CA Lab - simplify your LabVIEW™-EPICS communication

HZB Helmholtz Zentrum Berlin

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EPICS

29th April - 3rd May

Introduction

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1. Why another interface between LabVIEW™ and EPICS?

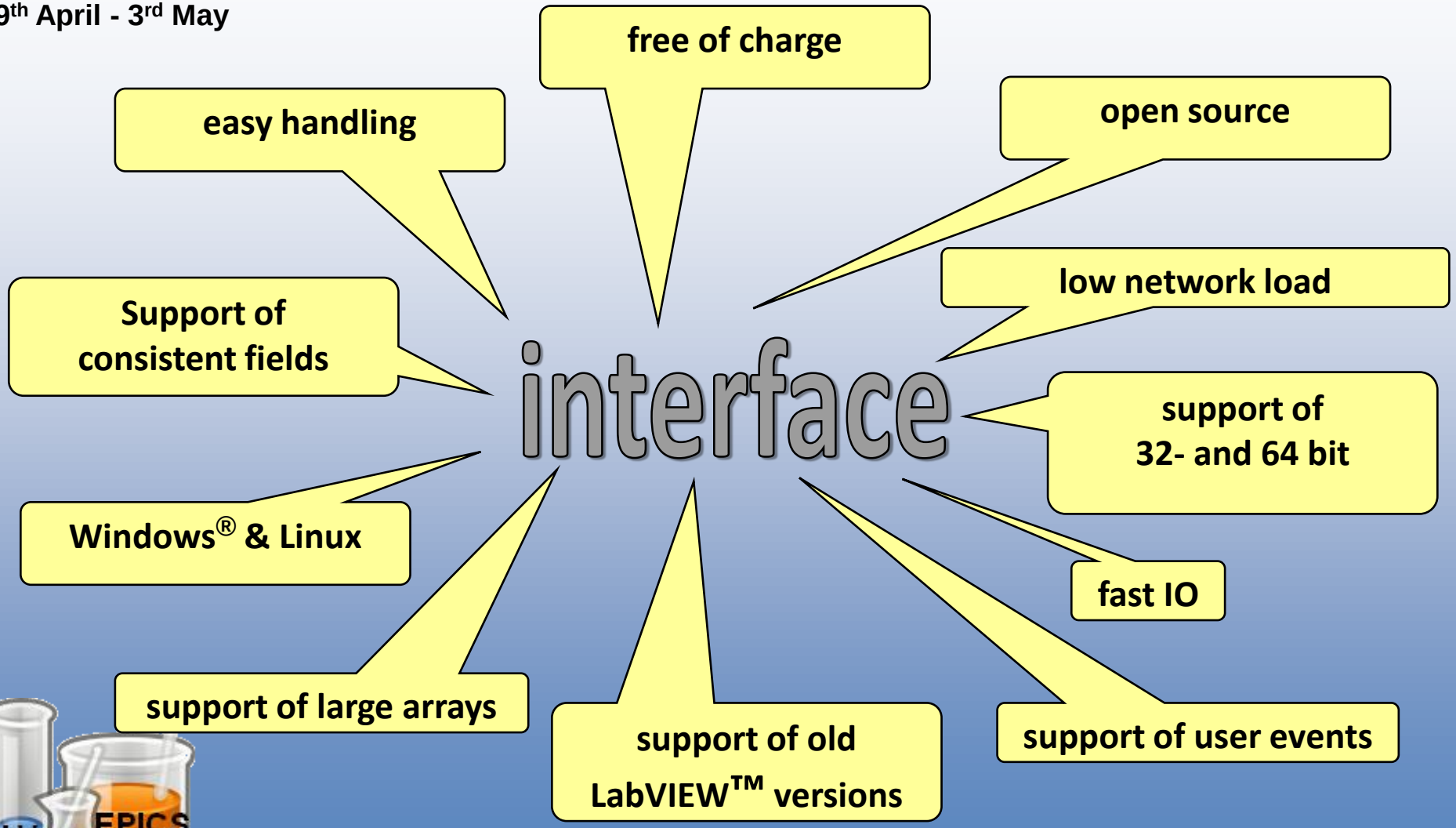
2. The technical realisation of the project

