



# NIWeek





# LabSocket for NI Linux Real-Time Platforms

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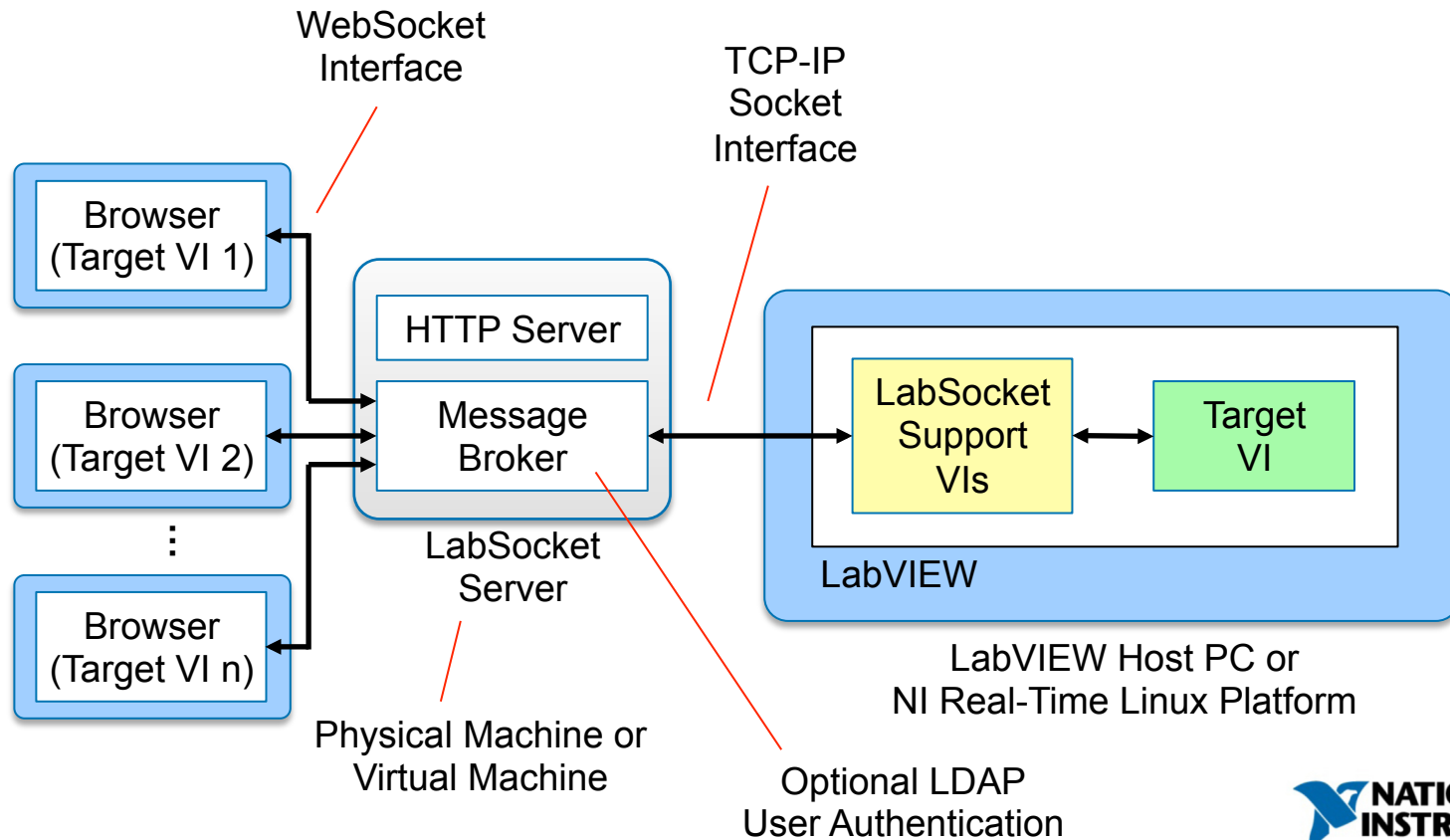
t: [@jbergmans](#) and [@LabSocket](#)

