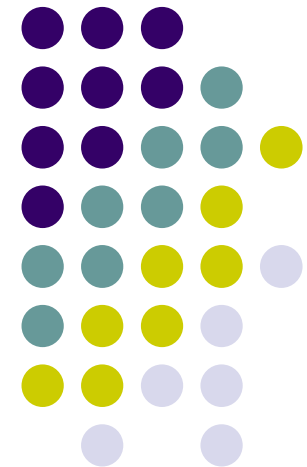


TINE Control System Overview and Status

P. Bartkiewicz, P. Duval, S. Herb, H. Wu (DESY/ Hamburg)

and

S. Weisse (DESY/ Zeuthen)

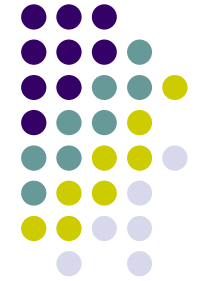




TINE: A Quick Tour

- Three-fold Integrated Networking Environment
(->Keep your eye on the word “*Integrated*”)
- Mature Control System
 - CERN Isolde Spin-off (~1991)
 - All the usual central services :
 - Archive, Alarm, Naming, Security, Logging, etc.
- Small Footprint
 - TINE Kernel written in C (just like your Operating System) or Java
 - Berkeley Sockets (NO SunRPC, CORBA, or other 3rd Party dependencies !)
 - Either Single-threaded or Multi-threaded mode
- Easy to Install
- High Performance
- Plug and Play
- Scalable to very large machines !

TINE @ DESY



Philip Duval - TINE Overview

HERA



Principal Devices :

- Large machine!
- 6.3 Km Proton-electron storage ring, collider
- Experiments at ZEUS, H1, Hermes, HeraB
- superconducting proton ring, RF cavities => QPS
- > 100000 control points

Device Type	Nr. of Units
Magnet PSCs	2000
RF Systems	230
Vacuum	3000
BPMs	800
Other beam measurement instrumentation	2000
Quench Protection System	2000
Other diagnostic instrumentation	1000
Air conditioning, water cooling	500

HERA FECS:



Shutdown on
June 30, 2007

~160 Front-End
Controllers
(FECs)
Many Operating
Systems !

FEL Remote Control

System	Category	System	System
ABSCALC.7	HEMARCH	HESTATESRV	MHF_TEST
ADDA	HEMARCHX	HETBUNCH	MPYLXLUTAS1
CVTLPOL	HEMON.5	HETCOOL.5	MPYLXLUTAS2
DIAGHIST.4	HEMON.6	HETIME.5	MPYLXLUTAS3
DIAGHIST.4.100	HEMON.7	HETMON.5	MPYLXLUTAS4
ELPRSTATSRV	HEMON.8	HETMON.6	MPYLXLUTAS5
ETServer	HEMON.9	HETMON.7	OSZIB
ETServer.RPT	HENEG.10	HETMON.8	PHFITRC2
FB-Q-HET	HENEG.11	HETRCRFFB.1	QUADSRV
FEBLINUX1	HENEG.5	HETRCRFN.1	RELIEFHP
H1CJCPROXY	HENEG.6	HETRCRFO.1	RMSFEC
H1LUSERVER	HENEG.7	HETRCRFS.1	WVEAST0
HEBRU.5	HEORBFIX.9	HETRCRFSLC.1	WVEAST1
HEBRU.6	HEPBPM	HETRCRFWL.1	WVNORD0
HECASSRV	HEPBUNCH	HETRCRFWR.1	WVNORD1
HECOOL.5	HEPCMFL	HETSFN	WVSUED0
HECOOL.6	HEPHAKO.5	HETSFO	WVSUED1
HECOOL.7	HEPHFTRC	HETSFPBEAM	WWWEST0
HECOOL.8	HEPIDC.1	HETSFS	WWWEST1
HECOOL.9	HEPKOLLI	HETSFW1	WWWEST2
HEDIALOG	HEPMARCH	HEVACN.10	ZEUSHISTORY
HEEBLM	HEPQPSH1	HEVACN.11	ZMEA-NORD
HEEBUNCH	HEPQPSZEUS	HEVACN.6	ZSPECTR.0
HEEHFFB	HEPTRANSF	HEVACN.7	bws-he-p
HEEIDC.1	HEPTRANSF-VXW	HEVACS.10	bws-he-e
HEEKOLLI.5	HEPVACPROXY	HEVACS.11	lmbarch
HEEMHFS	HEQPSPROXY	HEVACS.6	lmbarchiv
HEEPTICJ	HERA52	HEVACS.9	lmbsrv
HEETRANF-VXW	HERA208	HEVAKHIST.4	mstorbcor1
HEETRANF	HEREFORB.0	HEVAKHIST.4.100	mstorbcor1-2
HEEVENT	HEREFORB.1	HEWIRE.5	mstorbcor2
HEFECSTATSRV	HESEK1.5	HEXFEREFF	mstorbcor2-5
HEGLOBALSRV	HESEK1.6	HE_EORB_STAB	mstorbcor2-2
HEGLOBALSRV2	HESEK1.7	HE_PORB_STAB	mstorbdv1
HEHISTORY	HESRDETN.4	HPCHROM	mstorbdv1-4
HEHISTORY.RPT	HESRDETS.4	HPTUNE	pvaksvr1.13
HEHIT.5	HESSLUMIN.0	ILMAG.9	pvaksvr1.249
HEIDCSP.1	HESSLUMIS.0	MEX-ZEUS4	pvaksvr1.53
HEMAG	HESR0ST.0	MEX-HERMES	
HEMAGHIST.0	HESRWEST.0	MHFHISTORY	