3. How is the handling for end users?

Reasons

- Guest researchers at BESSY like LabVIEW™
- Beamlines are operable via EPICS
- Operation status of BESSY is available via EPICS
- Calling for suitable interface

Requirements



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Free Solutions in 2009

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1. EPICS I/O Client from NATIONAL INSTRUMENTS

2. LabVIEW™ Channel Access Client from SNS SPALLATION NEUTRON SOURCE

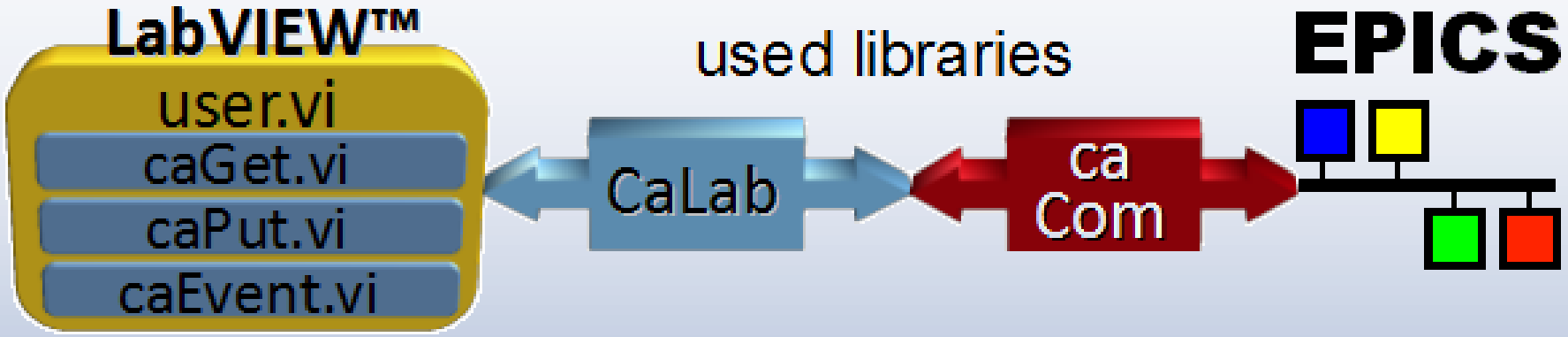
3. ... some more

Significant problems

Existing difficulties

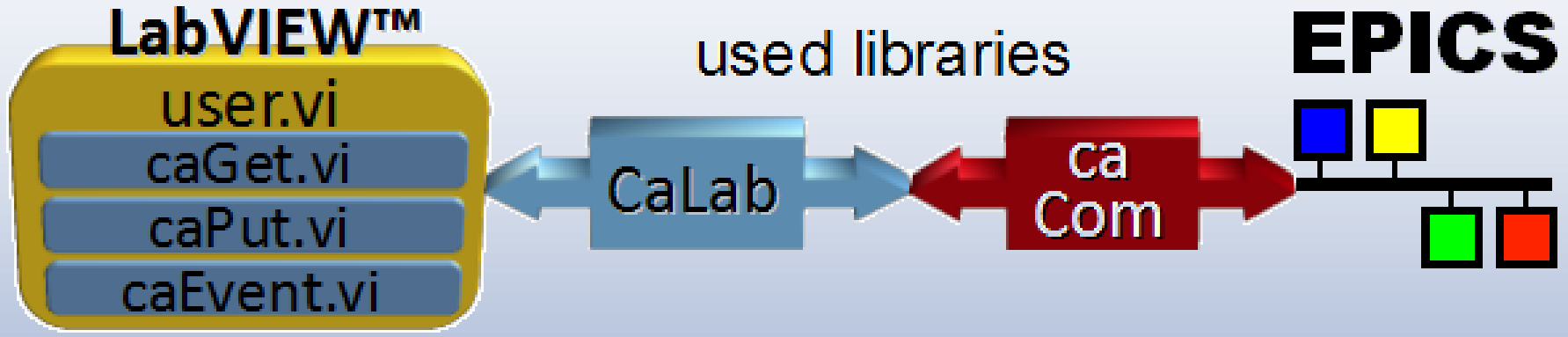
- Dependency of external services
- Error-prone for newcomers
- Incomplete implementations of
  - Data types
  - EPICS fields
  - Enumerations