# LabSocket

- Automatically generates web page representation of front panel
- Continuously synchronizes web client and front panel
- Compatible with NI Linux Real-Time platforms with Embedded UI
- Many VI Server methods and properties supported in Headless platforms → Not currently compatible with NI Linux Real-Time platforms that use Headless UI

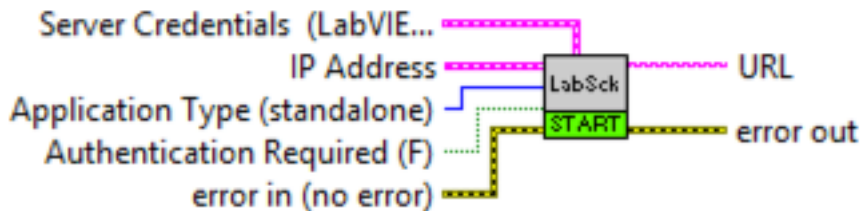


# LabSocket Overview

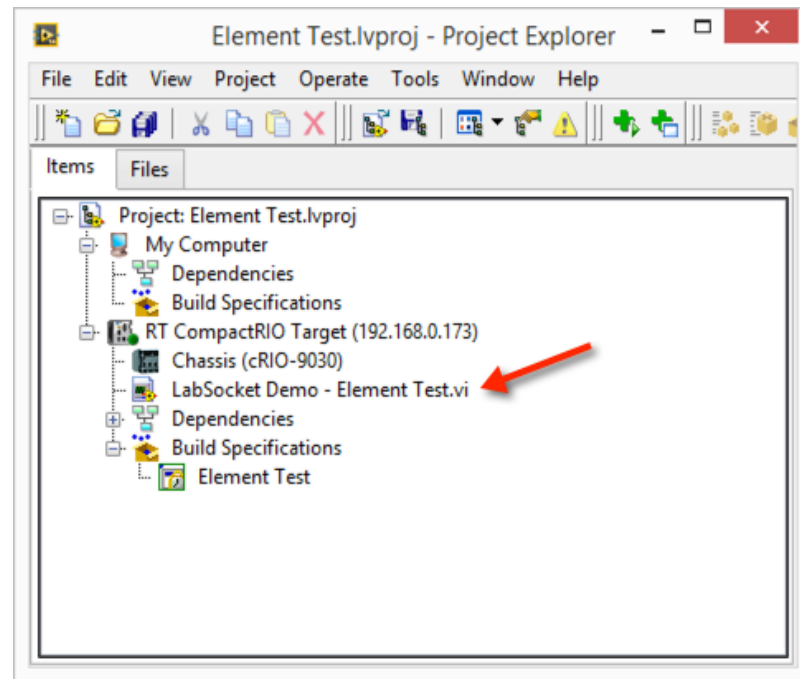