Front End: HEVACN.6, OS: WIN32, Address: 131.169.119.73

Host Computer: ACCNTHEVACN.desy.de, Responsible: W.Gerhardt, Location: Bldg 30 Rm 103

Device servers: HEVACN, HEVACN_SV, HEVACN_VD, NTHEVACN_VD, NTHEVACN_SV, NTHEVACN

Activity Contracts Clients Alarms Log File Stats

Available Log Files: fec.log, Log File Depth: +100, Lines, Refresh

3:25:27.466 CDT[HEVACN.10] global synchronization offset: -1.37107 sec
 18.09.07 23:25:34.506 CDT[HEVACN.7] largest correction: 4.56881 sec (nr. corrections 23)
 18.09.07 23:25:34.506 CDT[HEVACN.11] largest correction: 4.55881 sec (nr. corrections 23)
 18.09.07 23:25:27.466 CDT[HEVACN.1] global synchronization offset: -1.37107 sec
 18.09.07 23:25:34.646 CDT[HEVACN.1] largest correction: 4.13158 sec (nr. corrections 21)
 18.09.07 23:25:34.656 CDT[HEVACN.10] largest correction: 4.56365 sec (nr. corrections 19)
 19.09.07 06:27:10.148 CDT[HEVACN.6] global synchronization offset: -1.26262 sec
 19.09.07 06:27:10.198 CDT[HEVACN.6] largest correction: 7.79293 sec (nr. corrections 41)
 20.09.07 06:08:31.314 CDT[HEVACN.6] global synchronization offset: -2.25703 sec
 20.09.07 06:08:31.625 CDT[HEVACN.6] largest correction: 1.93445 sec (nr. corrections 2)
 20.09.07 06:08:35.315 CDT[HEVACN.7] global synchronization offset: -1.02061 sec
 20.09.07 06:08:35.395 CDT[HEVACN.7] largest correction: 7.09 sec (nr. corrections 10)
 20.09.07 06:08:35.315 CDT[HEVACN.11] global synchronization offset: -1.00081 sec
 20.09.07 06:08:35.445 CDT[HEVACN.11] largest correction: 7.09 sec (nr. corrections 10)
 20.09.07 21:55:36.065 CDT[HEVACN.7] global synchronization offset: -1.18025 sec
 20.09.07 21:55:36.325 CDT[HEVACN.7] largest correction: 3.88691 sec (nr. corrections 17)
 20.09.07 21:55:32.065 CDT[HEVACN.6] global synchronization offset: -3.60867 sec
 20.09.07 21:55:33.897 CDT[HEVACN.6] largest correction: 8.2438 sec (nr. corrections 38)
 20.09.07 21:55:36.065 CDT[HEVACN.11] global synchronization offset: -1.18025 sec
 20.09.07 21:55:36.385 CDT[HEVACN.11] largest correction: 3.88691 sec (nr. corrections 17)
 20.09.07 21:55:36.065 CDT[HEVACN.1] global synchronization offset: -1.18025 sec
 20.09.07 21:55:36.065 CDT[HEVACN.10] global synchronization offset: -1.18025 sec

