

PLC220 Lab Exercise 22, 2/17/17 I AM iSTAR, A DOL funded project





PLC220 Lab Exercise 22

InTouch HMI, Using Simulate



Using Simulate

Lesson Objective

By the end of this session, students should be able to:

- 1. Use the Wonderware Simulate Utility for Application Testing
- 2. Practice DDE set-ups with simulation software.
- 3. Working with Bitmap Graphics

Page

Introduction	
DDE Review	
Simulate	
Using Simulate	6
Bitmap Graphics	
Review Questions	

Lesson Requirements:

Computer with Wonderware InTouch, Software

Required File Tank_Picture.jpg



PLC220 Lab Exercise 22, 2/17/17 I AM iSTAR, A DOL funded project

Introduction:

This lesson will work with the InTouch Simulate simulation utility that can be used to test Wonderware screens.

The utility can be used to test screen objects and can be used to understand DDE communications with the use of I/O tags. The utility is a DDE server, which acts as a PLC

DDE Review:

DDE – Dynamic Data Exchange – a communication protocol used to exchange information between two applications, i.e. Wonderware InTouch and Simulate.

DDE requires three (3) pieces of information to establish a link.

- 1. Application name of the application providing data (i.e. server)
- 2. Topic name of a topic within an Application that contains the data.
- 3. Item the specific data to access.

Simulate:

The Simulate utility comes with Wonderware. By default it is located in the xx:\Program Files\Common Files\ArchestrA directory on a computer with Wonderware install.

Note: xx is the Drive where the InTouch application is installed. For Windows 7 location – xx:\Program Files (x86)\Common Files\ArchestraA

Run the utility by clicking on the Simulate.exe file. A shortcut can be put on the computers desktop to run the utility.



Figure 1-A. Shortcut to Simulate.



Run the Simulate utility. The Main screen opens

🚡 SIMUL/	ATE	
Configure	Help	
1		
L		

Figure 2-A. The Simulate utility.

The Configure selection configures 1. Topics 2. Server Settings



Figure 3-A. Configure a topic.

To configure a Topic- Select Topic Definition



opic Definition	
Topics	Done
	New
	Modify
	Delete

Figure 4-A. Click New for a new topic.

Choose the New button.

SIMULATE Topic Definition			
Topic Name:		OK	
PLC Address:	1	Cancel	
Coil Read Size:	2000		
Register Read Size:	125		
Update Interval:	1000 msec		

Figure 5-A The Parameters for a new topic.

To define a topic, enter a name in Topic Name box. Click the OK button.



Figure 6-A. A new topic that is created.

The Topic Definition will list the entered topic name.

The Server Setting allow configuration of application speed.



Server Settings	
Protocol Timer Tick: 10 msec	OK Cancel
Configuration File Directory: C:\9906-wonderware-test\Simulate\	
Start automatically as Windows NT Service	

Figure 7-A. The server settings.

The smaller the number in Protocol Timer Tick box, the faster the application will run. The application name for the Simulate utility is Simulate.

From the Help File:

Application Name

The name of the Windows program (*server*) that will be accessing the data element. In the case the data coming from or going to the equipment via this DDE Server, the application portion of the DDE address is **SIMULATE**.

Figure 8-A. Info from the help file.

The Help File also contains Item information for the Simulate utility.

ltem	Name	<u>Tag Type</u>	Description
	V1	Discrete	Milk Valve - Simulate.exe forces V1 on when Start = 1 and tank level < 800 and forces V1 off when tank level = 800 or Start = 0.
	V2	Discrete	Syrup Valve - Simulate.exe forces V2 on when Start = 1 and tank level = 800 and forces V2 off when tank level < 800 or Start = 0.
	V3	Discrete	Outlet Valve - Simulate.exe forces V3 on when tank level = 1000 and off at all other times.
	A1	Discrete	Agitator - Simulate.exe forces A1 on when Start bit is equal to 1 and off when tank level = 1000 or Start is equal to 0.
	START	Discrete	Process Start - When START = 1 Simulate.exe forces V1 to increment Tank Level and begins simulating process.
_	L1	Integer	Tank Level - Simulate.exe alternately increments then decrements L1 from 0 to 1000 when START=1.L1 is set to zero when START=0.

Figure 9-A. Help info for the Simulate utility.

The three pieces of DDE information for the Simulate Utility are:

Application – Simulate



PLC220 Lab Exercise 22, 2/17/17 I AM iSTAR, A DOL funded project

Topic – defined by user Item – See Figure 9-A

Create a new InTouch application - Simulator

Using the Simulate utility set-up a sample InTouch application that will:

- 1. Turn-On an indicator when a Start Switch is ON.
- 2. Monitor value of START Tag
- 3. Have an analog value -L1 increment/decrement when a Start Switch is ON.
- 4. Monitor Discrete Items V1, V2, V3, A1
- 5. Label Objects on application window using Item Names

Hint: You will need to define a Topic in the Simulate application.-See pages 4-5.