Solution



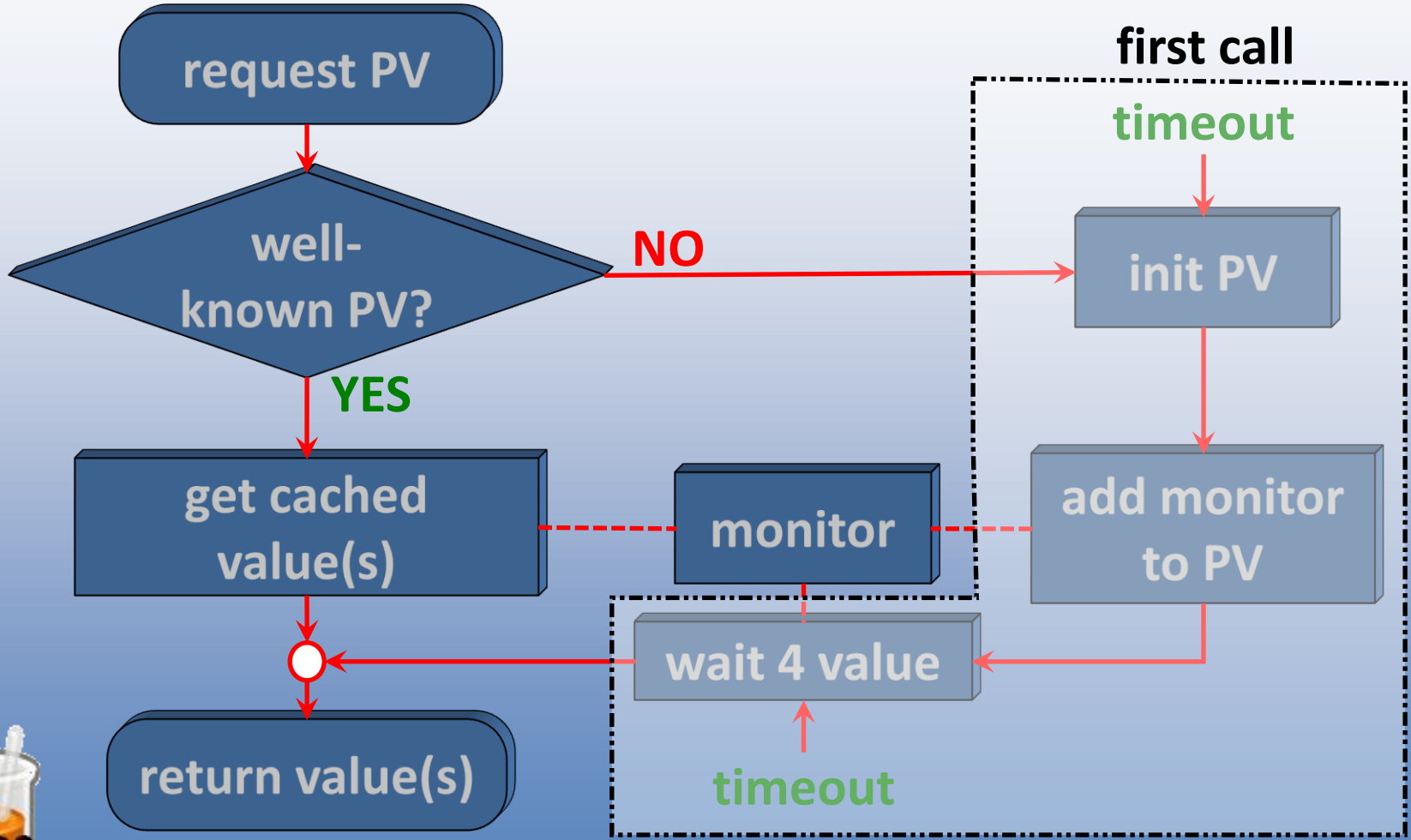
- + Directly based on the EPICS base
- + Supports all EPICS data types
- + Any number of consistent fields per EPICS variable
- + LabVIEW™ 7.0 to 2012 on Windows® and Linux
- + Monitoring und Caching → low network load