# LabSocket on cRIO-903x

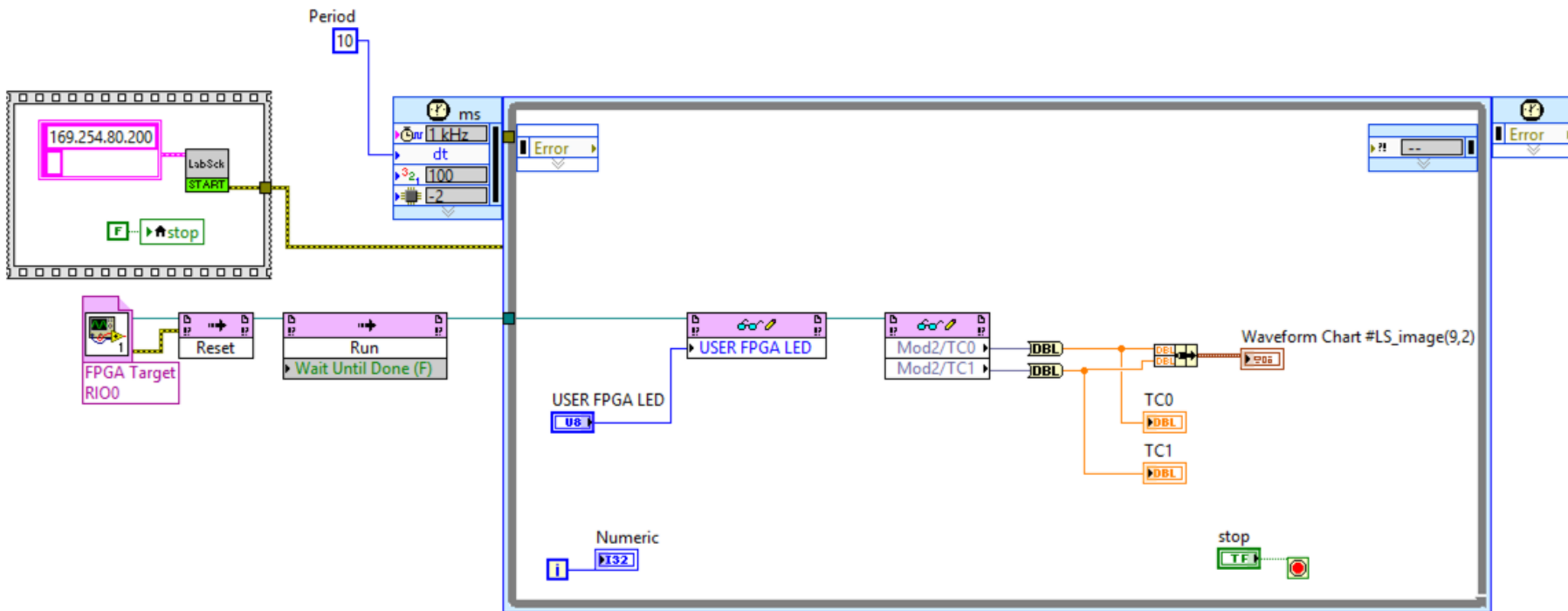
- LabSocket Start VI



- LabVIEW Project Window



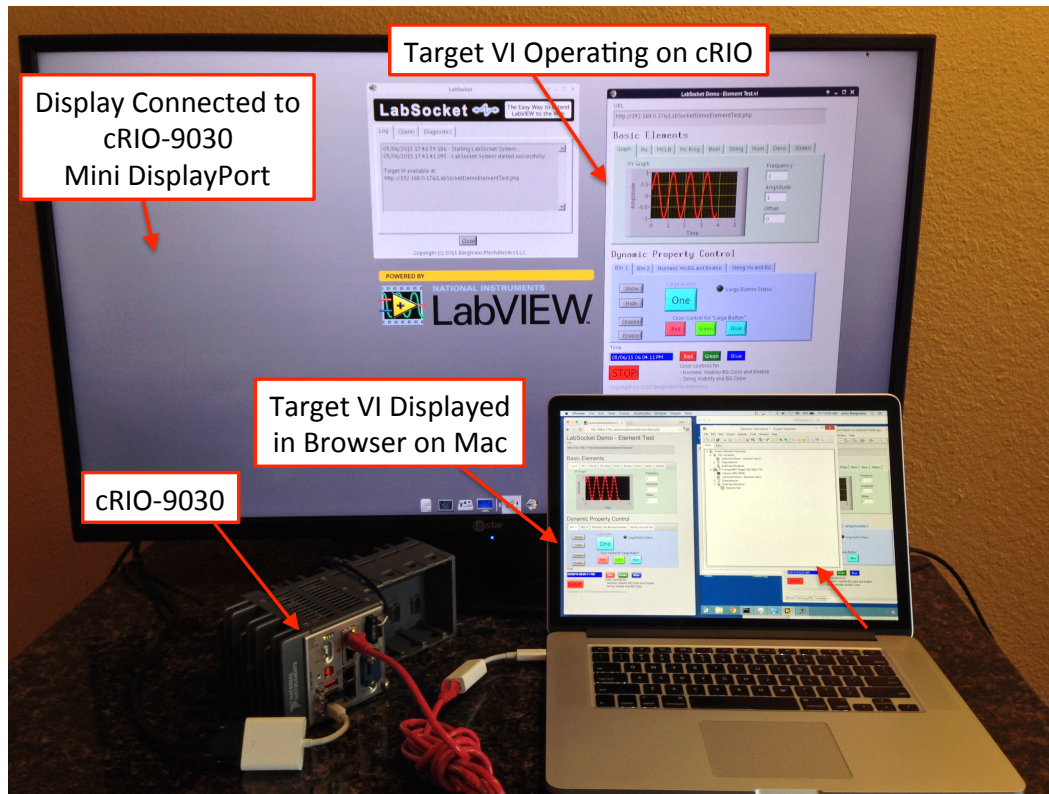
# LabSocket on cRIO-903x



# cRIO-903x Support

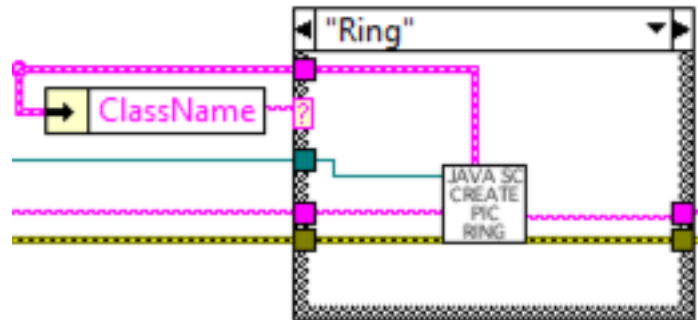
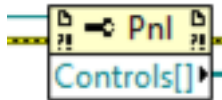
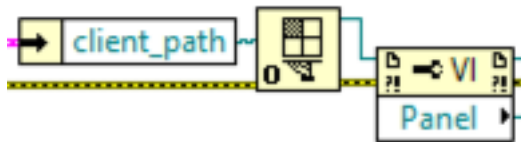
- LabSocket operates on cRIO-903x headless mode with Basic mapping
- Supported elements:
  - numeric controls and indicators
  - boolean controls and indicators
  - string controls and indicators
