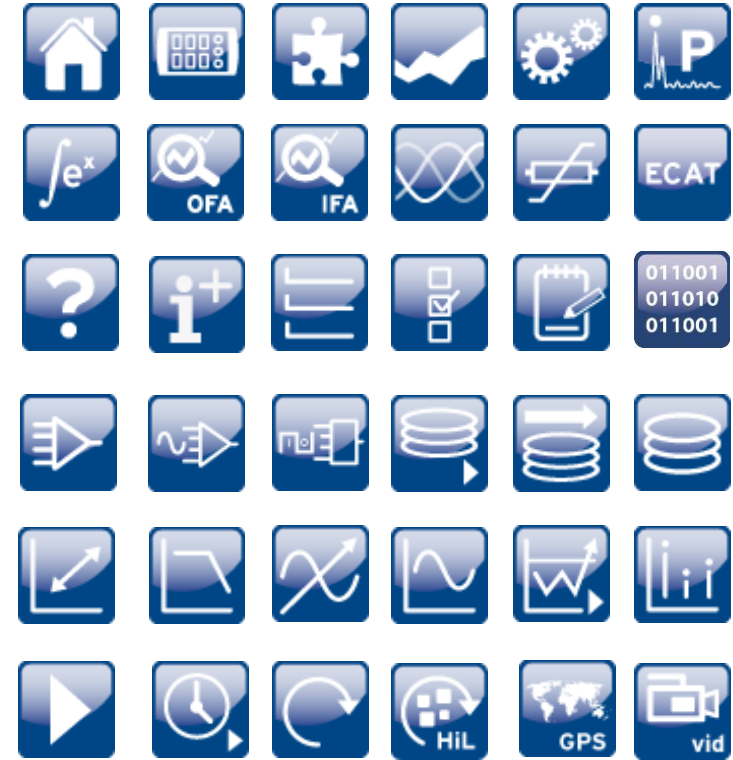


imc STUDIO 5.0R3 Release

What's New



1 29.09.2015

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Innovations in imc STUDIO

- Live data analysis („imc Inline FAMOS“)
- 3.rd party device integration („3PDI“)
- Decoding of protocol streams („Bus Decoder“)

New features in imc STUDIO

New device and hardware functionality (imc DEVICES)

Licensing and prices

imc STUDIO

integrated software environment for measurement & control



Processing of continuous data streams

- Equivalent to imc Online FAMOS (OFA) → Standard „Virtual Channels“
- Fundamentally different to imc FAMOS Post-Processing (completed data sets)

Virtually real-time performance in terms of

- „immediate results“
- „human real-time“
- However: no Sync-Task available in in IFA!

Processing is NOT executed on data acquisition hardware platform

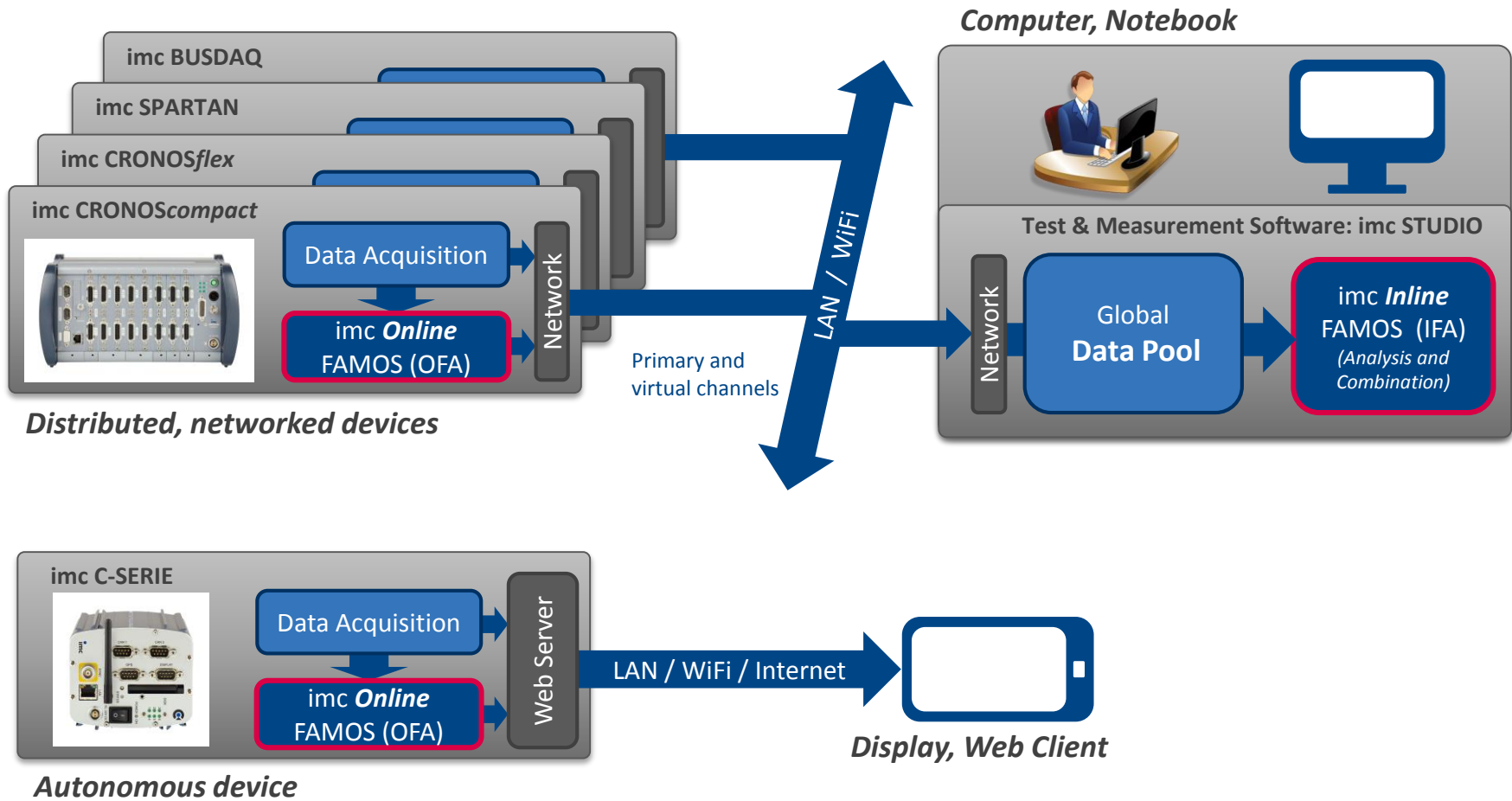
- Implemented on powerful and scalable PC platform (no stand-alone mode)
- → supports combining channels across multiple devices and 3.rd party devices (3PDI)
- Based on „DataProcessing“ technology of imc STUDIO

Uniform

- Uniform syntax and consistent function set IFA – OFA → interchangeable code IFA - OFA
- Flexible partitioning: multiple parallel tasks (automatically distributed on multi-cores)
- New modern editor