Device context: HERA, Ping all, Active: 88 of 161 (13:59:04)

Selected Subsystems: QPS, TIM, SER, XXX, HERA, INJ, RF, HIST, SUB, RPT, EXP, TUNE, MAG, PVAK, TEST, DIAG, MEX, VAC, CRYO

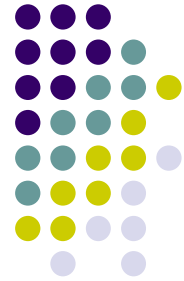
OS Color Code: Dos, Unix, VxWorks, VMS, Win16, Win32, Java

FEC Importance: ALL

Philip Duval - TINE Overview

Control Systems101

Control Systems (one way or another) have to deal with ...



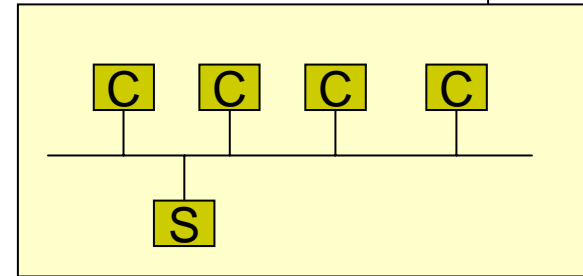
- **Distributed** end points and processes
- **Data Acquisition** (front end hardware)
- **Real-time** needs (where necessary)
- **Process control** (automation, feedback)
- **Central Services** (Archive, Alarm, Name Resolution, ...)
- **Security** (who's allowed to do what from where?)
- **States** (Finite State Machines, sequencing, automation...)
- **Time synchronization** (time stamps, cycle ids, etc.)
- **Databases** (configuration, machine data, post-mortem data, ...)
- **Statistics** (control system itself, operation, ...)
- **Logging** (central, local, application, ...)
- **Data transport** (data flow, *control system protocol*, scalability)

TINE Protocol (1)



- **Client-Server (classic)**

- Transaction based
- Synchronous data access only
- The “**N-Client**” Problem ? (do threads help?)
- ExecLink(“/HERA/BPM/WL167MX”, “ORBIT.X”, ...)



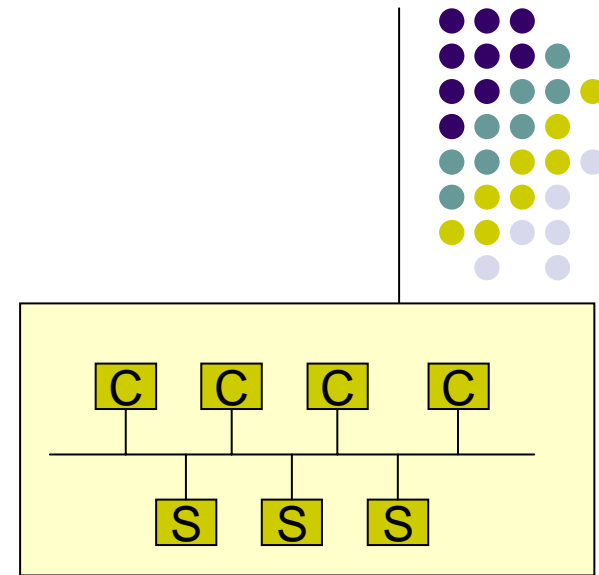
- **Publisher-Subscriber (nearly classic)**

- **Connection Tables !**
- Synchronous/Asynchronous data access
- The “**10N-Client**” Problem ?
- AttachLink(..., DATACHANGE, 100, linkCb)
- Callback events !

