

## Data Acquisition Backbone Core

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Again: motivation and use cases

Progress: system design (plug-ins, factories)

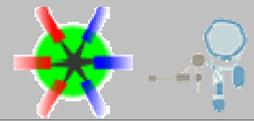
Progress: Controls

New: MBS with DIM control

New: MBS application as example

New: MBS with DABC event builder (demo screen shots)

Work supported by EU RP6 project JRA1 FutureDAQ RII3-CT-2004-506078



2004 → EU RP6 project JRA1 FutureDAQ\*  
 2004 → CBM FutureDAQ for FAIR

1996 → MBS future  
 50 installations at GSI,  
 50 external  
<http://daq.gsi.de>

Intermediate  
demonstrator

### Use cases

- Detector tests
- FE equipment tests
- Data transport
- Time distribution
- Switched event building
- Software evaluation
- MBS event builder
- General purpose DAQ

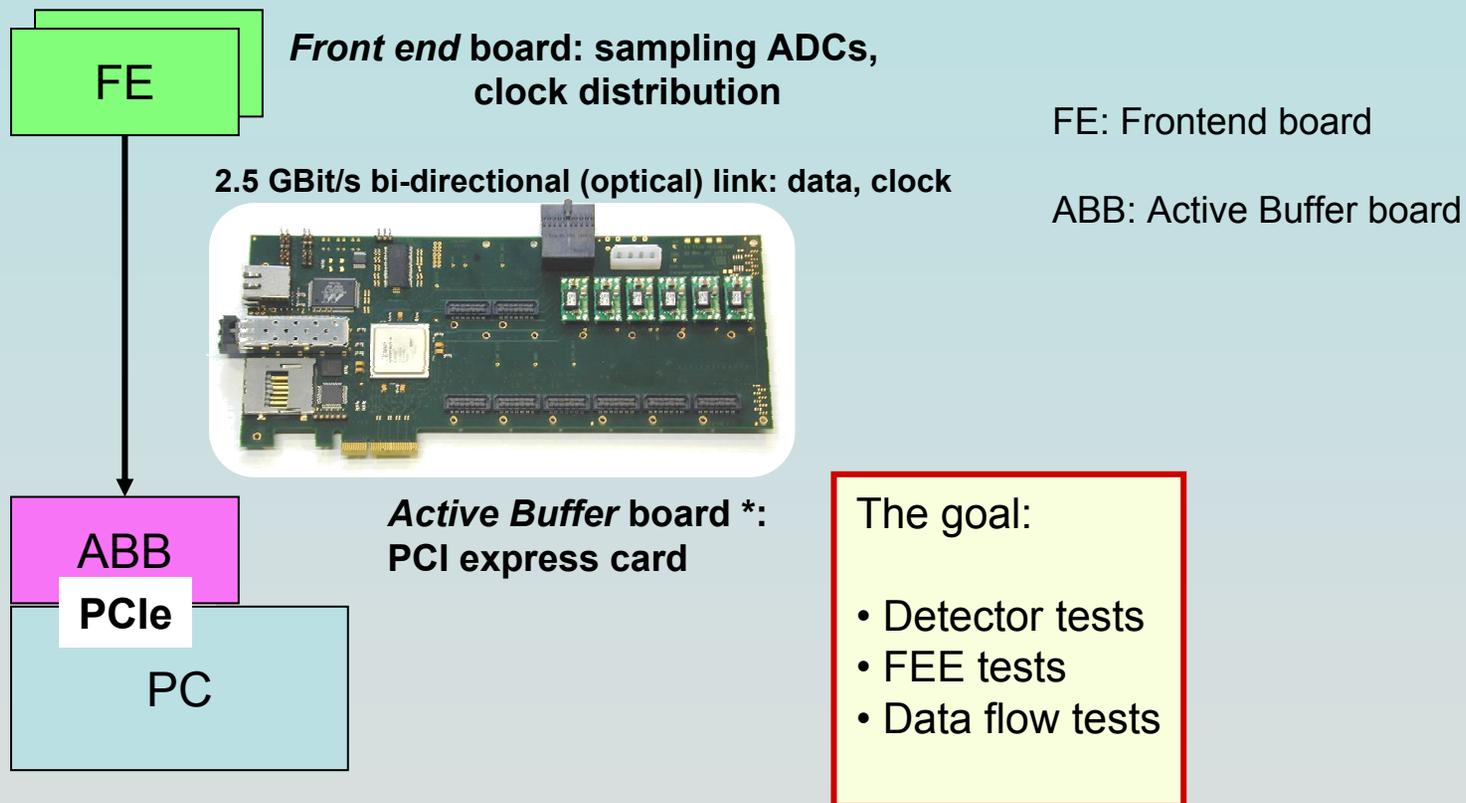
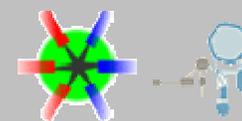
### Requirements

- build events over fast networks
- handle triggered or self-trigger front-ends
- process time stamped data streams
- provide data flow control (to front-ends)
- connect (nearly) any front-ends
- provide interfaces to plug in application codes
- connect MBS readout or collector nodes
- be controllable by several controls frameworks

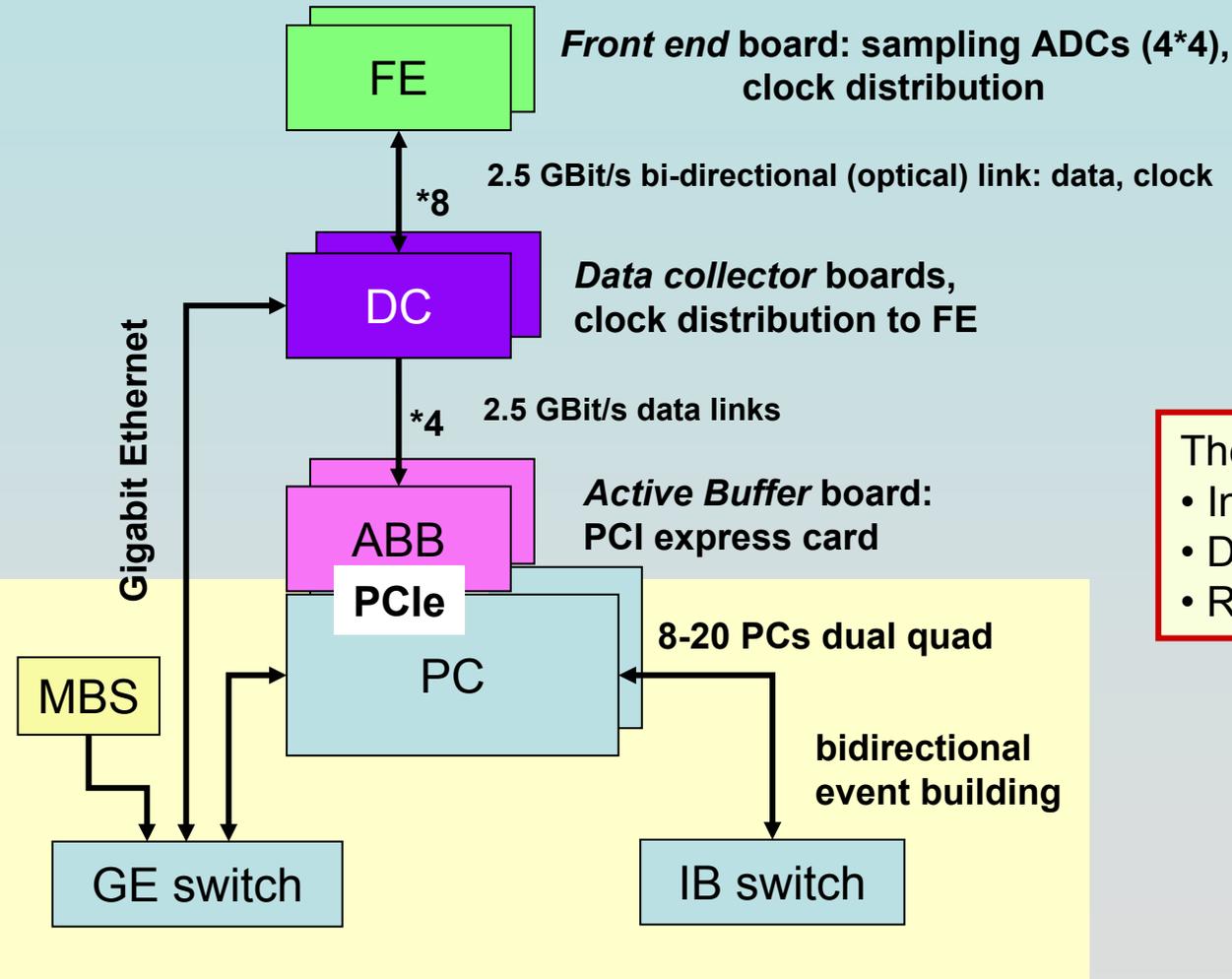
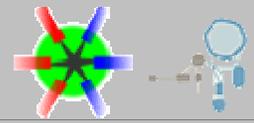
Data  
Acquisition  
Backbone  
Core

\* RII3-CT-2004-506078

➤ Some use cases



\* A.Kugel, G.Marcus, W.Gao, Mannheim University Informatics V

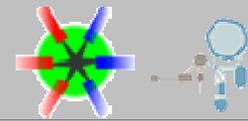


FE: Frontend board  
 DC: Data combiner board  
 ABB: Active Buffer board  
 GE: Gigabit Ethernet  
 IB: InfiniBand  
 MBS: MultiBranchSystem

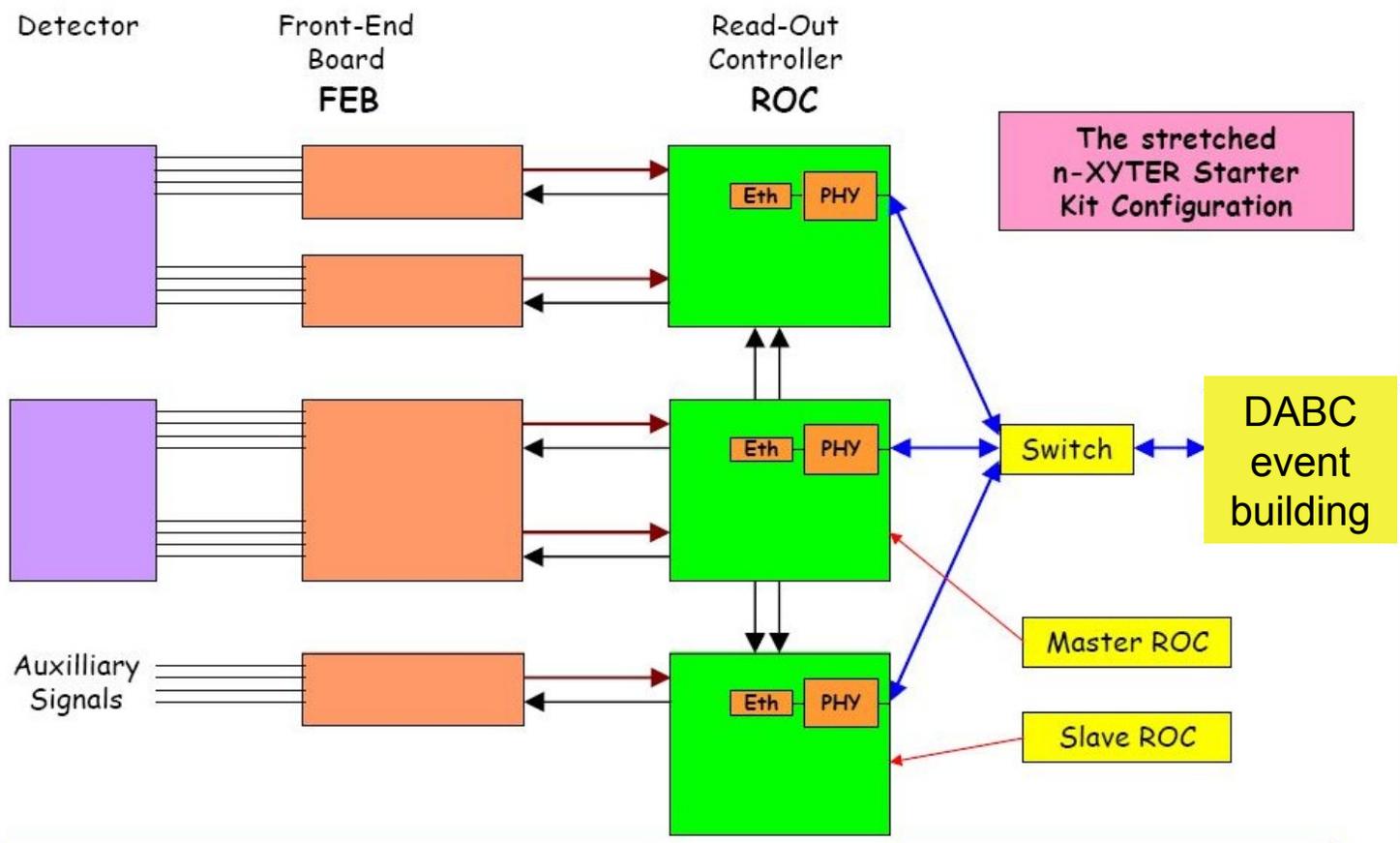
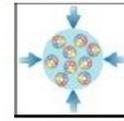
The goal:

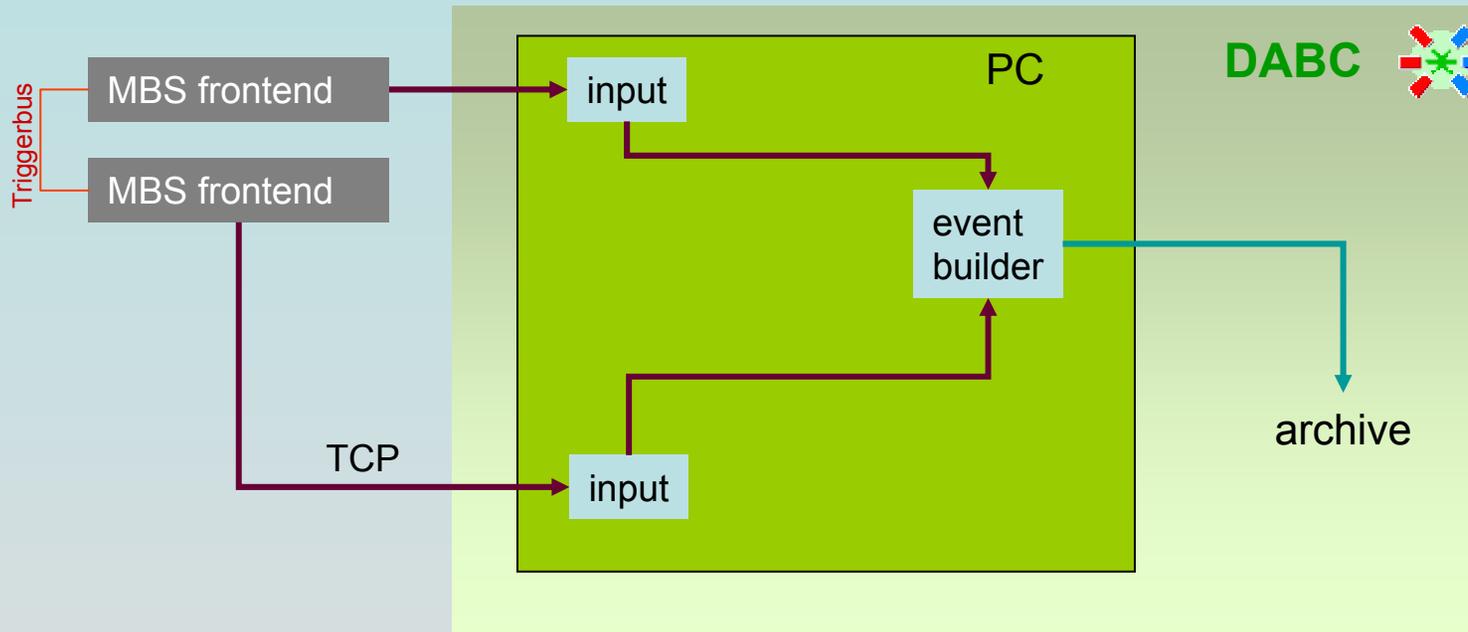
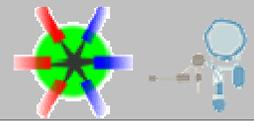
- Investigate critical technology
- Detector tests
- Readout tests