  - static picture elements
  - enums controls and indicators
  - picture ring controls and indicators
  - booleans controls and indicators with images

# LabSocket on cRIO-903x



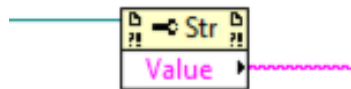
# LabSocket on Headless UI Systems

# LabSocket – Behind the Scenes

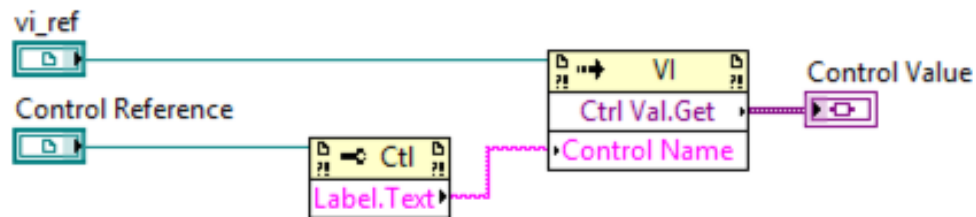


# LabSocket Modifications for NI Linux Real-Time

- Read Value (Desktop)



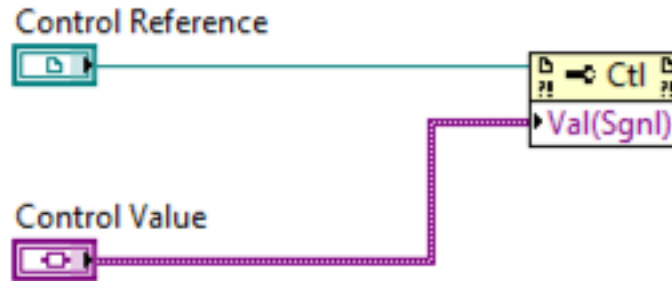
- Read Value (RT)