Solution



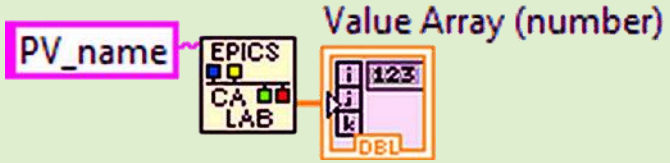
- EPICS client only
- Not available for realtime units
- 3 additional native libraries
  - CaLab
  - ca (EPICS base)
  - Com (EPICS base)

Solution

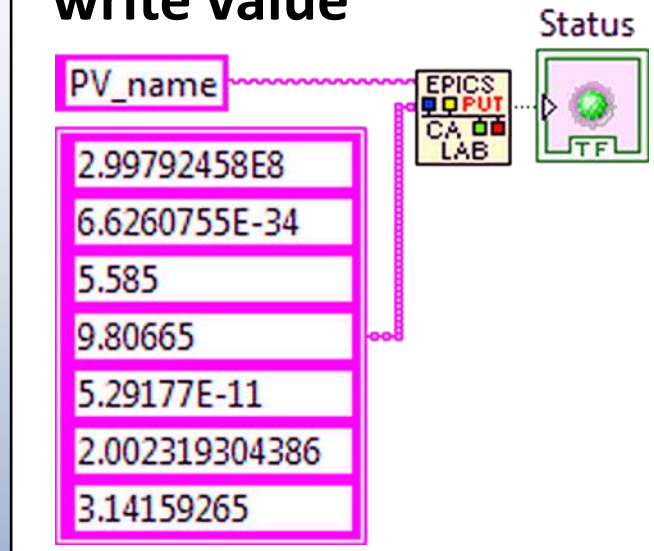

request PV
well-known PV?
NO
YES
first call
timeout
init PV
add monitor to PV
monitor
get cached value(s)
wait 4 value
timeout
return value(s)