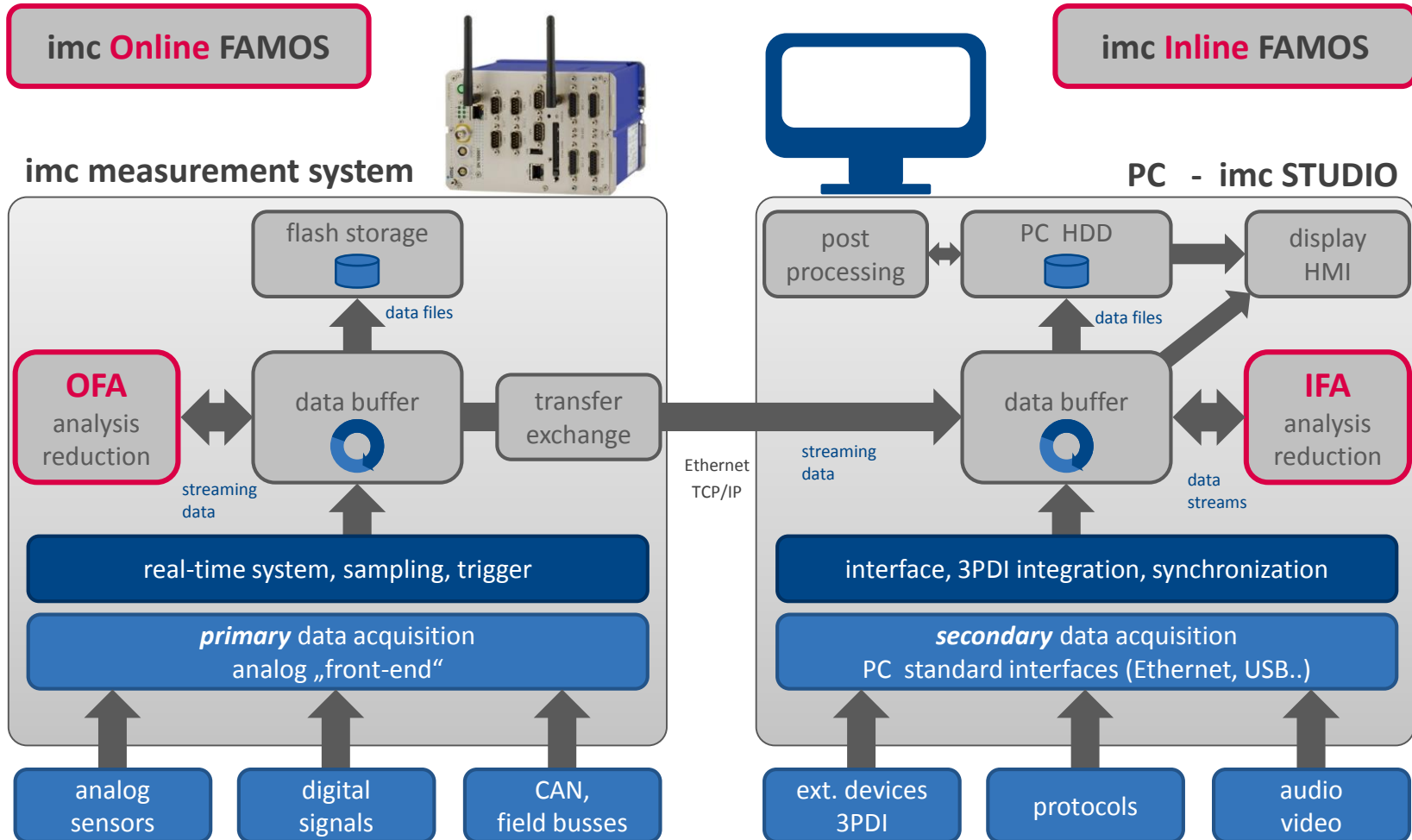
Live analysis of data streams

DataProcessing: imc Online FAMOS and imc Inline FAMOS



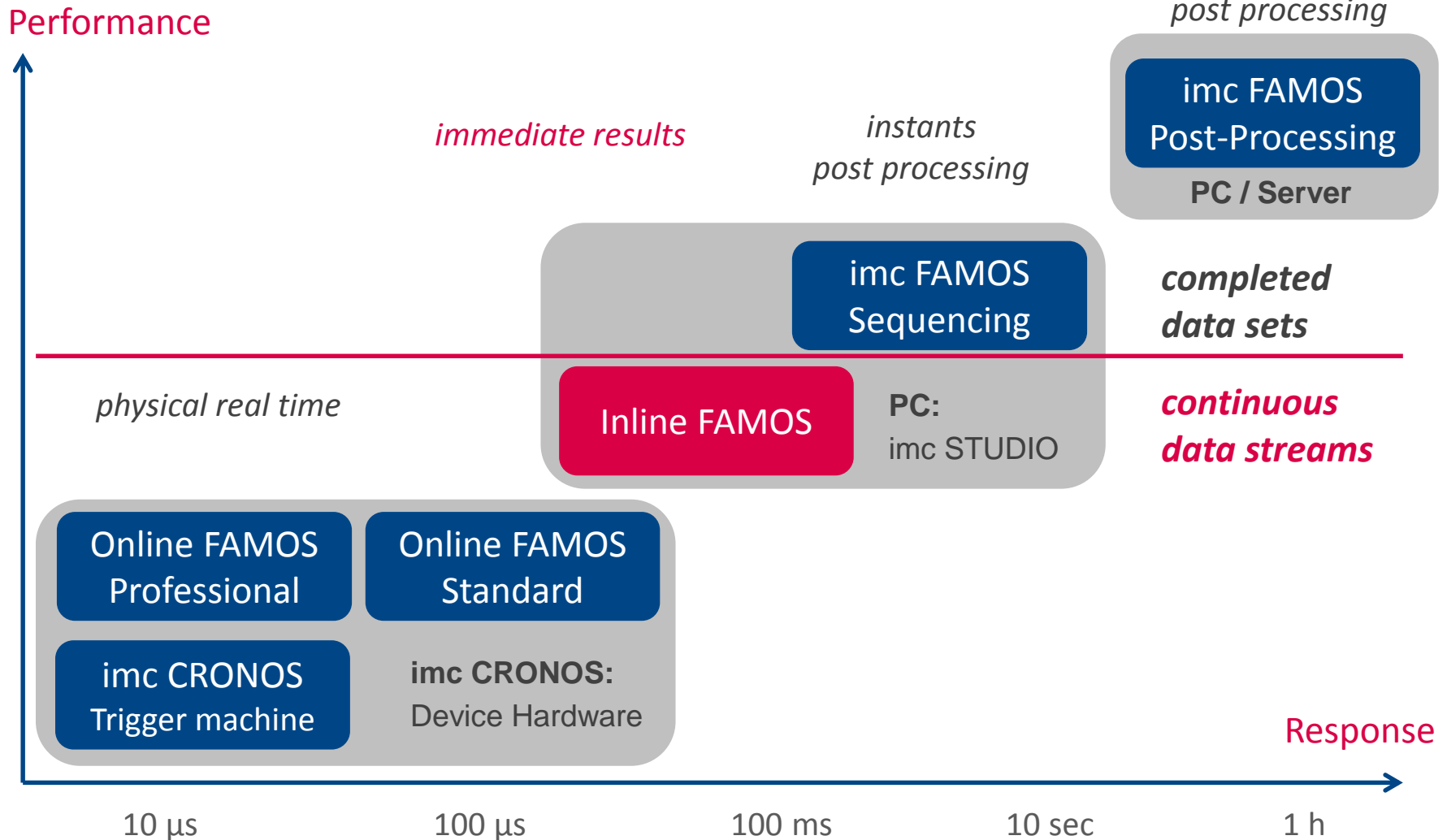
imc STUDIO DataProcessing

PC based data processing technology of imc Inline FAMOS (IFA)