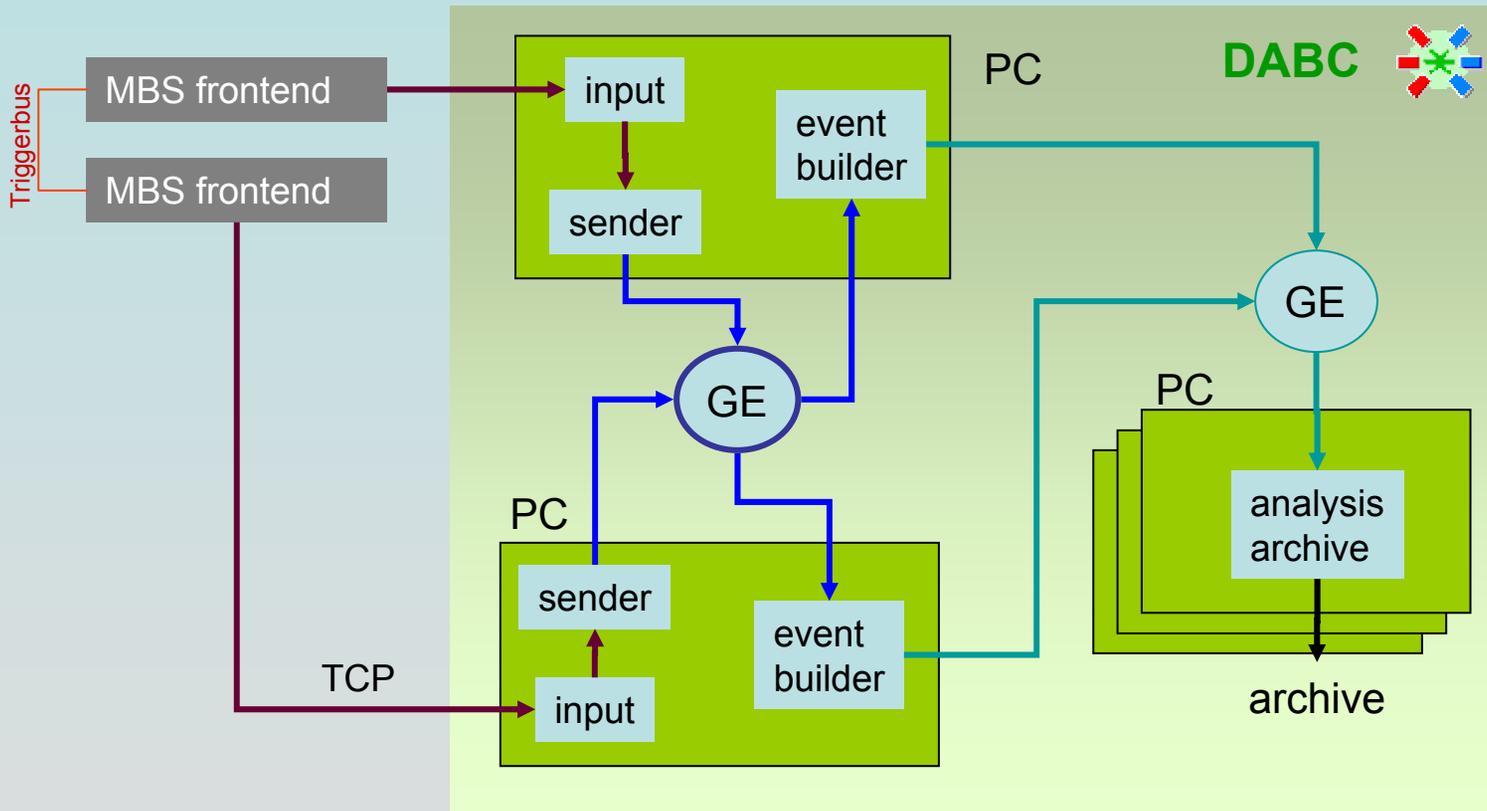
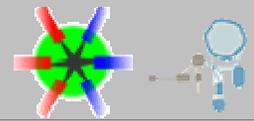
Scales up to 10k channels, 160 CPUs



# "DAQ" Configuration

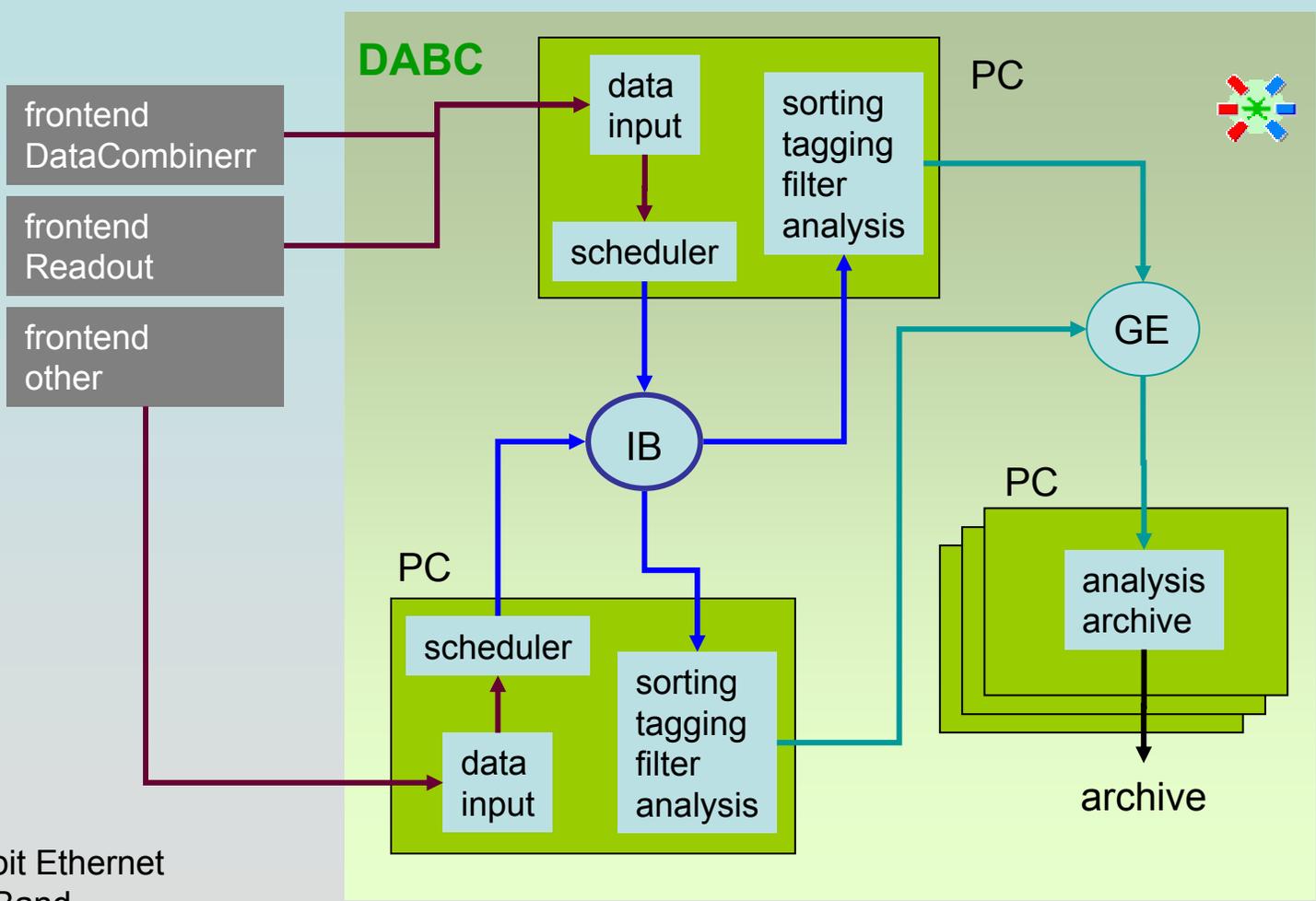
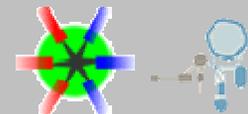