Practice

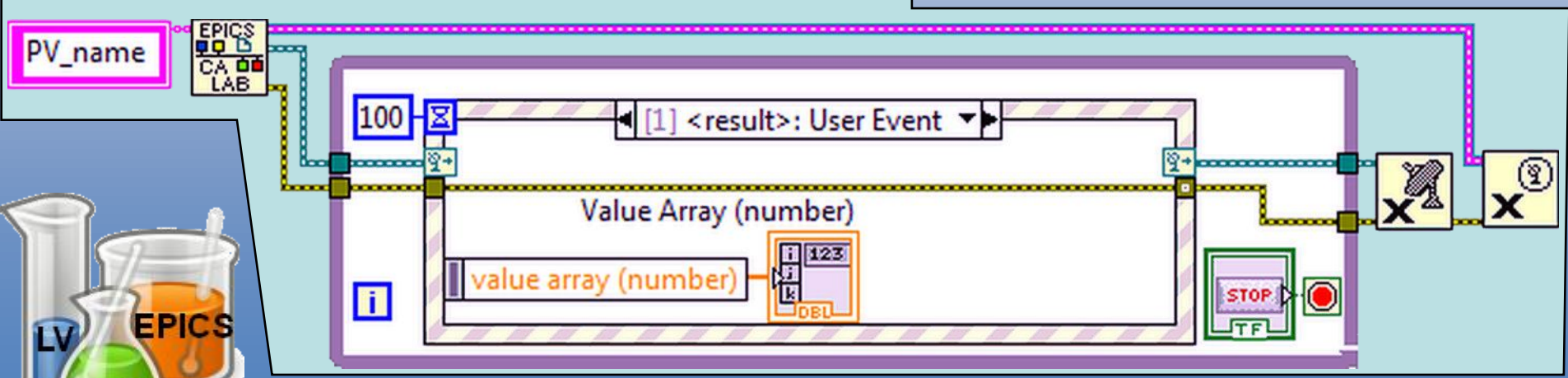
read value



write value



event



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Practice

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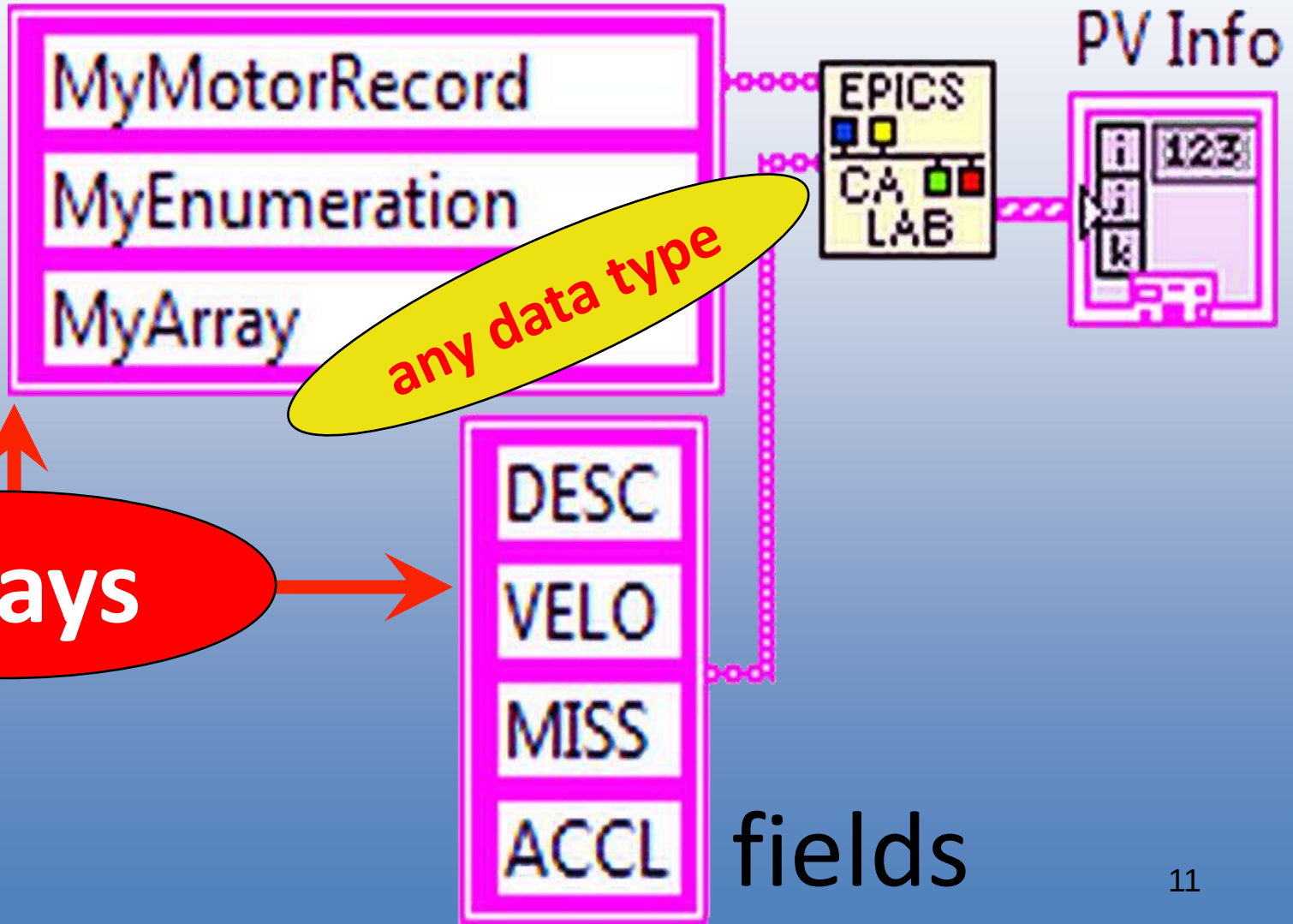
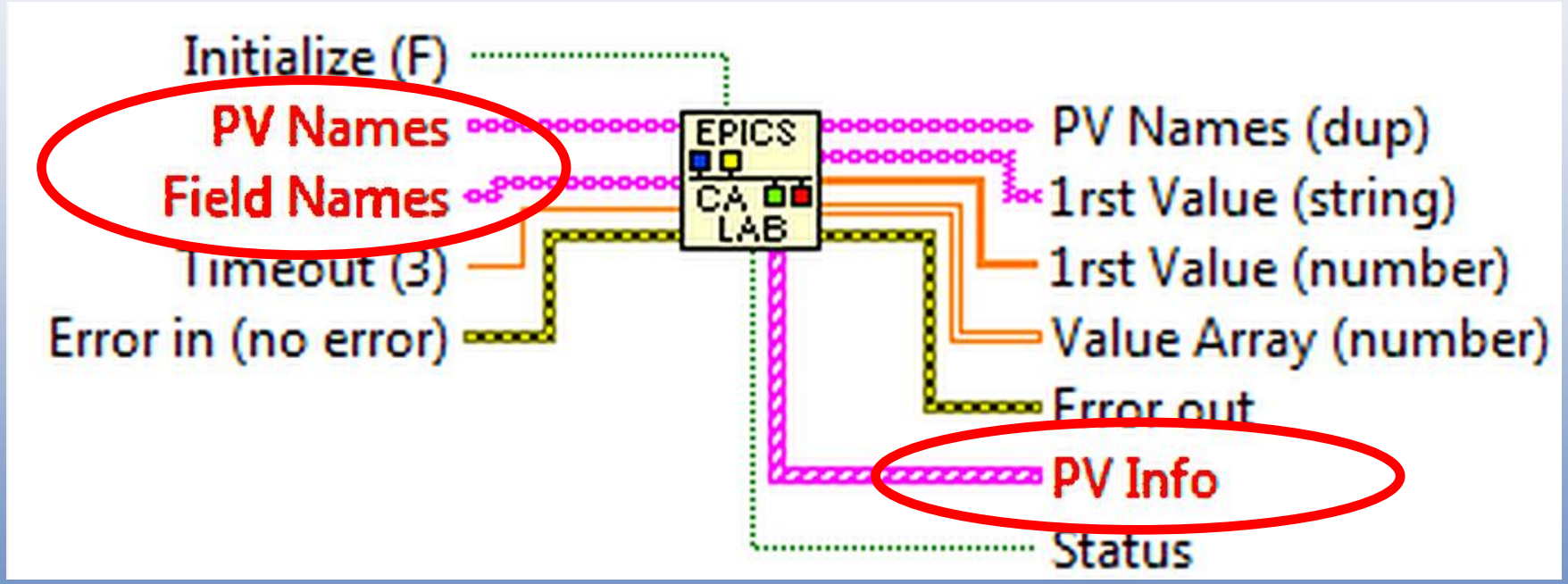
names