TINE Protocol (2)

- **Producer-Consumer**

- Asynchronous data messages (Multicast)
- The “**N-Producer**” Problem ?
- AttachLink(“HPENERGY”,..., RECEIVE, 1000, linkCb)



- **Publisher-Consumer (Producer-Subscriber?)**

- Like Publisher-Subscriber but:
- Multicast group is a single connection Table entry
- **N = 1 !!!**
- AttachLink(...,DATACHANGE|NETWORK,100, linkCb)

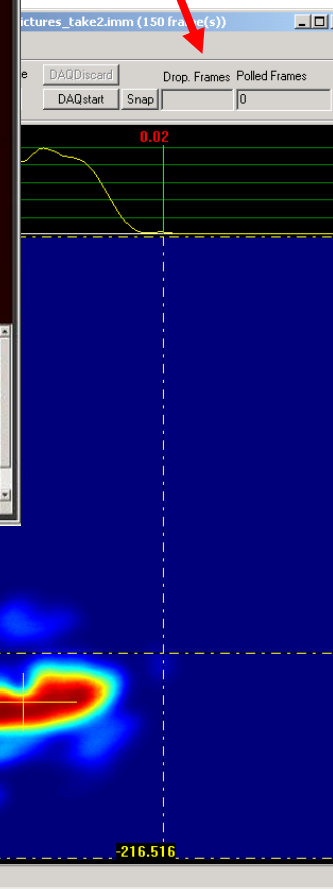
TINE Protocol (2)



Parameter	Value
HPENERGY	126
HPCur	82.511
HPtau	2644.584
HECur	0.004
HEtau	10000.000
HEMAGEN	.244576
HPMAGEN	126.2352
HPOPTICS	hpi40m
HPOPTICSZ	hpza150m
HPXFERCNT	7079
HEOPTICS	hoinjm0
HEOPTICSZ	hoinjm0
HEXFERCNT	-2
HETYPE	1
HESTATE	Waiting for P
HPSTATE	Ramp
PWEGSTATE	Injection Ready
EWEGSTATE	Injection Ready
H1Solen	100
ZeusSolen	99
ZeusCal	Closed
HeraBmag	0
Rotators	E- N- S-
HEFreqCor	0
HPFreqCor	0

TINE Globals

TINE Video





TINE Data Types

- Primitives (byte, short, int*, long*, float, double, char*)
- Fixed-length Strings (“NAME16”, “NAME32”, “NAME64”, ...)
- Doublets (FLTINT, “INTINT”, “DBLDBL”, “NAME32INT”, ...)
- Triplets (“FLTINTINT”, “NAME16FLTINT”, ...)
- Quadruplets (“FLTINTINTINT”, “INTINTINTINT”, ...)
- Specials (“USTRING”, “UNAME”, SPECTRUM, VIDEO...)
- Bitfields (new to Release 4.0):
 - CF_BITFIELD8, CF_BITFIELD16, CF_BITFIELD32, CF_BITFIELD64
 - Data type: DBITFIELD
 - Bitfield Registry
- **User-defined “Tagged Structures” !!!**
 - Structure registered at both ends (client, server)
 - Client can ‘discover’ structure fields !