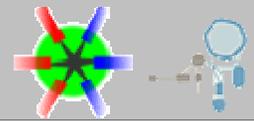
GE: Gigabit Ethernet

➤ DABC structure

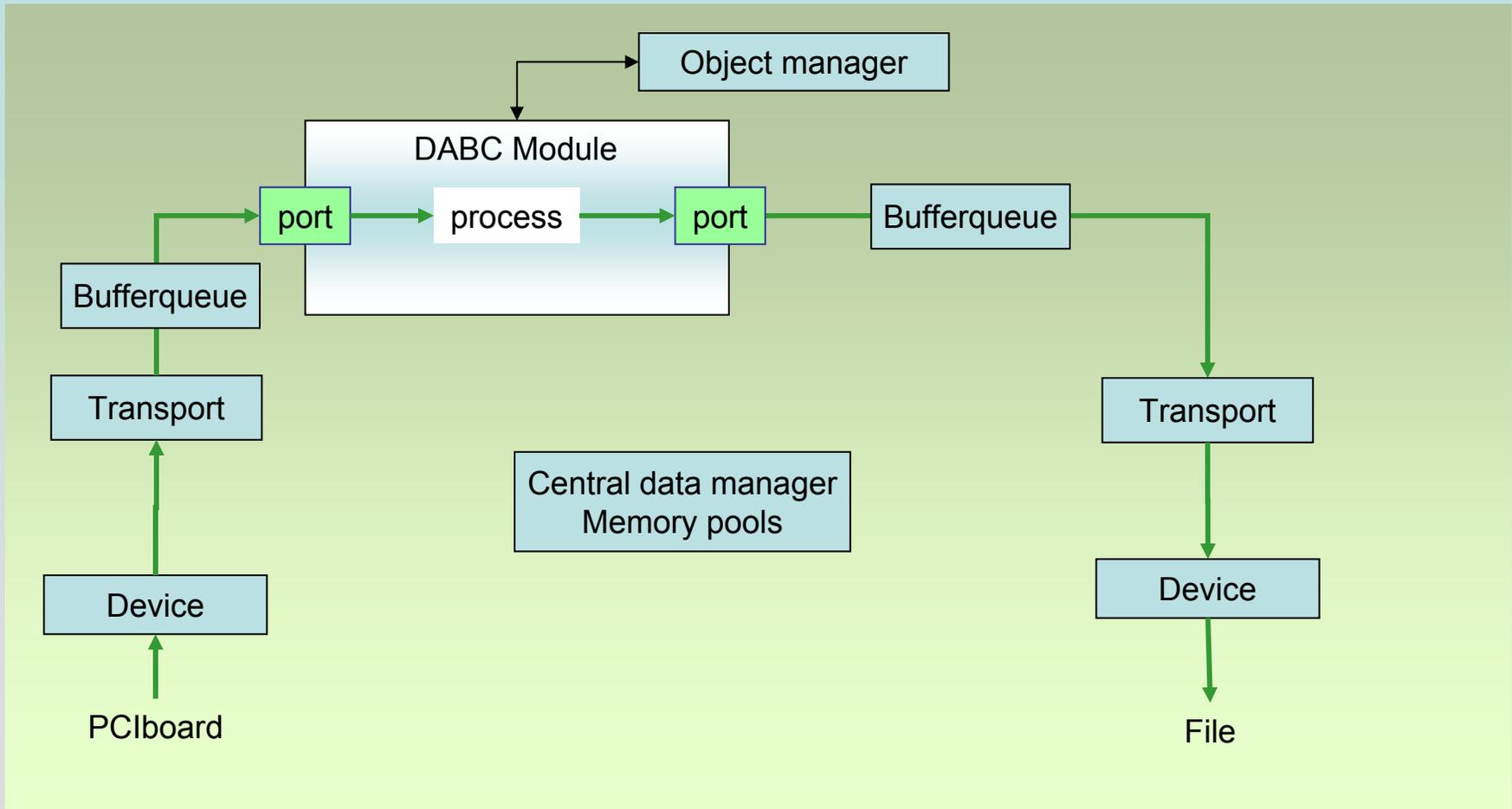


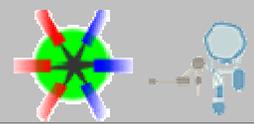
GE: Gigabit Ethernet  
IB: InfiniBand

➤ DABC data flow

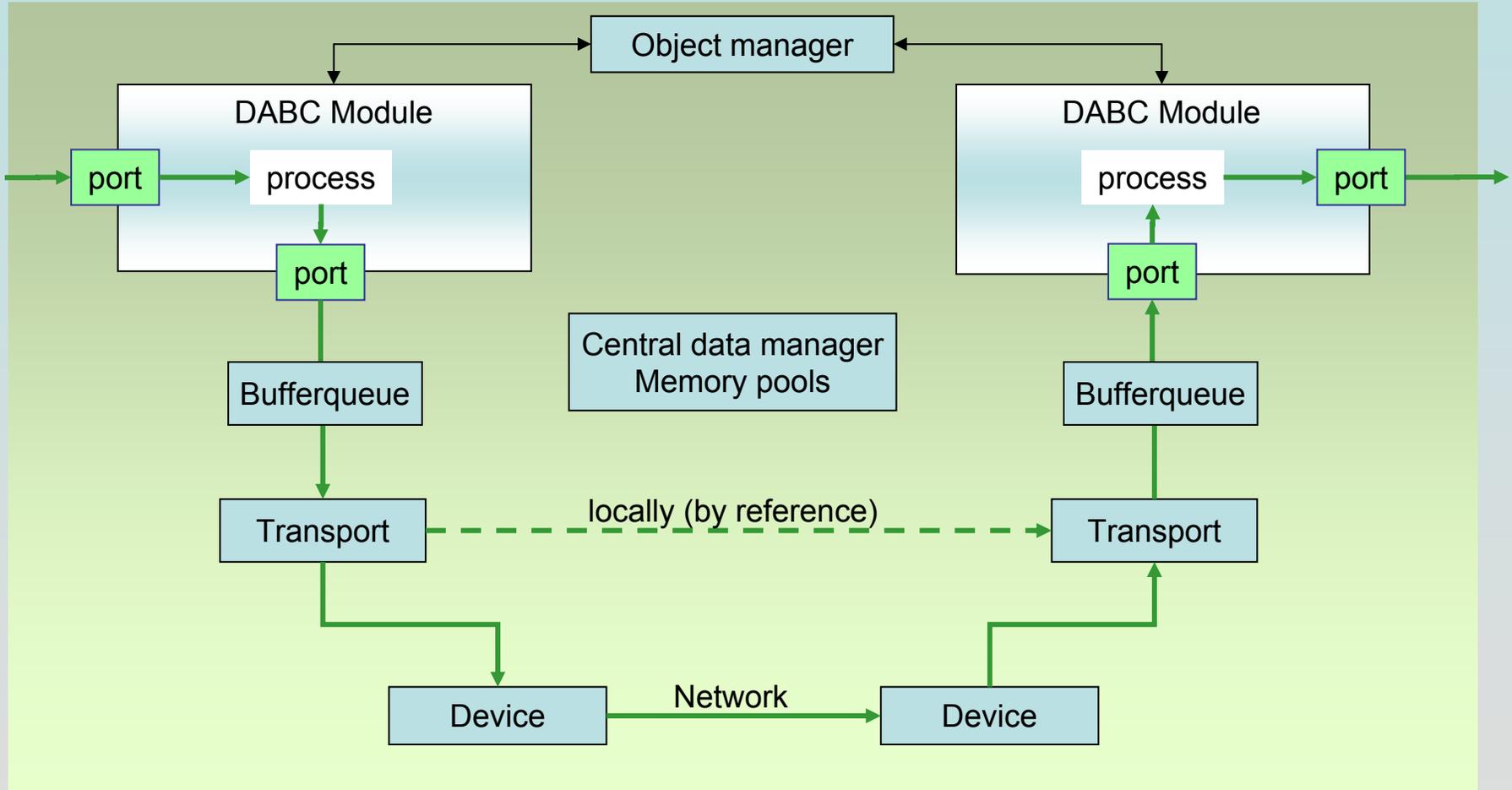


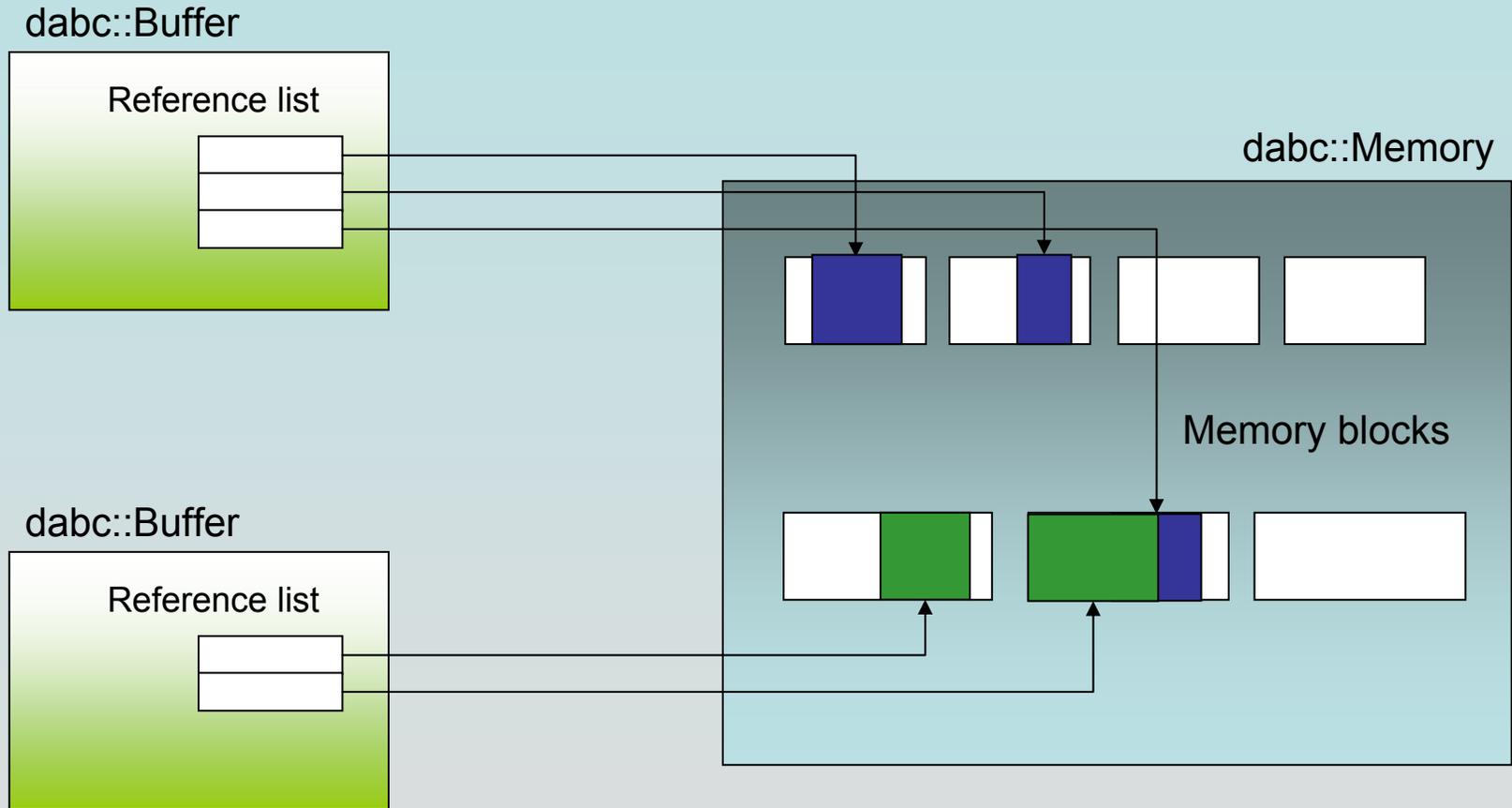
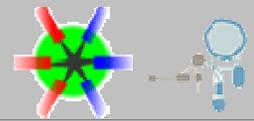
A *module* processes data of one or several data streams.  
Data streams propagate through *ports*, which are connected by *transports* and *devices*



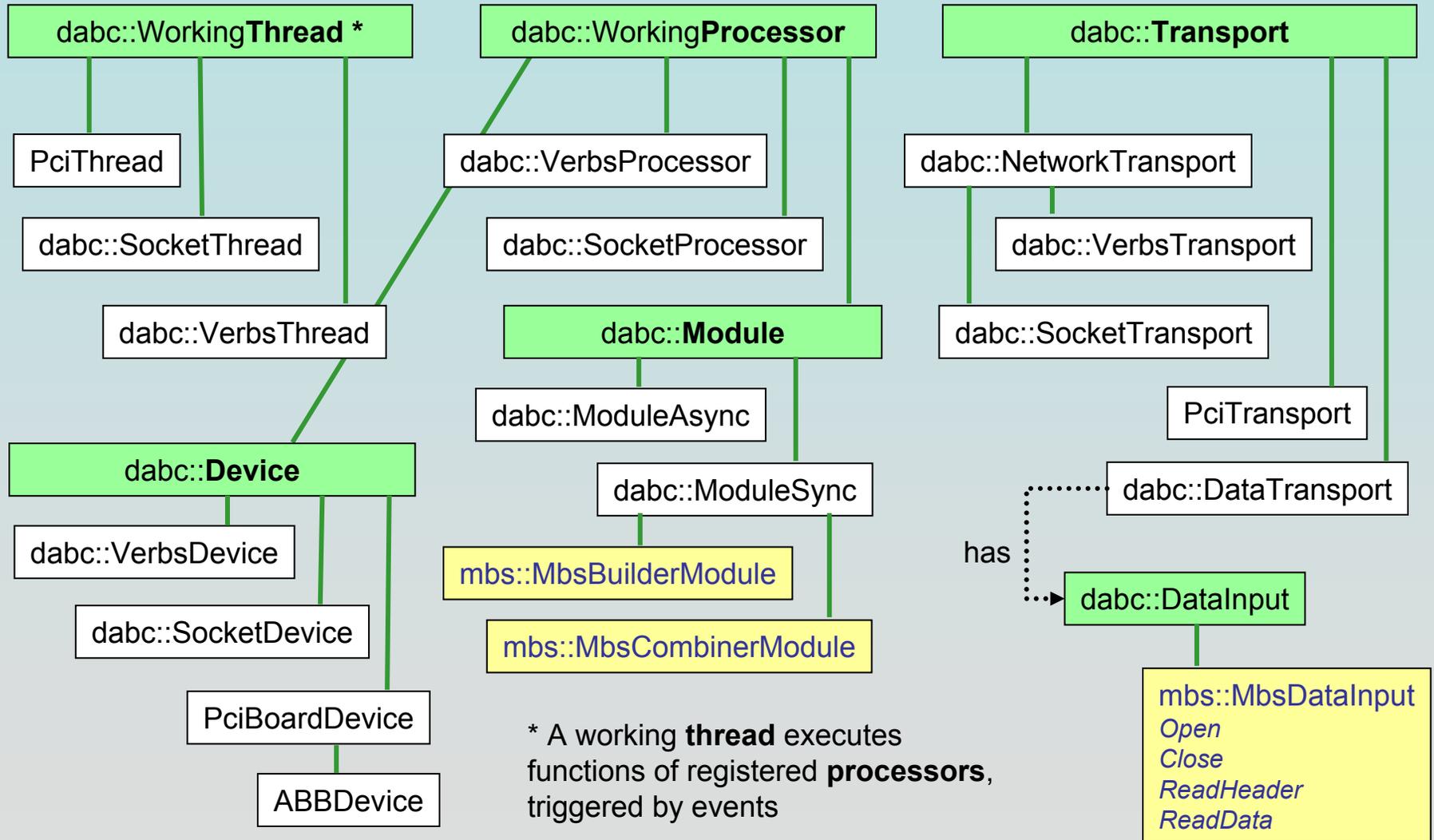
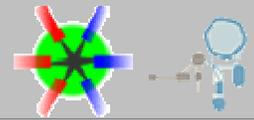


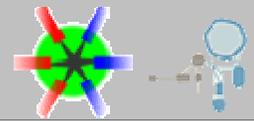
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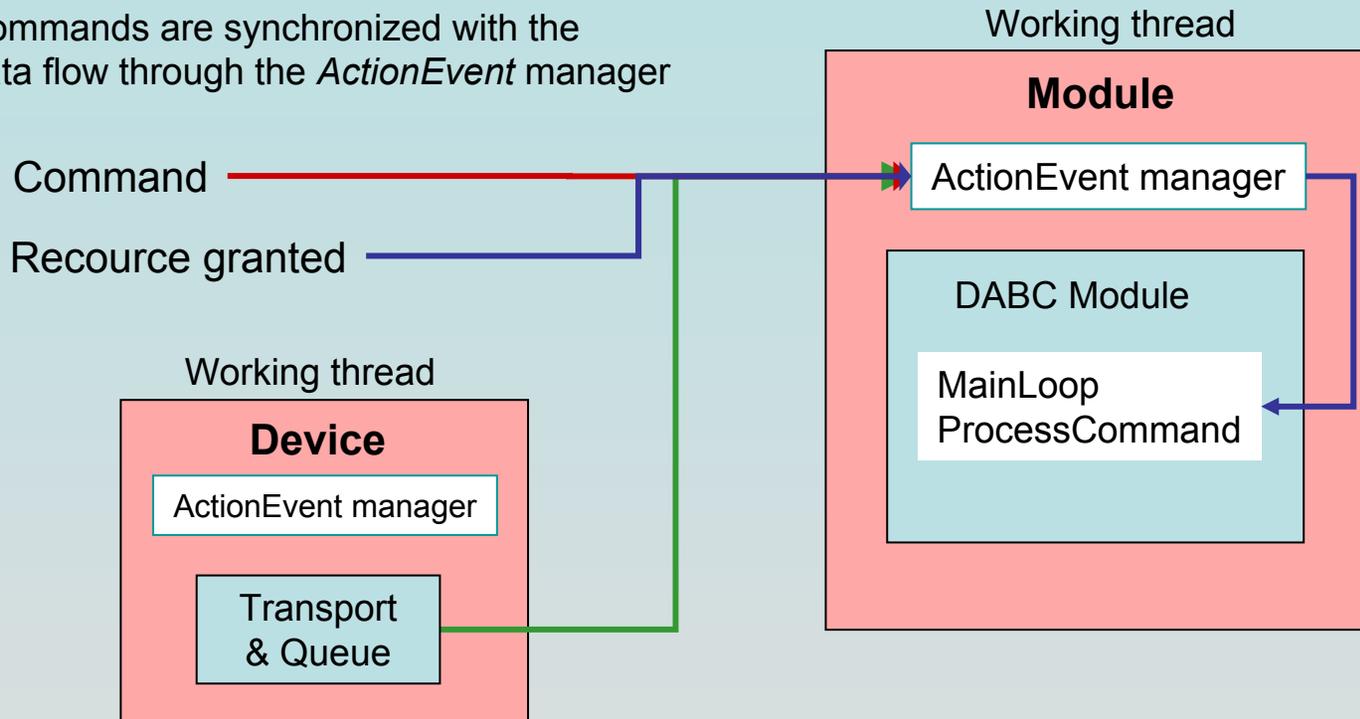


Multiple references of resources (blocks)  
Copy buffer without copy of data

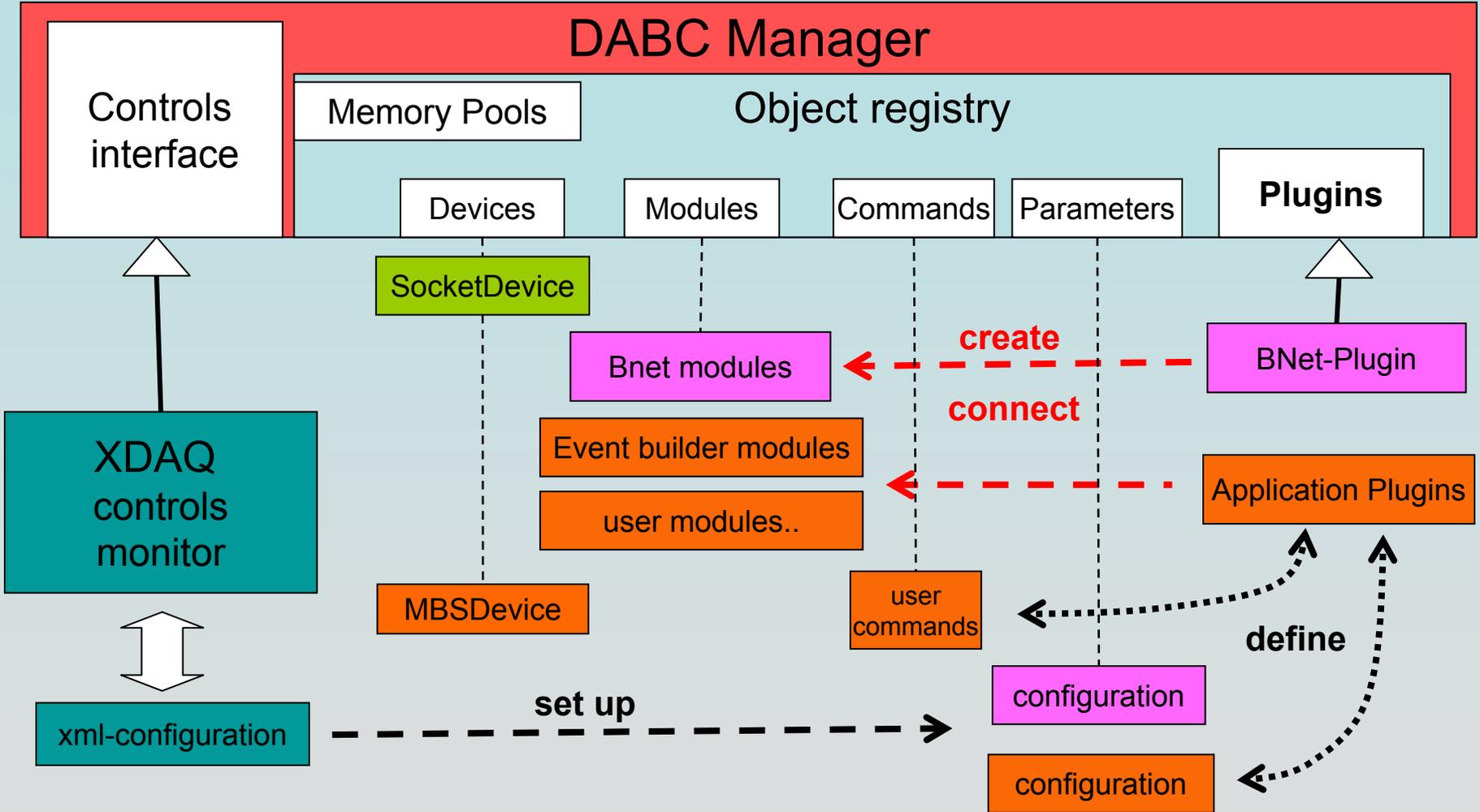
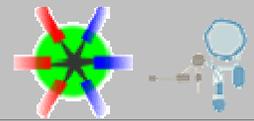