Data analysis and real-time processing

imc Inline FAMOS: „*immediate results*“ for data streams



Overview: OFA vs. IFA

new PC based signal processing platform



OFA (imc *Online* FAMOS)



- Device based
- Stand alone capable
- **Physical** real time (some 100 μ s)
- Channels of one device
- Limited performance (DSP platform)
- Device related license
- Popup editor



IFA (imc *Inline* FAMOS)



- PC based
- requires PC and imc STUDIO
- **Human** real time (some 100 *ms*)
- **Across multiple devices**, incl. 3.rd party
- **scalable** performance (PC platform)
- PC license (similar to imc STUDIO Video)
- New integrated **editor**

Common properties

- **Live analysis**: immediate visual feedback („**immediate results**“)
- Continuous **data streams**: current active, not yet completed measurements (*not* post processing)
- Common unified **syntax**, function sets and packages
- Additional licenses for order tracking and class counting (fatigue analysis)





Channels originating from same devices (sources)

- START and/or trigger
- Linking and combining channels that share the same trigger assignment (same as with OFA)

Channels from different devices

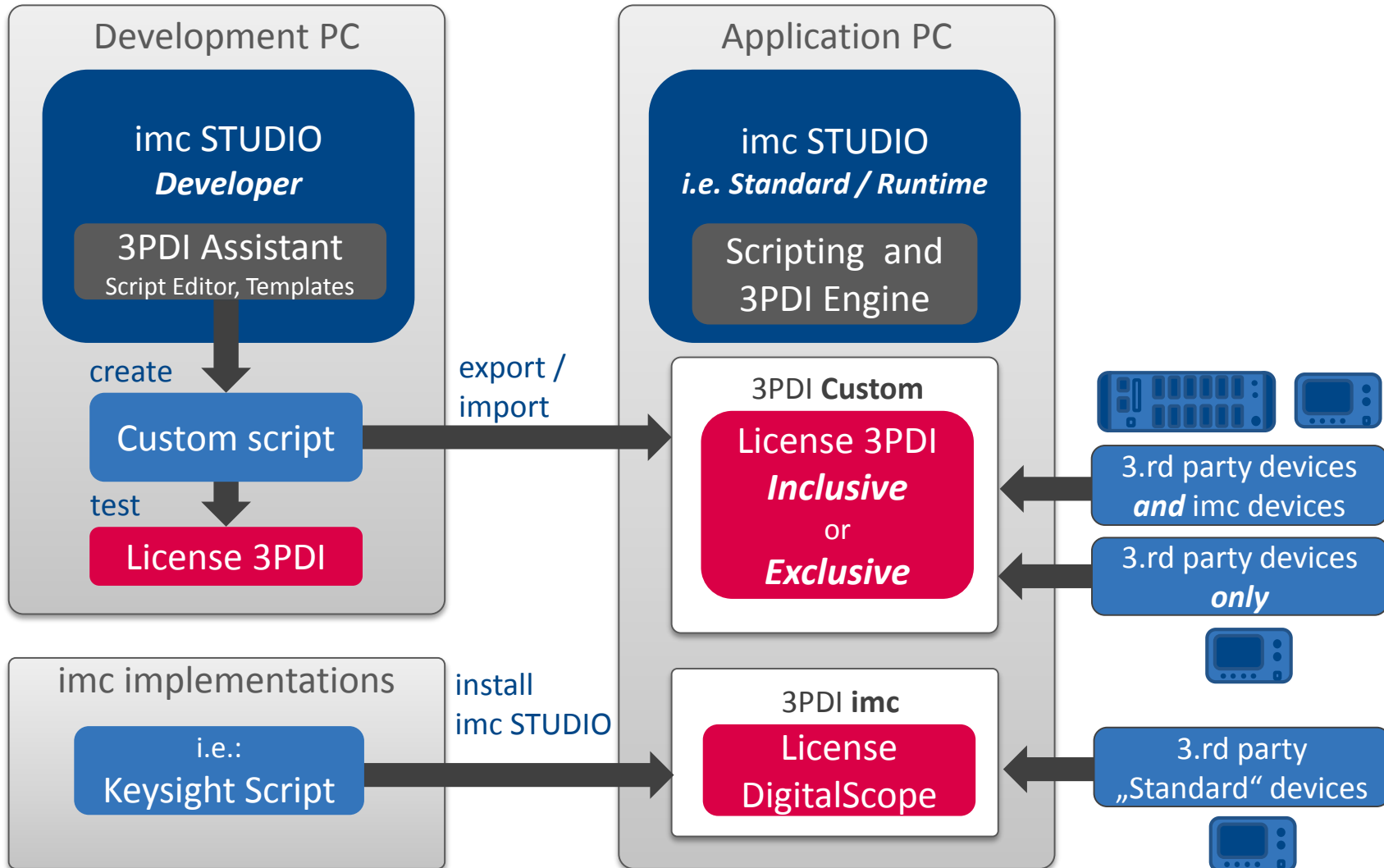
- Combining Channels that are configured for START (Trigger 48)
- Synchronization of START signals across multiple devices with sufficient precision
- Linking triggered channels from different channels is not supported, because:
 - Trigger_1 can be individually (differently) defined on separate devices
 - Device based trigger signals are not globally propagated nor synchronized:
 - Channel(Device_1) cannot be triggered by Trigger(Device_2)

Operating 3.rd party hardware (i.e. on a test stand)

- **Creating** individual device plug-in scripts by the customer:
→ included in Developer Edition (extended scripting and “3PDI Assistant“)
- **Executing read-made scripts** (developed by the customer):
- Select (or import) and activate the script with the “3PDI Assistant“ (free, available in all editions)
- Need to purchase a **License** to deploy and execute **at runtime**
- Comparable to imc STUDIO Video
- Can be combined with any imc STUDIO Edition (incl. free Runtime)
- License comes in two variants „**Inclusive/Exclusive**“:
 - Inclusive: with imc systems involved: **500 €**
 - Exclusive: exclusively 3.rd party, no imc devices involved: **2000 €**
 - Currently: administrative, End User License Agreement (EULA)
 - Future: automatic detection and verification of involved devices
- **Extra**: additional licenses for ready-made implementations of “**Standard devices**“
 - DigitalScope (Keysight/Agilent)
 - Future implementations by imc (individual prices...)

