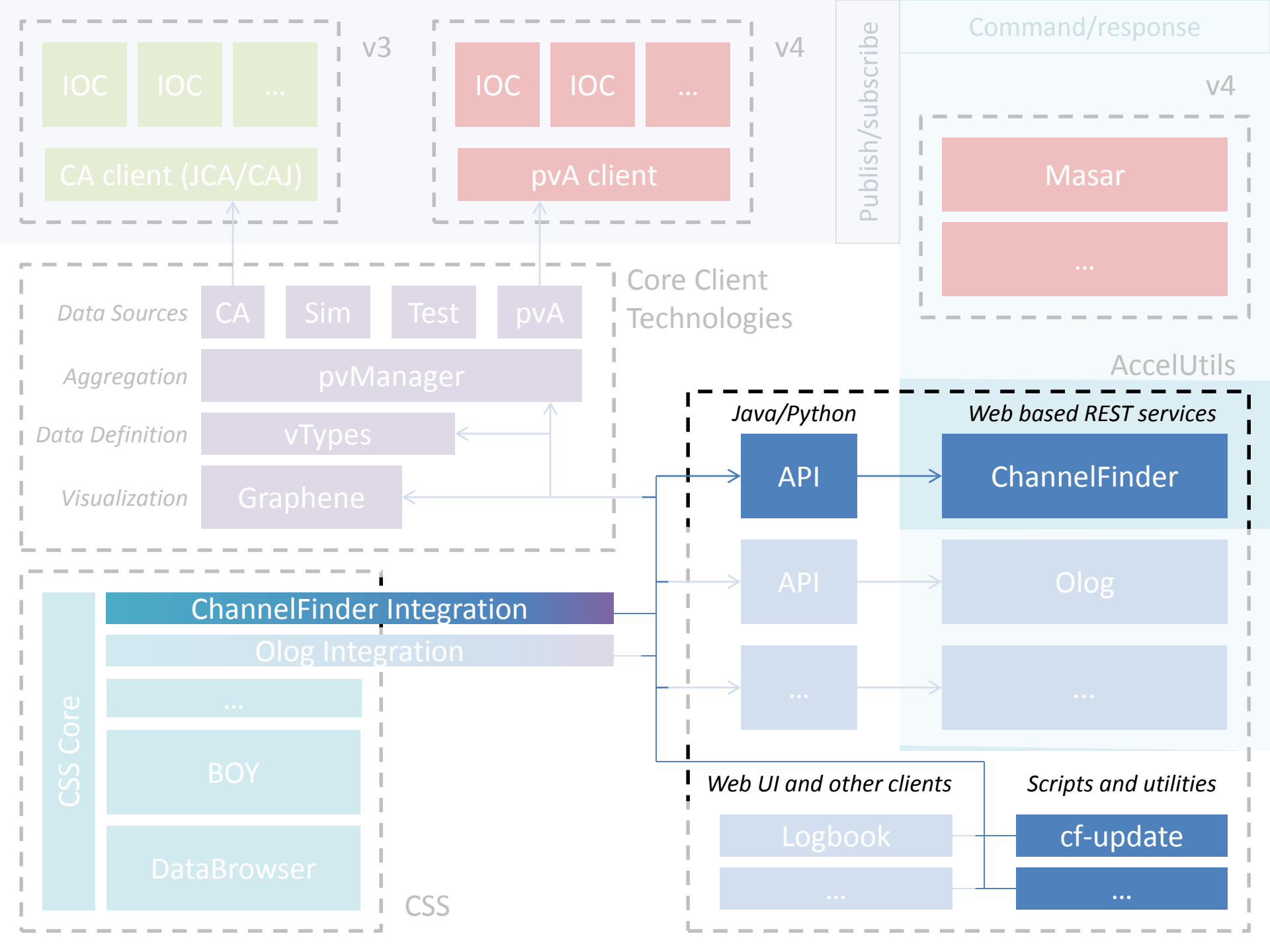
ChannelFinder:
A directory service

Motivation and Objectives

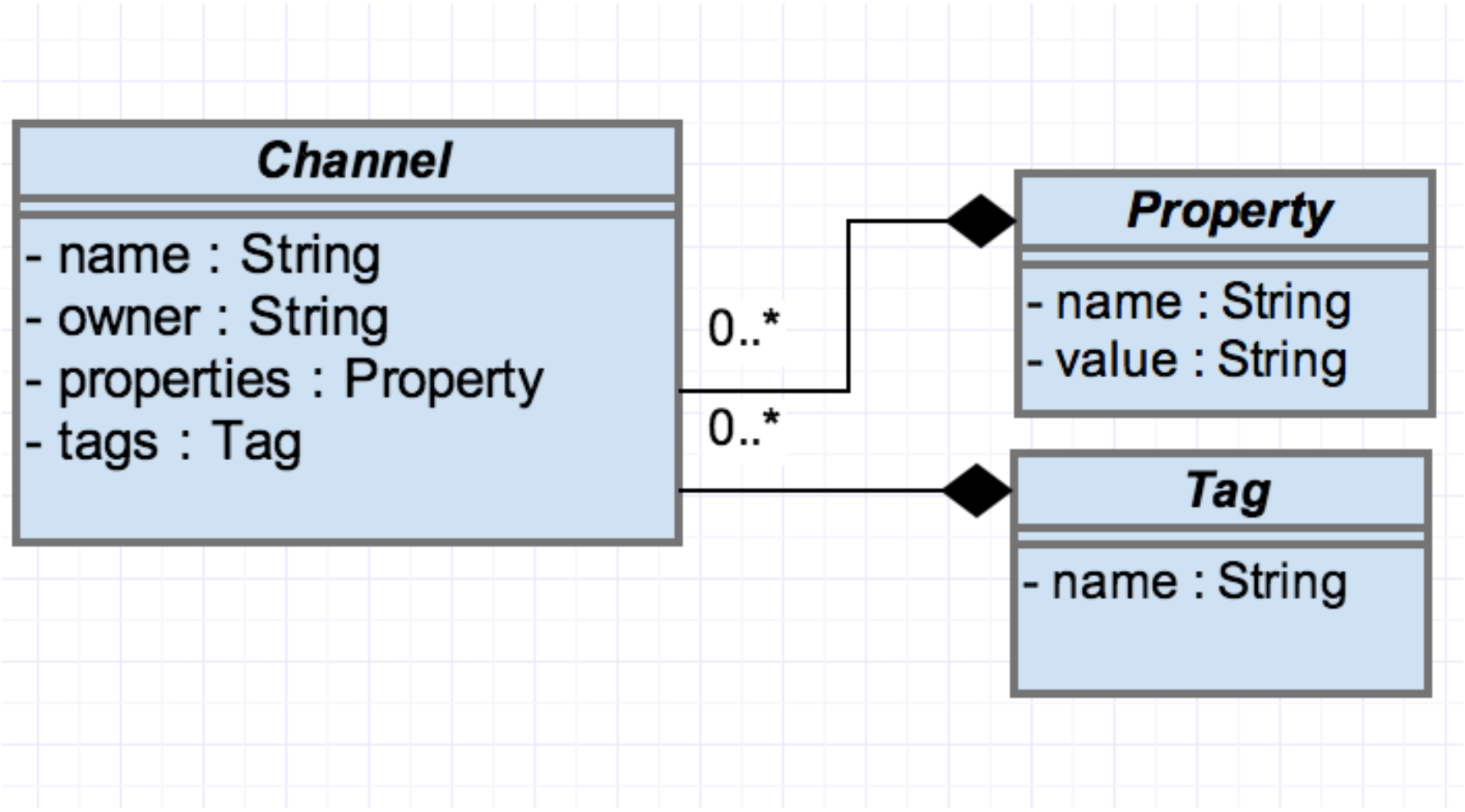
- A flat name space restricts seriously:
  - Clients need to know all channel names beforehand
  - Portable generic clients must be simple
  - Apps need full configuration or framework supplied service
- Develop a Directory Service
  - Generic
    - No dependency on installation and local conventions
  - Simple and fast (enough)
    - Use standards wherever possible
  - Provides "query-by-functionality"


v3
IOC
IOC
...
CA client (JCA/CAJ)
v4
IOC
IOC
...
pvA client
Publish/subscribe
Command/response
v4
Masar
...
Core Client Technologies
Data Sources
CA
Sim
Test
pvA
Aggregation
pvManager
Data Definition
vTypes
Visualization
Graphene
AccelUtils
Java/Python
Web based REST services
API
ChannelFinder
API
Olog
...
...
ChannelFinder Integration
Olog Integration
...
BOY
DataBrowser
CSS Core
CSS
Web UI and other clients
Scripts and utilities
Logbook
...
cf-update
...