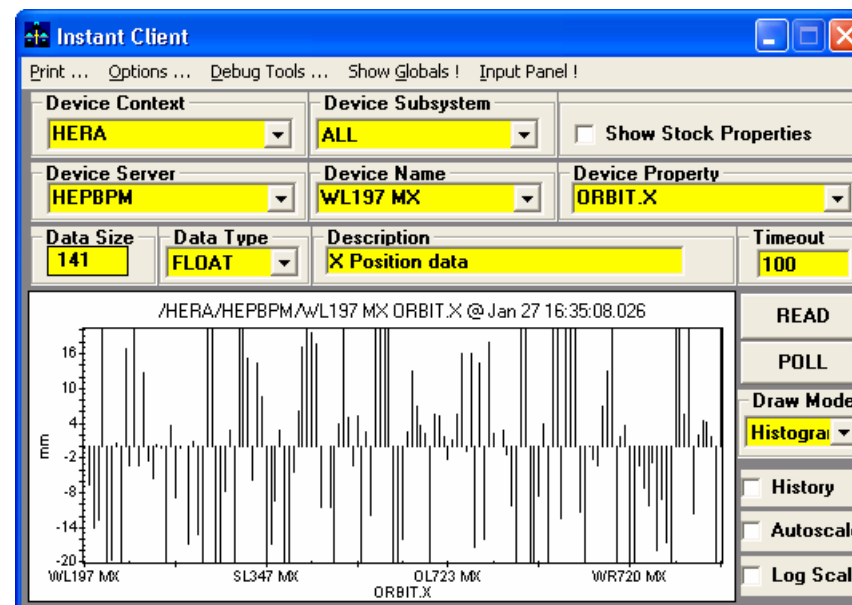


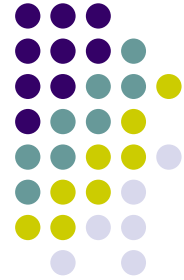
TINE Naming Convention

Engineer's View or Machine Physicist's View

- Hierarchical
- Device is specified by :
 - **Device Context** (*Facility* in DOOCS, *Domain* in TANGO)
 - **Device Server** (or **Group**) (*Device* in DOOCS, *Family* in TANGO)
 - **Device Name** (*Location* in DOOCS, *Member* in TANGO)
- Data endpoint is specified by:
 - **Property** (*Property* in DOOCS, *Attribute/Command* in TANGO)
 - Are really 'methods' or 'calls'

Note: **Device Subsystem** is not part of the name space, but is a browseable element!





TINE Address Redirection

Device Redirection

The screenshot shows the Instant Client interface with the following settings:

- Device Context: TTF
- Device Subsystem: ALL
- Device Server: QUAD
- Device Name: Q9ACC3
- Device Property: BITS2AMPS
- Data Size: 1
- Data Type: FLOAT
- Timeout: 100

The main window displays the command: `/TTF/QUAD/Q9ACC3 BITS2AMPS @ Jan 27 12:28:54.013` and the output: `(0) 3.662221E-03`.

A dialog box titled "Front End Information for : TTF/QUAD" is open, showing the following details:

- Device Server : QUAD -> TTMAG1-19
- Local equipment module name : QUAD -> TCPDAT
- Front End Computer (FEC) name: TTMAG1 -> TTMAG1-19
- Property : BITS2AMPS -> BITS2AMPS
- IP Address: 131.169.147.189
- IPX Address: 000000000000[00000000]
- Port Offset: 0
- Host Computer: accsottfmag2.desy.de

An arrow points from a yellow callout box to the dialog box.

Some registered devices are not handled directly by "QUAD" !

Wildcard calls (e.g. /TTF/QUAD/*/BITS2AMPS) still work !

Property Redirection (e.g. "Orbit.X.ARCH" -> central archive server)

TINE ENS: Plug and Play



I want to be known
to the system as
“BPM.P” in the
context “HERA”



Does BPM.P already exist for HERA?

-> **Yes** : Is same address as already
registered?

-> **Yes: Accept** and increment reboot count

-> **No**:

Is the currently listed BPM.P for HERA
running ?

Yes : Refuse and send “in-use” message

No : Accept and update database

-> **No : Accept** and update database

Equipment Name Server (ENS)

- Forward accepted requests to secondary name servers

Plug and Play (joining a group)



I want to be known to the system as “ERF.WL” in the context “HERA” and join the group “EHF”

- ERF.WL registers with ENS as before
- ERF.WL registers group EHF with GENS
Does group EHF exist ?

Yes:

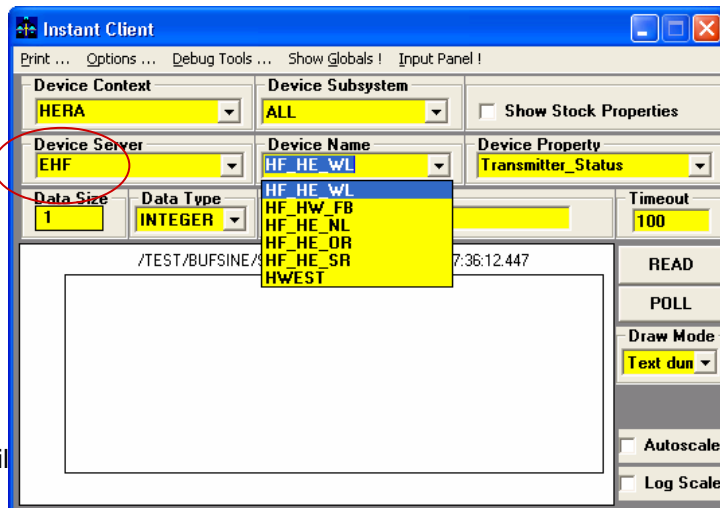
Is ERF.WL a member?

