

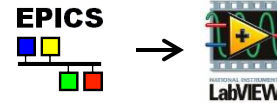
CONTROL SYSTEM INTEROPERABILITY AN EXTREME CASE:

Merging DOOCS and TINE

P. Duval, A. Aghababayan, O. Hensler, K.
Rehlich, DESY, Hamburg, Germany

Interoperability ?

- With **commercial packages** ...
- **Wrapping/Binding** non-native interfaces ?
 - e.g. How to interface **EPICS** with **LabView** ?
 - or **MatLab**, **Python**, **Perl**, **Root**, etc.
 - Just ask **COSYLAB** to do it ?
 - Use the **interoperability tools** that come with the package.
 - Java + JNI
 - .NET + System.Runtime.InteropServices
 - **MatLab** + MEX interface
 - **LabView** + external library support
 - etc.
- **Go native** ?
 - e.g. **STARS** has a native Perl interface.
 - Most have a native java interface.
 - Not always practical !



Interoperability ?

- With other **control system frameworks** ...
 - “We love our **EPICS** and they love their **TANGO** ...”
 - What to do?
- Gateways or translation layers that ‘*trade data*’.
 - epics2tango, tango2epics ...
- Assume as given:
 - control system frameworks manage interoperability to commercial software.
- Concentrate on:
 - interoperability **between** the **control system frameworks** !
- Why worry about this?

Motivation

- *Warring factions* within a single institute or project !
 - And those at the top who want results ...
 - (But this never happens, right?)
- Experiments, Test Equipment *from other institutes*
 - Sudden deadlines to get something new into the system ...
 - Recent example at DESY:
 - **OLYMPUS** experiment brought some detector software from **MIT** with **EPICS** interface.
 - *Immediate integration* with the rest of the control system via **epics2tine**.





Motivation

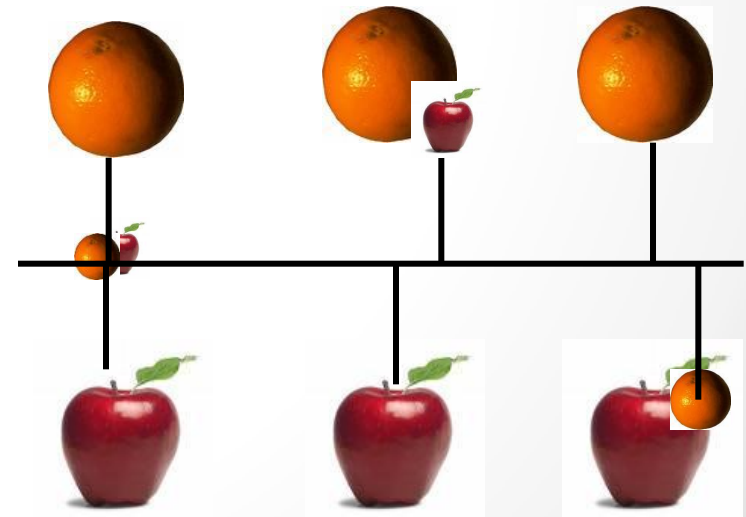
- Include *useful features* of another system
 - e.g. **STARS**
 - excellent system for beamline control
 - use **STARS-TINE** bridge for multicasting BEAM parameters to the 70 end stations at Photon Factory in **KEK**.
- *Major Release upgrades*
 - e.g. **TACO** and **TANGO**
- And if you're *not 100% EPICS*
 - you'll probably have to interoperate with it.

DOOCS / TINE

- Both are *mature* control systems
 - Primarily in use at DESY
 - But used at other institutes and *industry* as well
 - (*No, the entire rest of the control-system world does NOT use either EPICS or TANGO*).
- **TINE:**
 - An **ISOLDE** spin-off (CERN ~1991)
 - Transport is **socket based**
- **DOOCS:**
 - Early collaboration with **TACO** (~1995)
 - Transport is **SunRPC** based
- **ALL** accelerator control at DESY is either **TINE** or **DOOCS**.
 - Additional motivation to have seamless interoperation.
 - (*Yes, you will find EPICS in cryogenics and infrastructure and TANGO at the HASYLAB beamlines*).
- Strategies for *interoperability* ...

How best to 'trade data' ?

- System A (**oranges**) and System B (**apples**).
- Have to deal with **apples** and **oranges** one way or another!
 - Translate System **A** request into System **B** language:  → 
 - Translate System **B** response back to System **A** language:  → 
 - 1. **Apple** to **Orange** 'gateways'
 - lives as an external process
 - 2. **Apple** to **Orange** 'plugs'
 - live on 'Orange' clients
 - 3. **Apple** to **Orange** 'translators'
 - live on 'Apple' servers



Translation Layer

- **Method 1** (*gateway*)

- Requires setting up an extra process for each target server.
- Connectivity problems harder to trace ?
- Least invasive



- **Method 2** (client-side *plugs*)

- Popular: JCOP, cdev, abeans, CSS, jddd, ACOP, ...
- Available features depend on target server !
 - e.g. asking a server to multicast data would only work on a TINE server!



- **Method 3** (server-side *translator*)






- Most *invasive*
 - New software (new risks) on critical server components.
- Best method for merging **ALL** control system features.



Frameworks Models

- Brief Review:
- **1: Database Model**
 - **EPICS, VISTA** (i.e. VSystem not the OS)
 - 'get', 'set', 'monitor' elements in a database.
- **2: Device Server Model**
 - **TANGO, DOOCS, ACS, STARS, TINE**
 - Server offers methods to a collection of 'devices' at some location.
- **3: Property Server Model**
 - **STARS, TINE**
 - Server is a service with properties, which can have keywords.
- *How to map e.g. model 1 to model 2 and vice versa ?*

DOOCS/TINE Merger

- Uses **server-side translation** ! (*Method 3*) 
 - All **TINE** features available to a **DOOCS** server ! 
- **DOOCS** device servers maps *perfectly* into **TINE** device servers and vice versa! 
- **TINE** *property* servers present a **browsing issue** with some **DOOCS** utilities. 
 - *Straightforward* to deal with ! 

Server-side Translation

- **DOOCS** *DAQ protocol*
 - independent issue
 - does not impact the DOOCS/TINE merger
- **DOOCS** transport based on *SunRPC*
 - Synchronous polling and scalability problems ?
 - *Aside:*
 - **TACO** later (**post-DOOCS** collaboration) introduced inverted SunRPC client-servers to accommodate asynchronous transfer.
 - **TACO** + **SunRPC** gave way to **TANGO** + **CORBA**
 - **DOOCS**: Make use of **TINE** from the merger
- **TINE**:
 - Asynchronous transfer
 - QoS steering (UDP, TCP, Multicast)
 - **Contract coercion**

Contract Coercion

- “*Joe the Programmer*” is driving the data flow
 - The ability to do things efficiently (e.g. asynchronous updates on event) does **NOT** mean application programmers will do it this way!
 - *Synchronous calls are easy to understand and program !*
- Panel builders (**jddd**, **MEDM**, ...) designed to be simple.
 - *Optimized and efficient transport is **NOT** simple !*
 - How is “*Joe the Programmer*” using the panel builder?
- What does your **MatLab** interface look like?
 - **Note:** Yes, you can do callbacks in **MatLab** !
- **e.g.**
 - *Try synchronously polling all 300 BPMs individually at 10 Hz within some client application and then run the application on 10 different stations !*

A Server takes control of its Clients

TINE: Contract Coercion in the transport protocol

Example: doing 1 thing for 1 effective client instead of 600 things for 10

Client

- Give me property "Pressure" for pump "OL146.2"
- Ok then, monitor "Pressure" for pump "OL146.2"
- Ok then, monitor "Pressure" for all pumps
- Ok then, I'll listen for the multicast

Server

- No! You'll have to monitor this !
- No! You'll have to monitor the entire MCA (look for index 17)
- Ok, but I'm going to multicast it!