Practice

caLabGet.vi



Practice

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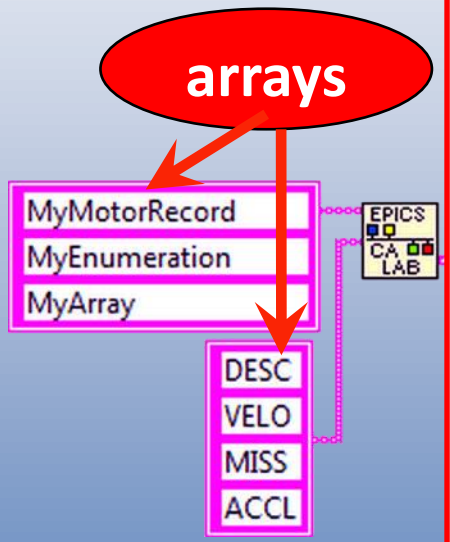

Name	Elements
MyMotorRecord	1
Values (string)	-10.4216
Values (number)	-10,4216
Status (string)	NO_ALARM
Status (number)	0
Severity (string)	NO_ALARM
Severity (number)	0
Timestamp (string)	2013-03-19 11:00:51.620337
Timestamp (number)	732535251
Field Names	DESC
Field Values	motor
Error	status: ✓, code: 1, source: Normal

Name	Elements
MyEnumeration	1
Values (string)	closed
Values (number)	1
Status (string)	
Status (number)	7
Severity (string)	MAJOR
Severity (number)	2
Timestamp (string)	2013-04-15 12:35:16.822000
Timestamp (number)	734870116
Field Names	DESC
Field Values	valve state
Error	status: ✓, code: 1, source: Normal

enums

consistence

Name	Elements
MyArray	2048
Values (string)	56
Values (number)	56
Status (string)	NO_ALARM
Status (number)	0
Severity (string)	NO_ALARM
Severity (number)	0
Timestamp (string)	2013-04-23 15:17:30.682276
Timestamp (number)	735571050
Field Names	DESC
Field Values	waveform
Error	status: ✓, code: 1, source: Normal

