Tech Tips



Communicating Between Janus Processors and Rockwell Processors using Ethernet/IP Tag Client

Janus Processors (JPLC) and Coprocessors (JACP) include many industrial protocols "built-in" to allow communication with other equipment on the plant floor. Among those is Ethernet/IP (EIP) which can be used to communicate with other EIP enabled devices, including Rockwell PLCs. Janus products feature the following capabilities on EIP.

- Ethernet/IP Tag Client enables Janus products to read tags directly from Rockwell PLCs
- Ethernet/IP Tag Server enables Rockwell PLCs to read tags directly from Janus products
- Ethernet/IP I/O Scanner enables Janus products to communicate with EIP devices like drives and I/O blocks
- Ethernet/IP Adapter enables Janus products to appear as an adapter to other EIP I/O Scanners
- Ethernet/IP Flex I/O Scanner enables Janus product to communicate with Flex I/O devices
 using EIP

In this Tech Tip we will show how to set up communications using Ethernet/IP Tag Client to a Rockwell Compact Logix PLC.

1.1 Overview

This Tech Tip assumes you are familiar with programming using CTI Workbench and Rockwell Studio 5000, so we do not detail every step and menu click to construct the configuration. Instead, we show the finished configuration screens with comments.

Here are the steps involved:

In CTI Workbench:

- Create a new project and set up IP address and other parameters in Project Settings
- Use the Fieldbus Configurator to Add the Ethernet/IP Tag Client
- Use "Insert Master/Port" in the Fieldbus configuration to add a connection to the Rockwell PLC. Configure the IP address and description.
- Use "Insert Slave/Data Block in the Fieldbus configuration to add the tags you want to READ and WRITE from the Rockwell PLC



In Rockwell Studio 5000:

- Create a new project and set up the Controller Properties description, IP address, Ethernet port setup. The IP address must match the one entered for the Rockwell PLC in the Workbench Fieldbus configuration.
- Create tags which match the names used in the Workbench

1.2 Workbench Setup

First create a new project (if you don't have one already) and set up the IP address in Project Settings.

Next, go to the Fieldbus configuration and add-in the "Ethernet/IP Tag Client" Protocol. Once added, it will show up in the Fieldbus configuration pane. Enter your IP address – this is the same one you entered from Project Settings.

C:\Users\rpeck559\OneDrive - Control Technol	logies, Inc\CTI Workspace\Work	bench Scratch\ProfinetPro	ojects\TEST - I/O Drivers *
Ethernet/IP Tag Client	Name	Value	
	Our IP address		
			add your IP address here. This should match the address from Project Settings

Next, use the "Insert Master/Port" icon to add a connection to the Rockwell PLC. Enter the IP address and description for the Rockwell PLC.

C:\Users\rpeck559\OneDrive - Control Technologies, I	nc\CTI Workspace\W	/orkbench Scratch\ProfinetProje	cts\TEST - I/
Ethernet/IP Tag Client	Name	Value	
옯 Server 172.18.68.140 - AB L16ER PLC	IP Address	172.18.68.140	
	Description	AB L16ER PLC	
			enter IP address and
			description for the
			Rockwell PLC



Use the "Insert Slave/Data Block" icon to insert a WRITE command as shown below:

Тад			×
Mode Read Tag Write Tag			OK Cancel
Tag name			
V1000			
Data type:	INT	~	
Nb. Elements:	13		
Offset:	o		
PLC Slot:	0		
Request			
Period (ms):	1000		
Timeout (ms):	3000		

Click OK and the WRITE command is added.

	Name	Value
⊨	Tag name	V1000
Write)	PLC Slot	0
	Mode	Write
	Nb. Elements	13
	Offset	0
	Tag data type	INT
	Period (ms)	1000
	Timeout (ms)	3000

Now we need to create and map variables. Create the following global variables in Workbench:

Data Variables

V1001 through V1013 INT V2001 through V2013 INT

Status Variables

Cmd1_ServerOK INT Cmd1_UCMM_Busy INT Cmd1_Transactions INT Cmd1_GeneralStatus INT Cmd1_ExtendedStatus INT Cmd2_ServerOK INT Cmd2_UCMM_Busy INT Cmd2_Transactions INT Cmd2_GeneralStatus INT Cmd2_ExtendedStatus INT



Now map the variables V1001 – V1013 plus the four "Cmd1" status variables into the WRITE command by dragging. You can use the "Renumber Offsets" command to do the offset numbering or do it manually. When complete, your configuration should look like this:

Ethernet/IP Tag Client				Name		Value
🖶 🏭 Server 172.18.68.140	- AB L16ER	PLC		Tag name		V1000
⊨–- 🔤 V1000 (Write)				PLC Slot		0
■ 0: V10 V1000 (M	(rite)			Mode		Write
□ 2: V1002	intoj			Nb. Elements		13
🛥 4: V1003				Offset		0
6 : V1004				Tag data type		INT
8 : V1005				Period (ms)		1000
🗖 10: V1006				Timeout (ms)		3000
12: V1007						
14: V1008						
16: V1009						
18: V1010						
20: V1011						
22: V1012						
24: V1013						
0: Cmd1_Serve	rOK					
0: Cmd1_UCMN	/I_Busy					
□ 0: Cmd1_Trans	actions					
O: Cmd2 Gener	alStatus					
0: Cmd2 Extend	dedStatus					
_						
Symbol	Offset	Bit	For	mat	Mode	F
V1001	0	0	16 b	it - signed	Data exchan	ge
V1002	2	0	16 b	it - signed	Data exchan	ge
V1003	4	0	16 b	it - signed	Data exchan	ge
V1004	6	0	16 b	it - signed	Data exchan	ge
V1005	8	0	16 b	it - signed	Data exchan	ge

10

12

14

0

0

0

16 bit - signed

16 bit - signed

14016 bit - signedData exchange16016 bit - signedData exchange18016 bit - signedData exchange20016 bit - signedData exchange22016 bit - signedData exchange24016 bit - signedData exchange004294967295Data exchange004294967295Data exchange004294967295Data exchange004294967295Data exchange004294967295Data exchange004294967295Data exchange004294967295Data exchange004294967295Data exchange004294967295Data exchange

16 bit - signed

Data exchange

Data exchange

Data exchange



V1006

V1007

V1008

V1009 V1010 V1011 V1012 V1013

Cmd1_ServerOK Cmd1_UCMM_Busy Cmd1_Transactions Cmd2_GeneralStatus Cmd2_ExtendedStatus

Lastly, we need to change the four status variable types to their matching diagnostic settings. To do this, double-click on the "Cmd1_ServerOK" status variable. In the dialog that comes up, select the "Diagnostic/Control" radio button and select "ServerOK" in the list below.

Symbol:	Cmd1_	ServerOK		 Cancel
O Data ex	kchange			
Offset:	0	Format:	Boolean	
Bit:	0			
Diagno Diagno Server Ok UCMM Bu Send requ [transactio [general s	stic / Cont sy jest now on counter tatus]	rol]		

Then click OK. That will set the correct status type for that variable. Repeat this process for the remaining 3 status variables, selecting the correct status for each one. Your configuration should now look like this:

■	lient		Name	Value
	.68.140 - AB L168	ER PLC	Tag name	V1000
⊨ IIII V1000 (Writ	e)		PLC Slot	0
🛥 0: V1001			Mode	Write
2: V1002			Nb. Elements	s <u>13</u>
4 : V1003			Offset	0
🗖 6: V1004			Tag data type	e INT
a 8: V1005			Period (ms)	1000
10: V100	6		Timeout (ms)	3000
12: V100	7			
14: V100	8			
16: V100	9			
18: V101	0			
a 20: V101	1			
22: V101	2			
2 4: V101	3			
Server C	K: Cmd1_Server	ОК		
	Busy: Cmd1_UCM	IM_Busy		
Transact	ions: Cmd1_Tran	sactions		
General	Status: Cmd2_Ge	eneralStatus		
🛥 Extended	d Status: Cmd2_E	ExtendedStat	us	
Symbol	0.0			
0,	Offset	Bit	Format	Mode
V1001	0	Bit 0	Format 16 bit - signed	Mode Data exchange
V1001 V1002	0 2	Bit 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange
V1001 V1002 V1003	0 2 V1002	Bit 0 0 0	Format 16 bit - signed 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange Data exchange
V1001 V1002 V1003 V1004	0 2 V1002 6	Bit 0 0 0 0	Format 16 bit - signed 16 bit - signed 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange Data exchange Data exchange
V1001 V1002 V1003 V1004 V1005	0 2 V1002 6 8	Bit 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed 16 bit - signed 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange Data exchange Data exchange Data exchange
V1001 V1002 V1003 V1004 V1005 V1006	0 2 <u>V1002</u> 6 8 10	Bit 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange Data exchange Data exchange Data exchange
V1001 V1002 V1003 V1004 V1005 V1006 V1007	0 2 V1002 6 8 10 12	Bit 0 0 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange
V1001 V1002 V1003 V1004 V1005 V1006 V1006 V1007 V1008	0 2 V1002 6 8 10 12 14	Bit 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange
V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1008 V1009	0 2 V1002 6 8 10 12 14 16	Bit 0 0 0 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed	Mode Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange
V1001 V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1006 V1007 V1008 V1009 V1010	0 2 √1002 6 8 10 12 14 16 18	Bit 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange Data exchange
V1001 V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1008 V1009 V1009 V1010 V1011	Offset 0 2 V1002 6 8 10 12 14 16 18 20	Bit 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange
V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1008 V1009 V1010 V1011 V1011 V1012	Offset 0 2 V1002 6 8 10 12 14 16 18 20 22	Bit 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange
V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1008 V1009 V1010 V1011 V1012 V1012 V1013	Offset 0 2 V1002 6 8 10 12 14 16 18 20 22 24	Bit 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exc
V1001 V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1008 V1009 V1010 V1011 V1012 V1013 Cmd1_ServerOK	Offset 0 2 V1002 6 8 10 12 14 16 18 20 22 24 0	Bit 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed	Mode Data exchange Data exc
V1001 V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1008 V1007 V1008 V1009 V1010 V1010 V1011 V1012 V1013 Cmd1_ServerOK Cmd1_UCMM_Busy	Offset 0 2 V1002 6 8 10 12 14 16 18 20 24 0 0	Bit 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange <
V1001 V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1008 V1009 V1010 V1010 V1011 V1011 V1012 V1012 V1013 Cmd1_ServerOK Cmd1_UCMM_Busy Cmd1_Transactions	0 2 √1002 6 8 10 12 14 16 18 20 22 24 0 0 0 0	Bit 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Server OK UCMM Busy [transaction counter]
V1001 V1002 V1003 V1004 V1005 V1006 V1007 V1008 V1009 V1010 V1010 V1011 V1011 V1011 V1012 V1013 Cmd1_ServerOK Cmd1_UCMM_Busy Cmd1_Transactions Cmd2_GeneralStatus	Offset 0 2 V1002 6 8 10 12 14 16 18 20 22 24 0 0 0 0 0 0 0 0 0	Bit 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Format 16 bit - signed 16 bit - signed	Mode Data exchange Data exchange <



Now repeat	the steps above for the V2000 command and variables	, except making this a READ
command.	The finished configuration looks like this.	

Ethern	net/IP Tag Cl	ient		_	Name	V	/alue	
🗄 🚠 Ser	ver 172.18.6	58.140 - AB	L16ER P	LC	IP Address	17	72.18.68.140	
III \	V1000 (Write	e)			Description	AE	B L16ER PLC	
	0 : V1001							
	a 2: V1002							
	a 4: V1003							
	🛥 6: V1004							
	8: V1005							
	🛥 10: V1006	5						
	12: V1007	7						
	🛥 14: V1008	3						
	🛥 16: V1009	9						
	🛥 18: V1010)						
	🛥 20: V1011							
	🛥 22: V1012	2						
	🛥 24: V1013	3						
	Server Oł	K: Cmd1_S	erverOK					
	😐 UCMM Bi	usy: Cmd1_	ОСММ_В	usy				
	Transaction	ons: Cmd1_	Transacti	ons				
	General S	Status: Cmd	2_Genera	IStatus				
	Extended	Status: Cm	d2_Exten	dedStatus				
	V2000 (Read	d)						
	🗖 0: V2001							
	2: V2002							
	4: V2003							
	6: V2004							
	8: V2005							
	10: V2006	5						
	12: V2007	7						
	🗖 14: V2008	3						
	16: V2009	9						
	18: V2010)						
	20: V2011							
	22: V2012	2						
	24: V2013	3						
	Server Ol	<: Cmd2_S	erverOK					
		usy: Cmd2_		usy				
	Transaction	ons: Cmd2	Transacti	ons				
	General S	status: Cmd	2_Extend	edStatus				
L	Extended	Status: Cm	d2_Gene	ralStatus				
Tag name	PLC Slot	Mode	Nb. Fl	e Offset	Tag dat	Period (Timeout	
V1000	0	Write	13	0	INT	1000	3000	
V2000	0	Read	13	0	INT	1000	3000	

Now compile your application (correcting any problems) and download to the target. Next, we'll set up the Rockwell side.



1.3 Studio 5000 Setup

After creating your project click on your Rockwell controller in the main navigation tree under I/O Configuration – Ethernet.



Then right-click and click on "Properties".