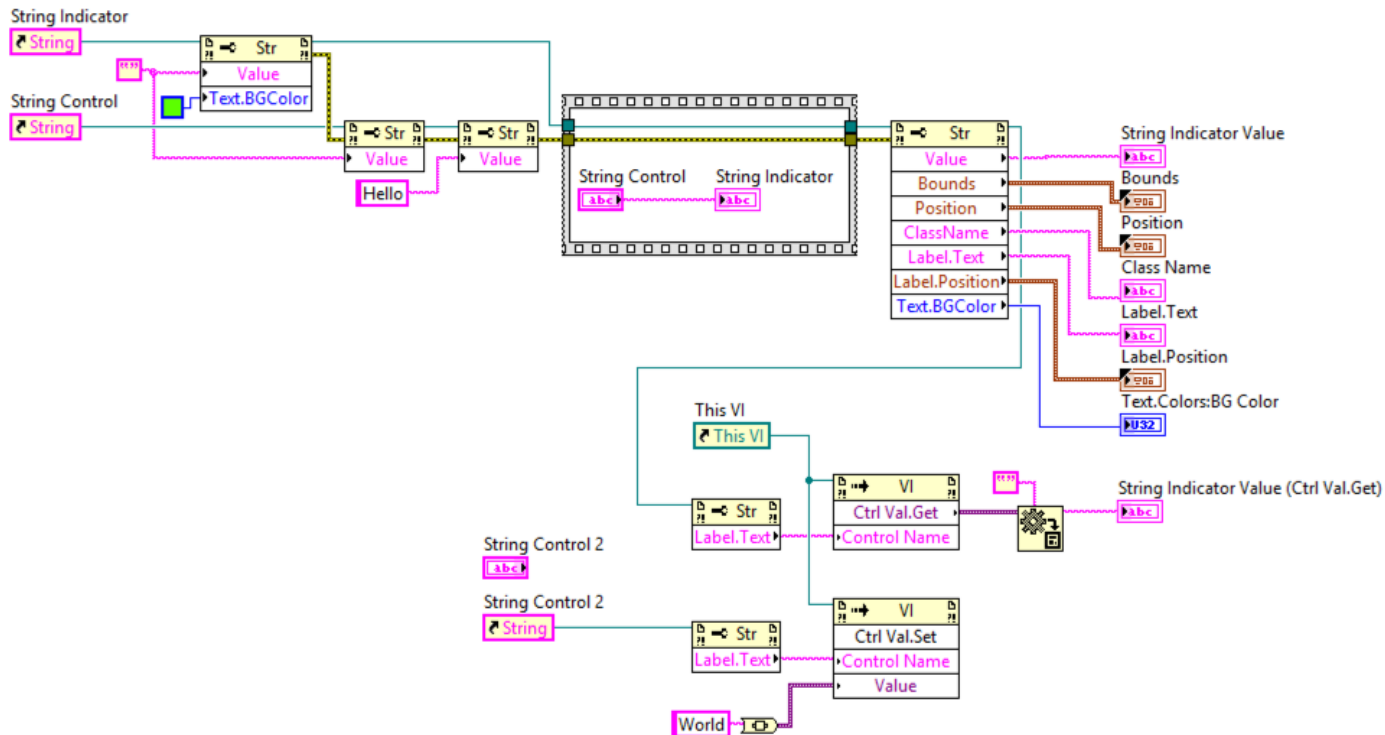
# LabSocket Modifications for NI Linux Real-Time

- Write Value (Desktop and RT)