Use In-Touch to create a Wonderware application.

Wonderware will communicate with Simulate with DDE.

Create a window called - Simulate

Use Switch -> Rocker Switch Wizard for Start Object

Use Number Field to monitor Start value

Use Light -> Light Panel to monitor status of Start Tag

Use Light -> Light Panel for A1, V1, V2, V3 Objects

Use rectangle -> Vertical Fill to monitor L1

Use Number Field to monitor L1

Create InTouch Tags Names based on Simulator Items

Configure Topic in Simulate



Figure 10-A Configure Topic

Define Start I/O Tag



Discrete Switch Wizard	
Tagname: Start	OK Cancel

Figure 11-A Start Tag – Rocker Switch

Tagname Undefined
Define "Start"?
OK Cancel

Figure 11-A Define Start Tag

All tags for Simulator application will be I/O tags Note: L1 will be I/O Integer, all others I/O Discrete

Tag Types
Memory Discrete Memory Discrete India of Discrete Memory Integer I/O Integer I/O Integer I/O Real I/O Real Indirect Analog Memory Message I/O Message I/O Message Indirect Message Trag ID
OK Cancel Details Select All Clear All
Figure 12-A

I/O Tags



Start tag I/O Discrete

Tagname Dictionary	×
🔘 Main 💿 Details 🔘 Alarms 🔘 Details & Alarn	rms 🔿 Members
New Restore Delete Save <<	Select >> Cancel Close
Tagname: Start	Type: I/O Discrete
Group: \$System	🔘 Read only 💿 Read Write
Comment:	
Log Data Log Events	Retentive Value
Initial ⊻alue Input Conversion ◯ On	On Msg: O <u>f</u> f Msg:
Access Name: Unassigned	
Item:	Use Tagname as Item Name
]	Figure 13-A
	I/O Tags

Click Access Name button

Note: I/O tags require Access Name

On Access Names window - Click Add button

Access Names	
Galaxy OPC	Close
	Add
	Modify
	Delete

Figure 14-A Add Button-Access Name

Complete the Add Access Name window as follows:

Access: User Defined - the example uses the name Sim Application Name: Based Server being accessed – see Figure 8-A Topic Name; User Defined – based on Topic assigned to Simulate – see pages 4-5.



DDE Protocol Advise only active items

Add Access Nan	ne		
Access	Sim		ОК
Node Name:			
			Cancel
Application Na	me:		Failover
simulate			
Topic Name:			
plc1			
Which proto	col to use		
ODE	🔘 SuiteLink	Message Exchange	ange
When to adv	vise server		
🔘 Advise	all items	Advise only active items	
Enable Secondary Source			
Figure 15-A			

Access Name window

Note: A single Wonderware InTouch application can have multiple Accesses A single external device, i.e. PLC can have multiple Accesses assigned

Sim now in Access Names list

Access Names	
Galaxy OPC	Close
Sim	Add
	Modify
	Delete

Figure 16-A Access Name window

Click Close button to return to Tagname Dictionary window.



 Main O Details Alarms Details & Alarms Members New Restore Delete Save << Select >> Cancel Close Tagname: Start Type: I/O Discrete Group: \$System Read only O Read Write Comment: Log Data Log Events Retentive Value Initial Value Input Conversion On Msg: Off Msg: Access Name: Sim Item: Start Value Value 	Tagname Dictionary	×
New Restore Delete Save < Select >> Cancel Close Tagname: Start Type: I/O Discrete Group: \$System Read only Read Write Comment: Initial Log Events Retentive Value Initial Value Input Conversion On Msg: Off Msg: Access Name: Sim Item: Start Vise Tagname as Item Name	🔘 Main 💿 Details 🔘 Alarms 🔘 Details & Alarm	ns 🔿 Members
Tagname: Start Type: I/O Discrete Group: \$System Read only Read Write Comment:	New Restore Delete Save <<	Select >> Cancel Close
Group: \$System Read only Read Write Comment: Image: Comment and the state of the sta	Tagname: Start	Type: I/O Discrete
Comment: Log Data Log Events Initial Value Initial Value On Off Direct Reverse On Msg: Off Msg: Access Name: Sim Item: Start	Group: \$System	Read only Read Write
Log Data Log Events Retentive Value Initial Value Input Conversion Off On Off Direct Reverse Access Name: Sim Item: Start Use Tagname as Item Name	Comment:	
Initial Value Input Conversion On Off On Off On Off Access Name: Sim Item: Start	🗖 Log Data 📄 Log Events 📃 Re	etentive Value
Access Name: Sim	Initial <u>V</u> alue Input Conversion	On Msg: O <u>ff</u> Msg:
Item: Start Vise Tagname as Item Name	Access Na <u>m</u> e: Sim	
	Item: Start	Use Tagname as Item Name

Figure 17-A Tagname Dictionary Window for I/O Tags

- Note: Sim to the right of Access Name button Access being used by this tag A single Wonderware InTouch application can have multiple Accesses
- Note: For this Simulate application, all Simulate Items use the same name as Wonderware InTouch tags.