Let the Merger Begin ...

- **Step 1: request-response mapping**
 - **Data type mapping**
 - **primitives** exist in both frameworks
 - **compound data types** must ALL map !
 - e.g. NAME-FLOAT-INT32 as an atomic data type
 - **TINE** offers user-defined data types (**structures**)
 - DOOCS doesn't
 - DOOCS -> TINE not a problem
 - TINE -> DOOCS ?
 - structure fields are accessible !
 - **Dispatch mapping**
 - client is calling property P, is sending type T1, wants type T2, access = A
 - *can now use TINE scheduling in DOOCS !*
 - **Error/Status code mapping**
 - Status = 0 is always 'success'
 - But: can send data with status (e.g. here's the data, but it's not calibrated)

DOOCS/TINE Merger

- **Step 2: *transport mapping***
 - **client Side API**
 - should support **asynchronous communication**
 - can disguise asynchronous listeners with a **synchronous façade**.
 - asynchronous API should be **rich** enough to support **ALL** features
 - e.g. How to launch an asynchronous data link but WAIT for the initial callback ?
- ***Is that it? Are we done?***
 - With a gateway you might even be done at Step 1!

DOOCS/TINE Merger

- We're **done** when a random **TINE** or **DOOCS** server passes the **Duck Test** using a random **TINE** or **DOOCS** control system utility.

“If it looks like a duck, swims like a duck, and quacks like a duck, then it probably is a duck”

- i.e. A kind of '*Turing Test*'.

DOOCS/TINE Merger

- **Step 3: *central Service and Utilities***

- **Naming**



- **Archiving**



- **Alarm**



- **Security**



- **Remote Management**

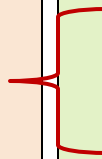


- **etc.**

DOOCS/TINE Merger

• DOOCS Naming

- /facility/server/location/property
- Equipment Name Server (ENS) provides facility and server(s)
- **No** separate **subsystem** identification.
 - Subsystem is usually applied to the facility.
 - Server “Modulator” in “FLASH.RF” instead of “FLASH”
- **Strict** OO Device Server model
 - locations have properties
- **Meta Properties not** principally distinguished from Properties
 - “P” is on the same footing as “P.EGU” or “P.HIST”



• TINE Naming

- /context/server/device/property
- Equipment Name Server (ENS) provides context and server(s)
- Separate **subsystem** identification! (not part of name space)
- OO Device Server model
 - devices have properties
- Or Property Server model
 - properties have keywords
- **Meta Properties are** distinguished from Properties
 - “P” is NOT on the same footing as “P.EGU” or “P.HIST”

DOOCS/TINE Naming

DOOCS
'RPCtest' Utility:

TINE
'Instant Client' :

Analogous to
TANGO + jive
EPICS + ?

The image shows two overlapping software windows. The background window is titled "DOOCS Communication and Plot Utility (Vers. API 5.10.23, DDD 2.2.73) duval@McsMcMini1". It features three columns of lists: "Facility" (TTF2.VAC, TTF2.RF, TTF2.DIAG, TTF2.DAQ, TTF2.EXP), "Device" (AMSCOPE, KLY.ADC, KLY.INTERLOCK, KLY.PLC, Mod39.PulseData), and "Location" (VMEKLY2._SVR, VMEKLY2.SHM, KLY2, ACC1, KLY2.1). A "Property Description" table is on the right, listing properties like NAME, STS.ERROR, STS.NEWERROR, STS.ERRORMASK, STS.ONLINE, SET.ONLINE, ERROR, and ERROR.STR. The foreground window is titled "Java Instant Client" and shows configuration fields for "Device Context" (PETRA), "Device Subsystem" (DIAG), "Device Server" (BPM), and "Device Name" (BPM_SWR_13). It also displays a plot of "SA X position" data with a y-axis from -2e6 to 3e6 and an x-axis with labels BPM_SWR_13, BPM_NOR_52, and BPM_SL_68. The plot shows a noisy signal fluctuating around zero. The plot title is "/PETRA/BPM/BPM_SWR_13 Orbit.X @ 15:29:29.334" and it includes "system stamp: 4344049, user stamp: 0".

DOOCS/TINE Archiving

• DOOCS

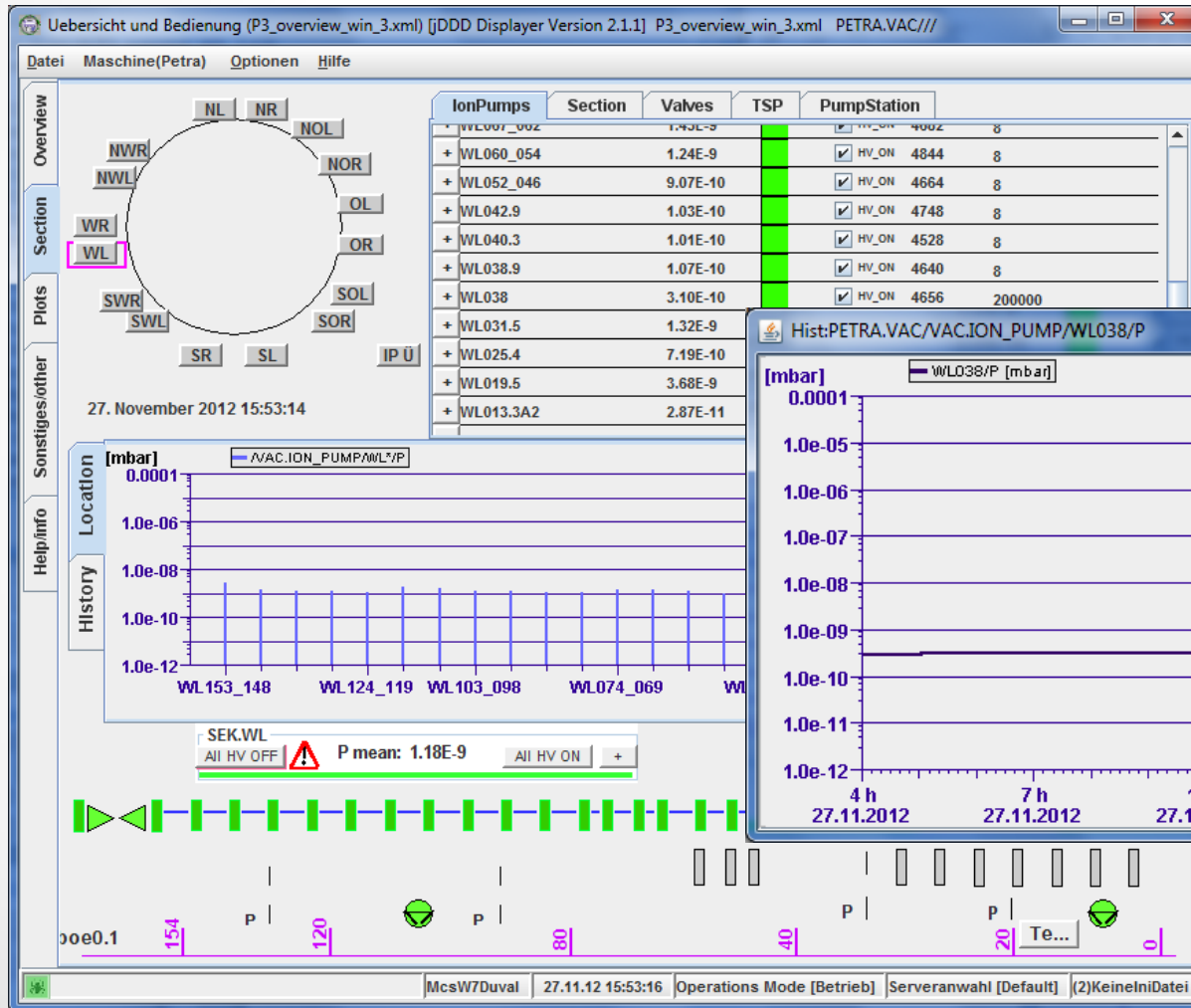
- Independent **DAQ** system
 - can also tag 'events'.
- Local archiving of specific (configured) properties
- Record = single channel
- Accessible via "<P>.HIST" meta-property
- No sampling raster
- **Thumbnails** available
 - fast access of general information over long time intervals