Commands are synchronized with the data flow through the *ActionEvent* manager

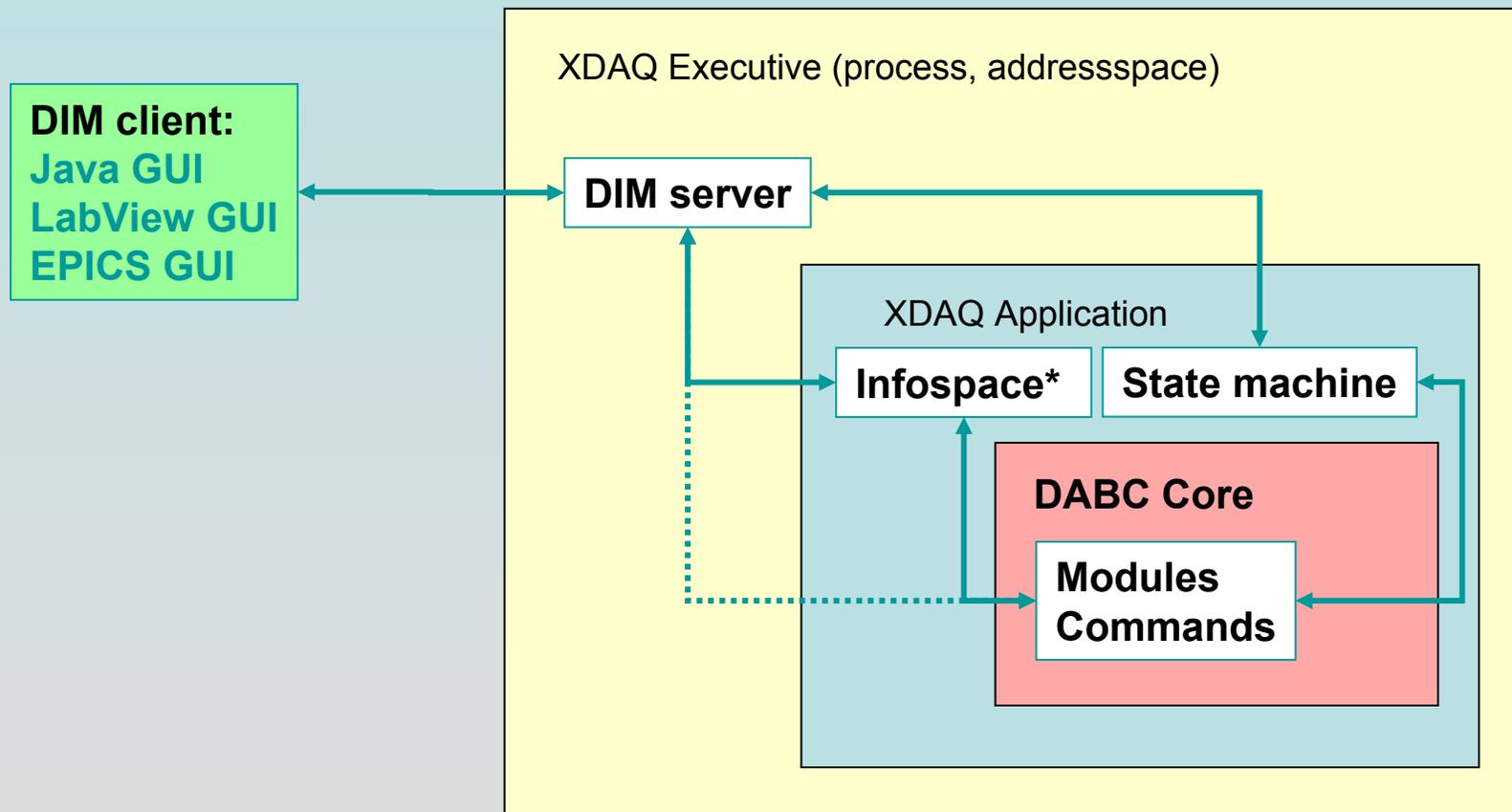


A device, i.e. socket device controls one port (transport).  
 Once a queue buffer is filled, the transport signals the *ActionEvent* manager, which in turn calls the *MainLoop* function of the associated module, or  
 If *MainLoop* was waiting for resource or buffer, it continues.



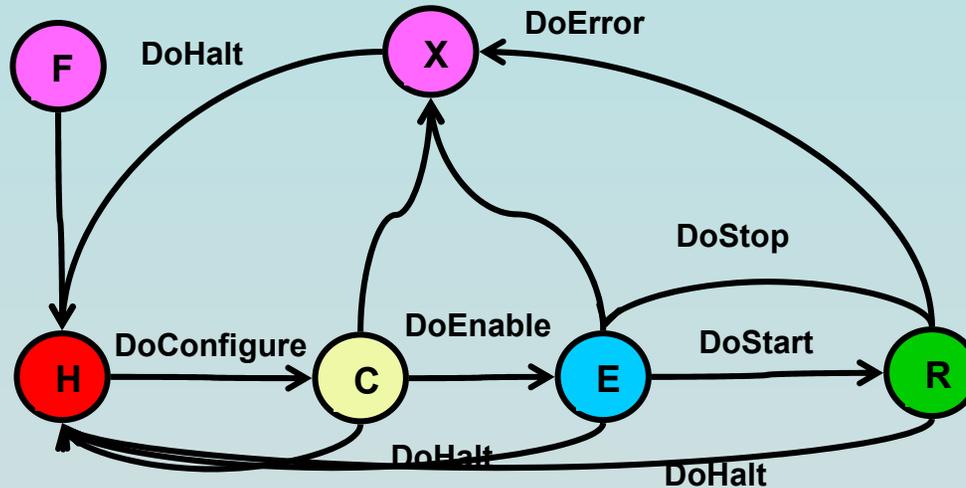
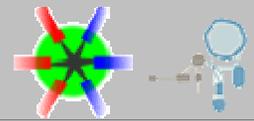


**DABC core decoupled from XDAQ environment!**

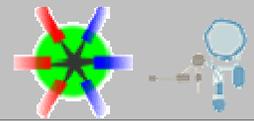


\* Infospace: remotely accessible parameters

➤ MBS connection



- State machine is **defined by controls interface** of DABC core
- **ApplicationPlugin** implements state transition actions („user code“)
- Nodes in B-net may set up **state machine hierarchy**:  
(e.g. 1 master node, n worker nodes)



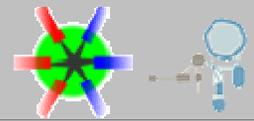
## Naming convention for DIM services (commands and parameters)

**/ server / node / application / <type.<thread.>>name**

- server: DIM namespace
- node: name<:ID> (port)
- application: <namespace::>name<:ID>
- type: DEV, MOD, POOL, PLUG
- thread: name of module or device or...
- name: parameter or command (description by related parameter record)

Records defined by DIM quality longword

**Using this convention one can control any system from generic Java GUI!**



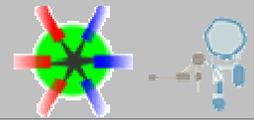
## Parameters

- Registered by **plugin** or device class as DIM service
- Also: SOAP/ **XDAQ infospace** representation, web interface, **xml input**
- Recognized by **generic GUI**, automatic graphical presentation
- Record types: Simple, Status, Rate, Histogram, Info, Command description,...

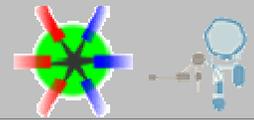
## Commands

- **DIM** (and SOAP) implementation
- **State machine** commands (generic, with **overwritten standard callbacks** in plugin)
- **Framework** commands (generic, e.g. „SetValue“)
- User defined **module commands** (registered by plugin or device):
  - executed in **user callback**
  - recognized by **generic GUI** via command description (XML)

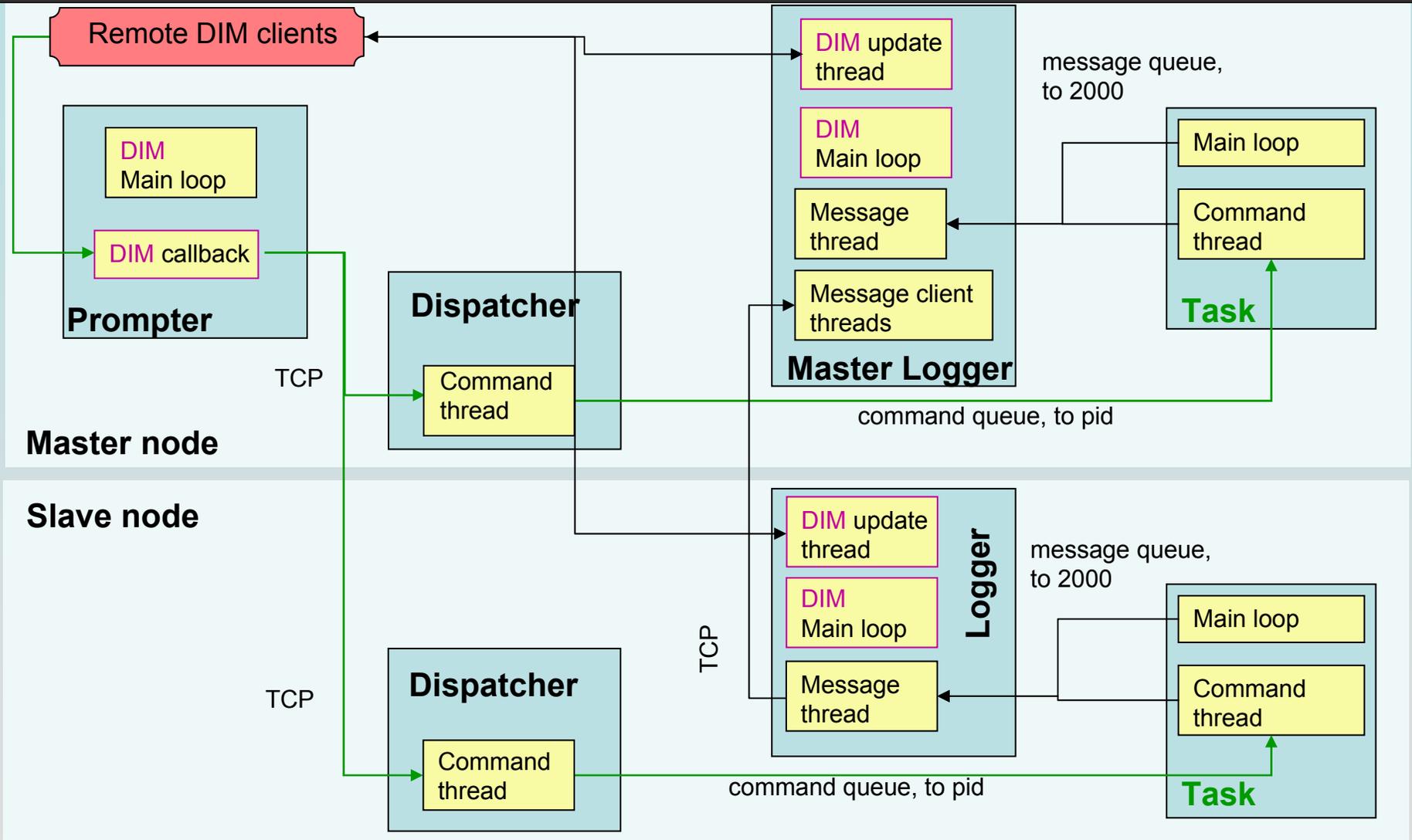
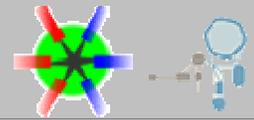
**Parameters and commands are independent from controls implementation!**

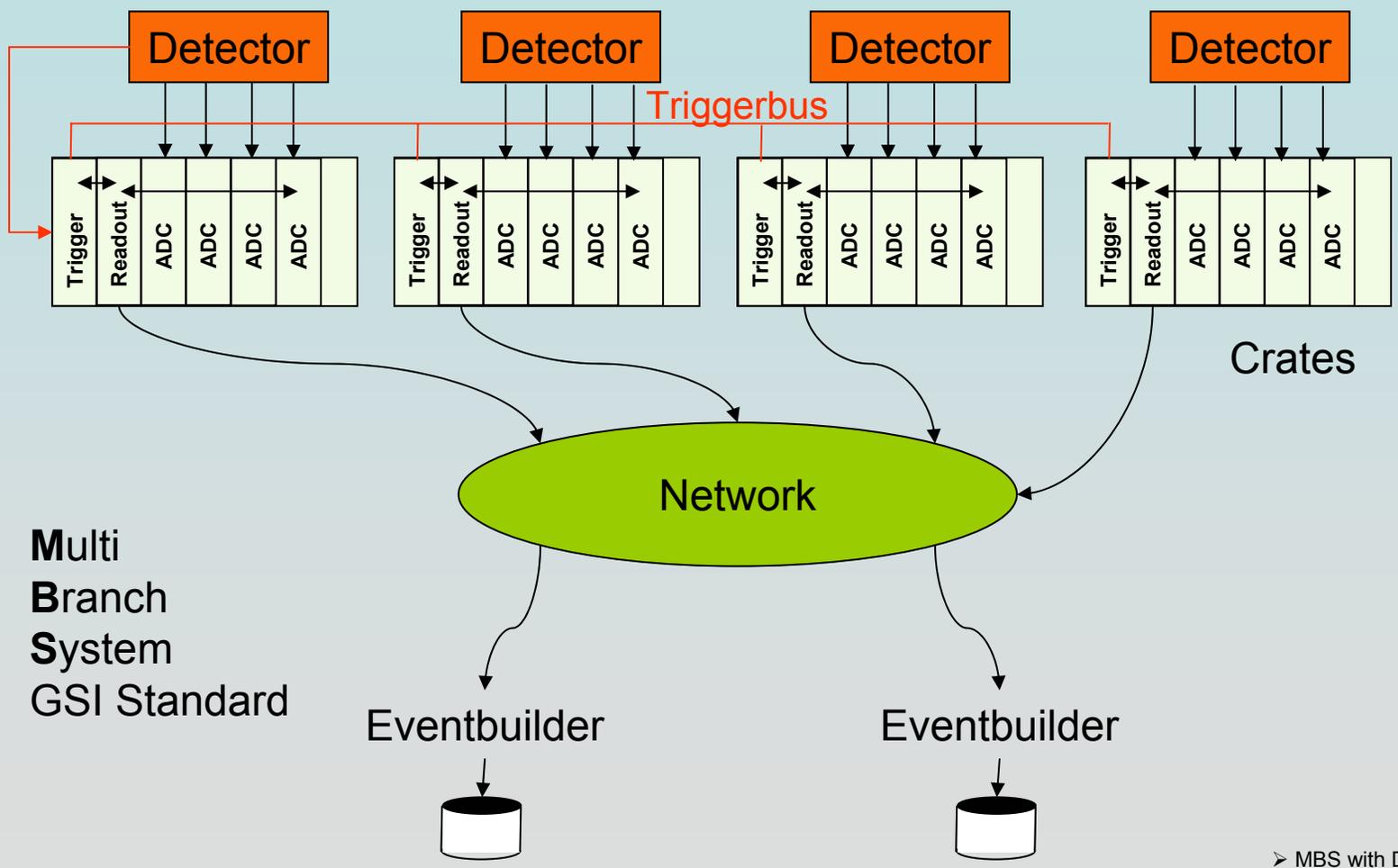


- **Configuration via XML files**
- ***ApplicationPlugin***
  - Create parameters/commands (to be set from setup file)
  - State transition functions (call factory functions)
    - Startup
    - Configure
    - Run / Stop
    - Hold / Resume
    - Shutdown
- **Application factory classes (entry points to application libraries)**
  - CreateMemoryPool
  - CreateDevice
  - CreateModule
  - Device->CreateTransport ( Module->GetPort )
  - ConnectPorts ( Module1->GetPort, Module2->GetPort )