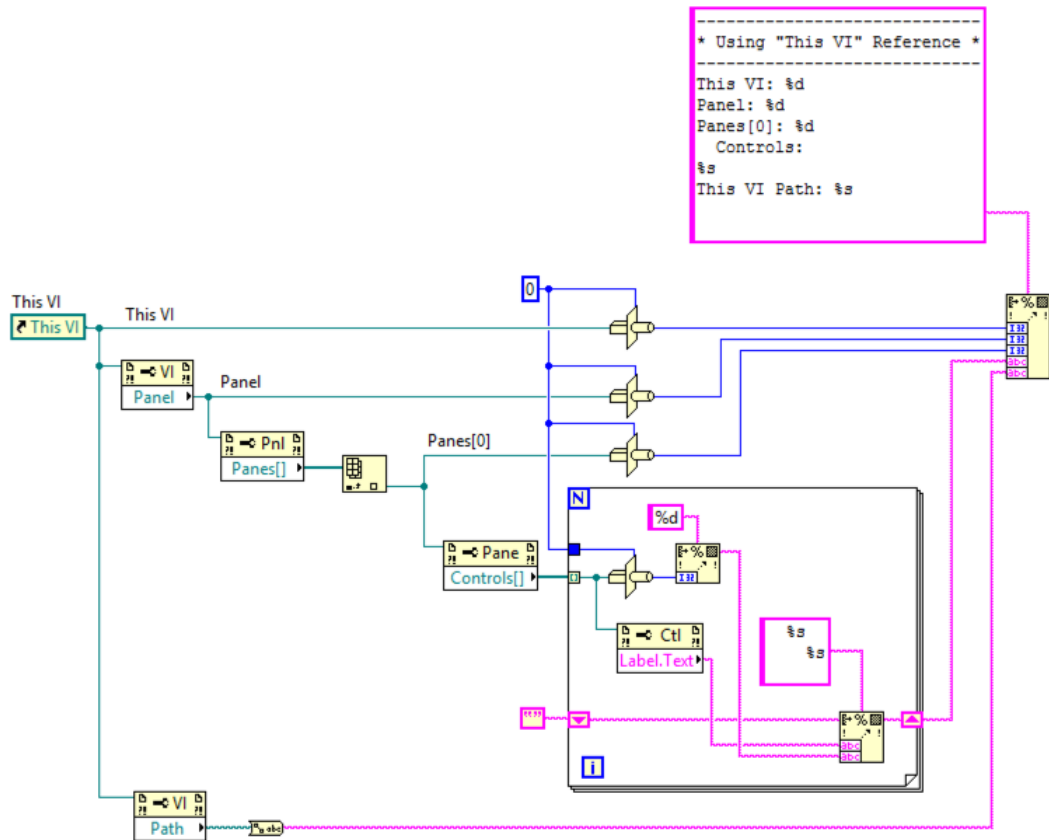
# VI Server Testing



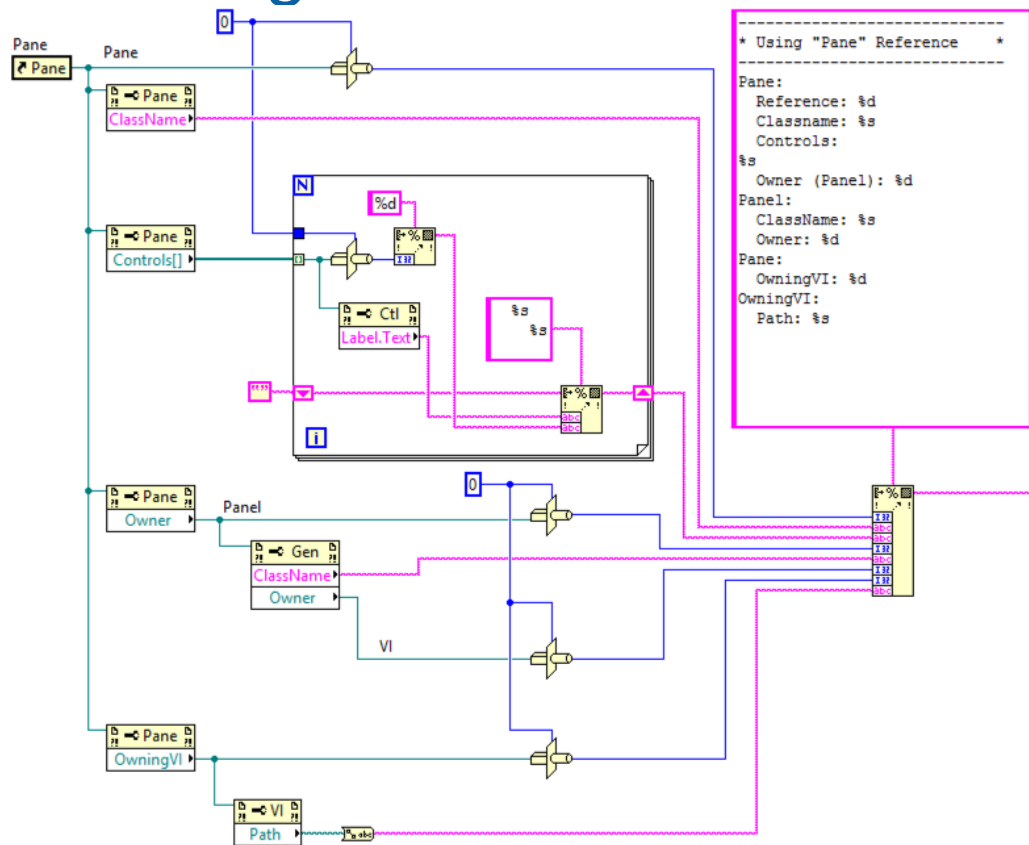
# VI Server Testing

Property Nodes	Property	Mode	Test	Win 8.1 (dev)	Win 8.1 (exe)	cRIO-9030 Interactive	cRIO-9068 Interactive
	Value	Read	"String Indicator Value" value = "Hello"	Y	Y	N	N
	Value	Write	"String Indicator" value = "Hello"	Y	Y	Y	Y
	Bounds	Read	"Bounds.Width" = 100, "Bounds.Height" = 44	Y	Y	Y	Y
	Position	Read	"Position.Left" = 156, "Position.Top" = 210	Y	Y	Y	Y
	ClassName	Read	"Class Name" value = "String"	Y	Y	Y	Y
	Label.Text	Read	"Label.Text" value = "String Indicator"	Y	Y	Y	Y
	Label.Position	Read	"Label.Position.Left" = 156, "Label.Position.Top" = 210	Y	Y	Y	Y
	Text.BGColor	Read	"Text.Colors:BG Color" value = "661880"	Y	Y	Y	Y
	Text.BGColor	Write	"String Indicator" BG color = Green	Y	Y	Y	Y
	Val(Sgnl)	Write	"String Control 3 New Val" value = "LabSocket"	Y	Y	Y	N
	App.Kind	Read		Development System	Run Time System	Run Time System	Embedded LabVIEW
Invoke Node	Method						
	Ctrl Val.Get		"String Indicator Value (Ctrl Val.Get)" value = "Hello"	Y	Y	Y	Y