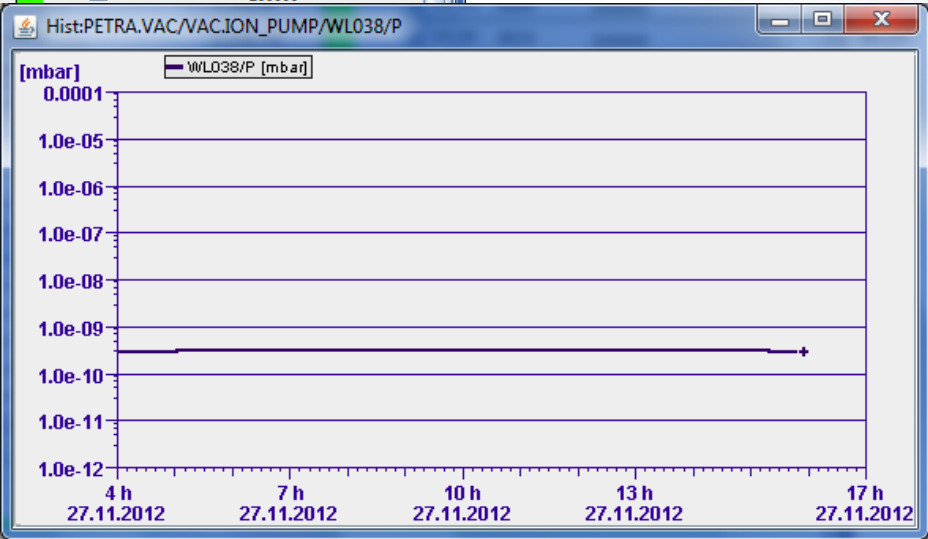
• TINE

- Central **Event Archive**
- Local archiving of specific (configured) properties
- Record = single channel or **multi-channel arrays** !
- Accessible via "<P>.HIST" meta-property
- Sampling raster configurable
- Automatic raster for optical zooming
 - "**points of interest**" insert peaks and valleys.
- **Central archiving** of specific properties
 - Many possible filters

DOOCS/TINE Archiving



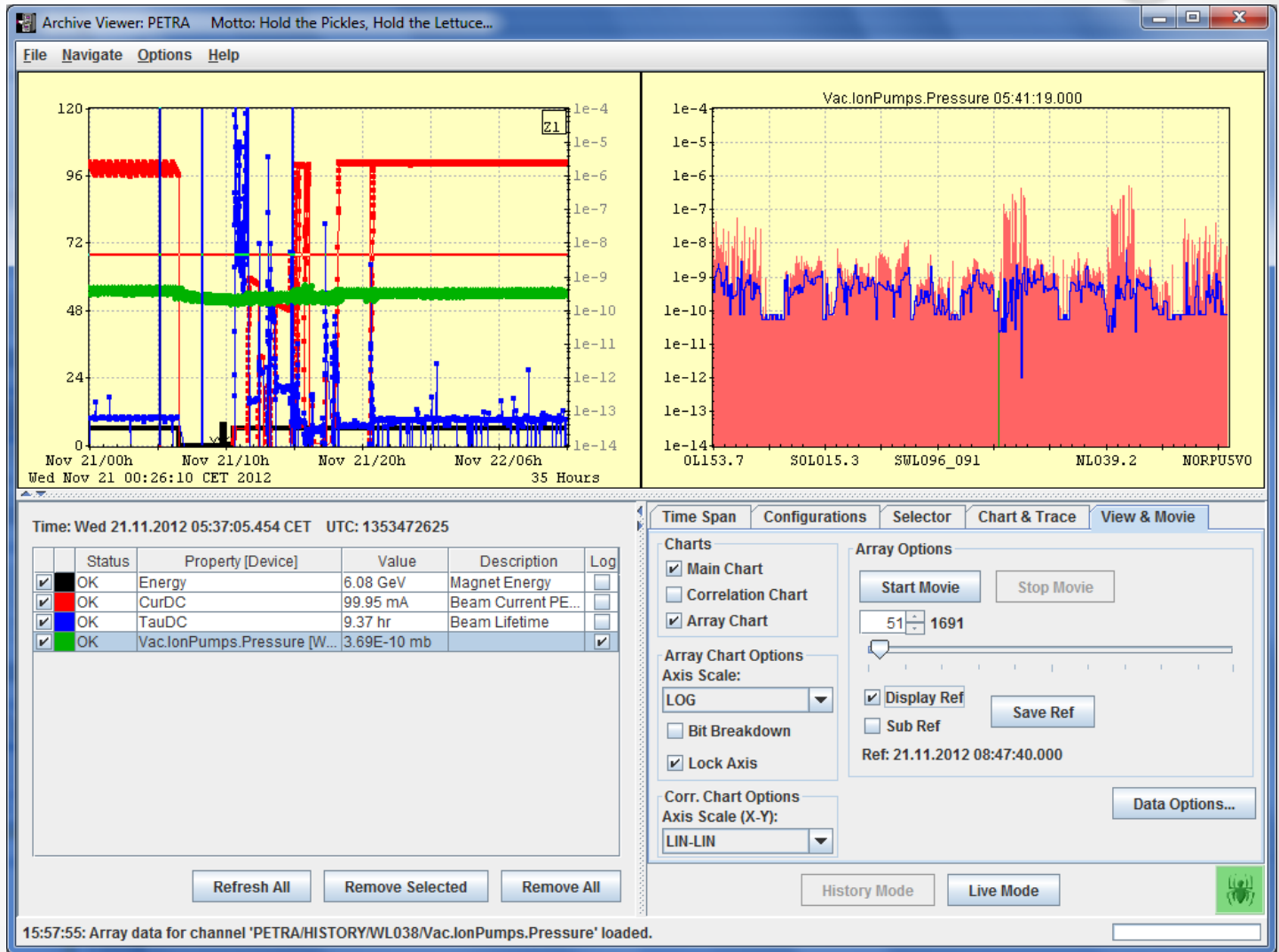
DOOCS local histories example :



DOOCS/TINE Archiving

TINE
Archive Viewer

Optical or
Digital
Zooming,
Trends and
Snapshots,
Movies,
Correlations,
FFT, Fits, etc.



DOOCS/TINE Archiving

The screenshot displays the DOOCS/TINE software interface. The main window, titled 'Uebersicht und Bedienung (REGAE_vac_main_05.xml)', shows a data plot for 'REGAE VAKUUM' with a selected trace for 'VAC.ION_PUMPF/P'. The plot shows a red line representing pressure over time, with a significant spike on Nov 22. A red arrow points from the plot to a schematic diagram on the right, which shows various components like 'SEK.HF', 'SEK.KLY', 'DISP.DDC2', and 'DISP'. The schematic is a block diagram of the vacuum system components.

Below the plot, there is a table with the following data:

Status	Property [Device]	Value	Description	Log	
<input checked="" type="checkbox"/>	OK	Charge.FaradayCup	0.02 pC	averaged charge ...	<input type="checkbox"/>
<input checked="" type="checkbox"/>	OK	P [DISP.DDC2]	1.53E-09	pressure [mbar]	<input checked="" type="checkbox"/>

At the bottom of the interface, there are buttons for 'Refresh All', 'Remove Selected', and 'Remove All'. The status bar at the bottom indicates: '16:07:21: History data for channel 'REGAE/VAC.ION_PUMP/DISP.DDC2/P' loaded.'