Licensing of imc STUDIO 3PDI

3.rd party device interface: Workflow, licenses and products



Details on licensing

- Licensing of „3PDI Custom“ / „3PDI imc“ are completely independent
 - „3PDI Inclusive“ covers customer’s development but NOT „3PDI DigitalScope“
 - „3PDI Inclusive“ is NOT an additional prerequisite for „3PDI DigitalScope“
- Pricing of „3PDI Custom“ / „3PDI imc“ is likewise independent
 - Specific imc implementations can have different prices
- Ready-made standard implementations are always treated as „Exclusive“
 - DigitalScope can also be operated „stand alone“ without any imc equipment!
- Selected implementations **free of cost** available: **„demo devices“**:
 - **AudioDevice** PC audio as a data source: microphone, headset, line input
 - **ChannelLoader** „Replay“ of test data sets from hard disk as a data source

→ Crucial for anonymous first customer contacts via web site!
→ demo STUDIO Download, no salesman available, no imc system at hand

Global protocol logging

Log file without logical content

- **Conventional**, simple requirement
- ⬇️ **Offline analysis only (post processing)**
- **Advantages:**
 - ⬆️ One single **protocol channel**
 - ⬆️ Efficient memory usage
 - ⬆️ Complete data contained

Selektive CAN decoding

Individual channels with scaling

- **Advanced**, intelligence + resources
- ⬆️ **Allows live analysis (OFA/IFA)**
- **Certain disadvantages however:**
 - ⬇️ High channel count (limit: 512!)
 - ⬇️ Requires more memory (overhead)
 - ⬇️ Need to decide on channel selection

Why worry about trade-offs when you can have the best of both worlds:

imc STUDIO BusDecoder

- ⬆️ Log the complete protocol channel (Log file)
- ⬆️ Decoding information embedded into the Log channel (equivalent to separate **dbc**)
- ⬆️ Selective decoding (individual channels) anywhere along the data stream (STUDIO, FAMOS)



Technology

- Applicable to protocol channels (in particular: CAN Log)
- Alternative popular terms for **protocol channels**: „Log , Log-File, Dump“
- Continuous data streams (current measurement)
- Based on „**DataProcessing**“ Technology of **imc STUDIO** (powerful PC platform)
- Embedded decode information (equivalent to dbc): encapsulated and complete avoiding any need to separately transport, administer and match the corresponding dcb file!
- Flexible and dynamic selection and decoding of outputs as Virtual Channels
- **Also applicable to imc FAMOS** post processing!

Supported protocols and communication bus systems

- CAN
- MVB (limited)
- SPI (serial bus, custom specific solution for Bosch)

Licensing

- No extra license required! Free feature, available in all editions of imc STUDIO

CAN Assistant:

- a) activate message log for all CAN messages (new message: „Definition“)
- b) mark all channels to be *“potentially”* decoded downstream: blue icon („Validity“)

a)

CAN-element	ID	Name
Node 1		Knoten_001
Message	64H	Message100
Channel		Cs01_Channel01
Channel		Cs01_Channel02
Channel		Cs01_Channel03
Channel		Cs01_Channel04
Message	65H	Message101
Message	fffffffH	Botschaft_003
Node 2		Knoten_002

Message

Name: Botschaft_003

Comment:

Device receiving message

Identifier (ID): All messages

Message log: Log CAN Bus message

b)

CAN-element	ID	Name
Node 1		Knoten_001
Message	64H	Message100
Channel		Cs01_Channel01
Channel		Cs01_Channel02
Channel		Cs01_Channel03
Channel		Cs01_Channel04
Message	65H	Message101
Channel		Cs01_Channel05
Channel		Cs01_Channel06
Channel		Cs01_Channel07

Channel state:

Validity depends on another channel

Channel state dropdown: a, p, -, +, ???

imc STUDIO BusDecoder

Look & Feel: actual setup of BusDecoders action (DataProcessing)



STUDIO DataProcessing (BusDecoder)

- select global **protocol channel** of the CAN node („CAN_Messages_S1_K1 “)
- activate individual **channels** for decoding (extraction); example shown: only two

Activated	Function	Output
<input checked="" type="checkbox"/>	Bus Decoder(CAN_Messages_S1_K1)	

Caption	Save (to hard drive)	Channel name
Cs01_Channel01	<input checked="" type="checkbox"/>	Cs01_Channel01
Cs01_Channel03	<input checked="" type="checkbox"/>	Cs01_Channel03

Caption	Active	Chann...	Circular buffer...	Availabl...	Sav...	Availabl...	Circular buf...	Sa...	Bu...
Cs01_Channel01	<input checked="" type="checkbox"/>	Cs01_...	1 min	Last	<input checked="" type="checkbox"/>	All	undefined	-1	0
Cs01_Channel02	<input type="checkbox"/>		1 min	Last	<input type="checkbox"/>	All	undefined	-1	0
Cs01_Channel03	<input checked="" type="checkbox"/>	Cs01_...	1 min	Last	<input checked="" type="checkbox"/>	All	undefined	-1	0
Cs01_Channel04	<input type="checkbox"/>		1 min	Last	<input type="checkbox"/>	All	undefined	-1	0

STUDIO Setup

- one single CAN-**protocol channel** only
- n resulting **Virtual channels**

Name	Connector	Status
> Channel type: Analog inputs (Count=8)		
> Channel type: Analog outputs (Count=4)		
> Channel type: Field bus: Analog inputs (Count=1)		
CAN_Messages_S1_K1	[01] FIN002	Active
> Channel type: Monitor: Analog inputs (Count=8)		
> Channel type: Virtual channels (Count=2)		
Cs01_Channel01		Active
Cs01_Channel03		Active

Innovations in imc STUDIO

New features in imc STUDIO

- New functions and extensions
- Improved user experience
- Bug fixes



New device and hardware functionality (imc DEVICES)