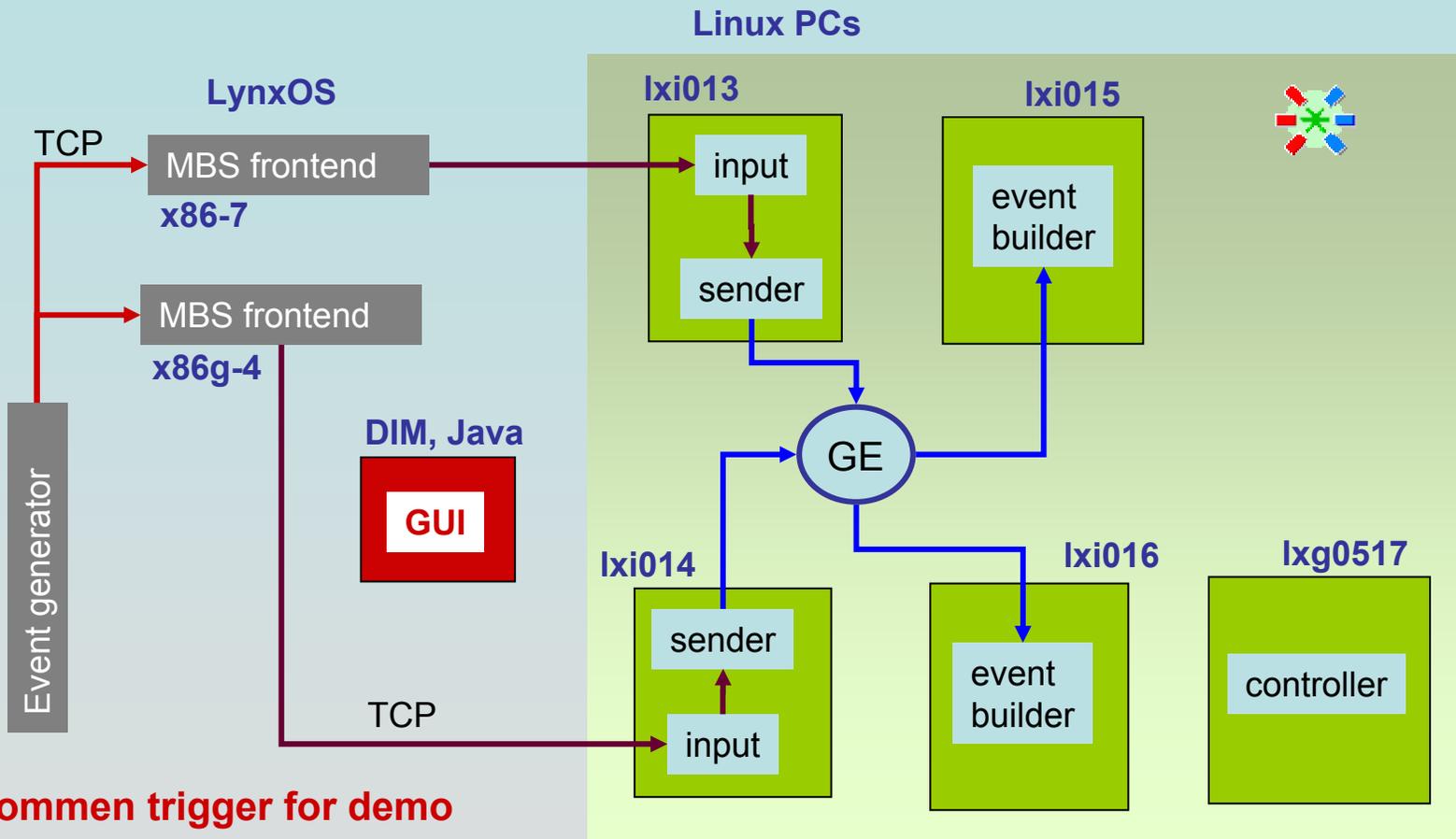
- **General upgrades**
  - ✓ Large buffers (up to now 32K limit) in MBS.
  - ✓ Large buffers in LMD files.
  - ✓ **Remote control of MBS via DIM by DABC Java GUI**
- **DABC specific mode**
  - ✓ MBS transport in DABC mode blocks, if no DABC is connected.
  - ✓ MBS transport sends variable sized buffers.
  - ✓ Using large buffers and one buffer per stream: no event spanning.
- **New LMD file format**
  - ✓ No buffer structure.
  - ✓ File header, data elements, index table (random access).
  - ✓ No size limit ( > 2 GB).
  - ✓ Supported by event API.
- **To do**
  - Event server in DABC (under test)
  - File output (library ready, RFIO 64 ?)





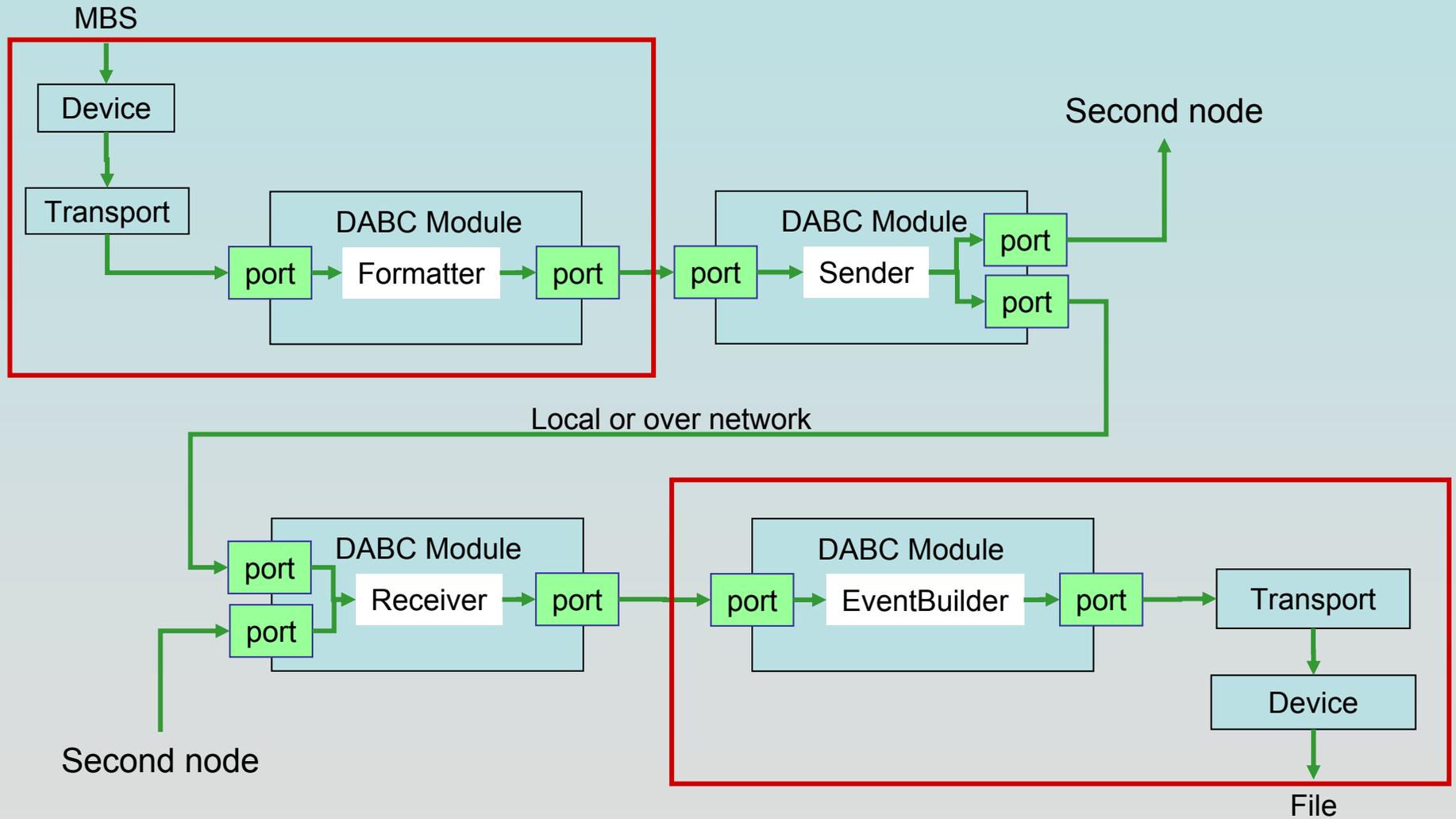
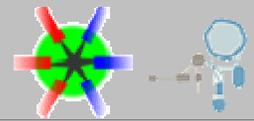
**Multi  
Branch  
System  
GSI Standard**

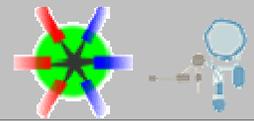
➤ MBS with DABC event builder



**No commen trigger for demo**

GE: Gigabit Ethernet





## DABC Device

### *MbsFrontend*

#### *MbsFrontend ()*

Create commands  
Register parameters

#### *CreateTransport (port)*

Create MbsRead

## DABC Transport

### *MbsRead*

#### *MbsRead (port)*

Connect MBS transport  
Register port

#### *GetBufferSize ()*

Return buffer size

#### *Read (buffer)*

Read header  
Read data  
Return

#### *~MbsRead ()*

Disconnect MBS

**Thread**

## DABC Module

### *MbsFormatter*

#### *MbsFormatter ()*

Create commands  
Register parameters  
Create ports (1 x input, 1x output)

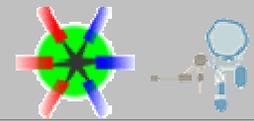
#### *MainLoop ()*

Wait input port 1  
Get empty buffer  
Loop: Add subevent ref. to buffer  
Size > max? Put buffer to port  
Return

EndLoop

#### *~MbsFormatter ()*

**Thread**



**DABC Module**

***BNetSender***

*BNetSender ()*  
 Create commands  
 Register parameters  
 Create ports (1 x input, n x output)

*MainLoop ()*  
 Wait input port 1  
 Put buffer to next output port

*~BNetSender ()*

Provided by DABC

**Thread**

**DABC Device**

***BNetNetworkDevice***

*BNetNetworkDevice ()*  
*CreateTransport (port) ()*

**DABC Transport**

***BNetNetworkTransport***

*NetNetworkTransport (port)*  
***Write (buffer)*** ←

**Thread** Provided by DABC

**DABC Device**

***BNetNetworkDevice***

*BNetNetworkDevice ()*  
*CreateTransport (port)*

**DABC Transport**

***BNetNetworkTransport***

*BNetNetworkTransport (port)*  
***Read (buffer)*** ←

**Thread** Provided by DABC

**DABC Module**

***BNetReceiver***

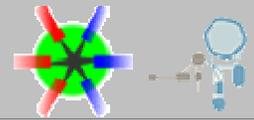
*BNetReceiver ()*  
 Create commands  
 Register parameters  
 Create ports (n x input, 1 x output)

*MainLoop ()*  
 Wait for all input ports  
 Add input buffers to output list  
 Put list to output port

*~BNetReceiver ()*

Provided by DABC

**Thread**



### DABC Module

**MbsEventBuilder**

*MbsEventBuilder ()*  
 Create commands  
 Register parameters  
 Create ports (1 x input, 1x output)

*MainLoop ()*  
 Wait input port 1  
 Get empty buffer  
 Build event from input list  
 Put event to buffer  
 Put buffer to port (file store)

*~MbsEventBuilder ()*

**Thread**

### DABC Device

**MbsFile**

*MbsFile ()*  
 Create commands  
 Register parameters

*CreateTransport (port)*  
 Create MbsStore

### DABC Transport

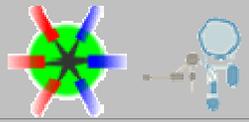
**MbsStore**

*MbsStore (port)*  
 Register port

*Write (buffer)*  
 Filesize > max?  
     close/open  
 Write fragments to file

*~MbsStore ()*  
 Close last file

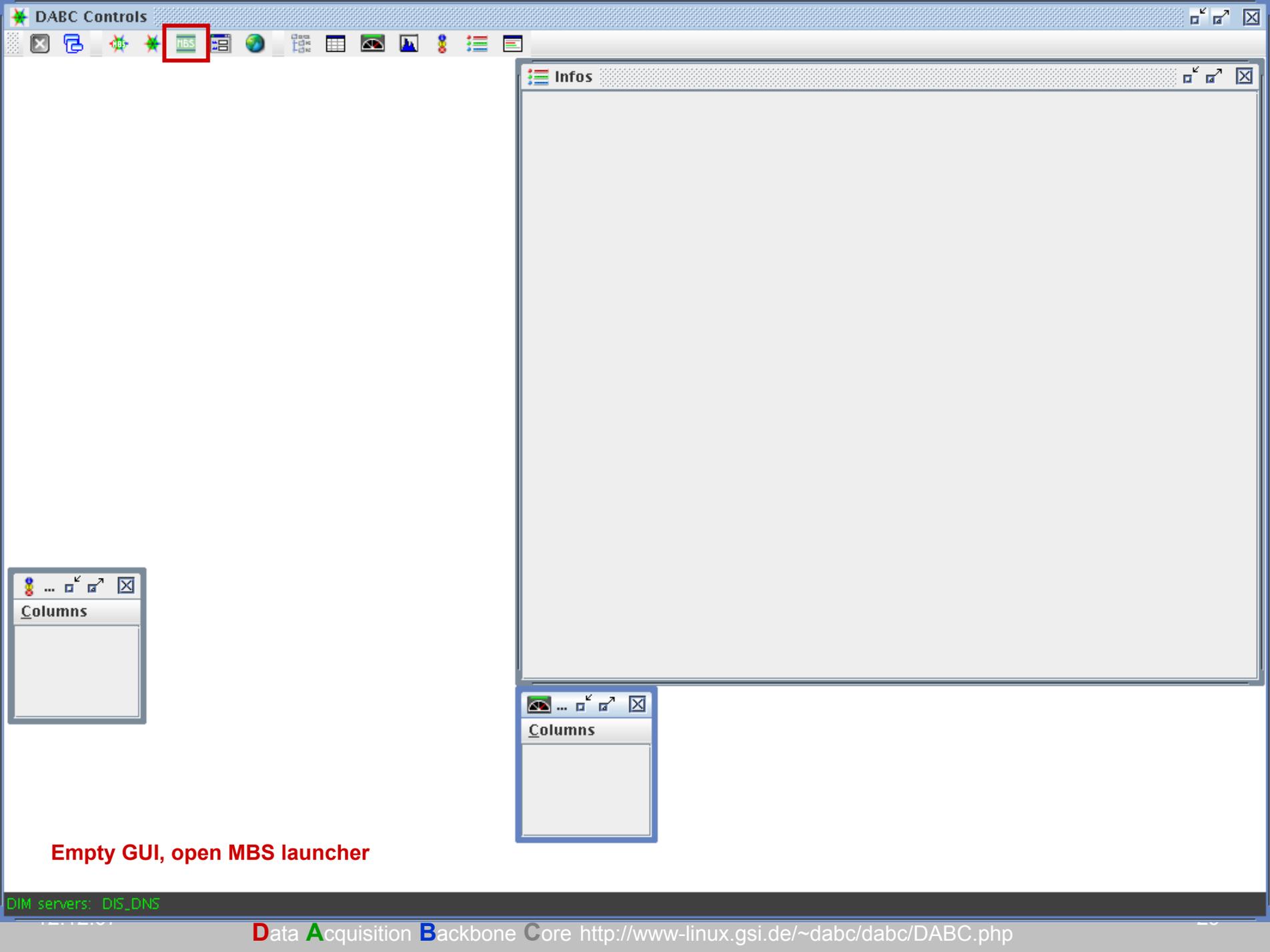
**Thread**



## Screen shot sequence from DEMO

**1. Standalone MBS controlled by GUI**

**2. MBS front-ends with DABC event builder**



Empty GUI, open MBS launcher

**MbsLauncher**

**Login**

Name server:

Master node:

Servers:

User name:

Password:

MBS system path:

User path:

MBS script:

MBS command:

Launch file:

Values from GUI setup file

**Infos**

**Columns**

**Columns**

Start remote MBS servers

DABC Controls

**MbsLauncher**

MBS connected

Name server: lxg0500.gsi.de

Master node: x86g-4

Servers: 3

User name: goofy

Password:

MBS system path: /daq/usr/goofy/mbswork/v5.1/

User path: v5.0/x86/newmbs

MBS script: script/remote\_exe.sc

MBS command: m\_rising v5.0/x86/newmbs . x86g-4 x86-7

Launch file: MbsLaunch.xml

**Infos**

```

X86-7: Dispatch
X86-7: MsgLog
X86-7: No file
X86-7: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
X86-7: Setup not loaded
X86G-4: Dispatch
X86G-4: MsgLog
X86G-4: Prompt
X86G-4: No file
X86G-4: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
X86G-4: Setup not loaded
Current node: X86G-4
X86G-4,X86-7
          
```

**States**

Columns

X86-7:Acquisition S.Stopped

X86G-4:Acquisition S.Stopped

**RateMeters**

Columns

X86-7: EventRate	X86-7: FileFilled	X86G-4: DataRate	X86G-4: EventRate
0,0	0,0	0,0	0,0

**Graphics as set by MBS, start tasks**

### MbsLauncher

MBS connected

Name server: lxg0500.gsi.de

Master node: x86g-4

Servers: 3

User name: goofy

Password:

MBS system path: /daq/usr/goofy/mbswork/v5.1/

User path: v5.0/x86/newmbs

MBS script: script/remote\_exe.sc

MBS command: m\_rising v5.0/x86/newmbs . x86g-4 x86-7

Launch file: MbsLaunch.xml

### Infos

- X86-7: Dispatch
- X86-7: MsgLog
- X86-7: Rate
- X86-7: Rising
- X86-7: Transport
- X86-7: Util
- X86-7: No file
- X86-7: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
- X86-7: Loaded ml setup set\_mo\_x86-7.usf
- X86G-4: Dispatch
- X86G-4: MsgLog
- X86G-4: Prompt
- X86G-4: Rate
- X86G-4: Rising
- X86G-4: Transport
- X86G-4: Util
- X86G-4: No file
- X86G-4: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
- X86G-4: Loaded ml setup set\_mo.usf
- Current node: X86-7
- X86G-4, X86-7

### States

Columns

- X86-7:Acquisition S.Stopped
- X86G-4:Acquisition S.Stopped

### RateMeters

Columns

X86-7:EventRate	X86-7:FileFilled	X86G-4:DataRate	X86G-4:EventRate
0,0	0,0	0,0	0,0

All tasks there, start event generator



**MbsLauncher**

MBS connected

Name server: lxg0500.gsi.de

Master node: x86g-4

Servers: 3

User name: goofy

Password:

MBS system path: /daq/usr/goofy/mbswork/v5.1/

User path: v5.0/x86/newmbs

MBS script: script/remote\_exe.sc

MBS command: m\_rising v5.0/x86/newmbs . x86g-4 x86-7

Launch file: MbsLaunch.xml

**Infos**

- X86-7: Dispatch
- X86-7: MsgLog
- X86-7: Rate
- X86-7: Rising
- X86-7: Transport
- X86-7: Util
- X86-7: No file
- X86-7: Events: 48160, MBytes: 96, E/s: 4522, MB/s: 9.28
- X86-7: Loaded ml setup set\_mo\_x86-7.usf
- X86G-4: Dispatch
- X86G-4: MsgLog
- X86G-4: Prompt
- X86G-4: Rate
- X86G-4: Rising
- X86G-4: Transport
- X86G-4: Util
- X86G-4: No file
- X86G-4: Events: 48176, MBytes: 96, E/s: 4522, MB/s: 9.28
- X86G-4: Loaded ml setup set\_mo.usf
- Current node: X86-7
- X86G-4, X86-7

**States**

Columns

- X86-7:Acquisition W:Running
- X86G-4:Acquisition W:Running

**RateMeters**

Columns

X86-7: EventRate 4522,0	X86-7: FileFilled 0,0	X86G-4: DataRate 9278,0	X86G-4: EventRate 4522,0
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**Acquisition running, open commands**

### MbsLauncher

**MBS connected**

Name server: lxg0500.gsi.de  
Master node: x86g-4  
Servers: 3  
User name: goofy  
Password:  
MBS system path: /daq/usr/goofy/mbswork/v51/  
User path: v50/x86/newmbs  
MBS script: script/remote\_exe.sc  
MBS command: m\_rising v50/x86/newmbs . x86g-4 x8  
Launch file: MbsLaunch.xml

### Commands

- MbsRead\_meb
- MbsRemote
- MbsRirec
- MbsSmi
- MbsStream\_serv
- MbsTo
- MbsTransport
  - CloseFile
  - ConnectRfio
  - DisableTcp
  - DisconnectRfio
  - DismountTape
  - EnableDabc
  - EnableTcp
  - InitTape
  - MountTape
  - OpenFile**
  - SetFileheader
  - ShowFile
  - ShowTape
  - TypeEvent
  - TypeStream

#### Command OpenFile, scope MBS

name (c, opt): test  
tape (l, opt):  
sizemb (l, opt): 30  
number (l, opt): 3  
first (l, opt):  
inhead (c, opt):  
outhead (c, opt):

-auto  
 -prompt  
 -edit  
 -disk  
 -rfio  
 -multi  
 -first



### States

Columns

X86-7:Acquisition W:Running X86G-4:Acquisition W:Running

### RateMeters

Columns

X86-7: EventRate 4269,0 	X86-7: FileFilled 0,0 	X86G-4: DataRate 8759,0 	X86G-4: EventRate 4269,0 
--------------------------------	------------------------------	--------------------------------	---------------------------------

Open file

**MbsLauncher**

MBS connected

Name server: lxg0500.gsi.de

Master node: x86g-4

Servers: 3

User name: goofy

Password:

MBS system path: /daq/usr/goofy/mbswork/v5.1/

User path: v5.0/x86/newmbs

MBS script: script/remote\_exe.sc

MBS command: m\_rising v5.0/x86/newmbs . x86g-4 x86-7

Launch file: MbsLaunch.xml

**Infos**

- █ X86-7: Dispatch
- █ X86-7: MsgLog
- █ X86-7: Rate
- █ X86-7: Rising
- █ X86-7: Transport
- █ X86-7: Util
- █ X86-7: test0052.lmd size: 50 MB, filled: 33 MB 66% open
- █ X86-7: Events: 712193, MBytes: 1424, E/s: 1679, MB/s: 3.44
- █ X86-7: Loaded ml setup set\_mo\_x86-7.usf
- █ X86G-4: Dispatch
- █ X86G-4: MsgLog
- █ X86G-4: Prompt
- █ X86G-4: Rate
- █ X86G-4: Rising
- █ X86G-4: Transport
- █ X86G-4: Util
- █ X86G-4: No file
- █ X86G-4: Events: 712248, MBytes: 1424, E/s: 1679, MB/s: 3.44
- █ X86G-4: Loaded ml setup set\_mo.usf
- █ Current node: X86-7
- █ X86G-4,X86-7

**States**

Columns

- █ X86-7:Acquisition W:Running
- █ X86G-4:Acquisition W:Running

**RateMeters**

Columns

X86-7:EventRate 1679,0	X86-7:FileFilled 66,0	X86G-4:DataRate 3439,0	X86G-4:EventRate 1679,0
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**Writing file, shut down tasks**



**MbsLauncher**

MBS connected

Name server: lxg0500.gsi.de

Master node: x86g-4

Servers: 3

User name: goofy

Password:

MBS system path: /daq/usr/goofy/mbswork/v5.1/

User path: v5.0/x86/newmbs

MBS script: script/remote\_exe.sc

MBS command: m\_rising v5.0/x86/newmbs . x86g-4 x86-7

Launch file: MbsLaunch.xml

**Infos**

- █ X86-7: Dispatch
- █ X86-7: MsgLog
- ▣ X86-7: no Rate
- ▣ X86-7: no Rising
- ▣ X86-7: no Transport
- ▣ X86-7: no Util
- █ X86-7: test0054.lmd size: 50 MB, filled: 48 MB 97% closed
- █ X86-7: Events: 839568, MBytes: 1679, E/s: 0, MB/s: 0.00
- █ X86-7: Loaded ml setup set\_mo\_x86-7.usf
- █ X86G-4: Dispatch
- █ X86G-4: MsgLog
- █ X86G-4: Prompt
- ▣ X86G-4: no Rate
- ▣ X86G-4: no Rising
- ▣ X86G-4: no Transport
- ▣ X86G-4: no Util
- ▣ X86G-4: No file
- █ X86G-4: Events: 839552, MBytes: 1679, E/s: 0, MB/s: 0.00
- █ X86G-4: Loaded ml setup set\_mo.usf
- █ Current node: X86-7
- █ X86G-4,X86-7

**States**

Columns

- █ X86-7:Acquisition W:Running
- █ X86G-4:Acquisition W:Running

**RateMeters**

Columns

X86-7: EventRate	X86-7: FileFilled	X86G-4: DataRate	X86G-4: EventRate
0,0	97,0	0,0	0,0

Tasks down, open DABC-MBS launcher

**DABC Controls**

**DabcMbsLauncher**

**Login**

Name server: lxxg0500.gsi.de  
 MBS master: x86g-4  
 MBS servers: 3  
 DABC master: lxxg0517.gsi.de  
 DABC name: Controller:41  
 DABC servers: 5  
 User name: goofy  
 Password:   
 MBS system path: /daq/usr/goofy/mbswork/v51/  
 MBS user path: v50/x86/newmbs  
 MBS script: script/remote\_exe.sc  
 MBS command: m\_rising v50/x86/newmbs . x86g-4 x86-7  
 DABC system path: /misc/goofy/sniff/dabc/  
 DABC user path: /misc/goofy/sniff/dabcappl2/config  
 DABC setup file: DABC\_MBS\_Setup.xml  
 DABC script: ps  
 Mbs Launch file: MbsLaunch.xml  
 Dabc Launch file: DabcLaunch.xml

**Infos**

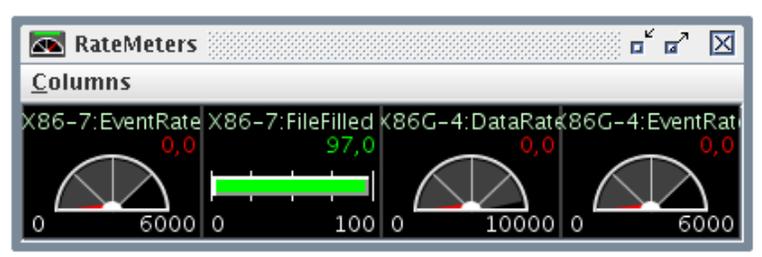
- X86-7: Dispatch
- X86-7: MsgLog
- X86-7: no Rate
- X86-7: no Util
- X86-7: test0054.lmd size: 50 MB, filled: 48 MB 97% closed
- X86-7: Events: 839568, MBytes: 1679, E/s: 0, MB/s: 0.00
- X86-7: Loaded ml setup set\_mo\_x86-7.usf
- X86G-4: Dispatch
- X86G-4: MsgLog
- X86G-4: Prompt
- X86G-4: no Rate
- X86G-4: no Rising
- X86G-4: no Transport
- X86G-4: no Util
- X86G-4: No file
- X86G-4: Events: 839552, MBytes: 1679, E/s: 0, MB/s: 0.00
- X86G-4: Loaded ml setup set\_mo.usf
- Current node: X86-7
- X86G-4,X86-7

**Values from GUI setup file**

**States**

Columns

- X86-7:Acquisition W:Running
- X86G-4:Acquisition W:Running



**Start MBS and DABC servers**

DIM servers: DIS\_DNS X86G-4:MSC X86-7:MSC X86G-4:PRM

**DABC Controls**

**DabcMbsLauncher**

**MBS and DABC connected**

Name server: lxg0500.gsi.de  
 MBS master: x86g-4  
 MBS servers: 3  
 DABC master: lxg0517.gsi.de  
 DABC name: Controller:41  
 DABC servers: 5  
 User name: goofy  
 Password:  
 MBS system path: /daq/usr/goofy/mbswork/v51/  
 MBS user path: v50/x86/newmbs  
 MBS scrip: script/remote\_exe.sc  
 MBS command: m\_rising v50/x86/newmbs . x86g-4 x86-7  
 DABC system path: /misc/goofy/sniff/dabc/  
 DABC user path: /misc/goofy/sniff/dabcappl2/config  
 DABC setup file: DABC\_MBS\_Setup.xml  
 DABC script: ps  
 Mbs Launch file: MbsLaunch.xml  
 Dabc Launch file: DabcLaunch.xml