	Ctrl Val.Set		"String Control 2" value = "World"	Y	Y	Y	Y

# VI Server Testing



# VI Server Testing



# Results - "Diagnostics.txt" (Windows 8.1)

```
-----  
* Using "This VI" Reference *  
-----
```

```
This VI: 551550977  
Panel: 1034944524  
Panes[0]: 1035993233  
Controls:  
C - String Control  
1037041787  
B - Numeric Indicator  
1038090271  
D - String Indicator  
1039138905  
A - Numeric Control  
1040187473
```

```
This VI Path: \\psf\Home\Desktop\labsocket_v3.3.1.70_test  
\cRIO-9068\VI Server Reference Test.vi
```

```
-----  
* Using "Pane" Reference *  
-----
```

```
Pane:  
Reference: 1035993233  
Classname: Pane  
Controls:  
C - String Control  
1037041787  
B - Numeric Indicator  
1038090271  
D - String Indicator  
1039138905  
A - Numeric Control  
1040187473
```

```
Owner (Panel): 1034944524
```

```
Panel:  
ClassName: Panel  
Owner: 0
```

```
Pane:  
OwningVI: 846200883
```

```
OwningVI:  
Path: \\psf\Home\Desktop\labsocket_v3.3.1.70_test  
\cRIO-9068\VI Server Reference Test.vi
```