Licensing and prices

imc STUDIO

integrated software environment for measurement & control

Installation of imc STUDIO 5.0R3

Install and product configuration



Product configurator

- Settings will be preserved to facilitate update installation

Global settings

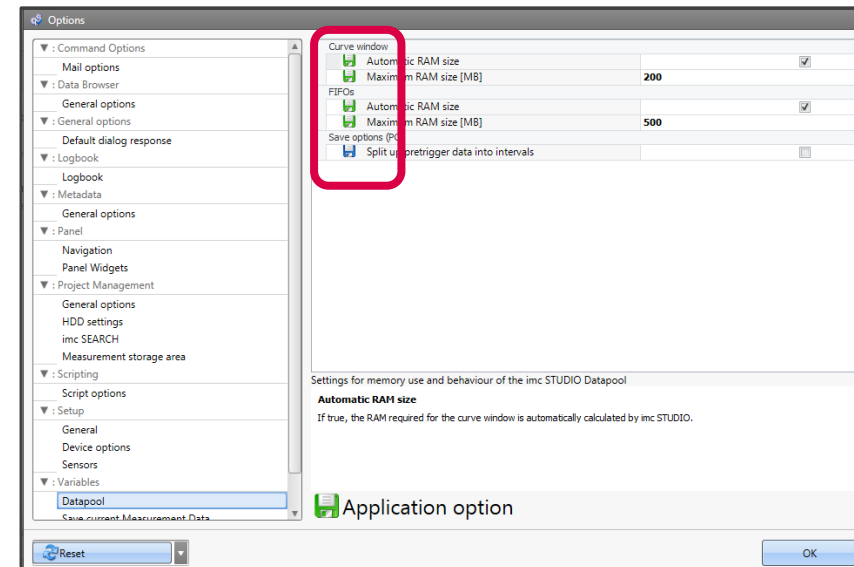
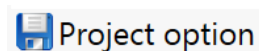
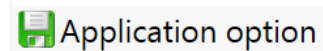
- Preserved settings, persistent in update installation
- i.e. root path for experiments or other subtle settings difficult to memorize ...!
- „Scope“ of individual options is now indicated: Project/Application

Example.: Root folder of projects and experiments:



Green: applies to entire installation („Application“)

Blue: applies to current project only



→ *Support for update installation
transparent and understandable project settings*



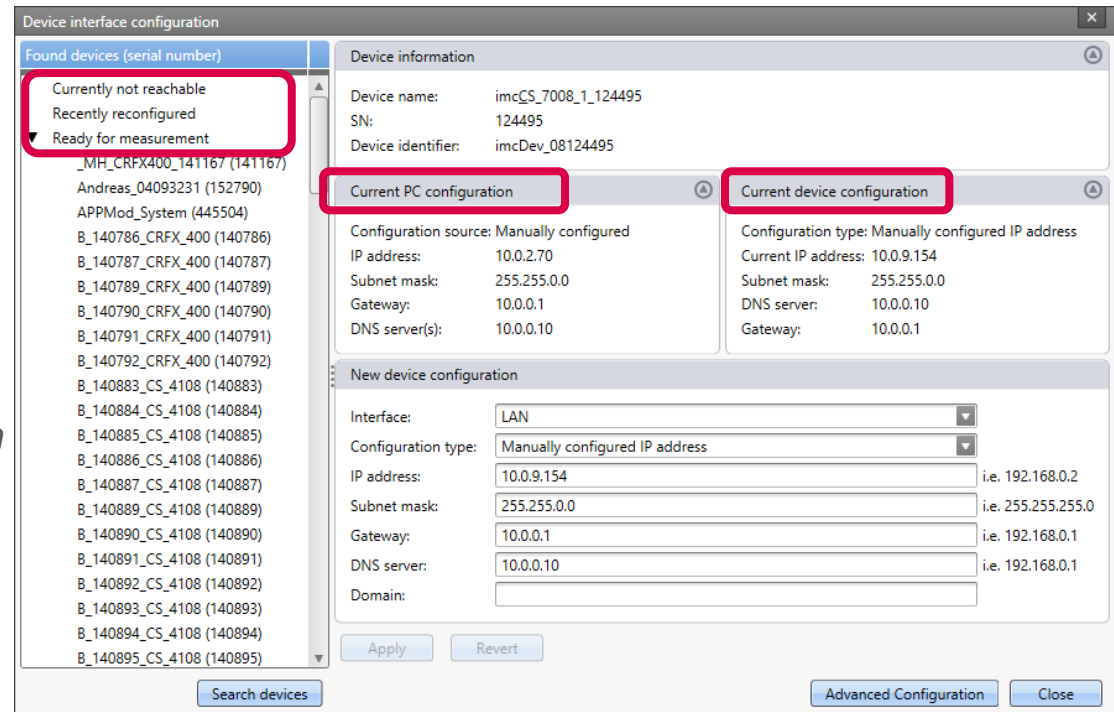
Network configuration

- Device interface configuration integrated into STUDIO (former “imc DEVICES Interface Configuration”), also: automatically launched when no devices have been found
- When finding incompatible network settings PC-vs.-Device: „Currently not reachable”
Suggestions for fixing!
- Categories
„recently configured”
for easy navigation
- Overview:

Current PC configuration

VS.

Current device configuration



→ Support with notorious network trouble, traditionally hard to understand...



imc Online FAMOS

- Automatic conversion into code with control commands
→ i.e. detection and assignment of code segments (channels) to respective triggers
- Save initialization of DACs (analog out) via „OnInitAll“

Supplemental files (characteristic curves, messaging)

- New dialog for central administration of all supplemental files
- Assigning files to devices
- Assigning single files (globally maintained) to multiple devices
- Directly open files with associated standard application

Init values

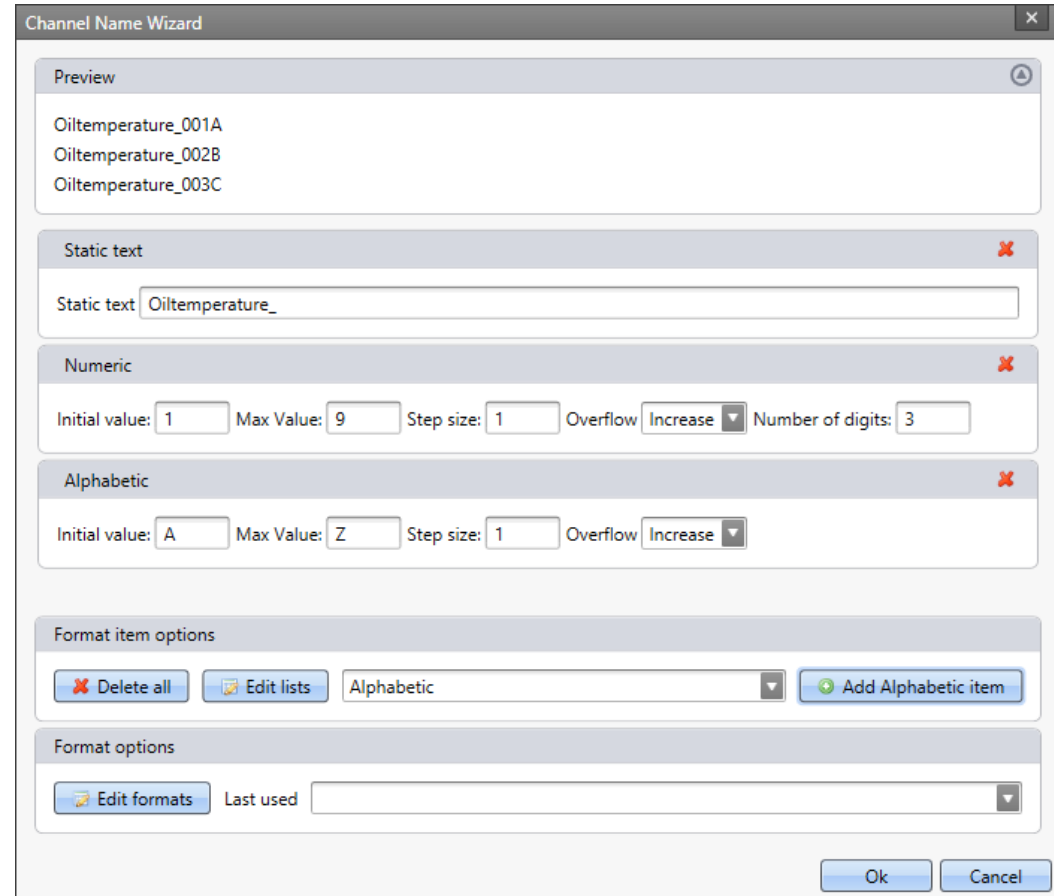
- Now also supported for virtual channels and fieldbus channels