Drag-and-drop
between the two:
No mean feat!

DOOCS/TINE Alarms

• DOOCS Alarms

- Devices have alarms
- **5** severity levels
- **Push** system
- Alarms have an status/error **string**
- Also set TINE Alarm on the server side
 - error string -> alarm data



• TINE Alarms

- Devices have alarms
- **15** severity levels
 - 4 principal categories
- **Pull** system
- Alarms have **data** (up to 64 bytes)
- Also push DOOCS Alarm at the Central Alarm Server.

DOOCS/TINE Alarms

DOOCS
Alarm / Info
Display :

DOOCS Alarm and Info Server Display, Version 3.11 23.03.11

Menu View Help

Device Tree: Filter OFF

- Device Tree
 - TTF2.SYSTEM
 - TTF2.FEL
 - TTF2.RF
 - TTF2.DIAG
 - TTF2.VAC
 - TTF2.MAGNETS
 - TTF2.UTIL
 - TTF2.DAQ
 - TTF2.CRATE
 - TTF2.EXP
 - TTF.VAC
 - TTF.RF
 - LAB.VAC
 - CTA.VAC
 - TTF.SYSTEM
 - PETRA
 - VAC.ION_PUMP
 - WATCH.PEDOOC1
 - VAC.SV
 - VAC.TSP
 - TurboPumpen
 - VAC.MS.QMG220
 - VAC.TPG
 - SEK.SOL
 - SEK.SL
 - SEK.SL_CY1
 - SEK.SWL
 - SEK.SWR
 - SEK.WR_DW
 - SEK.NW
 - SEK.NL_MDI
 - SEK.NR
 - SEK.NO
 - SEK.NORPU2_3
 - SEK.OLPU8_9
 - SEK.OLPU11_12
 - SEK.OR

Pending Errors:

Location	Property	Time	Severity	Message
TTF2.DIAG/BEAMPOW...	ERROR	16:42:28,757	27.11.2012	no beam
TTF2.MAGNETS/ERRO...	ERROR	16:38:36,634	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:24,984	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:15,351	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:13,018	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:13,018	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:08,878	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:04,612	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:04,612	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:03,795	27.11.2012	IST differs from SOLL too much!
TTF2.MAGNETS/ERRO...	ERROR	16:38:03,385	27.11.2012	IST differs from SOLL too much!
TTF2.RF/LLRF.CONTR...	ERROR	15:49:58,174	27.11.2012	VS except. occurred ! Alarm reg: 0x800
LAB.VAC/VAC.MS.QM...	ERROR	15:27:42,882	27.11.2012	unavailable server
TTF2.FEL/TIMER/VME...	ERROR	14:18:52,864	27.11.2012	unavailable server
LAB.VAC/PIRANI_VALV...	ERROR	14:06:29,459	27.11.2012	Valve undef., 0x8C00
LAB.VAC/PIRANI_VALV...	ERROR	14:06:29,409	27.11.2012	Valve undef., 0x8C00
TTF2.SYSTEM/VMEHO...	ERROR	08:41:54,657	27.11.2012	stopped trying after 4 restarts
TTF.RF/TIMER/FPGA7	ERROR	14:57:52,732	26.11.2012	NO CLOCK ON BOARD 0

Ticker Table History Table

Recent messages of all devices:

Location	Property	Time	Severity	Message
TTF2.RF/QUENCHDE...	ERROR	16:47:54,269	27.11.2012	low gradient
TTF2.RF/QUENCHDE...	ERROR	16:47:53,268	27.11.2012	low gradient toggled 3 times in 10:01 min
TTF2.RF/QUENCHDE...	ERROR	16:47:04,115	27.11.2012	low gradient
TTF2.RF/QUENCHDE...	ERROR	16:47:04,115	27.11.2012	low gradient
TTF2.RF/QUENCHDE...	ERROR	16:47:04,115	27.11.2012	low gradient
TTF2.RF/QUENCHDE...	ERROR	16:47:03,115	27.11.2012	low gradient
TTF2.RF/QUENCHDE...	ERROR	16:46:14,095	27.11.2012	DAQ data not found : LLRF.CONTROLLER/...
TTF2.RF/QUENCHDE...	ERROR	16:46:14,095	27.11.2012	DAQ data not found : LLRF.CONTROLLER/...
TTF2.RF/QUENCHDE...	ERROR	16:45:48,076	27.11.2012	DAQ data not found : LLRF.CONTROLLER/...
TTF2.RF/QUENCHDE...	ERROR	16:45:48,076	27.11.2012	DAQ data not found : LLRF.CONTROLLER/...
TTF2.RF/LLRF.CONT...	ERROR	16:45:43,543	27.11.2012	ok
TTF2.RF/QUENCHDE...	ERROR	16:44:49,054	27.11.2012	low gradient
TTF2.RF/QUENCHDE...	ERROR	16:44:49,054	27.11.2012	low gradient
TTF2.RF/QUENCHDE...	ERROR	16:44:49,054	27.11.2012	low gradient
TTF2.RF/QUENCHDE...	ERROR	16:44:48,053	27.11.2012	low gradient toggled 4 times in 10:01 min
TTF2.RF/QUENCHDE...	ERROR	16:44:48,053	27.11.2012	low gradient toggled 4 times in 10:01 min
TTF2.RF/QUENCHDE...	ERROR	16:44:48,053	27.11.2012	low gradient toggled 4 times in 10:01 min
TTF2.RF/QUENCHDE...	ERROR	16:44:43,051	27.11.2012	low gradient

DOOCS/TINE Alarms

TINE
Alarm
Viewer:

Alarm Viewer: REGAE

File View Options Navigate Help

Context: REGAE

Fatal	Error	Warning	Alarm Display
6	0	2	<input checked="" type="radio"/> Live <input type="radio"/> Archive

Tue Nov 27 17:09:02 Warning Severity >= 0 Selected/Total No. of Alarms: 8/8 Active Alarms Only (1 Disabled)

System	Fatal	Error	Warning	Subsystem	Fatal	Error	Warning
Magnets	0	0	0	Beam Dump	0	0	0
Ref. Magnets	0	0	0	Feedback	0	0	0
RF	0	0	0	Timing	0	0	0
Vacuum	1	6	0	Diagnostics	0	0	0
Kicker/Septum	0	0	0	Collimators	0	0	0
Transfer	0	0	0	System	0	0	0
				Hardware	0	0	0
				Services	0	0	0
				Alarm Server	0	0	0
				Archive Server	0	0	0
				Infrastructure	0	0	0

System	Device Name	Message	Sev	Alarm Descriptor	Alarm Time	Duration
Vacuum	SEK.TESTB1	TPG Fehler	8	Oscillating Data Changed	17:08:57.000 - Nov 27 CET	27.2 hr
Vacuum	SEK.TESTB2	TPG Fehler	8	Oscillating Data Changed	17:08:57.000 - Nov 27 CET	27.2 hr
Vacuum	2CATH.H	Schieber geschlossen	15	Heartbeat Oscillating	17:04:00.000 - Nov 27 CET	27.1 hr
Vacuum	DDC	Schieber geschlossen	15	Heartbeat Oscillating	17:04:00.000 - Nov 27 CET	27.1 hr
Vacuum	BC1	Schieber geschlossen	15	Heartbeat Oscillating	17:04:00.000 - Nov 27 CET	27.1 hr
Vacuum	EXP	Schieber geschlossen	15	Heartbeat Oscillating	17:04:00.000 - Nov 27 CET	27.1 hr
Vacuum	DET	Schieber geschlossen	15	Heartbeat Oscillating	17:04:00.000 - Nov 27 CET	27.1 hr
Vacuum	SEK.TESTA2	TPG Druckschwelle ueber...	15	Heartbeat Oscillating	16:53:22.000 - Nov 27 CET	26.9 hr

17:09:01: Alarms loaded.