**Infos**

```

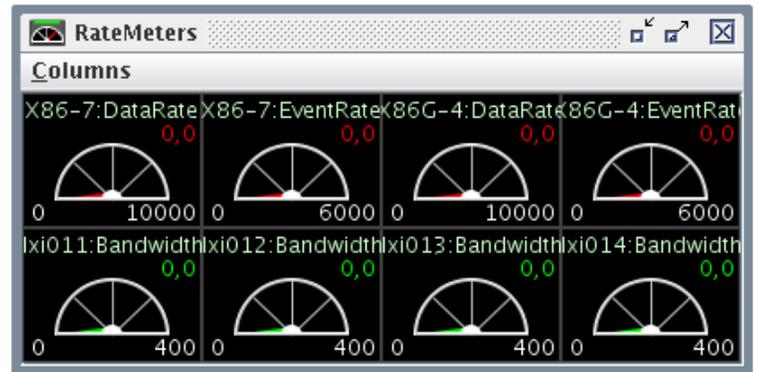
X86-7: Dispatch
X86-7: MsgLog
X86-7: No file
X86-7: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
X86-7: Setup not loaded
X86G-4: Dispatch
X86G-4: MsgLog
X86G-4: Prompt
X86G-4: No file
X86G-4: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
X86G-4: Setup not loaded
Current node: X86G-4
X86G-4,X86-7
lxg0517: Created.
lxg0517: Unknown setup file
lxi011: Created.
lxi011: Unknown setup file
lxi012: Created.
lxi012: Unknown setup file
lxi013: Created.
lxi013: Unknown setup file
lxi014: Created.
lxi014: Unknown setup file
  
```

**States**

**Columns**

X86-7:Acquisition S:Stopped	X86-7:RunMode S:MBS standalone
X86G-4:Acquisition S:Stopped	X86G-4:RunMode S:MBS standalone
lxg0517:Controller S:Halting	lxi011:Readout S:Halting
lxi012:Eventbuilder S:Halting	lxi013:Readout S:Halting
lxi014:Eventbuilder S:Halting	

**Start MBS tasks and configure DABC**



DIM servers: DIS\_DNS lxg0517 lxi013 lxi012 lxi011 lxi014 X86G-4:MSG X86-7:MSG X86G-4:PRM

### DabcMbsLauncher

**MBS and DABC connected**

Name server:	lxg0500.gsi.de
MBS master:	x86g-4
MBS servers:	3
DABC master:	lxg0517.gsi.de
DABC name:	Controller:41
DABC servers:	5
User name:	goofy
Password:	
MBS system path:	/daq/usr/goofy/mbswork/v51/
MBS user path:	v50/x86/newmbs
MBS scrip:	script/remote_exe.sc
MBS command:	m_rising v50/x86/newmbs . x86g-4 x86-7
DABC system path:	/misc/goofy/sniff/dabc/
DABC user path:	/misc/goofy/sniff/dabcappl2/config
DABC setup file:	DABC_MBS_Setup.xml
DABC script:	ps
Mbs Launch file:	MbsLaunch.xml
Dabc Launch file:	DabcLaunch.xml

### Infos

- █ X86-7: Dispatch
- █ X86-7: MsgLog
- █ X86-7: Rate
- █ X86-7: Rising
- █ X86-7: Transport
- █ X86-7: Util
- ▣ X86-7: No file
- X86-7: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
- █ X86-7: Loaded ml setup set\_mo\_x86-7.usf
- █ X86G-4: Dispatch
- █ X86G-4: MsgLog
- █ X86G-4: Prompt
- █ X86G-4: Rate
- █ X86G-4: Rising
- █ X86G-4: Transport
- █ X86G-4: Util
- ▣ X86G-4: No file
- X86G-4: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
- █ X86G-4: Loaded ml setup set\_mo.usf
- Current node: X86-7
- X86G-4,X86-7
- █ lxg0517: State machine reached current state : [Ready]
- lxg0517: Unknown setup file
- █ lxi011: State machine reached current state : [Ready]
- lxi011: Unknown setup file
- █ lxi012: State machine reached current state : [Ready]

### States

Columns	
█ X86-7:Acquisition S:Stopped	█ X86-7:RunMode W:DABC connected
█ X86G-4:Acquisition S:Stopped	█ X86G-4:RunMode W:DABC connected
█ lxg0517:Controller S:Ready	█ lxi011:Readout S:Ready
█ lxi012:Eventbuilder S:Ready	█ lxi013:Readout S:Ready
█ lxi014:Eventbuilder S:Ready	

**Start Acquisition**



### DabcMbsLauncher

**MBS and DABC connected**

Name server: lxxg0500.gsi.de  
 MBS master: x86g-4  
 MBS servers: 3  
 DABC master: lxxg0517.gsi.de  
 DABC name: Controller:41  
 DABC servers: 5  
 User name: goofy  
 Password:   
 MBS system path: /daq/usr/goofy/mbswork/v51/  
 MBS user path: v50/x86/newmbs  
 MBS scrip: script/remote\_exe.sc  
 MBS command: m\_rising v50/x86/newmbs . x86g-4 x86-7  
 DABC system path: /misc/goofy/sniff/dabc/  
 DABC user path: /misc/goofy/sniff/dabcappl2/config  
 DABC setup file: DABC\_MBS\_Setup.xml  
 DABC script: ps  
 Mbs Launch file: MbsLaunch.xml  
 Dabc Launch file: DabcLaunch.xml

### Infos

- █ X86-7: Dispatch
- █ X86-7: MsgLog
- █ X86-7: Rate
- █ X86-7: Rising
- █ X86-7: Transport
- █ X86-7: Util
- █ X86-7: No file
- █ X86-7: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
- █ X86-7: Loaded ml setup set\_mo\_x86-7.usf
- █ X86G-4: Dispatch
- █ X86G-4: MsgLog
- █ X86G-4: Prompt
- █ X86G-4: Rate
- █ X86G-4: Rising
- █ X86G-4: Transport
- █ X86G-4: Util
- █ X86G-4: No file
- █ X86G-4: Events: 0, MBytes: 0, E/s: 0, MB/s: 0.00
- █ X86G-4: Loaded ml setup set\_mo.usf
- █ Current node: X86-7
- █ X86G-4,X86-7
- █ lxxg0517: State machine reached current state : [Running]
- █ lxxg0517: Unknown setup file
- █ lxxi011: State machine reached current state : [Running]
- █ lxxi011: Unknown setup file
- █ lxxi012: State machine reached current state : [Running]

### States

Columns

█ X86-7:Acquisition S:Stopped	█ X86-7:RunMode W:DABC connected
█ X86G-4:Acquisition S:Stopped	█ X86G-4:RunMode W:DABC connected
█ lxxg0517:Controller S:Running	█ lxxi011:Readout S:Running
█ lxxi012:Eventbuilder S:Running	█ lxxi013:Readout S:Running
█ lxxi014:Eventbuilder S:Running	

**Start event generator**



### DabcMbsLauncher

**MBS and DABC connected**

Name server:	lxg0500.gsi.de
MBS master:	x86g-4
MBS servers:	3
DABC master:	lxg0517.gsi.de
DABC name:	Controller:41
DABC servers:	5
User name:	goofy
Password:	
MBS system path:	/daq/usr/goofy/mbswork/v51/
MBS user path:	v50/x86/newmbs
MBS script:	script/remote_exe.sc
MBS command:	m_rising v50/x86/newmbs . x86g-4 x86-7
DABC system path:	/misc/goofy/sniff/dabc/
DABC user path:	/misc/goofy/sniff/dabcappl2/config
DABC setup file:	DABC_MBS_Setup.xml
DABC script:	ps
Mbs Launch file:	MbsLaunch.xml
Dabc Launch file:	DabcLaunch.xml

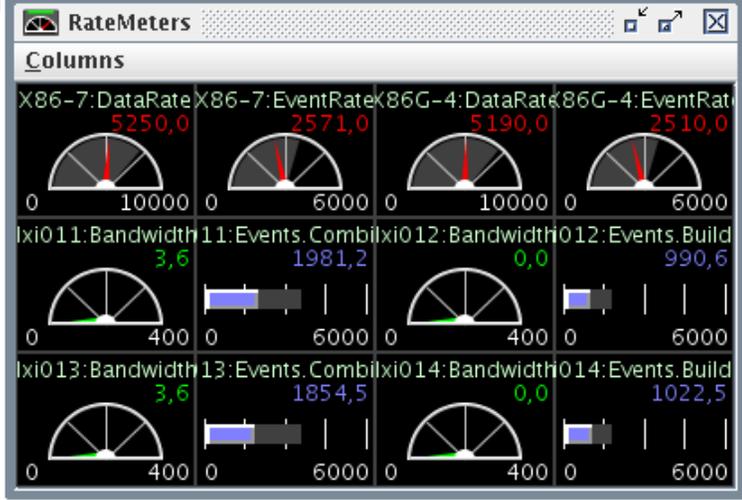
### Infos

- █ X86-7: Dispatch
- █ X86-7: MsgLog
- █ X86-7: Rate
- █ X86-7: Rising
- █ X86-7: Transport
- █ X86-7: Util
- ▣ X86-7: No file
- █ X86-7: Events: 100416, MBytes: 200, E/s: 2571, MB/s: 5.25
- █ X86-7: Loaded ml setup set\_mo\_x86-7.usf
- █ X86G-4: Dispatch
- █ X86G-4: MsgLog
- █ X86G-4: Prompt
- █ X86G-4: Rate
- █ X86G-4: Rising
- █ X86G-4: Transport
- █ X86G-4: Util
- ▣ X86G-4: No file
- █ X86G-4: Events: 100264, MBytes: 200, E/s: 2510, MB/s: 5.19
- █ X86G-4: Loaded ml setup set\_mo.usf
- █ Current node: X86-7
- █ X86G-4, X86-7
- █ lxg0517: State machine reached current state : [Running]
- █ lxg0517: Unknown setup file
- █ lxi011: State machine reached current state : [Running]
- █ lxi011: Unknown setup file
- █ lxi012: State machine reached current state : [Running]

### States

Columns

█ X86-7:Acquisition W:Running	█ X86-7:RunMode W:DABC connected
█ X86G-4:Acquisition W:Running	█ X86G-4:RunMode W:DABC connected
█ lxg0517:Controller S:Running	█ lxi011:Readout S:Running
█ lxi012:Eventbuilder S:Running	█ lxi013:Readout S:Running
█ lxi014:Eventbuilder S:Running	



**Stop MBS tasks and shut down DABC**

### DabcMbsLauncher

MBS and DABC connected

**Name server:** lxg0500.gsi.de  
**MBS master:** x86g-4  
**MBS servers:** 3  
**DABC master:** lxg0517.gsi.de  
**DABC name:** Controller:41  
**DABC servers:** 5  
**User name:** goofy  
**Password:**  
**MBS system path:** /daq/usr/goofy/mbswork/v51/  
**MBS user path:** v50/x86/newmbs  
**MBS scrip:** script/remote\_exe.sc  
**MBS command:** m\_rising v50/x86/newmbs . x86g-4 x86-7  
**DABC system path:** /misc/goofy/sniff/dabc/  
**DABC user path:** /misc/goofy/sniff/dabcappl2/config  
**DABC setup file:** DABC\_MBS\_Setup.xml  
**DABC script:** ps  
**Mbs Launch file:** MbsLaunch.xml  
**Dabc Launch file:** DabcLaunch.xml

### Infos

```

X86-7: Dispatch
X86-7: MsgLog
X86-7: no Rate
X86-7: no Rising
X86-7: no Transport
X86-7: no Util
X86-7: No file
X86-7: Events: 131728, MBytes: 263, E/s: 0, MB/s: 0.00
X86-7: Loaded ml setup set_mo_x86-7.usf
X86G-4: Dispatch
X86G-4: MsgLog
X86G-4: Prompt
X86G-4: no Rate
X86G-4: no Rising
X86G-4: no Transport
X86G-4: no Util
X86G-4: No file
X86G-4: Events: 131736, MBytes: 263, E/s: 0, MB/s: 0.00
X86G-4: Loaded ml setup set_mo.usf
Current node: X86-7
X86G-4,X86-7
%none%
%none%
%none%
%none%
%none%

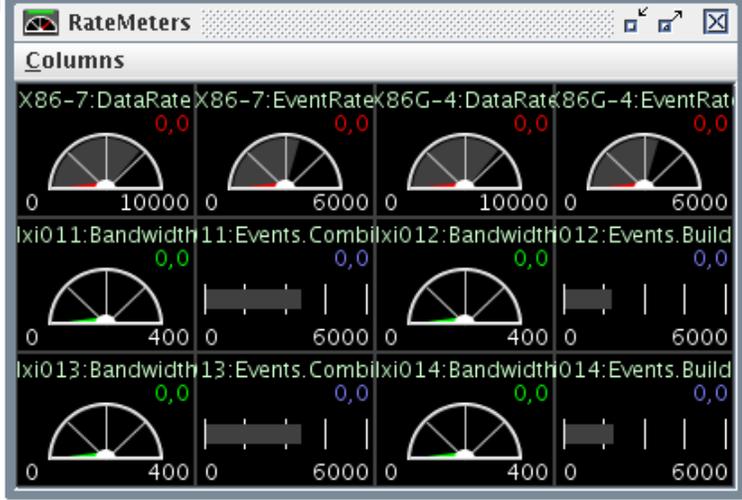
```

### States

Columns

X86-7:Acquisition W:Running	X86-7:RunMode W:MBS to DABC
X86G-4:Acquisition W:Running	X86G-4:RunMode W:MBS to DABC
lxg0517:Controller S:%none%	lxi011:Readout S:%none%
lxi012:Eventbuilder S:%none%	lxi013:Readout S:%none%
lxi014:Eventbuilder S:%none%	

Open parameter table



**DABC Controls**

**DabcMbsLauncher**

**MBS and DABC connected**

Name server: lxg0500.gsi.de  
MBS master: x86g-4  
MBS servers: 3

**Infos**

- X86-7: Dispatch
- X86-7: MsgLog
- X86-7: no Rate
- X86-7: no Rising
- X86-7: no Transport

**Parameters**

ID	Node	Application	Parameter	Current	Set v...	Show
00106	X86G-4	MSG	Rate	no Rate	-	<input type="checkbox"/>
00107	X86G-4	MSG	Rising	no Rising	-	<input type="checkbox"/>
00108	X86G-4	MSG	Run		-	<input type="checkbox"/>
00109	X86G-4	MSG	Transport	no Transport	-	<input type="checkbox"/>
00110	X86G-4	MSG	User	goofy	-	<input type="checkbox"/>
00111	X86G-4	MSG	Util	no Util	-	<input type="checkbox"/>
00112	X86G-4	MSG	eFile	No file	-	<input type="checkbox"/>
00113	X86G-4	MSG	ePerform	Events: 131736, MBytes: ...	-	<input type="checkbox"/>
00114	X86G-4	MSG	eSetup	Loaded ml setup set_mo.usf	-	<input type="checkbox"/>
00119	X86G-4	PRM	Current	Current node: X86-7	-	<input type="checkbox"/>
00120	X86G-4	PRM	NodeList	X86G-4,X86-7	-	<input type="checkbox"/>
00140	X86G-4	RunMode	State	MBS to DABC	-	<input type="checkbox"/>
00227	lxg0517.gs...	Controller: 41	CfgNodeId, ClusterPlugin	1		<input type="checkbox"/>
00228	lxg0517.gs...	Controller: 41	CfgNumNodes, ClusterPlugin	5		<input type="checkbox"/>
00229	lxg0517.gs...	Controller: 41	CtrlBuffer, ClusterPlugin	2048		<input type="checkbox"/>
00230	lxg0517.gs...	Controller: 41	CtrlPoolSize, ClusterPlugin	2097152		<input type="checkbox"/>
00231	lxg0517.gs...	Controller: 41	DABCVersion	DABC Control 00.09.07(Mar 27...	-	<input type="checkbox"/>
00232	lxg0517.gs...	Controller: 41	InfoMessage	Created.	-	<input type="checkbox"/>
00233	lxg0517.gs...	Controller: 41	IsRunning, ClusterPlugin	0		<input type="checkbox"/>
00234	lxg0517.gs...	Controller: 41	NetDevice, ClusterPlugin	SOCKET		<input type="checkbox"/>
00235	lxg0517.gs...	Controller: 41	Nodelist	lxi011.gsi.de:1972,lxi012.gsi...	-	<input type="checkbox"/>
00236	lxg0517.gs...	Controller: 41	NumEventsCombine, ClusterPlugin	1		<input type="checkbox"/>
00237	lxg0517.gs...	Controller: 41	RunStatus	Halted	-	<input type="checkbox"/>
00238	lxg0517.gs...	Controller: 41	SetupFile		-	<input type="checkbox"/>
00239	lxg0517.gs...	Controller: 41	SetupInfo	Unknown setup file	-	<input type="checkbox"/>
00240	lxg0517.gs...	Controller: 41	State	Halted	-	<input type="checkbox"/>
00241	lxg0517.gs...	Controller: 41	TransportBuffer, ClusterPlugin	32768		<input type="checkbox"/>
00242	lxg0517.gs...	Controller: 41	WithController, ClusterPlugin	0		<input type="checkbox"/>
00243	lxg0517.gs...	Controller: 41	Worker0RecvStatus, ClusterPlugin	- not connected -		<input type="checkbox"/>
00244	lxg0517.gs...	Controller: 41	Worker0SendStatus, ClusterPlugin	- not connected -		<input type="checkbox"/>
00245	lxg0517.gs...	Controller: 41	Worker0Status, ClusterPlugin	- not connected -		<input type="checkbox"/>