→ *intelligent setup support, structured handling of experiment variants*



Channel name wizard

- completely *reworked*
- incl. *preview*
- Num, Alpha, custom lists



The screenshot shows the 'Channel Name Wizard' dialog box with the following sections:

- Preview:** A list of channel names: Oiltemperature_001A, Oiltemperature_002B, Oiltemperature_003C.
- Static text:** A text input field containing 'Oiltemperature_'.
- Numeric:** Fields for Initial value (1), Max Value (9), Step size (1), Overflow (Increase), and Number of digits (3).
- Alphabetic:** Fields for Initial value (A), Max Value (Z), Step size (1), and Overflow (Increase).
- Format item options:** Buttons for 'Delete all', 'Edit lists', a dropdown menu showing 'Alphabetic', and 'Add Alphabetic item'.
- Format options:** A button for 'Edit formats' and a dropdown menu for 'Last used'.

Buttons for 'Ok' and 'Cancel' are located at the bottom right.

→ *very powerful tool for comfortable handling of high channel counts in large testing applications*

Data Browser (Panel)

Organize and view data



Channel related meta data

- In addition to data on PC-HDD: now also supported with onboard storage (device HDD, Flash)
- i.e. meta information will also be written to channel properties of FAMOS data files onboard

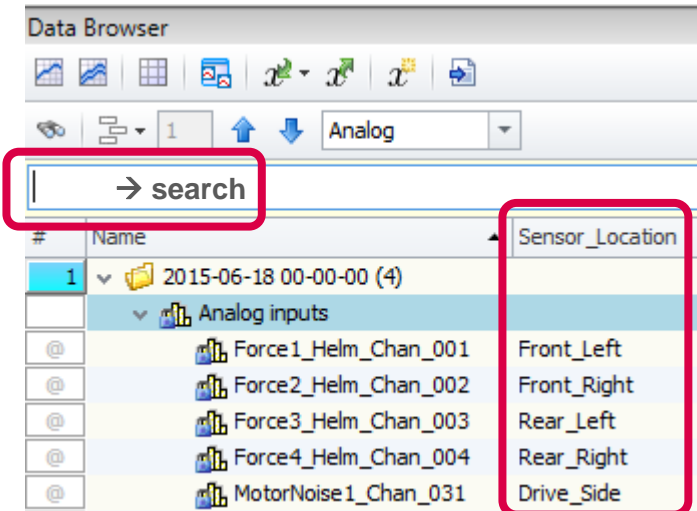
Channel drag & drop from within the data browser

- Directly into floating curve window
- Into Windows file system (Explorer)
- Into FAMOS variable list and sequence

Channel meta data in browser table

- Meta attributes (standard and custom) can be listed and filtered

→ *Improved and efficient handling
Structured workflows with large data / channels*





Menus and GUI

- Reworked menu for editing of panel pages (create, copy etc.)
- Support for quick saving of elements into the Repository
- Data browser: drag from channel context menu directly into floating curve window
- Curve window toolbar: activate via context menu



Navigation bar

- Interactive editing (cut out) of curve segments and store to HDD

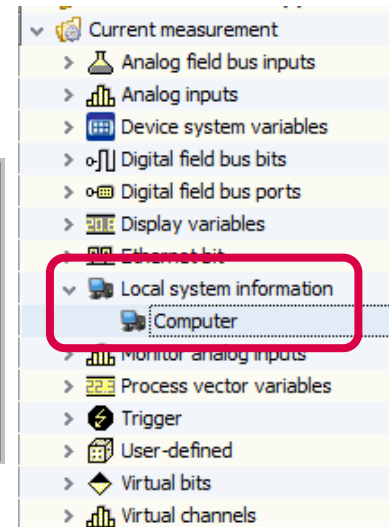
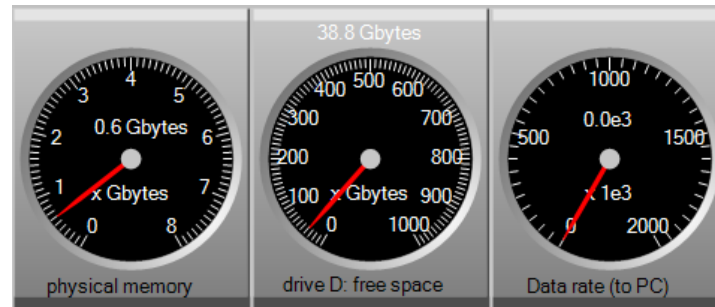
→ *Improved and efficient handling*



System information (incl. PC resources)

- New class of variables for parameters on performance and resources („Local system information – Computer“)

- Data rate
- Memory consumption
- Free HDD space etc.



Widgets

- Option: additional suffix to channel names: „current measurement name“
- Defining update rate of widgets
- Loading curve window configurations (*.ccv) using symbolic path variable (i.e. current experiment path!)

→ *Supervising and optimizing performance*



Special widgets

- Level indicator (signal relative to current range setting)
- Bar graph with arbitrary center line (incl. zero)
- Filling drop-down selection lists with texts (from variables)
- Clocks can now also display duration, measuring time etc.



GPS data and maps

- Map as curve window overlay for GPS data, including map update via internet



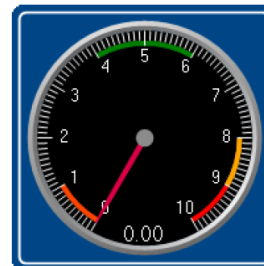
Table widgets

- Various improvements



Gauges

- Multi color zones and scales (rings)



Animated graphics

- Dynamic placement (rotation angle) of graphics controlled by variable („graphic switch“)



New symbolic placeholders for use with commands and widgets

- „PROPS“: user defined properties
- „EXPERIMENT.PATH“: now also supported for Monitor edition
- „SQL“: now supports column designators including space characters



Parameter set export

- In addition to csv/xls and txt, now also supports ***XML*** format
- Choosing variables for export or delete is supported by ***multi-selection***



“Silent” mode execution

- Optionally suppress prompt or user confirmation (i.e. “file exists, overwrite?”) with
 - Storage assistant
 - Variable export

→ ***more flexibility with workflow automation***



Completed data folder

- „Storage_DirectoryUpdate“
- particularly useful for *cyclic interval measurements* (continuous long term monitoring with storage time interval)
- Event will now providing extended information on the completed partial measurement such as storage location / **FolderName** (via scripting)

→ *flexible workflow automation*
i.e. post processing with cyclically launched FAMOS sequence



- Attention with cyclic intervals in combination with triggered measurements:
 - Folder will be completed (update) **not until**
 - first trigger event has occurred, that is related to the **following** interval !
 - Careful with very sporadic, non-regular trigger schemes...“!