# Results - "Diagnostics.txt" (cRIO-9068 – Interactive)

```
-----  
* Using "This VI" Reference *
```

```
This VI: 1206910976  
Panel: 0  
Panes[0]: 0  
Controls:
```

```
This VI Path: /home/lvuser/natinst/bin/VI Server Reference  
Test.vi
```

```
-----  
* Using "Pane" Reference *
```

```
Pane:  
Reference: 1239416832  
Classname: Pane  
Controls:  
C - String Control  
1241513986  
B - Numeric Indicator  
1242562563  
D - String Indicator  
1243611140  
A - Numeric Control  
1244659717
```

```
Owner (Panel): 1240465409
```

```
Panel:  
ClassName: Panel  
Owner: 0
```

```
Pane:  
OwningVI: 848298035  
OwningVI:  
Path: /
```



# VI Server Testing

Property Nodes	Property	Mode	Test	Win 8.1 (dev)	Win 8.1 (exe)	cRIO-9030 Interactive	cRIO-9068 Interactive
	Value	Read	"String Indicator Value" value = "Hello"	Y	Y	N	N
	Value	Write	"String Indicator" value = "Hello"	Y	Y	Y	Y
	Bounds	Read	"Bounds.Width" = 100, "Bounds.Height" = 44	Y	Y	Y	Y
	Position	Read	"Position.Left" = 156, "Position.Top" = 210	Y	Y	Y	Y
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	Label.Text	Read	"Label.Text" value = "String Indicator"	Y	Y	Y	Y
	Label.Position	Read	"Label.Position.Left" = 156, "Label.Position.Top" = 210	Y	Y	Y	Y
	Text.BGColor	Read	"Text.Colors:BG Color" value = "661880"	Y	Y	Y	Y
	Text.BGColor	Write	"String Indicator" BG color = Green	Y	Y	Y	Y
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	App.Kind	Read		Development System	Run Time System	Run Time System	Embedded LabVIEW
Invoke Node	Method						
	Ctrl Val.Get		"String Indicator Value (Ctrl Val.Get)" value = "Hello"	Y	Y	Y	Y
	Ctrl Val.Set		"String Control 2" value = "World"	Y	Y	Y	Y

# VI Server Documentation

## Front Panel Property

**Short Name:** Panel

**Requires:** Base Development System


**Class:** [VI Properties](#)

**To Use:** [Create a property.](#)

Reference to the front panel of a VI.

### Remarks

The following table lists the [characteristics](#) of this property.

Data type	
Permissions	Read Only
Available in Run-Time Engine	Yes (Read Only)
Available in Real-Time Operating System	Yes
Settable when the VI is running	No
Loads the front panel into memory	Yes
Need to authenticate before use	No
Loads the block diagram into memory	No
Remote access allowed	Yes
Must wait until user interface is idle	Yes
Available with control VIs	Yes
Available with global VIs	Yes
Available with strict type definitions	No
Available with polymorphic VIs	No

## Panes[] Property

**Short Name:** Panes[]

**Requires:** Base Development System


**Class:** [Panel Properties](#)

**To Use:** [Create a property.](#)

Returns an array of references to each pane in the pane hierarchy on the panel. You can use this property with the [Front Panel](#) property to obtain a reference to a pane in another VI.

### Remarks

The following table lists the [characteristics](#) of this property.

Data type	
Permissions	Read Only
Available in Run-Time Engine	Yes
Available in Real-Time Operating System	Yes
Settable when the VI is running	No
Loads the front panel into memory	No
Need to authenticate before use	No
Loads the block diagram into memory	No
Remote access allowed	Yes

# VI Server Testing

- VI Server limitations prevent current LabSocket version from being used on cRIO-9068
- Potential solution: Hardcode Target VI front panel references as inputs into LabSocket architecture

# Summary

- LabSocket has been successfully tested on cRIO-903x platforms
- Workarounds to current VI Server limitations possible for other platforms
- Research on-going into behavior of VI Server properties and methods on different NI platforms
- Source code optionally available

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