If this is the case, check Check Box to left of Use Tagname as Item Name or type the tagname in Item Entry Box.

Finished Simulate window will look similar to Figure 18-A



I Simulate	<u></u>
-	
####	# V1
L1 Valu	
Start	V2
#	
	·····
	A1
L1.	

Figure 18-A Simulate Application Window

Verify the operation of the Simulate Window

Create a second window called Tank

Window Properties	-	×
Name: Tank Comment:	Window Color:	OK Cancel
Window Type Replace Overlay Popup Frame Style Single Double None Title Bar V Size Control: Close Button	DimensionsX Location:79Y Location:49Window Width:393Window Height:349	Scripts

Figure 19-A Simulate Application Window

Configure Window Type as Overlay



Add a Bitmap object to the Tank window Bitmap icon located on Draw Object Toolbar.



Figure 20-A Bitmap Icon - Draw Object Toolbar

Use Bitmap icon to position a square on the Tank window – Container for Graphic.



Bitmap Container

Note: Although the object is referred to as a Bitmap – other type of graphics besides *.bmp files can also be used including:

- *.jpg
- *.jpeg
- *.pcx
- *.tga

Right click on the graphic container.



Select Import Image from the context menu.

See Figure 22-A



Import Image

Use the Tank_Picture.jpg file included in Module 8 - Highlight the file - Choose Open





Open Graphic File

The Graphic file is import to the application window. Use handles to resize graphic - See Figure 23-A



Figure 23-A Graphic File Imported

Double click tank graphic or right clock on the tank graphic and select Animation Link form the context menu to open the Animation Links window for the Object type: Bitmap



II Tank	Object type: Bitmap Prev Link Next Link			OK Cancel
	- Touch Links	Line Color	Fill Color	Text Color
	User Inputs	Discrete	Discrete	Discrete
	Discrete	Analog	Analog	Analog
	🗖 🗌 Analog	Discrete Alarm	Discrete Alarm	Discrete Alarm
	String	Analog Alarm	Analog Alarm	Analog Alarm
	Sliders	Object Size	Location	Percent Fill
	Vertical	🗖 🛛 Height	Vertical	Vertical
	Horizontal	Width	Horizontal	Horizontal
	Touch Pushbuttons	Miscellaneous	Value Display	
	Discrete Value	Visibility	Discrete	
	Action	🗖 🛛 Blink	Analog	
	Show Window	Orientation	String	
	Hide Window	Disable		
		Tooltip		

Figure 23-A Animation Links Window – Object Type Bitmap

In the Miscellaneous region of the Animation Links window – check the Tooltip Check Box.

On the Object Tooltip -> String Tagname Select Static text: Radio Button Type –Tank Picture in the Entry Box

Object type: Bitmap	Prev Link Next Link	OK Cancel
	Object Tooltip -> String Tagname	
Tooltip Attributes		OK Cancel
Static text: Tank Picture		Clear

Figure 24-A Object Tooltip -> String Tagname



Click the upper OK button.

Add window navigation buttons to the two application window to change widows in Runtime

Finished windows will look similar to:



Figure 25-A Finished Tank Window





Figure 26-A Finished Simulate Window

Test the application Go to Runtime – Window Viewer





Figure 27-A WindowViewer Tank Window On Tank window - place mouse on Tank graphic – Tooltip will appear See Figure 27-A

From Tank window Open Simulate window – Does Tank window close?_____

Explain:_____





Figure 28-A WindowViewer Tank / Simulate Windows

From Simulate window Open Tank window – Does simulate window close?_____

Explain:

Return to WindowMaker - Save All Windows - Exit WindowMaker

Review Questions

- 1. T F Bitmap Graphic cannot be assigned Animation Links .
- 2. Items in the Wonderware Simulate application include:
 - a) Start



- b) PLC1
- c) Simulate
- d) L1
- 3. The Application name for the Simulate application is:
 - a) User defined
 - b) PLC1
 - c) Simulate
 - d) B and C.
- 4. T F The Access and Topic must be the same on Wonderware Access Name screen.
- 5. Wonderware InTouch requires which type of tags to work with Simulate
 - a) Memory Discrete
 - b) Memory Analog.
 - c) I/O Discrete
 - d) I/O Integer
 - e) Memory Message
- 6. T F The Topic name when using Simulate must be PLC1
- 7. T F Overlay windows close other application windows
- 8. T F Replace windows close other application windows
- 9. T F All Accesses to the same device must be the same



10. A DDE link consists of which components :

- a) Application.
- b) Topic
- c) Item
- d) All the above.



PLC220 Lab Exercise 22, 2/17/17 I AM iSTAR, A DOL funded project

Review Questions Answers

1) F

2) a, d

3) c

4) F

5) c, d

- 6) F
- 7) F
- 8) T
- 9) F
- 10) d

DOL DISCLAIMER:

This product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.



This work is licensed under a Creative Commons Attribution 4.0 International License.