ChannelFinder Data

- Set of **Channels** (unique names)
- Each Channel has an arbitrary number of **Properties** (name/value pairs) and **Tags** (names)
- Each Channel, Property, or Tag has an **Owner** (group) to allow basic access control
- All names and values are strings

Directory Data



Channel example


```
"name":"XF:31IDA-OP{Tbl-Ax:X1}Mtr",
"owner":"train",
"properties":
        ["handle":"Setpoint",
         "axis":"1",
         "hostname":"training.org.epics",
         "iocName":"motorsim",
         "time":"2016-03-21"]
"tags":
        ["motor",
         "sys.XF:31"
        ]
```

Query Example

- XF:31*IDA*

  All pvs from the insertion device 31
- XF:31*IDA**&*axis*=4**

  All pvs from the insertion device 31 belonging to axis 4
- XF:31*IDA**&*axis*=4*&pvStatus=active*

  All pvs from the insertion device 31 belonging to axis 4 and with pvStatus active
- XF:31*IDA**&*axis*=4*&tag=aphla.sys.SR*

  All pvs from the insertion device 31 belonging to axis 4 with tag sys.XF:31

EXAMPLE DATA SET

device FM1G4C02A

Channel Name	SR:C02-MG:G04A{HFCor:FM1}		SR:C02-MG:G04A{VFCor:FM1}	
	Fld-I	Fld-SP	Fld-I	Fld-SP
handle	READBACK	SETPOINT	READBACK	SETPOINT
elemName	FXM1G4C02A		FYM1G4C02A	
elemType	HFCOR		VFCOR	
elemField	x		y	
devName	FM1G4C02A			
sEnd	65.5222			
cell	C02			
girder	G4			
symmetry	A			
length	0.044			
ordinal	263		264	
tags	eget	eput	eget	eput
	x		y	
	sys.SR			

device FM1G4C02A

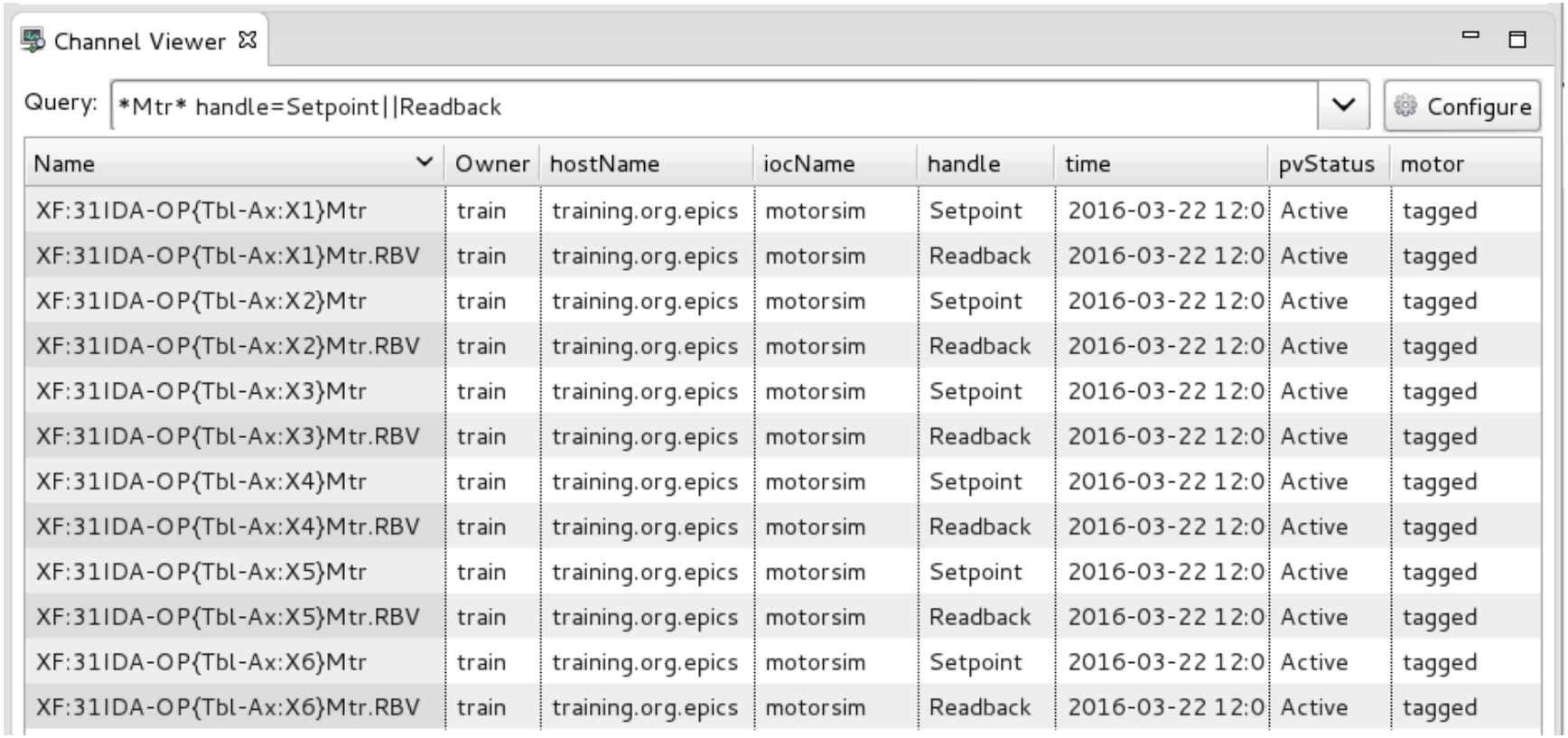
Channel Name	SR:C02-MG:G04A{HFCor:FM1}		SR:C02-MG:G04A{VFCor:FM1}	
	Fld-I	Fld-SP	Fld-I	Fld-SP
hostName	ps-psioc-c02.cs.nsls2.local			
iocName	ps-C02A			
updateTime	2015-03-13			
active	True			
Tags	archive			