DOOCS/TINE Security

• DOOCS Security

- Open READ
- WRITE (set) calls must pass security !
- Server Level or Property Level
- UNIX style
 - **gid, uid** of the caller determines access rights
- Non-UNIX systems
 - Locate caller 'user name' in a **nis (ldap)** database to ascertain gid, uid.

• TINE Security

- Open READ (default)
 - Can configure '**exclusive READ**'
- WRITE (set) calls must pass security !
- Server level, property level or device level.
- Compare **user name** and **address** of caller to the configured ACL tables.
- Can acquire an **Access Lock**

DOOCS/TINE

Remote Management

- **DOOCS**

- Process watchdog
 - Unix-like or windows
- Special DOOCS server
- Monitors process statistics
- (re)starts missing server processes
- Allows remote stop and start



- **TINE**

- Process watchdog
 - Different solutions for
 - Unix-like
 - Windows
 - VxWorks
 - DOS
- Monitors process statistics
- (re)starts missing server processes.
- Allows remote stop and start.

DOOCS/TINE

Remote Management

DOOCS
Watchdog
Panel :

WatchdogOverview.xml LINAC2/ACCLXL2R6F.WATCH/* /AMTF.SYSTEM/AMTF...

pedoocs1 0137 days, 03:10 0.49 load 5.90

2 * Intel(R) Core(TM)2 Duo CPU E8400 2997.000 MHz, 5978.53 bogomips
Linux version 2.6.32-24-generic-pae (buildd@palmer) (gcc version 4.4.3 (Ubuntu 4

online 0 errors offline 0

@mcsarthur

PETRA LINAC2 DESY2

Lab REGAE SALOME

PETRA WATCH.PEDOOC1 doocsadm login root login

SYS	ok	Set Offline	Sys Info	P
DISK	ok	Set Offline	R: -1.30E-5 kb/s W: 16.78 kb/s	P
NET	ok	Set Offline	eth0 IB: 9.01E4 OB: 9.87E4	plot P
FS.ROOT	ok	Set Offline	FREE: 1.19E4 MB	P
FS.EXPORT	ok	Set Offline	FREE: 1.46E5 MB	P
CAREPEATER	ok	Set Offline	CPU: 0.00E0 % 0 errors	L P
SVR.WATCHDOG	ok	Set Offline	CPU: 0.70 % 0 errors	L P
SVR.P3GP	ok	Set Offline	CPU: 3.80 % 0 errors	L P
SVR.HFGP	ok	Set Offline	CPU: 1.80 % 0 errors	L P

commonFCT_CODE_117.xml REGAE/ACCLXRG503B.WATCH/SVR...

SVR.P3GP p3gp_server Online 1 Offline

ok

Program:	UID: 406	GID: 406	PID: 3503	NICE: 0	PRI: 20	STATE: L
Operator:	-1	433				P
Expert:	-1	3349				

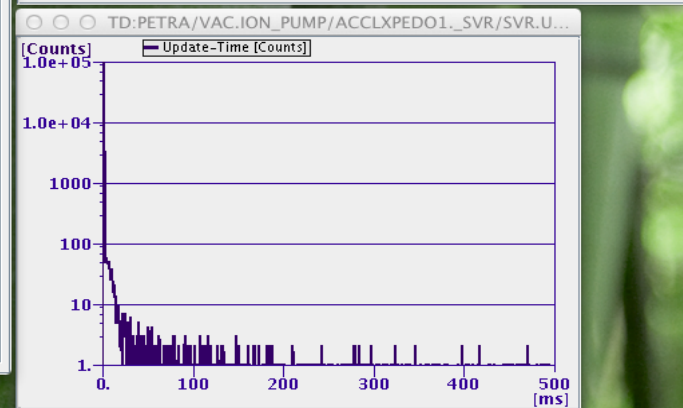
SIZE: 203640 kb RSIZE: 10812 kb
START_SIZE: 203232 kb Reset STARTUP_SIZE
CPU-Util: 0.60 0.0 time: 2673246 msec

Restarts (RPC): 3 Nr. rpc check: true set off
SVR_Errors: 6 rpc check svr errors: true set off
RPC_LIBNO: 610489625 SVR LOC: ACCLXRG503B_SVR

Waittime for rpc_check after start: 120 Min timedelay for restart: 150 tail log
Kill after x rpc_check fails: 2 x restarts before switch offline: 2 show log
edit conf

Last Start Times: Server Authorization Start Server
2012-10-12 09:10:56
2012-07-17 13:14:58
2012-07-16 14:14:33
2012-02-27 12:02:52 Server Statistics Stop Server Kill Server

/doocs/acclxrgs03b/server/p3gp_server
REGAE/VAC.ION_PUMP/ACCLXRG503B_SVR/ C
/doocs/acclxrgs03b/server/doocs start p3gp_server
/doocs/acclxrgs03b/server/p3gp_server/p3gp_server.PID



DOOCS/TINE

Remote Management

TINE FEC
Remote
Panel :

FEC Remote Control Panel

File View Tools Help

ACCLXRS03B.WA...	FECSTATS	MOTORBOX.4	RFRgModulator
ACCLXRS03C.W...	GLOBALS	MotorElecDur	RFRgModulatorMeta
ALARMSTATE	HISTORY	MOTORMBOX.1	RgPiloProxy
ARCHIVER	IOBOX.1	MSKCPUREGAE1....	RGVAC.CDI
CameraIntensifier	Laser.SGP	OTR.JPEG	RgWdwProxy
CameraShutter	Laser.SGPPrs	OTR.SGP	STATE
CameraShutter1	Laser.USC	OTR.USC	TempP3
CameraShutter2	Laser.VSV2	OTR.VSV2	TempRe.CDI
CameraShutter3	LaserPulse	PiConditions	VAC.FRM
CAS	LLRF_CTRL_UTCA	PiControls	VAC.ION_PUMP
CAS.ARCHIVE	LLRF_TIMER	PiloRg.CDI	VAC.SV
CSSPY	Mag.Corr	PiloRgSta	VAC.TPG
DaMon	Mag.Group	PiPrivCond_RegaeP	VAC.TSP
EVENTAPC	Mag.Group.Corr	PiPrivCtrls_RegaeP	WATER
EVENTS	MOTOR1	regae.CDI	
EVENTSTORE	MOTORBOX.2	RegCanCorr	
FaradayCup	MOTORBOX.3	RF.RgModulator.CDI	

Ping all Active: 65 of 65 (16:37:22)
GLOBALS: Active (16:39:47)

Device context: REGAE

Selected Subsystems

<input checked="" type="checkbox"/> DIAG	<input checked="" type="checkbox"/> SER	<input checked="" type="checkbox"/> MAG	<input checked="" type="checkbox"/> MEX
<input checked="" type="checkbox"/> HIST	<input checked="" type="checkbox"/> VAC	<input checked="" type="checkbox"/> RF	<input checked="" type="checkbox"/> PINTLK
<input checked="" type="checkbox"/> VIDEO			

ALL NONE

OS Color Code: Dos Unix VxWorks VMS Win16 Win32 Java

FEC Importance: ALL

16:39:45: Normal

Front End: RGGLOBALSRV OS: UNIX Address: 131.169.153.213

Host Computer: acclxrs03c.desy.de Responsible: P.Duval

Device servers: GLOBALS Description: REGAE globals server Location: bldg 23 rm U02 K3 (3)