MB/s: 0.00

0, MB/s: 0.00

G-4: EventRate 0,0

14: Bandwidth 0,0

400

**Open log window**

DIM servers: DIS\_DNS X86G-4 MSG X86-7 MSG X86G-4 PRM lxg0517 lxi013 lxi012 lxi011 lxi014

Data Acquisition Backbone Core <http://www-linux.gsi.de/~dabc/dabc/DABC.php>

**DABC Controls**

**DabcMbsLauncher**

**MBS and DABC connected**

Name server: lxg0500.gsi.de  
 MBS master: x86g-4  
 MBS servers: 3

**Infos**

- X86-7: Dispatch
- X86-7: MsgLog
- X86-7: no Rate
- X86-7: no Rising
- X86-7: no Transport

**Parameters**

ID	Node	Application	Parameter	Current	Set v...	Show
00106	X86G-4	MSG	Rate	no Rate	-	<input type="checkbox"/>
00107	X86G-4	MSG	Rising	no Rising	-	<input type="checkbox"/>
00108	X86G-4	MSG	Run		-	<input type="checkbox"/>
00109	X86G-4	MSG	Transport	no Transport	-	<input type="checkbox"/>
00110	X86G-4	MSG	User	goofy	-	<input type="checkbox"/>
00111	X86G-4	MSG	Util	no Util	-	<input type="checkbox"/>

**Logger**

**Logging**

```

21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :rirc : ds nodes: ds id: transfer type: ds_pipe_base:
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :rirc : X86-7 0 0x1001 0x00000000
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :rirc : totally 1 ds nodes:
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :rirc :-----
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :rirc :buffer size: 0x10000, 1 buffer per stream, 10 streams
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :rirc :stream segment base: 0x0, outmode: 1
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :rirc :-----
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :rirc :task m_rirc started
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :transport :task m_transport started
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-4 :transport :starting server in exclusive mode
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86G-4 :transport :Set DABC mode, buffer format variable, type 100
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86G-4 :transport :waiting for client (port 6000)
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :transport :starting server in exclusive mode
21.05.2008 18:46:42 |U| XDAQ/X86G-4/MSG/M: -X86-7 :transport :Set DABC mode, buffer format variable, type 100
21.05.2008 18:46:43 |U| XDAQ/X86G-4/MSG/M: -X86-7 :transport :waiting for client (port 6000)
21.05.2008 18:46:43 |S| XDAQ/lxg0517.gsi.de:1968/Controller:41/DoConfigure
21.05.2008 18:46:44 |U| XDAQ/X86G-4/MSG/M: -X86G-4 :transport :Client 140.181.66.179 connected
21.05.2008 18:46:44 |I| XDAQ/lxi013.gsi.de:1972/Readout:42/statusMessage: State machine reached current state : [Configured]
21.05.2008 18:46:44 |I| XDAQ/lxi012.gsi.de:1972/Eventbuilder:42/statusMessage: State machine reached current state : [Configured]
21.05.2008 18:46:44 |U| XDAQ/X86G-4/MSG/M: -X86-7 :transport :Client 140.181.66.175 connected
21.05.2008 18:46:44 |I| XDAQ/lxi014.gsi.de:1972/Eventbuilder:42/statusMessage: State machine reached current state : [Configured]
21.05.2008 18:46:44 |I| XDAQ/lxi011.gsi.de:1972/Readout:42/statusMessage: State machine reached current state : [Configured]
21.05.2008 18:46:44 |I| XDAQ/lxg0517.gsi.de:1968/Controller:41/statusMessage: State machine reached current state : [Configured]
  
```

**and close**

DIM servers: DIS\_DNS X86G-4 MSG X86-7 MSG X86G-4 PRM lxg0517 lxi013 lxi012 lxi011 lxi014

**DABC Controls**

**DabcMbsLauncher**

**MBS and DABC connected**

Name server: lxg0500.gsi.de  
 MBS master: x86g-4  
 MBS servers: 3  
 DABC master: lxg0517.gsi.de  
 DABC name: Controller:41  
 DABC servers: 5  
 User name: goofy  
 Password:  
 MBS system path: /daq/usr/goofy/mbswork/v51/  
 MBS user path: v50/x86/newmbs  
 MBS scrip: script/remote\_exe.sc  
 MBS command: m\_rising v50/x86/newmbs . x86g-4 x86-7  
 DABC system path: /misc/goofy/sniff/dabc/  
 DABC user path: /misc/goofy/sniff/dabcappl2/config  
 DABC setup file: DABC\_MBS\_Setup.xml  
 DABC script: ps  
 Mbs Launch file: MbsLaunch.xml  
 Dabc Launch file: DabcLaunch.xml

**Infos**

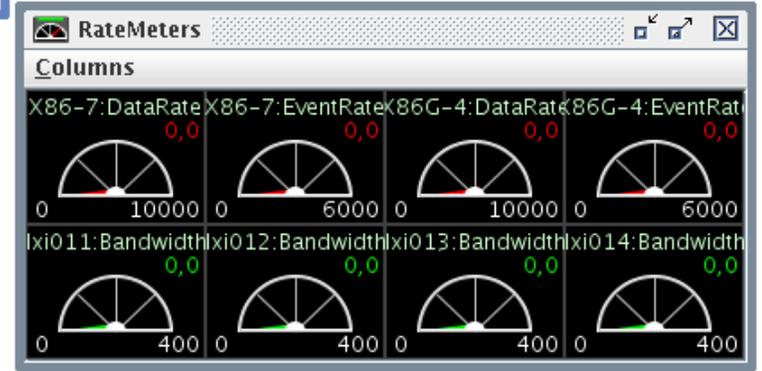
```

X86-7: Dispatch
X86-7: MsgLog
X86-7: no Rate
X86-7: no Rising
X86-7: no Transport
X86-7: no Util
X86-7: No file
X86-7: Events: 131728, MBytes: 263, E/s: 0, MB/s: 0.00
X86-7: Loaded ml setup set_mo_x86-7.usf
X86G-4: Dispatch
X86G-4: MsgLog
X86G-4: Prompt
X86G-4: no Rate
X86G-4: no Rising
X86G-4: no Transport
X86G-4: no Util
X86G-4: No file
X86G-4: Events: 131736, MBytes: 263, E/s: 0, MB/s: 0.00
X86G-4: Loaded ml setup set_mo.usf
Current node: X86-7
X86G-4,X86-7
%none%
%none%
%none%
%none%
%none%
  
```

**States**

Columns

X86-7:Acquisition W:Running	X86-7:RunMode W:MBS to DABC
X86G-4:Acquisition W:Running	X86G-4:RunMode W:MBS to DABC
lxg0517:Controller S:%none%	lxi011:Readout S:%none%
lxi012:Eventbuilder S:%none%	lxi013:Readout S:%none%
lxi014:Eventbuilder S:%none%	



**Shutdown MBS**

DIM servers: DIS\_DNS X86G-4:MSC X86-7:MSC X86G-4:PRM

### DabcMbsLauncher

**MBS and DABC connected**

Name server: lxg0500.gsi.de  
MBS master: x86g-4  
MBS servers: 3  
DABC master: lxg0517.gsi.de  
DABC name: Controller:41  
DABC servers: 5

DABC system path: /misc/goofy/sniff/dabc/  
DABC user path: /misc/goofy/sniff/dabcappl2/config  
DABC setup file: DABC\_MBS\_Setup.xml  
DABC script: ps  
Mbs Launch file: MbsLaunch.xml  
Dabc Launch file: DabcLaunch.xml

**Really continue?**

Shut down and cleanup MBS and DABC?

**Ja** **Nein**

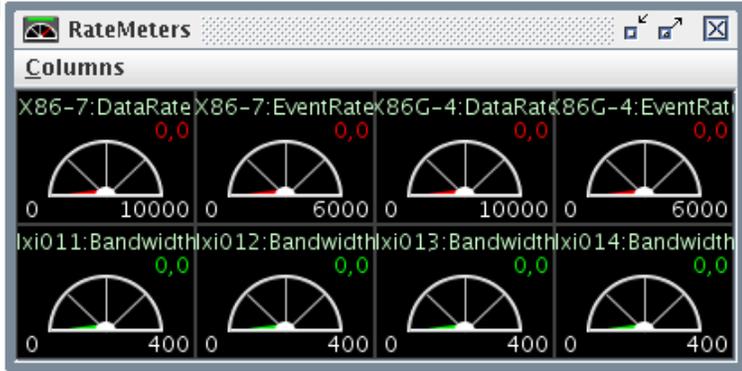
### Infos

- X86-7: Dispatch
- X86-7: MsgLog
- X86-7: no Rate
- X86-7: no Rising
- X86-7: no Transport
- X86-7: no Util
- X86-7: No file
- X86-7: Events: 131728, MBytes: 263, E/s: 0, MB/s: 0.00
- X86-7: Loaded ml setup set\_mo\_x86-7.usf
- X86G-4: Dispatch
- X86G-4: MsgLog
- X86G-4: Prompt
- X86G-4: no Rate
- X86G-4: no Rising
- X86G-4: no Transport
- X86G-4: no Util
- X86G-4: No file
- X86G-4: Events: 131736, MBytes: 263, E/s: 0, MB/s: 0.00
- X86G-4: Loaded ml setup set\_mo.usf
- Current node: X86-7
- X86G-4, X86-7
- %none%
- %none%
- %none%
- %none%
- %none%
- %none%

### States

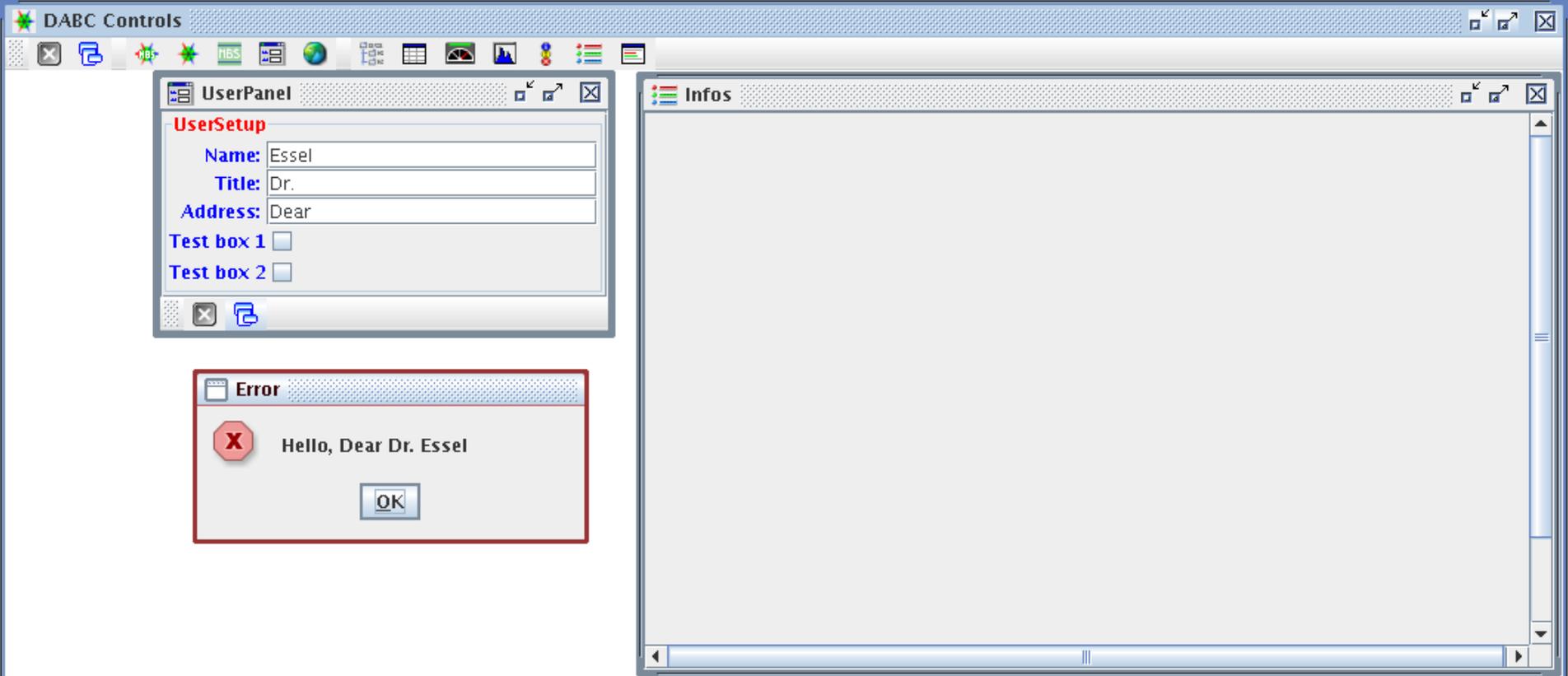
Columns

X86-7:Acquisition W:Running	X86-7:RunMode W:MBS to DABC
X86G-4:Acquisition W:Running	X86G-4:RunMode W:MBS to DABC
lxg0517:Controller S:%none%	lxi011:Readout S:%none%
lxi012:Eventbuilder S:%none%	lxi013:Readout S:%none%
lxi014:Eventbuilder S:%none%	

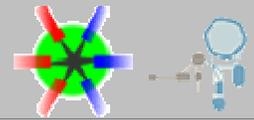


**Yes, do it**





**Example of user GUI**

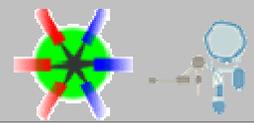


## Achieved

- Infrastructure
- Data flow engine
- First Java GUI
- PCIe support
- MBS event building
- Plug-in Interface implementation
- MBS DIM control
- MBS GUI

## Todo

- GUI (continuously)
- Data formats
- Combiner/Time sort
- Event building
- Final Plug-in Interface implementation
- Final packaging
- Documentation



- People of data processing group  
H.G.Essel  
J.Adamczewski  
N.Kurz  
S.Linev
- People of controls group  
maybe one FTE
- People from CBM  
hopefully
- **CBM requires in 2008 a data taking system**  
Start with small system, grow on demand  
Preliminary controls
- **NUSTAR ?**  
In discussion
- **MBS** a first test bed