Quick demo of the ChannelFinder applications

CHANNELFINDER IN CSS

ChannelViewer

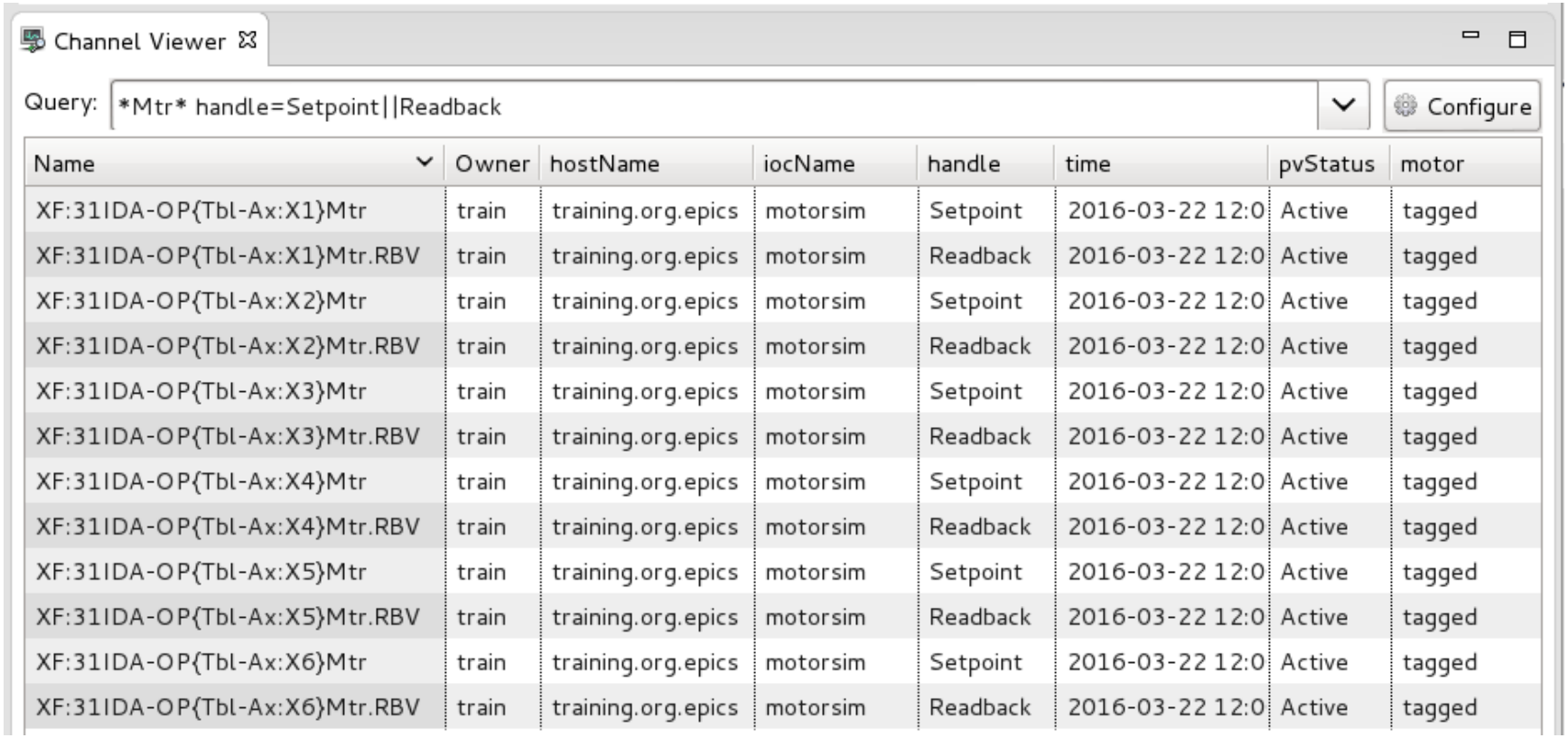
- CS-Studio → Display → ChannelViewer



Name	Owner	hostName	iocName	handle	time	pvStatus	motor
XF:31IDA-OP{Tbl-Ax:X1}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X1}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X2}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X2}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X3}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X3}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X4}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X4}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X5}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X5}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X6}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X6}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged

ChannelViewer

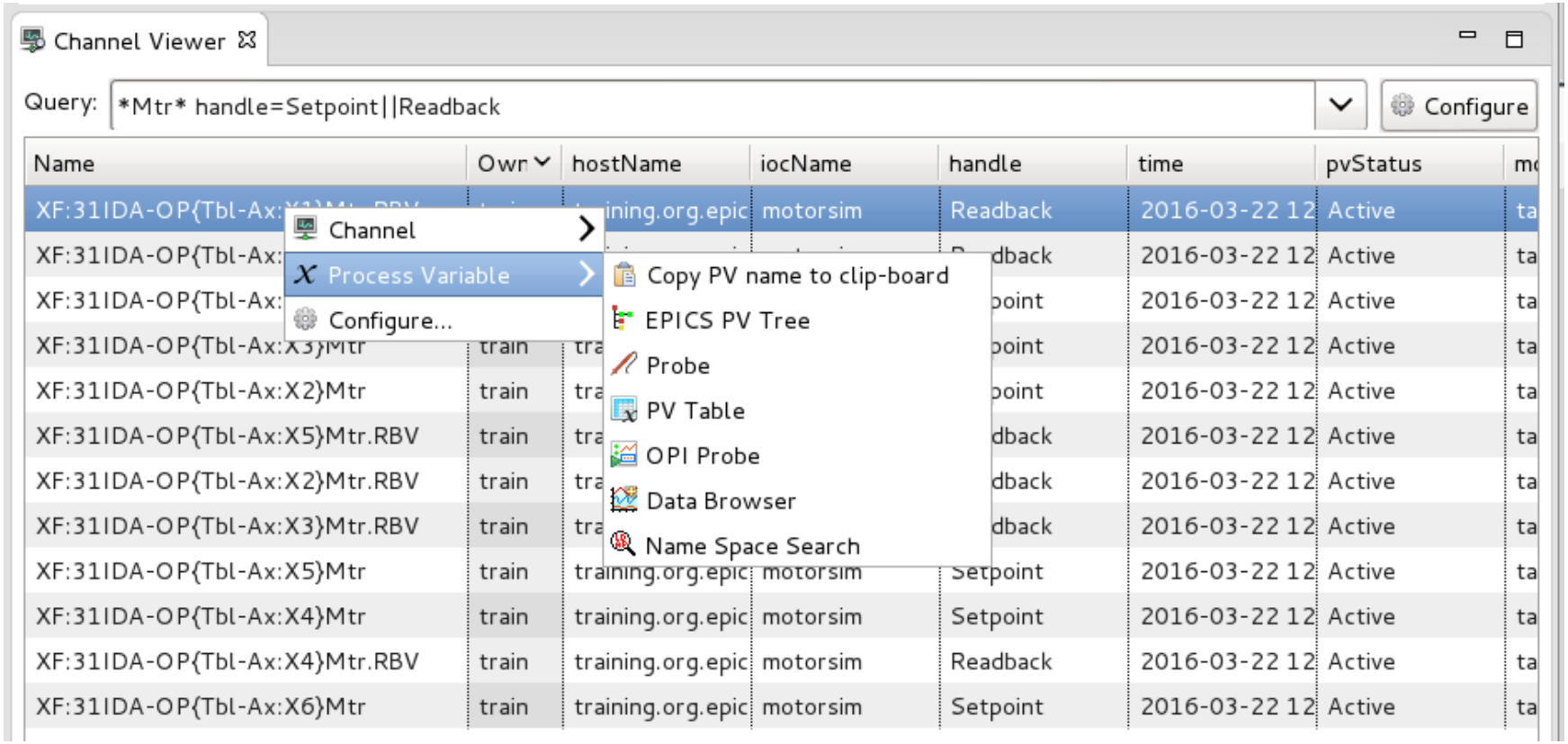
- Query can be construted for the Name, Property value, Tags associated with channels
- Wildcard character like "*", "?" can be used in the queries
- prop=val1||val2 is equivalent to prop=val1 OR prop=val2
- prop=val1 tag=myTag is equivalent to prop=val1 AND tag=myTag



Name	Owner	hostName	iocName	handle	time	pvStatus	motor
XF:31IDA-OP{Tbl-Ax:X1}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X1}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X2}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X2}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X3}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X3}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X4}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X4}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X5}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X5}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X6}Mtr	train	training.org.epics	motorsim	Setpoint	2016-03-22 12:0	Active	tagged
XF:31IDA-OP{Tbl-Ax:X6}Mtr.RBV	train	training.org.epics	motorsim	Readback	2016-03-22 12:0	Active	tagged