Innovations in imc STUDIO

New features in imc STUDIO

New device and hardware functionality

- imc DEVICES
- Firmware / device drivers
- Support of new hardware modules
- Improvements and bug fixes

Licensing and prices



imc STUDIO

integrated software environment for measurement & control

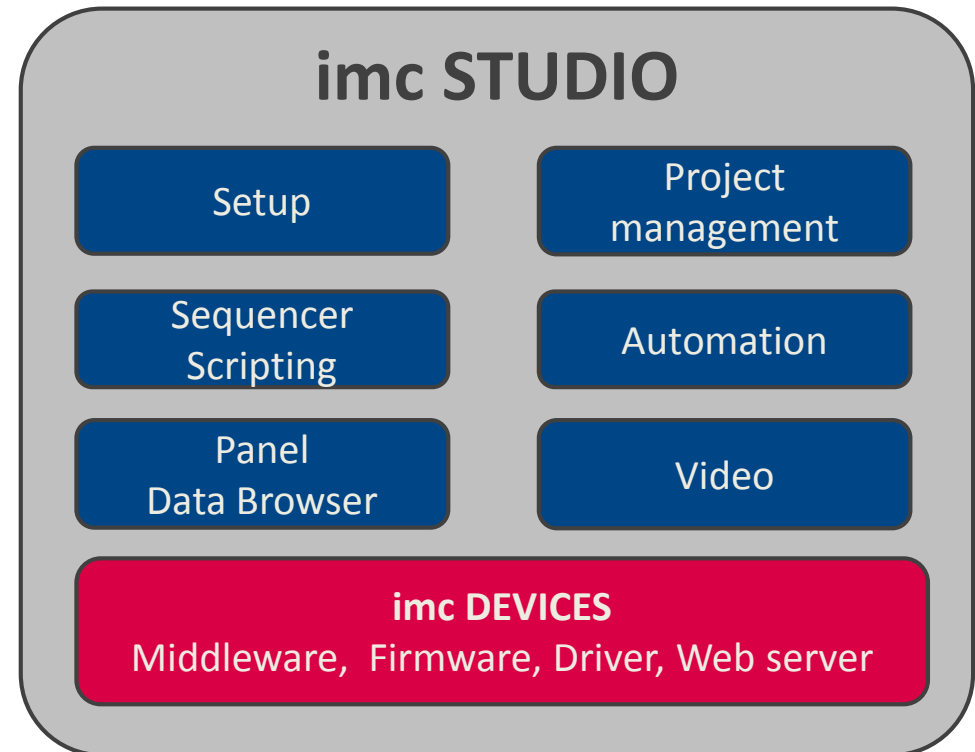


imc STUDIO 5.0R3 comes with new **imc DEVICES 2.8 R7** under the hood

- Automatically installs with imc STUDIO
- New *device and hardware functions*
- Support for new modules
- *Improvements and bug fixes*

- **imc DEVICES is *no longer* published or declared as “operating software”, GUI etc.**

- imc DEVICES forms the „invisible“ foundation („firmware, driver“)
- Entire GUI, operation and measurement and all “extended” functionality exclusively via imc STUDIO



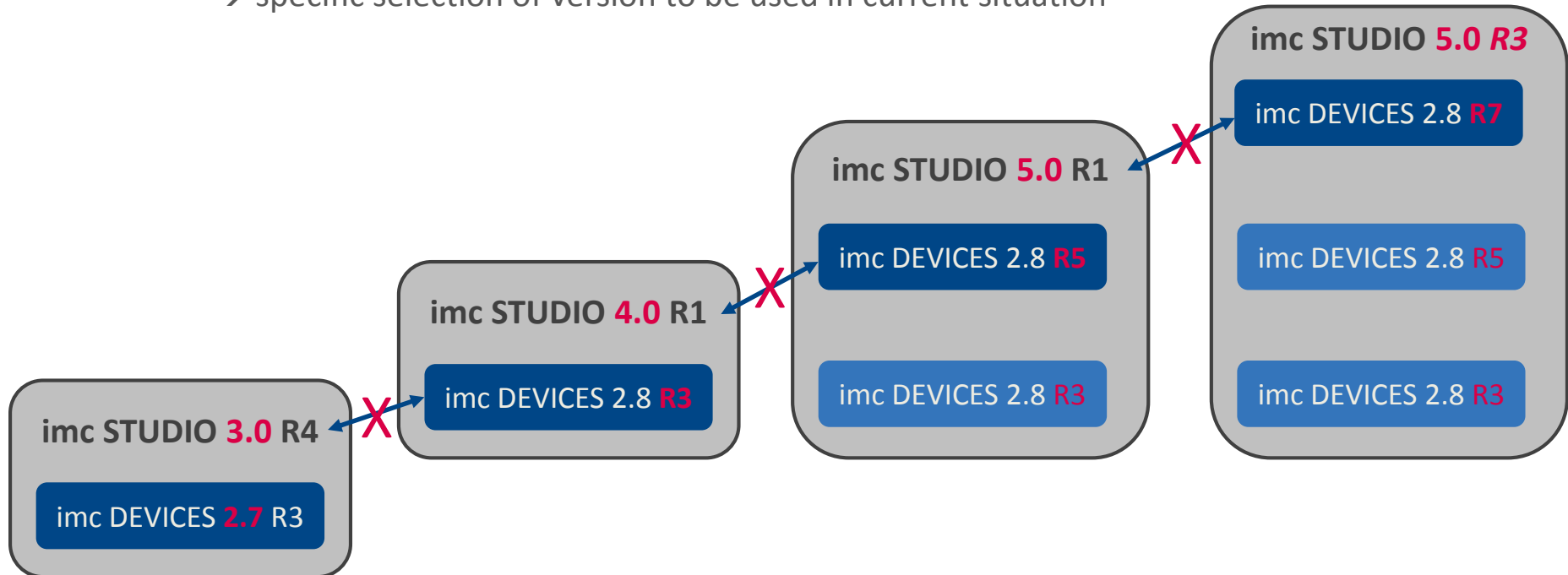
Compatibility and version history

imc STUDIO vs. imc DEVICES



imc STUDIO provides and installs imc DEVICES automatically

- New imc DEVICES is typically NOT compatible with previous imc STUDIO !
- However: STUDIO is often backwards compatible
latest imc STUDIO does not necessarily require latest imc DEVICES (but recommended!)
- imc STUDIO supports *simultaneous operation with multiple versions of imc DEVICES*
→ specific selection of version to be used in current situation