Yes: Update device list if different

No: join group

No:

Create Group and register Group as Server in Context HERA with the ENS



Phil

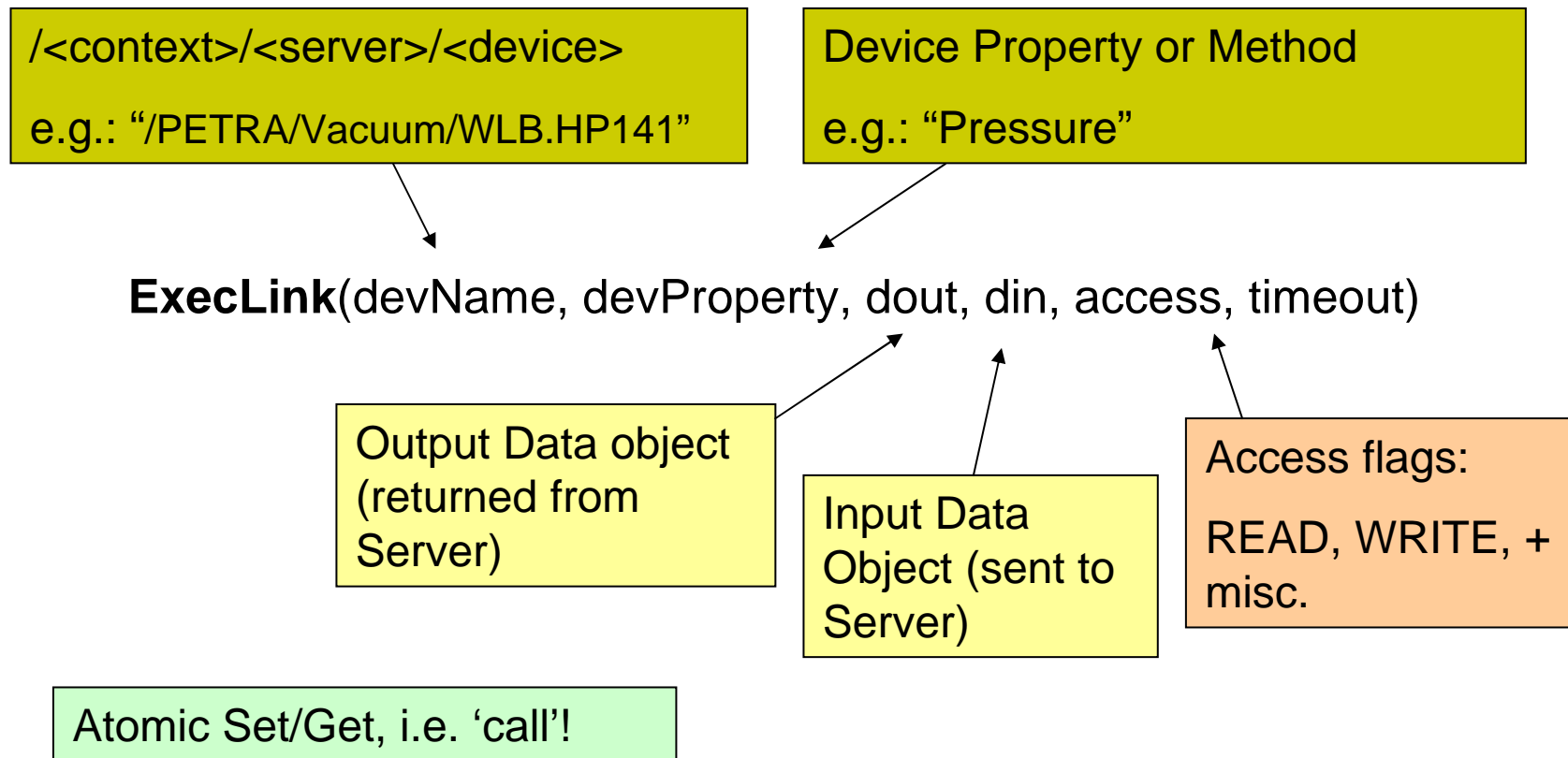
- Clients see a “Server” called “EHF”
- Selected Device is redirected to the appropriate physical server.