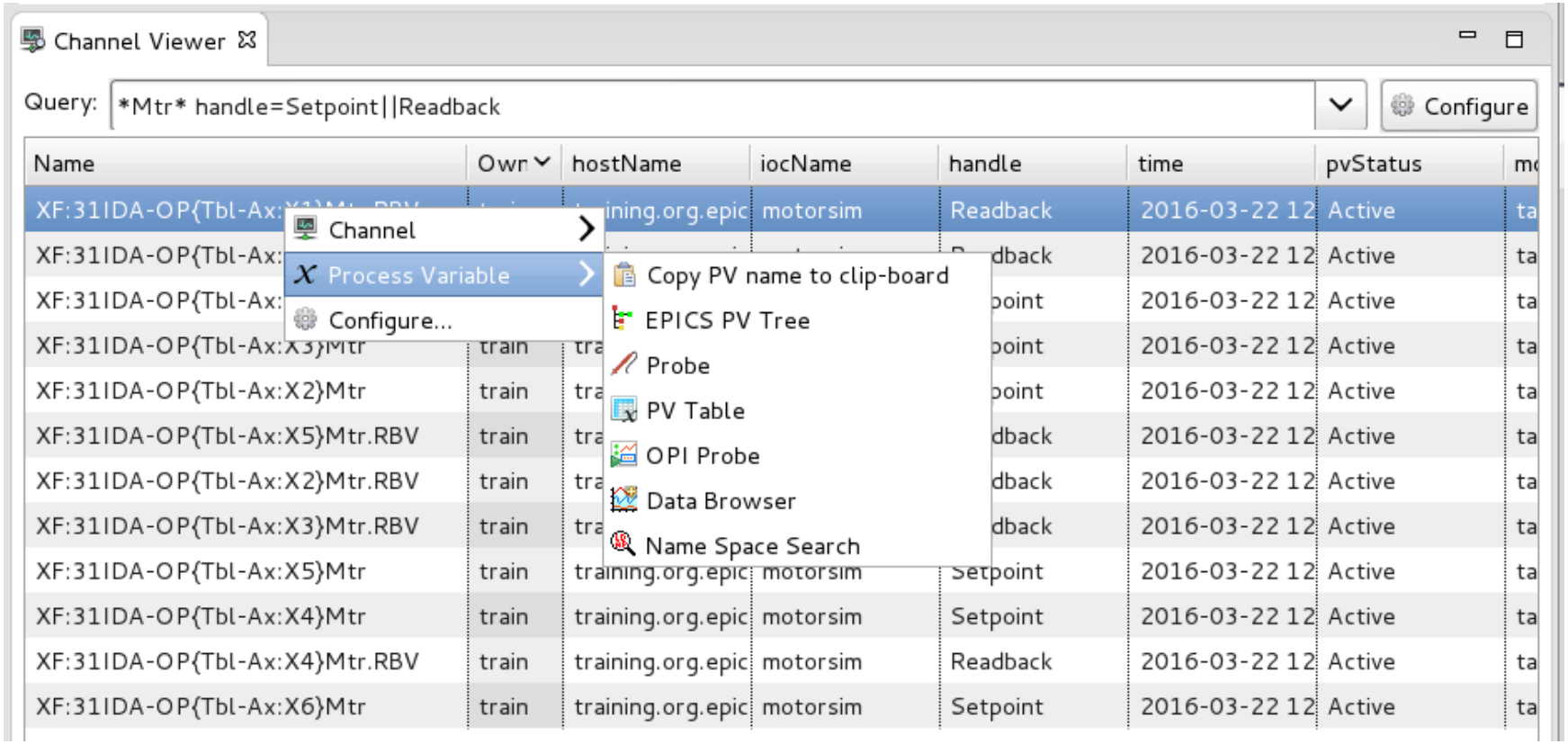
ChannelViewer

- Channel/s can be forwarded to other cs-studio applications



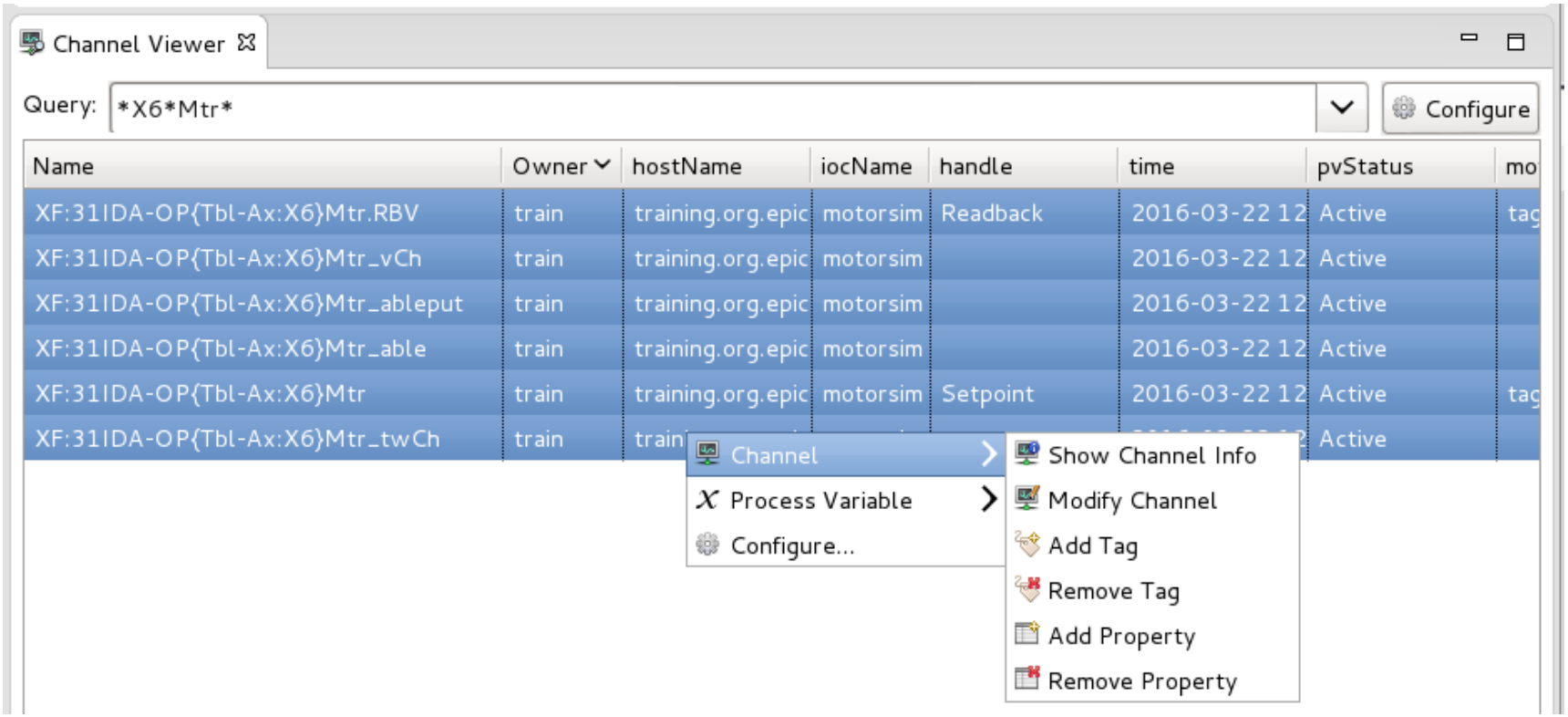
ChannelViewer

- Channel/s can be forwarded to other cs-studio applications



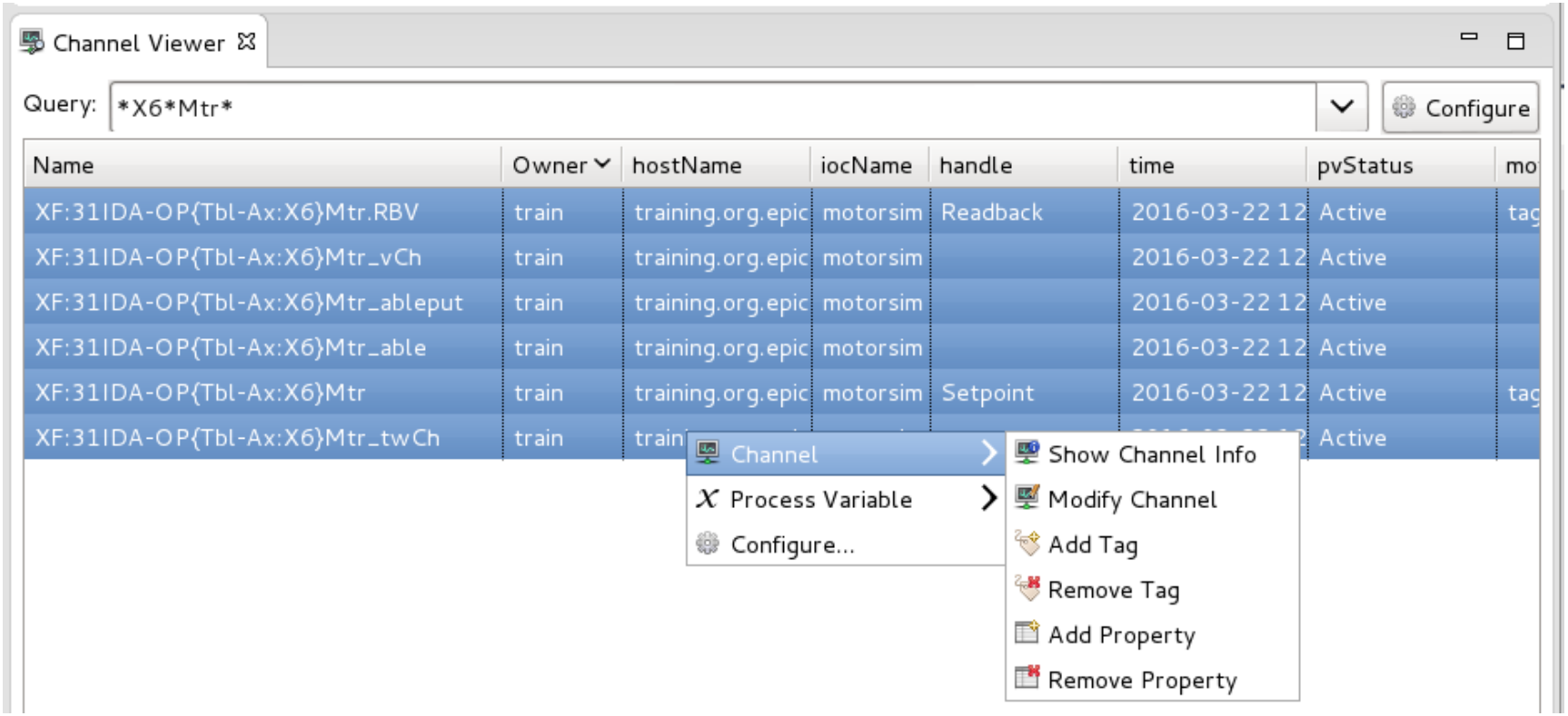
ChannelViewer - editing

- Add a tag/property to a channel or a group of channels
- Remove a tag/property from a channel or a group of channels