New hardware functions: imc DEVICES 2.8 R7



imc STUDIO 5.0R3 comes with latest imc DEVICES 2.8 R7

imc Messaging

- Sending of encrypted email (SSL3) supported



Network configuration

- Export/import of device network settings
- Display of current IP and MAC (LAN, WLAN)



Remote access to device storage

- „Explorer extension“ with new title and icon (“imc systems”)



Web server

- Web designer supports import/export of created web pages, allowing to →
 - Create pages on high performance device CRFX-2000G (DAB2M)
 - Import/operate on “smaller” device families C-SERIES-N (DABHS)





Web server: device requirements

Background information: WebServer and WebDesigner

- Server and Designer (!) run on the device and require certain performance (processing, memory)
- Server will benefit from additional memory extension (see revision DABHS) - Designer does NOT!
- **→ Designer requires DAB2M (CRFX-2000G) for smooth workflow – only recommended scenario!**
- So far, porting of created web pages to other devices had not been possible!
New:
 - a) Create pages with DAB2M
 - b) Operate them with DABHS**→ Import/export is now available as a workaround solution for these performance issues!**

→ 2000G devices (DAB2M) strongly recommended for design work with WebDesigner

Device platform for imc REMOTE WebServer	WebServer <i>display</i> pages	WebDesigner <i>create</i> pages
CRC, CRFX-400, C-SERIES,... (DABHS)		
+ MEM (Memory extension, new revision)	 import	
CRC/CRFX-2000G (DAB2M)		export 

Hardware support

- **Custom specific** devices and OEM: SPI (Bosch, test of serial bus systems)



- **Fieldbus protocol (automotive)**

- CAN-ECUs: Seed/Key with *.skb files
OB2-2: „ID for tester“
Format Extended: masking IBC
- LIN: MasterBreak configurable
- IPTCOM: Pre-selection of signals



- **HiL** latest Matlab Versions supported: R2014a/b, R2015a



New hardware functions: imc DEVICES 2.8 R7



imc STUDIO 5.0R3 comes with imc DEVICES 2.8 R7

New amplifier modules

- CRFX/FRQ2-4: for transducers with “xx-to-frequency” output
- CRFX/AUDIO2-4-MIC: with supply (200V) for condenser microphones



New amplifier functions and capabilities

- **Bridge balancing** now supported even during running measurement
- **Characteristic curve linearization** supported for additional CRC amps:
new: UNI2-8, DCB2-8, B-8, LV3-8, ICP2-8
- Almost all CRFX amp now support **low-pass** and AAF to **below 50 Hz (down to 10 Hz)**
past: UNI2-8, LV3-8, ICP2-8, DCB2-8
new: **ISOF-8, ISOF-16, HV2-2U2I**
- CRFX/ICP2-8 allow **high-pass** down to **0.07 Hz**





Linearization curves on conditioning amplifier

- **Local** processing on the amp, **no OFA** resources required
 - Specify characteristic curve with up to **1023 supporting points** via imc SENSORS
- now supported for most modules and device series



Low-pass filter with CRFX amplifiers

- In the past, with CRFX (only this series, NOT for CRC!) low-pass had often not been possible with corner frequencies **below 50 Hz**
 - Limitation also applied to (non-transparent) automatically chosen AAF type!
 - Background: caused by numerical limitations
 - This had been an issue with CRFX only!!
- this issue is now almost completely solved!

New hardware functions: imc DEVICES 2.8 R7

Linearization on amplifiers



Device series / amplifier	CR-PL, C-SERIES (-N)	CRC	CRFX	SPARTAN
UNI2-8, DCB2-8, B-8	✓	✓	✓	✓ (B16)
UNI-8, DCB-8 (obsolete)	✓	---	---	---
LV3-8, ICPU2-8	✓	✓	✓	---
UNI-4	---	✓	✓	---
ISO2-8	✓	✓	✓	✓ (U16)
HISO-8	✓	✓	⊘	---
ISOF-8	---	⊘	✓	---
SC2-32	✓	✓	---	---
OSC	⊘	⊘	---	⊘ (T16)
HV-2U2I, AUDIO-4, C8	⊘	⊘	⊘	---
HV2-2U2I	---	⊘	✓	---
BR2-4	⊘	⊘	⊘	⊘
QI-4, AUDIO2-4	---	---	⊘	---

- Module not available for this device series
- ✓ imc DEVICES 2.8 R7
imc STUDIO 5.0 R3
- ⊘ Feature currently not supported

New hardware functions: imc DEVICES 2.8 R7



Minimum low-pass filter with imc CRONOSflex (CRFX)

CRFX amplifier	Past	Currently imc DEVICES 2.8 R7	Remarks
UNI2-8, DCB2-8, B-8	50 Hz	10 Hz	
LV3-8, ICPU2-8	50 Hz	10 Hz	
UNI-4	50 Hz	10 Hz	
ISO2-8	20 Hz	2 Hz	
HISO-8	20 Hz	20 Hz	2 Hz in preparation
ISOF-8	50 Hz	10 Hz	
HV-2U2I	20 Hz	10 Hz	
HV2-2U2I		10 Hz	New HV generation
BR2-4	20 Hz	20 Hz	2 Hz in preparation
QI-4, AUDIO2-4	50 Hz	50 Hz	10 Hz in preparation

Innovations in imc STUDIO
New features in imc STUDIO
New device and hardware functionality
Licensing and prices



imc STUDIO

integrated software environment for measurement & control

Editions, supplemental packages, prices

New supplemental packages for imc STUDIO 5.0 R3



Editions

Package	Remarks	Price
imc STUDIO Standard	<i>No longer included in standard delivery for new devices</i>	990 €
imc STUDIO Professional	Recommended for experienced users	1390 €
imc STUDIO Developer	For developers and system integrators (incl. Automation)	4500 €
imc STUDIO Runtime	<i>Free, execution only, no editing (for tests stands)</i>	---
Demo	30 days free license for Developer Edition	---

Supplemental packages for extension of editions

Package	Remarks	Price
imc STUDIO Video	Integration and operation of video cameras	750 €
imc STUDIO Monitor	Additional component to be combined i.e. with Standard Edition	390 €
imc STUDIO PowerQuality	Power quality analysis, PC based (EN 50160, IEC 61000-4-30)	1500 €
imc SENSORS	Sensor data base	1750 €
imc Inline FAMOS	PC based analysis of data streams	2500 €
imc STUDIO 3PDI-Exclusive	„3.rd Party Device Integration“ runtime license, without imc systems	2000 €
imc STUDIO 3PDI-Inlusive	3PD with imc systems involved	500 €
imc STUDIO 3PDI-DigitalScope	Keysight/Agilent InfiniVision 6014L	TBD

Thank you for your attention.

See you at: www.imc-berlin.com



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