Ping Host: alive
Control Server: alive
Restart Daemon: alive

Activity Contracts Clients Alarms Log File Stats

Server	RGGLOBALSRV
Local Time	Wed Nov 28 16:40:16
Start Time	Thu Nov 27 17:19:59
Sys Poll Rate	10
Nr bkg tasks	0
[SRV] Nr total contracts	5
[SRV] Nr total clients	3
[SRV] REGAE/GLOBALS contracts	5
[SRV] REGAE/GLOBALS clients	1
[SRV] Nr UDP packets received	8024
[SRV] Nr TCP packets received	0

DOOCS/TINE

Remote Management

TINE: attachfec /REGAE/VAC.ION_PUMP (a native DOOCS server !)

```
help
help clients contracts connections stats modules time version settings debug level : off 1 2 3 4

>
>
> CLIENT          ADDRESS PROTOCOL CONTRACTS
>(0) FECADMIN    131.169.153.213:8061  UDP      2
>(1) FECADMIN    131.169.119.43:8058  UDP      2
>(2) REGAEDEV    131.169.153.203:8060  UDP      6
>(3) FECADMIN    131.169.153.213:8055  UDP      1
>(4) FECADMIN    131.169.153.213:8057  UDP      1
>(5) REGAEDEV    131.169.153.203:8064  UDP     12
>
> CONTRACT        POLL      TO
>[0] DCSEQM P.MEAN <*> (6 elements) 1000 msec FECADMIN
>[1] DCSEQM IO_STATUS <SEK.GUN> (1 elements) 1000 msec REGAEDEV
>[2] DCSEQM P.MEAN <SEK.GUN> (1 elements) 1000 msec REGAEDEV
>[3] DCSEQM IO_STATUS <SEK.DDC> (1 elements) 1000 msec REGAEDEV
>[4] DCSEQM P.MEAN <SEK.DDC> (1 elements) 1000 msec REGAEDEV
>[5] DCSEQM IO_STATUS <SEK.BC> (1 elements) 1000 msec REGAEDEV
>[6] DCSEQM P.MEAN <SEK.BC> (1 elements) 1000 msec REGAEDEV
>[7] DCSEQM IO_STATUS <SEK.DISP> (1 elements) 1000 msec REGAEDEV
>[8] DCSEQM P.MEAN <SEK.DISP> (1 elements) 1000 msec REGAEDEV
>[9] DCSEQM IO_STATUS <SEK.EXP> (1 elements) 1000 msec REGAEDEV
>[10] DCSEQM P.MEAN <SEK.EXP> (1 elements) 1000 msec REGAEDEV
>[11] DCSEQM IO_STATUS <SEK.DET> (1 elements) 1000 msec REGAEDEV
>[12] DCSEQM P.MEAN <SEK.DET> (1 elements) 1000 msec REGAEDEV
>[13] DCSEQM IO_STATUS_INSTR <SEK.GUN> (1 elements)1000 msec REGAEDEV
>[14] DCSEQM IO_STATUS_INSTR <SEK.DDC> (1 elements)1000 msec REGAEDEV
>[15] DCSEQM IO_STATUS_INSTR <SEK.BC> (1 elements) 1000 msec REGAEDEV
>[16] DCSEQM IO_STATUS_INSTR <SEK.DISP> (1 elements)1000 msec REGAEDEV
>[17] DCSEQM IO_STATUS_INSTR <SEK.EXP> (1 elements)1000 msec REGAEDEV
>[18] DCSEQM IO_STATUS_INSTR <SEK.DET> (1 elements)1000 msec REGAEDEV
>[19] DCSEQM NALARMS <*> (6 elements) 500 msec FECADMIN
>[20] DCSEQM ACTIVITY <#0> (68 elements) 30000 msecFECADMIN
>[21] DCSEQM SRVSTATS <> (10 elements) 5000 msec FECADMIN
>[22] DCSEQM SRVLASTACCESS <#0> (1 elements) 30000 msecFECADMIN
>[24] DCSEQM P <*> (14 elements) 1000 msec FECADMIN
>
>
```

Culture Shock

• DOOCS

- Generally use **jddd panels**
 - Simple clients with display widgets
- MatLab, etc.
- **No** explicit multi-channel support
 - But heavy reliance on wildcards and filters.
- **No** user-defined structures (hard to attach to a widget)
- Names tend to be
 - ALL **uppercase** with underscores
 - e.g. "PROPERTY_ONE"



• TINE

- Generally use **rich clients** (java, .NET)
 - RAD tools (**ACOP beans**)
- MatLab, etc.
- **Explicit** multi-channel support
 - Can also use wildcards and filters
- User-defined structures are popular with some developers !
- Names tend to be
 - **camel case**
 - e.g. "PropertyOne"