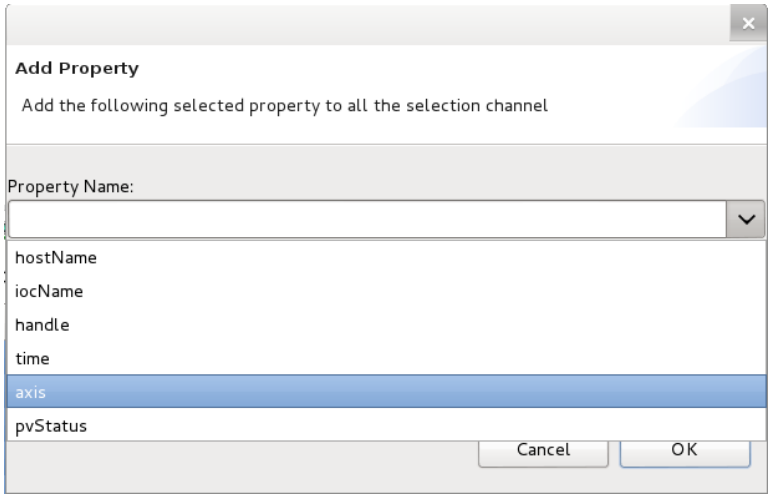
ChannelViewer - editing

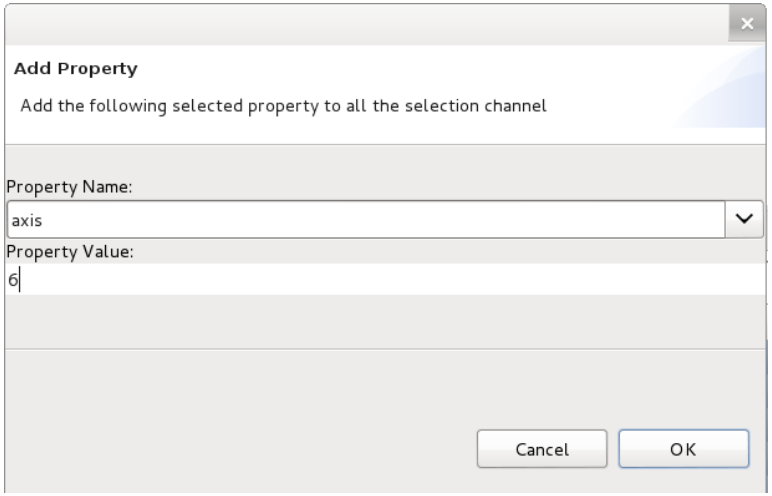
- Query *X6*Mtr to select all the channels for associated with motor6
- Select all pv's and choose "add property"



ChannelViewer - editing

- Select the property "Axis" from the listed properties.
- Enter a value for the property
  e.g. “X6"



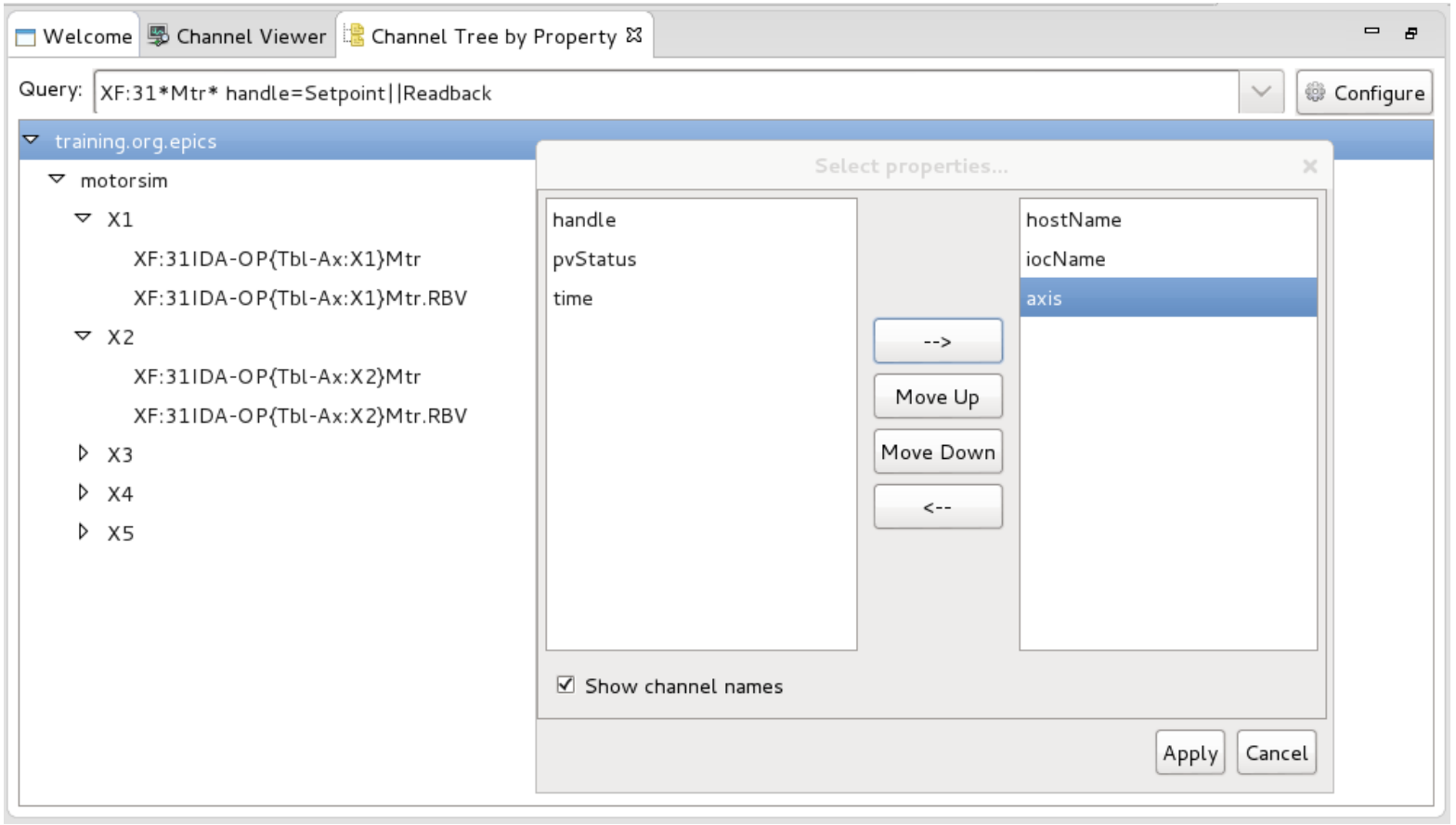


Channel Tree

- Channel Tree by Property allows to create an hierarchical view of the channels by using properties and their values.

