExtensionObject
2	ResultContent	Double click to display value	Variant
3	ResultMetaData	Double click to display value	ExtensionObject
4	AssemblyType	1	Byte
5	AssociatedEntities	Double click to display value	ExtensionObject
6	Classification	1	Byte
7	CreationTime	2024-04-29T12:08:28.103Z	DateTime
8	Description	"en", "SINGLE TIGHTENING RESULT"	LocalizedText
9	InterventionType	0	Byte
10	IsGeneratedOffline	false	Boolean
11	IsPartial	false	Boolean
12	IsSimulated	true	Boolean
13	JoiningTechnology	"en", "Tightening"	LocalizedText
14	Name	Single Result	String
15	OperationMode	2	Byte
16	ProcessingTimes	Double click to display value	ExtensionObject

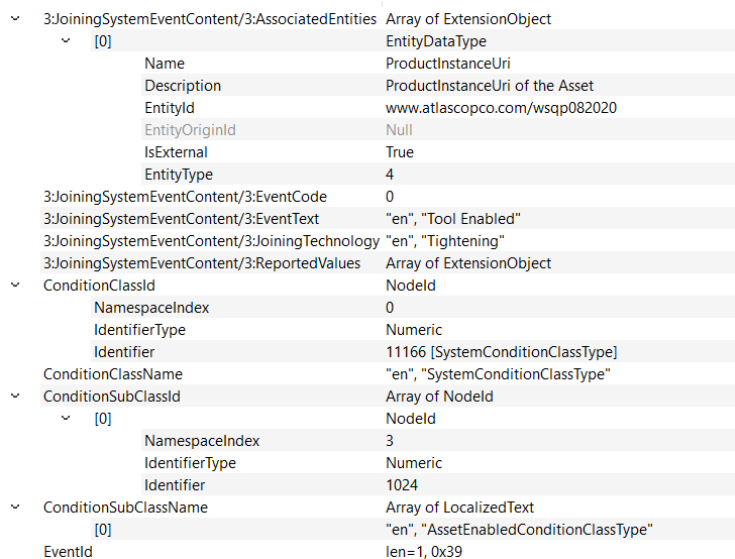
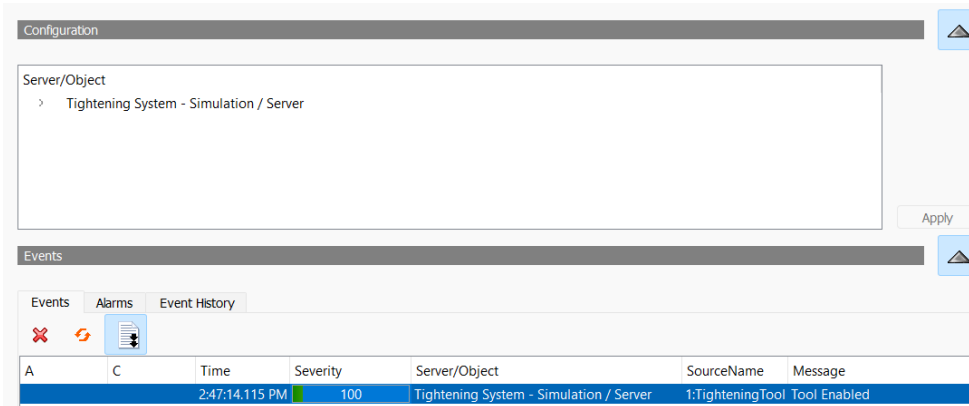
## Event Simulation

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.



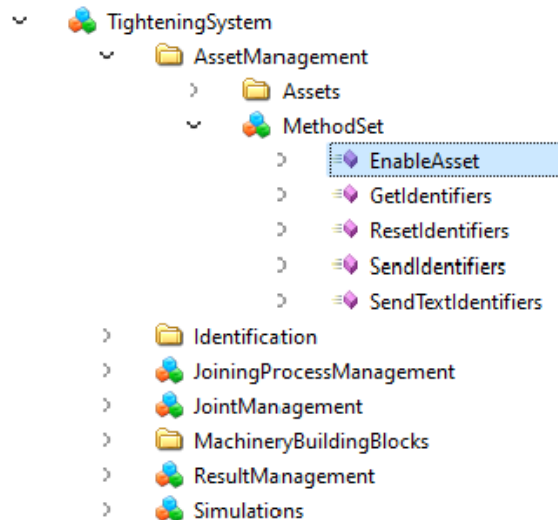
## Example Events View



## 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

Call EnableAsset on MethodSet

Input Arguments			
Name	Value	DataType	Description
ProductInstanceUri	<input type="text" value="www.atlascopco.com/wsqp082020"/> ... <input data-bbox="878 1234 967 1255" type="button" value="Load file..."/>	String	
Enable	<input checked="" type="checkbox"/>	Boolean	

Output Arguments			
Name	Value	DataType	Description
Status	<input type="text" value="0"/>	Int64	
StatusMessage	<div>en <input type="text" value="SUCCESSFUL OPERATION"/></div>	LocalizedText	

Result

Succeeded