jddd Applications

The screenshot displays the jddd (jDD Display) interface for the PETRA-VAC system. The main window, titled "Uebersicht und Bedienung (P3_overview_win_3.xml) [jDDD Displayer Version 2.1.1] P3_overview_win_3.xml PETRA.VAC///", shows a circular overview of the accelerator sections. The sections are labeled with codes like SEKNL, SEKNR, SEKNOL, SEKNORP, SEKNORPU, SEKNORPUA, SEKNORPUB, SEKNORPUBA, SEKNORPUBB, SEKNORPUBC, SEKNORPUBD, SEKNORPUBE, SEKNORPUBF, SEKNORPUBG, SEKNORPUBH, SEKNORPUBI, SEKNORPUBJ, SEKNORPUBK, SEKNORPUBL, SEKNORPUBM, SEKNORPUBN, SEKNORPUBO, SEKNORPUBP, SEKNORPUBQ, SEKNORPUBR, SEKNORPUBS, SEKNORPUBT, SEKNORPUBU, SEKNORPUBV, SEKNORPUBW, SEKNORPUBX, SEKNORPUBY, SEKNORPUBZ, SEKNORPUBAA, SEKNORPUBAB, SEKNORPUBAC, SEKNORPUBAD, SEKNORPUBAE, SEKNORPUBAF, SEKNORPUBAG, SEKNORPUBAH, SEKNORPUBAI, SEKNORPUBAJ, SEKNORPUBAK, SEKNORPUBAL, SEKNORPUBAM, SEKNORPUBAN, SEKNORPUBAO, SEKNORPUBAP, SEKNORPUBAQ, SEKNORPUBAR, SEKNORPUBAS, SEKNORPUBAT, SEKNORPUBAU, SEKNORPUBAV, SEKNORPUBAW, SEKNORPUBAX, SEKNORPUBAY, SEKNORPUBAZ, SEKNORPUBBA, SEKNORPUBBB, SEKNORPUBBC, SEKNORPUBBD, SEKNORPUBBE, SEKNORPUBBF, SEKNORPUBBG, SEKNORPUBBH, SEKNORPUBBI, SEKNORPUBBJ, SEKNORPUBBK, SEKNORPUBBL, SEKNORPUBBM, SEKNORPUBBN, SEKNORPUBBO, SEKNORPUBBP, SEKNORPUBBQ, SEKNORPUBBR, SEKNORPUBBS, SEKNORPUBBT, SEKNORPUBBU, SEKNORPUBBV, SEKNORPUBBW, SEKNORPUBBX, SEKNORPUBBY, SEKNORPUBBZ, SEKNORPUBCA, SEKNORPUBCB, SEKNORPUBCC, SEKNORPUBCD, SEKNORPUBCE, SEKNORPUBCF, SEKNORPUBCG, SEKNORPUBCH, SEKNORPUBCI, SEKNORPUBCJ, SEKNORPUBCK, SEKNORPUBCL, SEKNORPUBCM, SEKNORPUBCN, SEKNORPUBCO, SEKNORPUBCP, SEKNORPUBCQ, SEKNORPUBCR, SEKNORPUBCS, SEKNORPUBCT, SEKNORPUBCU, SEKNORPUBCV, SEKNORPUBCW, SEKNORPUBCX, SEKNORPUBCY, SEKNORPUBCZ, SEKNORPUBDA, SEKNORPUBDB, SEKNORPUBDC, SEKNORPUBDD, SEKNORPUBDE, SEKNORPUBDF, SEKNORPUBDG, SEKNORPUBDH, SEKNORPUBDI, SEKNORPUBDJ, SEKNORPUBDK, SEKNORPUBDL, SEKNORPUBDM, SEKNORPUBDN, SEKNORPUBDO, SEKNORPUBDP, SEKNORPUBDQ, SEKNORPUBDR, SEKNORPUBDS, SEKNORPUBDT, SEKNORPUBDU, SEKNORPUBDV, SEKNORPUBDW, SEKNORPUBDX, SEKNORPUBDY, SEKNORPUBDZ, SEKNORPUBEA, SEKNORPUBEB, SEKNORPUBEC, SEKNORPUBED, SEKNORPUBEE, SEKNORPUBEF, SEKNORPUBEG, SEKNORPUBEH, SEKNORPUBEI, SEKNORPUBEJ, SEKNORPUBEK, SEKNORPUBEL, SEKNORPUBEM, SEKNORPUBEN, SEKNORPUBEO, SEKNORPUBEP, SEKNORPUBEQ, SEKNORPUBER, SEKNORPUBES, SEKNORPUBET, SEKNORPUBEU, SEKNORPUBEV, SEKNORPUBEW, SEKNORPUBEX, SEKNORPUBEY, SEKNORPUBEZ, SEKNORPUBFA, SEKNORPUBFB, SEKNORPUBFC, SEKNORPUBFD, SEKNORPUBFE, SEKNORPUBFF, SEKNORPUBFG, SEKNORPUBFH, SEKNORPUBFI, SEKNORPUBFJ, SEKNORPUBFK, SEKNORPUBFL, SEKNORPUBFM, SEKNORPUBFN, SEKNORPUBFO, SEKNORPUBFP, SEKNORPUBFQ, SEKNORPUBFR, SEKNORPUBFS, SEKNORPUBFT, SEKNORPUBFU, SEKNORPUBFV, SEKNORPUBFW, SEKNORPUBFX, SEKNORPUBFY, SEKNORPUBFZ, SEKNORPUBGA, SEKNORPUBGB, SEKNORPUBGC, SEKNORPUBGD, SEKNORPUBGE, SEKNORPUBGF, SEKNORPUBGG, SEKNORPUBGH, SEKNORPUBGI, SEKNORPUBGJ, SEKNORPUBGK, SEKNORPUBGL, SEKNORPUBGM, SEKNORPUBGN, SEKNORPUBGO, SEKNORPUBGP, SEKNORPUBGQ, SEKNORPUBGR, SEKNORPUBGS, SEKNORPUBGT, SEKNORPUBGU, SEKNORPUBGV, SEKNORPUBGW, SEKNORPUBGX, SEKNORPUBGY, SEKNORPUBGZ, SEKNORPUBHA, SEKNORPUBHB, SEKNORPUBHC, SEKNORPUBHD, SEKNORPUBHE, SEKNORPUBHF, SEKNORPUBHG, SEKNORPUBHH, SEKNORPUBHI, SEKNORPUBHJ, SEKNORPUBHK, SEKNORPUBHL, SEKNORPUBHM, SEKNORPUBHN, SEKNORPUBHO, SEKNORPUBHP, SEKNORPUBHQ, 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SEKNORPUBQO, SEKNORPUBQP, SEKNORPUBQQ, SEKNORPUBQR, SEKNORPUBQS, SEKNORPUBQT, SEKNORPUBQU, SEKNORPUBQV, SEKNORPUBQW, SEKNORPUBQX, SEKNORPUBQY, SEKNORPUBQZ, SEKNORPUBRA, SEKNORPUBRB, SEKNORPUBRC, SEKNORPUBRD, SEKNORPUBRE, SEKNORPUBRF, SEKNORPUBRG, SEKNORPUBRH, SEKNORPUBRI, SEKNORPUBRJ, SEKNORPUBRK, SEKNORPUBRL, SEKNORPUBRM, SEKNORPUBRN, SEKNORPUBRO, SEKNORPUBRP, SEKNORPUBRQ, SEKNORPUBRR, SEKNORPUBRS, SEKNORPUBRT, SEKNORPUBRU, SEKNORPUBRV, SEKNORPUBRW, SEKNORPUBRX, SEKNORPUBRY, SEKNORPUBRZ, SEKNORPUBSA, SEKNORPUBSB, SEKNORPUBSC, SEKNORPUBSD, SEKNORPUBSE, SEKNORPUBSF, SEKNORPUBSG, SEKNORPUBSH, SEKNORPUBSI, SEKNORPUBSJ, SEKNORPUBSK, SEKNORPUBSL, SEKNORPUBSM, SEKNORPUBSN, SEKNORPUBSO, SEKNORPUBSP, SEKNORPUBSQ, SEKNORPUBSR, SEKNORPUBSS, SEKNORPUBST, SEKNORPUBSU, SEKNORPUBSV, SEKNORPUBSW, SEKNORPUBSX, SEKNORPUBSY, SEKNORPUBSZ, SEKNORPUBTA, SEKNORPUBTB, SEKNORPUBTC, SEKNORPUBTD, SEKNORPUBTE, SEKNORPUBTF, SEKNORPUBTG, SEKNORPUBTH, SEKNORPUBTI, SEKNORPUBTJ, SEKNORPUBTK, SEKNORPUBTL, SEKNORPUBTM, SEKNORPUBTN, SEKNORPUBTO, SEKNORPUBTP, SEKNORPUBTQ, SEKNORPUBTR, SEKNORPUBTS, SEKNORPUBTT, SEKNORPUBTU, SEKNORPUBTV, SEKNORPUBTW, SEKNORPUBTX, SEKNORPUBTY, SEKNORPUBTZ, SEKNORPUBUA, SEKNORPUBUB, SEKNORPUBUC, SEKNORPUBUD, SEKNORPUBUE, SEKNORPUBUF, SEKNORPUBUG, SEKNORPUBUH, SEKNORPUBUI, SEKNORPUBUJ, SEKNORPUBUK, SEKNORPUBUL, SEKNORPUBUM, SEKNORPUBUN, SEKNORPUBUO, SEKNORPUBUP, SEKNORPUBUQ, SEKNORPUBUR, SEKNORPUBUS, SEKNORPUBUT, SEKNORPUBUU, SEKNORPUBUV, SEKNORPUBUW, SEKNORPUBUX, SEKNORPUBUY, SEKNORPUBUZ, SEKNORPUBVA, SEKNORPUBVB, SEKNORPUBVC, SEKNORPUBVD, SEKNORPUBVE, SEKNORPUBVF, SEKNORPUBVG, SEKNORPUBVH, SEKNORPUBVI, SEKNORPUBVJ, SEKNORPUBVK, SEKNORPUBVL, SEKNORPUBVM, SEKNORPUBVN, SEKNORPUBVO, SEKNORPUBVP, SEKNORPUBVQ, SEKNORPUBVR, SEKNORPUBVS, SEKNORPUBVT, SEKNORPUBVU, SEKNORPUBVV, SEKNORPUBVW, SEKNORPUBVX, SEKNORPUBVY, SEKNORPUBVZ, SEKNORPUBWA, SEKNORPUBWB, SEKNORPUBWC, SEKNORPUBWD, SEKNORPUBWE, SEKNORPUBWF, SEKNORPUBWG, SEKNORPUBWH, SEKNORPUBWI, SEKNORPUBWJ, SEKNORPUBWK, SEKNORPUBWL, SEKNORPUBWM, SEKNORPUBWN, SEKNORPUBWO, SEKNORPUBWP, SEKNORPUBWQ, SEKNORPUBWR, SEKNORPUBWS, SEKNORPUBWT, SEKNORPUBWU, SEKNORPUBWV, SEKNORPUBWW, SEKNORPUBWX, SEKNORPUBWY, SEKNORPUBWZ, SEKNORPUBXA, SEKNORPUBXB, SEKNORPUBXC, SEKNORPUBXD, SEKNORPUBXE, SEKNORPUBXF, SEKNORPUBXG, SEKNORPUBXH, SEKNORPUBXI, SEKNORPUBXJ, SEKNORPUBXK, SEKNORPUBXL, SEKNORPUBXM, SEKNORPUBXN, SEKNORPUBXO, SEKNORPUBXP, SEKNORPUBXQ, SEKNORPUBXR, SEKNORPUBXS, SEKNORPUBXT, SEKNORPUBXU, SEKNORPUBXV, SEKNORPUBXW, SEKNORPUBXX, SEKNORPUBXY, SEKNORPUBXZ, SEKNORPUBYA, SEKNORPUBYB, SEKNORPUBYC, SEKNORPUBYD, SEKNORPUBYE, SEKNORPUBYF, SEKNORPUBYG, SEKNORPUBYH, SEKNORPUBYI, SEKNORPUBYJ, SEKNORPUBYK, SEKNORPUBYL, SEKNORPUBYM, SEKNORPUBYN, SEKNORPUBYO, SEKNORPUBYP, SEKNORPUBYQ, SEKNORPUBYR, SEKNORPUBYS, SEKNORPUBYT, SEKNORPUBYU, SEKNORPUBYV, SEKNORPUBYW, SEKNORPUBYX, SEKNORPUBYY, SEKNORPUBYZ, SEKNORPUBZA, SEKNORPUBZB, SEKNORPUBZC, SEKNORPUBZD, SEKNORPUBZE, SEKNORPUBZF, SEKNORPUBZG, SEKNORPUBZH, SEKNORPUBZI, SEKNORPUBZJ, SEKNORPUBZK, SEKNORPUBZL, SEKNORPUBZM, SEKNORPUBZN, SEKNORPUBZO, SEKNORPUBZP, SEKNORPUBZQ, SEKNORPUBZR, SEKNORPUBZS, SEKNORPUBZT, SEKNORPUBZU, SEKNORPUBZV, SEKNORPUBZW, SEKNORPUBZX, SEKNORPUBZY, SEKNORPUBZZ