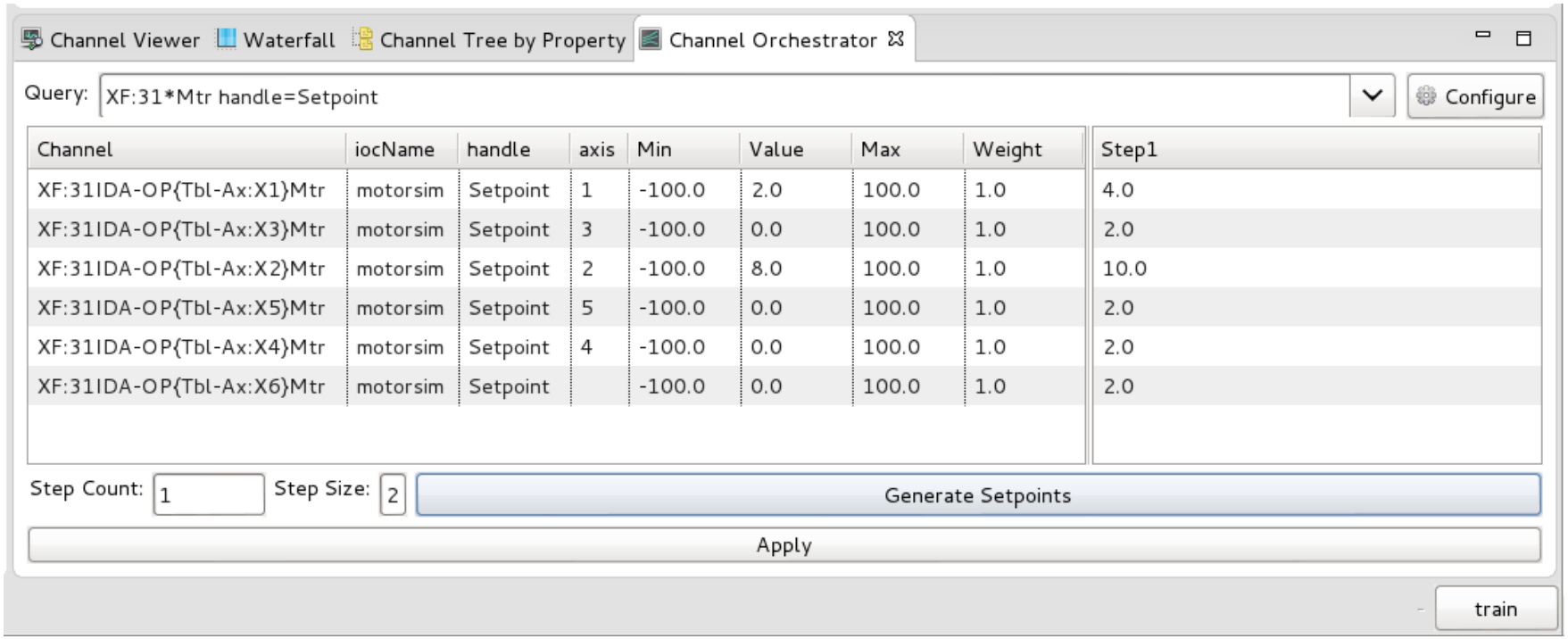
Channel Tree

- Query: XF:31*Mtr* handle=Setpoint||Readback
- Configure the tree by selecting the properties to be used to create the hierarchy (hostname, handle, axis,…)



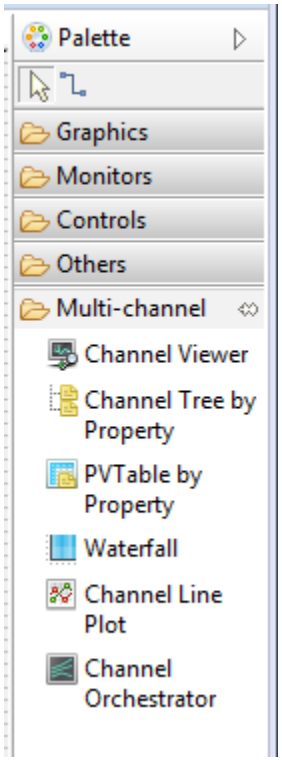
Channel Orchestrator

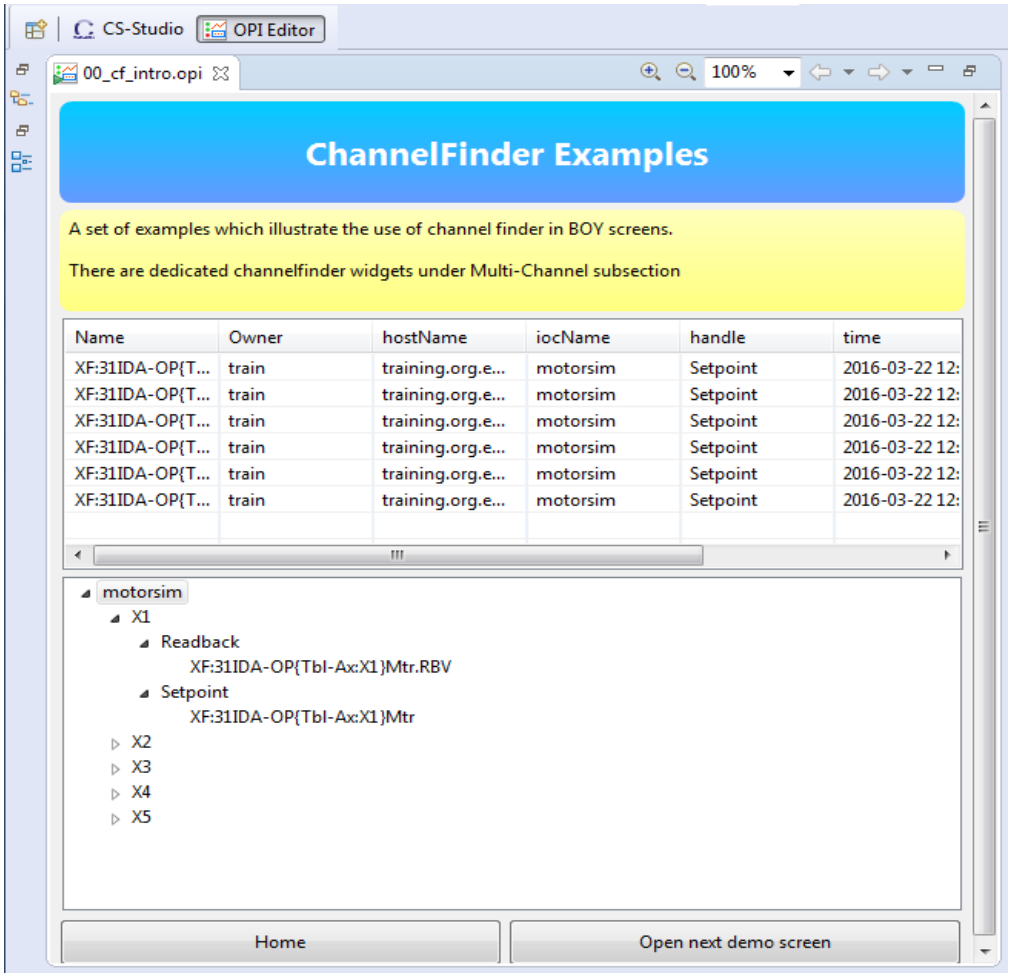
- The channel orchestrator is a tool to assist in preparing and writing a group of set points