This brings up the "Controller Properties" dialog. On the "Internet Protocol" tab, configure the IP settings of your Rockwell PLC. This must match the setting made in the Workbench fieldbus configuration for this Rockwell PLC.

General Ma	jor Faults Minor Faults	Date/Time Adva	anced SFC Executio	n Project
Nonvolatile Memory	Capacity Internet Prot	Port Configuration	Network Securit	y Alarm Lo
Manually conf	inure IP settings			
Obtain IP setti	ngs automatically using DHCP			
IP Address:	172 . 18 . 68 . 140	Subnet Mask:	255 . 255 . 240 . 0	
		Gateway Address:	172 . 18 . 64 . 1	
Domain Name:		Primary DNS Server Address:	0.0.0.0	
Host Name:	CompactLogix	Secondary DNS Server Address:	0.0.0.0	

On the "Port Configurations" tab, be sure you have one or more Ethernet ports enabled and set up.

Ge	eneral	Major Fa	ults	Minor Faults	Date/Ti	ime Adv	vanced	SFC Execution	Project
Nor	volatile I	Memory	Capacity	Internet Pr	rotocol P	ort Configuration	Network	security	Alarm Log
2 ort	Eachla	Link Status	Auto-	Sp	eed	Du	plex	Port	
on	Enable	LINK Status	Negotiate	Selected	Current	Selected	Current	Diagnostics	
1	~	Active		~	100 Mbps	~	Full		
2	 Image: A set of the set of the	Inactive	~	~		~			



Now go back to the main navigation tree and expand your main project item, and click "Controller Tags".

Add tags to this configuration. The names and structures of the tags must match the tags you configured in the Workbench fieldbus configuration. Here, we've added 2 tags: V1000 (13 elements) and V2000 (13 elements).

	MSG vinuow Help	n an an inn an an	~					
Mode	10" p p p 12" (2		● + F = +/F = < ()F = <(U)F = <(L	}		*		
ergy Storage OK	▶ No Edits 문	Favorites	PlantPAx Safety Ala	rms Bit Timer/Counter	Input/Output Compare Compute/Math	Mov		
ler Organizer	X Controller Tags - EIP JACP Tag	Client(controller) ×			inperentipat compare competential			
	Scope: @EIP JACP Tag Cli >	Show: All Tags				~ T.	Enter Name Fi	iltor
Controller EIP_JACP_Tag_Client	Name	ant Alles Fee	Press Tree	Data Tura	Description	Endowed Annual	Constant	Chula
Controller Tags	Name	Allas For	base rag	Data Type	Description	External Access	Constant	style
Controller Fault Handler	CIP_READ_MSG			MESSAGE		Read/Write		
Tasks	Local:1:C			AB:Embedded_Di		Read/Write		
Notion Groups	Local:1:1			AB:Embedded_Di		Read/Write		
Assets	Local:1:0			AB:Embedded_Di		Read/Write		
Ogical Model /O Configuration	▲ V1000			INT[13]		Read/Write		Decima
	▶ V1000[0]			INT		Read/Write		Decima
	▶ V1000[1]			INT	we've created	Read/Write		Decima
	▶ V1000[2]			INT	a 12 element	Read/Write		Decima
	▶ V1000[3]			INT		Read/Write		Decima
	▶ V1000[4]			INT	INTEGER	Read/Write		Decima
	▶ V1000[5]			INT	array	Read/Write		Decima
	► V1000[6]			INT		Read/Write		Decima
	► V1000[7]			INT		Read/Write		Decima
	N/1000[8]			INT		Read Write		Decima
				INT INT		Read/write		Decima
	▶ V1000[9]			INI		Read/write		Decima
	▶ V1000[10]			INT		Read/Write		Decima
	▶ V1000[11]			INT		Read/Write		Decima
	▶ V1000[12]			INT		Read/Write		Decima
	▶ V2000			INT[13]		Read/Write		Decima

Compile and run the application on the Rockwell PLC. In Studio 5000, you can change the values of V2000(0) – V2000(12) and these values will show up in V2001-V2013 the Workbench fieldbus configuration windows. Likewise, you can change the values of V1001-V1013 in Workbench and these values will show up in Studio 5000 V1000(0) – V1000(12).