The interface includes several key components:

- Beam Parameters:** A table showing DC-Current (100.36), Bunche (320), Energy (6.08), Lifetime (8.38), and Mean pressure (1.34E-8).
- Max and Mean Pressure Plot:** A graph showing pressure in mbar over time (13h, 22h, 7h) for 29.11.2012 and 30.11.2012.
- Section Status:** A detailed view for section SEKNORPUS_6 showing status (MICRO, INTERLOCK), mean pressure (6.80E-9 [Micro], 8.21E-9 [SERVER]), and a plot of pressure over time.
- Control Panel:** Buttons for "auf/open", "zu/close", and "auf/open" for various sections.
- System Information:** A footer bar showing "McsW7Duval", "30.11.12 13:53:24", "Operations Mode [Betrieb]", "Serveranwahl [Default]", and "(2)KeinIniDatei".

acopbeans Applications

Operating LINAC II

Teststrahl: T22 EIN

ignoring? NEIN

Positronen Betrieb->Teststrahl

449.6 MeV

18.66 mA

$11.38 \cdot 10^9$ Teilchen

125 MHz

10.4 MHz

Strahlstrom Limiter $20.0 \cdot 10^9$

Strahlstrom Limiter deaktivieren

PIA

6 Zyklen unterdrückt

IMR-PIA20

V 21

SM 22

EK 22

BK 23

V 7

BK 5

Dipol QD QF SD SF

H 4

V 2

SM 3

SM 25

V 25

SM E SM I

Septum

SE SI

V 9

SML 3

V 1

Q 10

Q 6

Q 4

H 2

H 1

IMR-L13

IMR-L1

IMA-L01

Q 7

Q 5

A B

A B

FODO

PLPS Ein

IMR-A7

IMA-A07

IMA-A05

IMR-A4

IMA-A01

IMR-L19

ZZ

ZZ erst nach Anforderung möglich!

Fehler Reset

Kicker-Delay Correction Loop: AUS Servo

Regelung ist Servo Zyklus

HEW / Quarz Umschaltung: Quarz

Multiplexer: MODULATOR 9

I-Monitore: ch2: IMA-L01

Kicker/PLPS: BK_5Inj

Alle Modulatoren: EIN AUS

Strahlbedarf: TESTSTRAHL

Gun: EIN AUS

Soll: 0.6897 Ist: 0.6653 Old: 0.6897

H: = 12 = 11 = 10 = 9 = 8 = 7 = 6 = 5 = 4 = 3 = 2 = 1

OLD

V: = 12 = 11 = 10 = 9 = 8 = 7 = 6 = 5 = 4 = 3 = 2 = 1

0 5 10 15 20 25 30 35 40 45 50 55 60

McsW7Duval 30.11.12 13:56:08 Operations Mode [Betrieb] Serverwahl [Default] [2]

Operating LINAC II

Pulse I Klystron 9 Pulse RF Modulator 9 Charge Modulator 9 Pulse IMA-L119 Pulse IMR-PIA20

Injektion Abschnitt Testweg Pulse Kicker BK 5 Pulse V Klystron 9

300

300

230

160

90

20

-50

sec

Reference Pulse (Tue Nov 25 07:14:53 CET 2008)

Pulse

Servo

1.4

98.0

Continuous Store 26.2 Old Sync

Soll 26.2 Ist 26.4 SKT

10.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0

LINAC 2

Q 7

Q 5

A B

A B

FODO

PLPS Ein

IMR-A7

IMA-A07

IMA-A05

IMR-A4

IMA-A01

Soll: 0.6897 Ist: 0.6653 Old: 0.6897

A B A B

A B Faktor 1 10 100

H: = 12 = 11 = 10 = 9 = 8 = 7 = 6 = 5 = 4 = 3 = 2 = 1

OLD








V: = 12 = 11 = 10 = 9 = 8 = 7 = 6 = 5 = 4 = 3 = 2 = 1

DOOCS/TINE Merger

- **In the field:**
 - **FLASH**
 - DOOCS culture with notable TINE servers (e.g. magnets)
 - **PETRA**
 - TINE culture with notable DOOCS servers (e.g. vacuum)
 - **REGAE**
 - Many native DOOCS and TINE servers all speaking TINE
 - Many **jddd** panels and **acopbeans** rich clients.
 - Many **MatLab** applications
 - Generally smooth operations for the past half-year.
 - **XFEL**
 - To be: DOOCS centric with DOOCS and TINE servers all speaking TINE
 - Currently gaining experience via **REGAE**
 - Similar mix of **jddd**, rich clients, **MatLab** as in **REGAE** (?)
 - Heavy use of **DOOCS DAQ**
 - We'll see how it goes ...

DOOCS/TINE Merger

- **Status**

- **response-request translation** ~98 % complete 
- **services mapping** : ~80 % complete 
- **culture shock:**
 - Although most all '**features**' are mapped, those in one 'world' often remain **unknown** and unused the other 'world'. 
 - Can sometimes battle different '**mindsets**' with **contract coercion**. 
 - can trap synchronous polling of individual channels, etc.
 - There are still sometimes '**gateways**' that are created for no other purpose than to bridge cultural differences. 
- Components still carry a '**brand name**' (and probably always will) 
- *Strive for a non-zero sum game (WIN-WIN!)* 



<http://doocs.desy.de>
<http://tine.desy.de>