ChannelFinder & BOY

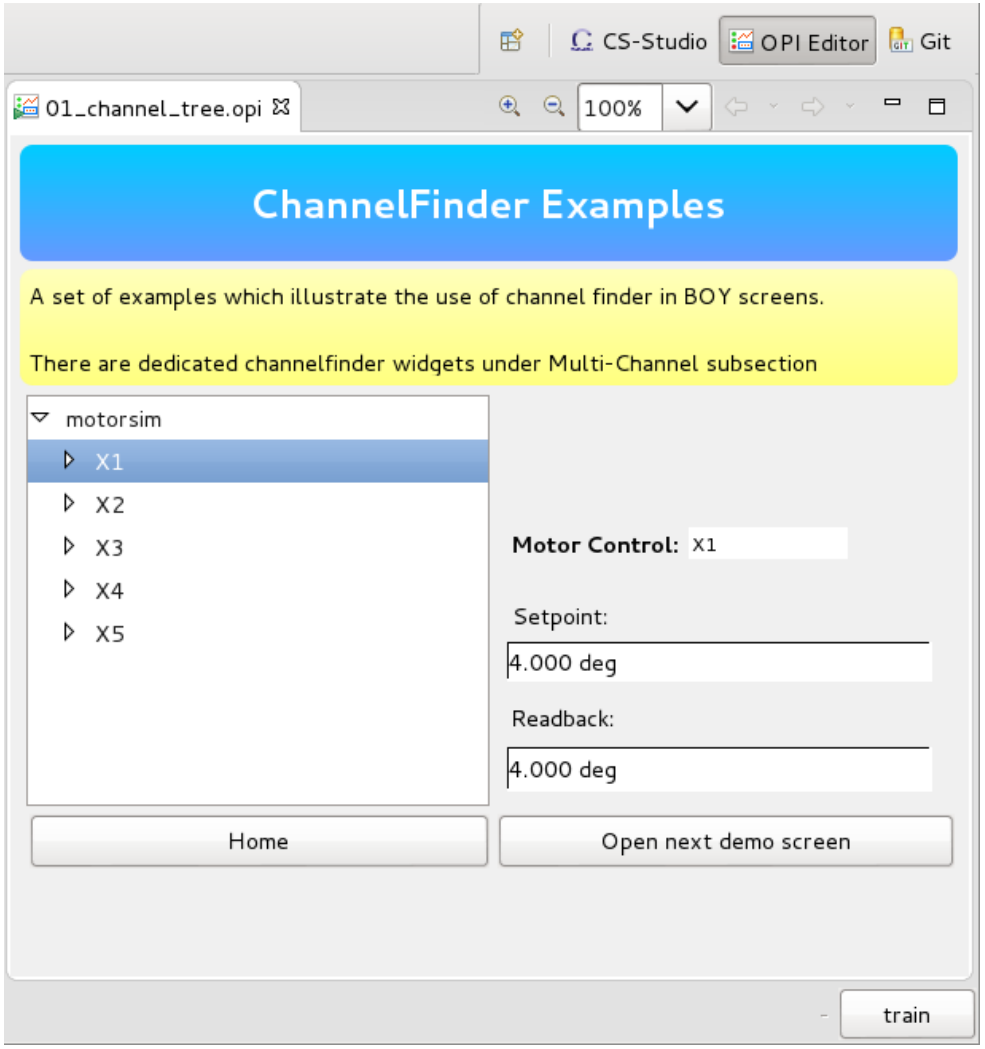
- Dedicated ChannelFinder widgets





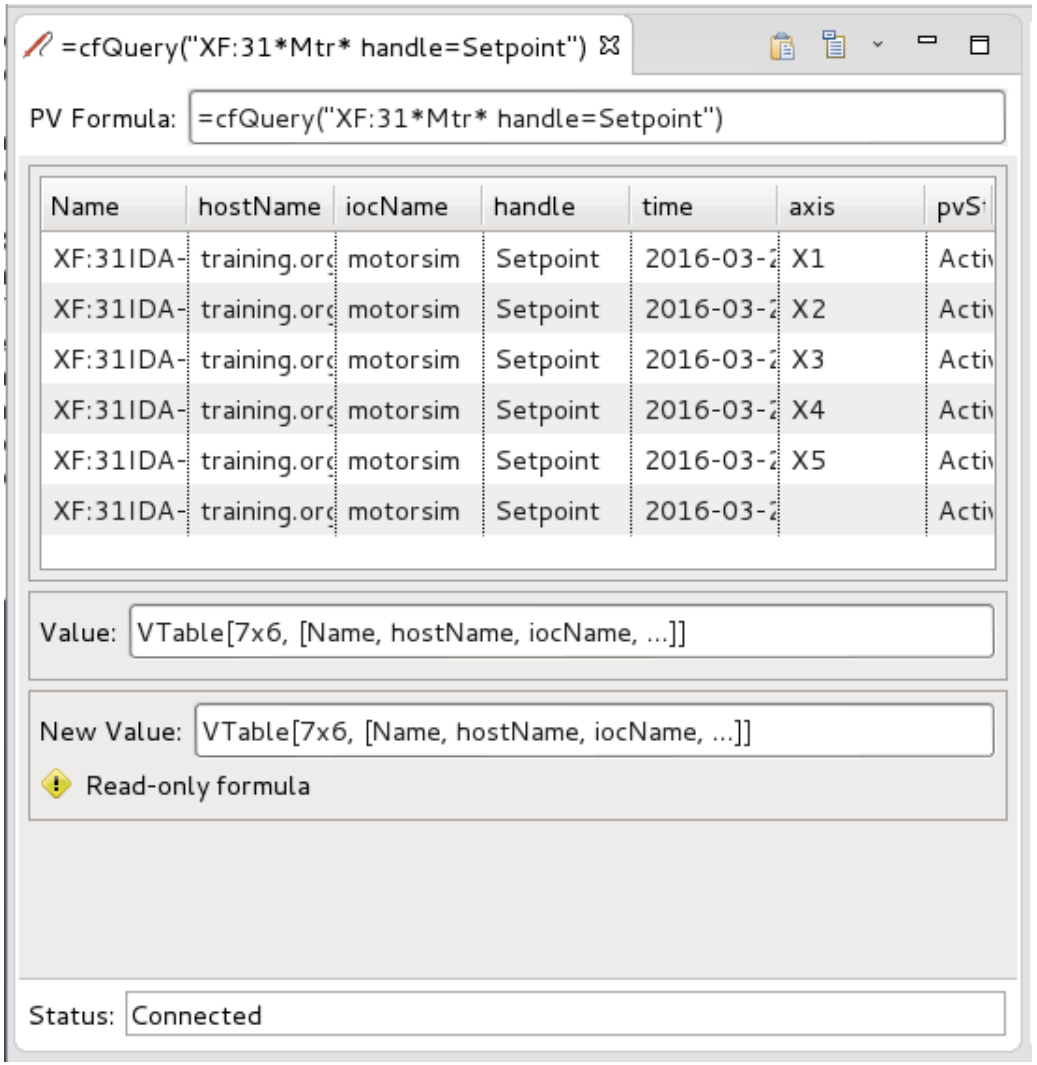
ChannelFinder & BOY

- Embed channel tree by property widget into the opi
  - Set Channel query: “XF:31*Mtr*”
  - Tree Properties: iocName, axis, handle
  - Selection Expression: #(axis)
- Selections from this widget can be used to initialize other widgets



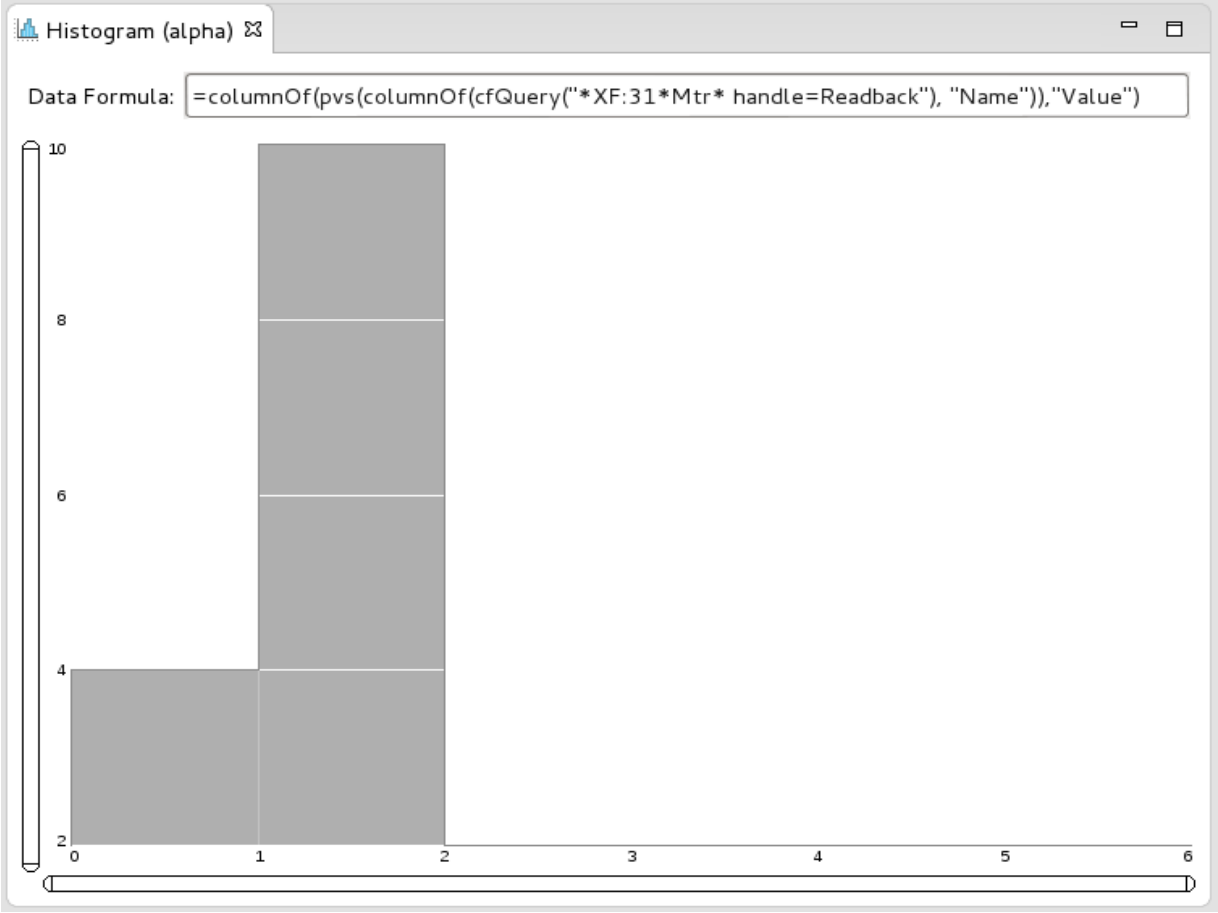
cfQuery

- Accessing channelfinder data in opi screens
- *=cfQuery(Vstring query) : VTable*