Logix Designer - E	EIP_Janus2 [1769-L16ER-BB1B 33.11]					
File Edit View	Search Logic Communications	Tools Window Help				
ኄ 🖆 🗎 🖶	ង 🗇 🙃 ႒ 🦿 CIP_WRITE	_MSG 🚽 🍫 🏂 🛅 📴 🏡	🕞 占 📩 🌾 🎼	Ci Ci		
Run Mode Controller OK	Path: Ethernet\172.18.68.1	40*	€ # 8 4 14 14	HERI H H H H () (L) (U) ONS OSR	OSF	
Energy Storage OK I/O OK	Rem Run 📑 No Forces	▶ No Edits 🔒	 Favorit 	tes Add-On Alarms Bit Timer/Count	er Input/Output Compare	Compute/Math
Controller Organizer	~ ₽	🗙 📋 MainProgram - MainRoutine 🔇	Controller Tags - EIP_Ja	nus2(controller) ×		
0 1		Scope: BEIP_Janus1 ~	Show: All Tags			
Controller EIP_	Janus2	Name	III - Value	* For	e Mask 🔹 Style	Data T
A STasks		b. Local:1:1		()	()	AB·Emt
A h MainPro	gram	h Localdio		()	()	AD-Carl
Param	neters and Local Tags	Local:1:0		{}	{}	AB:Emt
ID MainF	Routine	- V1000		()	{} Decimal	INT[13]
Unschedule	d	▶ V1000[0]		1001	Decimal	INT
Motion Groups	S	▶ V1000[1]		1002	Decimal	INT
Logical Model		▶ V1000[2]		1003	Decimal	INT
🔺 🖼 I/O Configurat	ion	▶ V1000[3]		1004	Decimal	INT
PointIO		▶ V1000[4]		1005	Decimal	INT
∠ ⊆ Embedd	ed I/O	► V1000[5]		1005	Decimal	INT
 Embedded I/O [1] Embedded Discrete_IO Expansion I/O, 0 Modules 		> V1000[5]		1007	Decimal	INT
		▶ V1000[6]		1007	Decimal	INT
A Stephennet		▶ V1000[7]		1008	Decimal	INT
및 1769-LT6ER-BB1B EIP_Janus2		▶ V1000[8]		0	Decimal	INT
		V1000[9]		0	Decimal	INT
		▶ V1000[10]		0	Decimal	INT
		▶ V1000[11]		0	Decimal	INT
		▶ V1000[12]		0	Decimal	INT
		4 V2000		()	{} Decimal	INT[13]
		► V2000[0]		2001	Decimal	INT
		N2000[1]		2007	Desimal	INIT
		V2000[1]		2002	Decimal	INT INT
		► V2000[2]		2003	Decimal	INT
		▶ V2000[3]		2004	Decimal	INT
		▶ V2000[4]		2005	Decimal	INT
		▶ V2000[5]		2006	Decimal	INT
		▶ V2000[6]		2007	Decimal	INT
Туре	Ladder Diagram (Main)	► V2000[7]		2008	Decimal	INT
Description	course bragram (main)	▶ V2000[8]		0	Decimal	INT
Program	MainProgram	▶ V2000[9]		0	Decimal	INT
Number of Rungs	0	► V2000[10]		0	Decimal	INT
		N/2000[10]		0	Decimal	INIT
		P V2000[11]		0	Decimal	INT
		▶ V2000[12]		0	Decimal	INT

	[IO Drivers]						
	Block Transfer						
옯 4	-T- Ethernet/IP Tag Client						
"目	A Server 172.18.68.140 - AB L16ER PLC						
	▲ 1000 (Write)						
HE.	0: \1000 = 1001						
	2: V1001 = 1002						
	4: \1002 = 1003						
	6: \1003 = 1004						
8	8: V1004 = 1005						
	10: V1005 = 1006						
	12: V1006 = 1007						
	14: V1007 = 1008						

The transaction counter and other status variables can be used to diagnose errors and monitor operation. In addition, you can view the "EIP Tag Client Statistics" in the "Statistics" section of the Janus web page:





Product Information Application Information Configuration Event Log Statistics Error Descriptions & Status Display All Pages Custom HTML (graphics) Acknowledgements Product Support

Janus ACP Classic V1 v01.05 2023-03-06

Module Clock: Tue, 2023-03-07 19:34:47 EST Browser Clock: Wed Mar 13 2024 11:36:32 GMT-0400 (Eastern Daylight Time)
Turn Auto Refresh Off Clear Statistics Last Cleared: Tue, 2023-03-07 19:34:17 EST

EIP Tag Client Statistic	S				
Open Time (µsec)		9			
Minimum Exchange Time (µsec)		14			
Average Exchange Time (µsec)		17			
Peak Exchange Time (µsec)		215			
Close Time (µsec)	0				
Server IP Addr ReadTag Req	ReadTag Err	WriteTag Req	WriteTag Err	Gen Status	Ext Status
172.18.68.140 30	0	30	0	0	0

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