Performance

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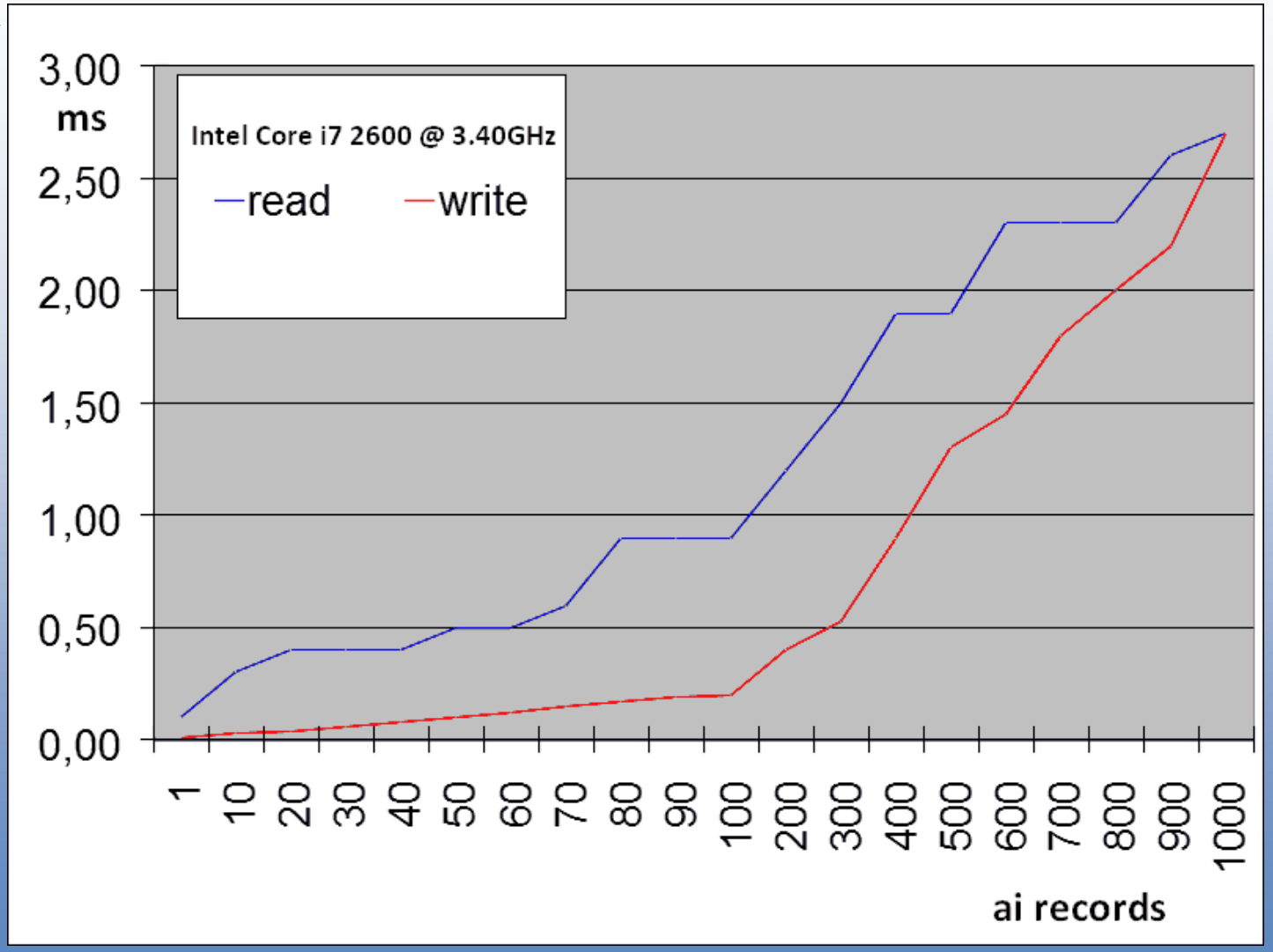

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Conclusion

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- Very easy handling of EPICS variables in LabVIEW™
- All requirements have been met
- In use at BESSY since 2009 (beamline control, machine tools)
- Continuous development
  - Better error handling in VIs

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http://tinyurl.com/calab2013