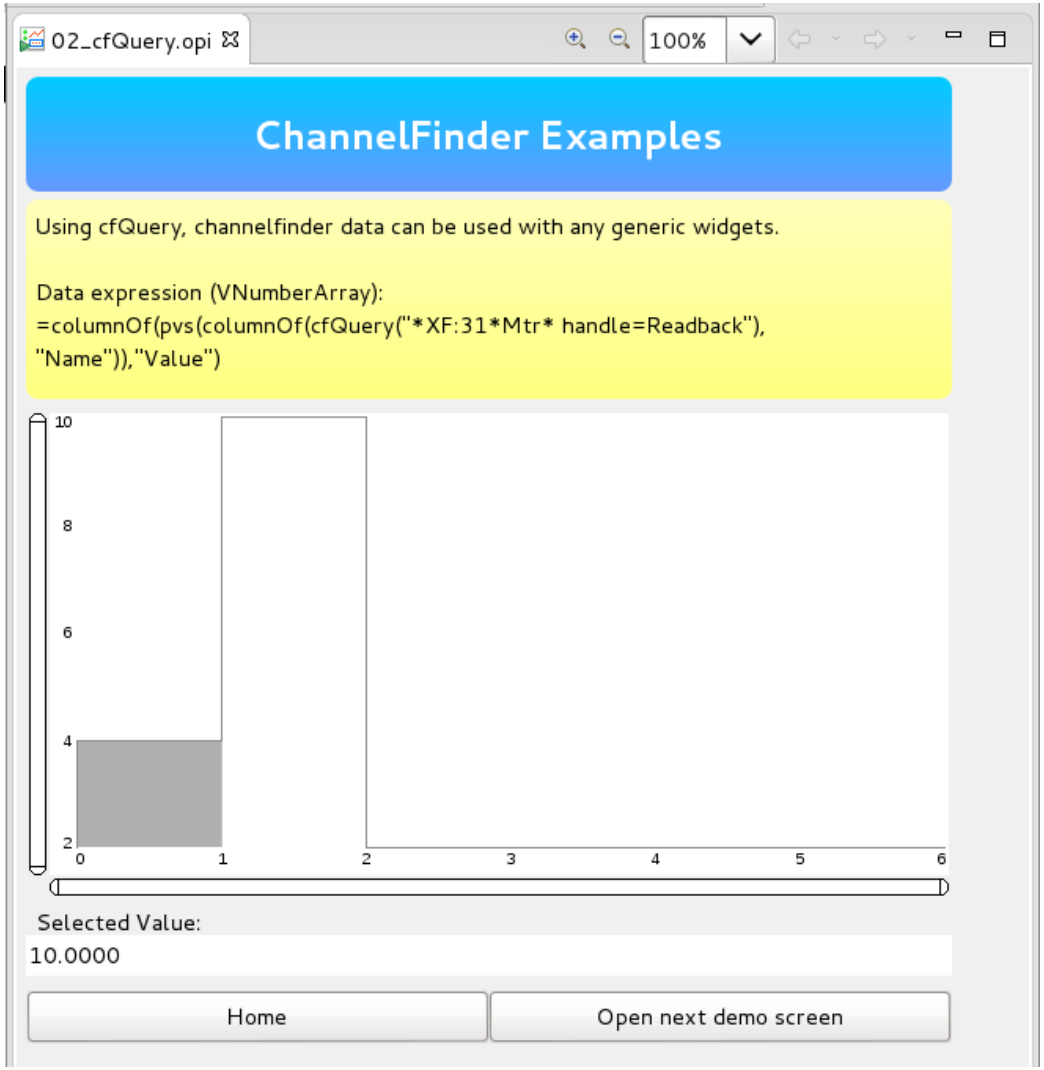


cfQuery

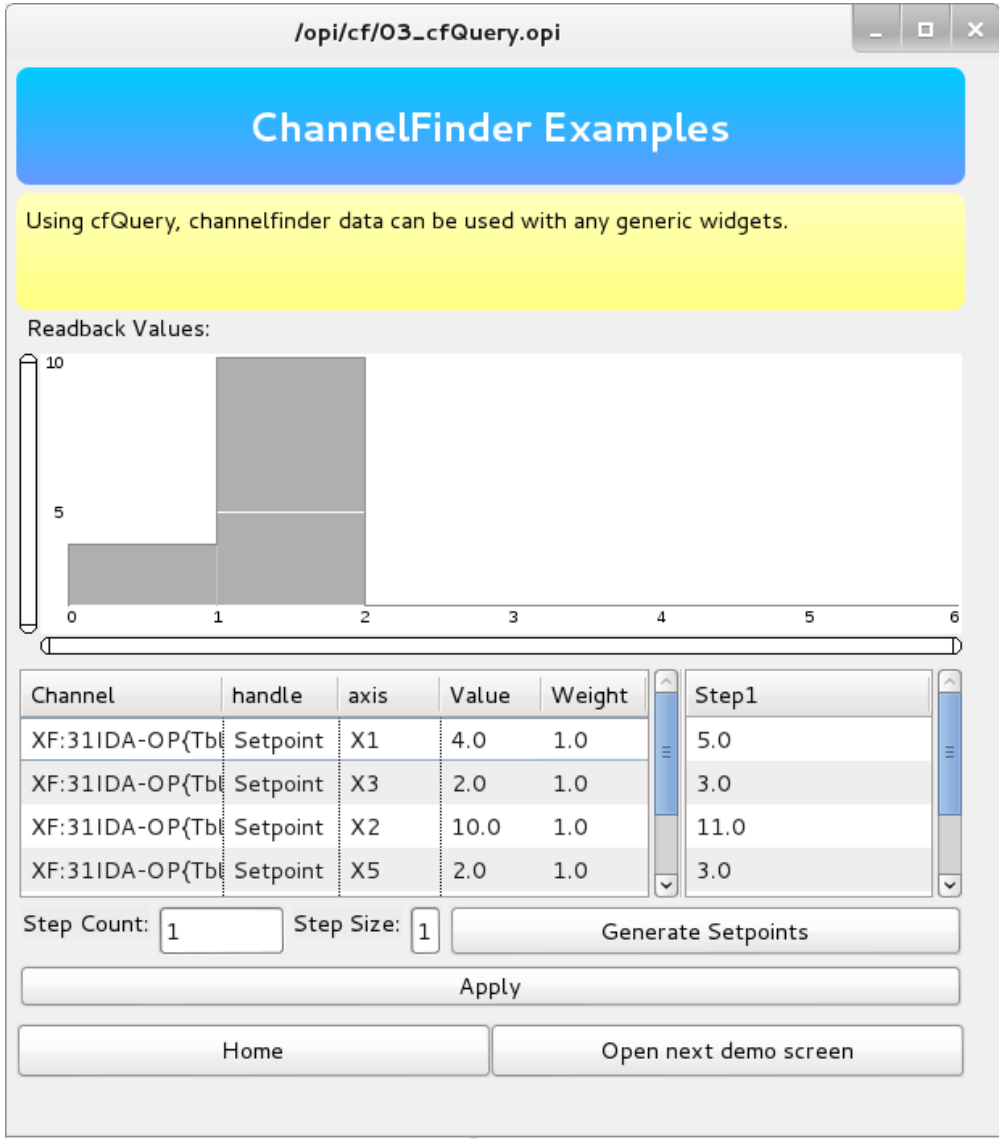
- Combining cfQuery with other formulas to create tables/arrays which can be then used with existing cs-studio widgets
- *=columnOf(pvs(columnOf(cfQuery("*XF:31*Mtr* handle=Readback"), "Name")),"Value")*



ChannelFinder & BOY



ChannelFinder & BOY



Questions