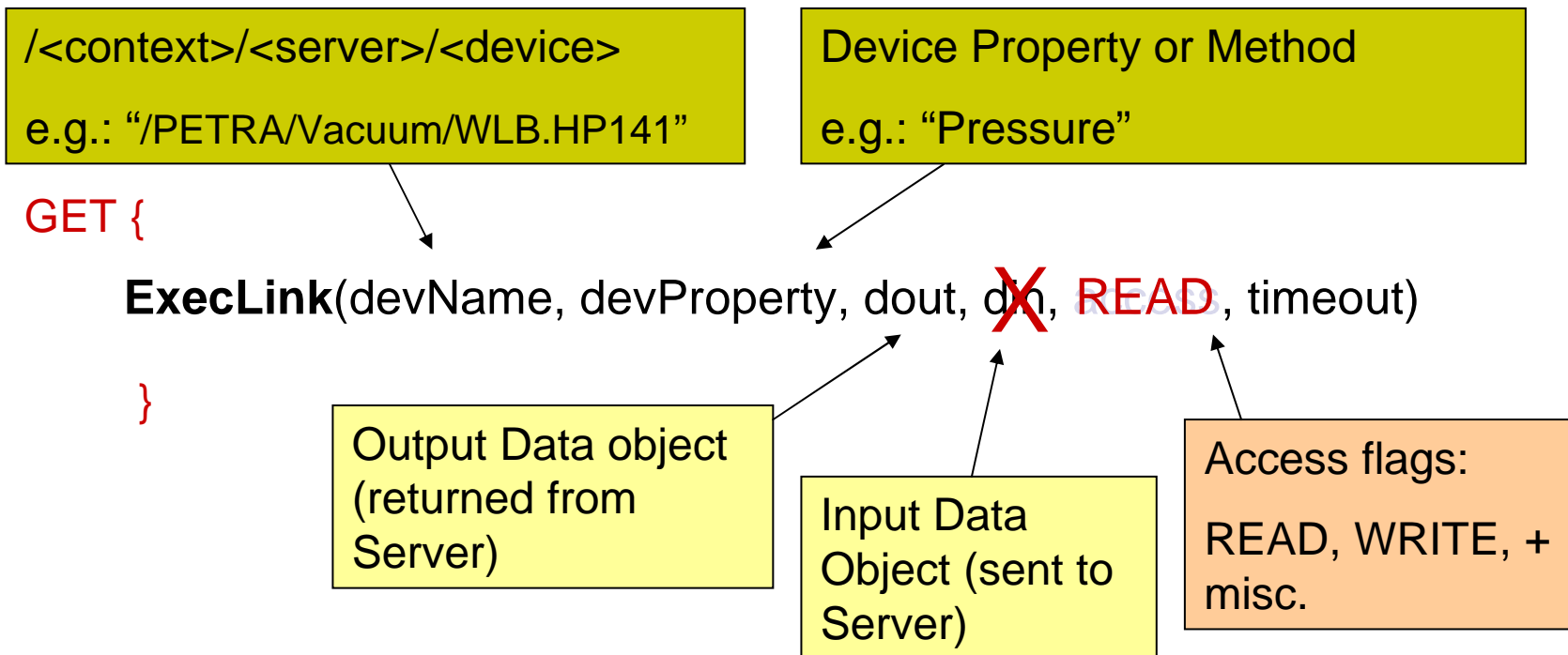
TINE Client API ...

- Fundamental API is :
 - Link based and Not Channel based !
 - Narrow Interface
 - **NOT** 'get', 'set', and 'monitor' !!!
 - Think of 'calls' a la RPC or RMI ...
 - Synchronous data acquisition
 - Asynchronous data acquisition
 - Callbacks, events

Client API: Synchronous Calls



Client API: Synchronous Calls



Client API: Synchronous Calls



e.g. A call to the orbit correction server:

din = tagged struct with optics, current orbit, beam parameters;

dout = tagged struct with new optics, projected corrected orbit;

ExecLink("/SERVICE/ORBCOR", "EFFCOR", dout, din, READ, 1000)

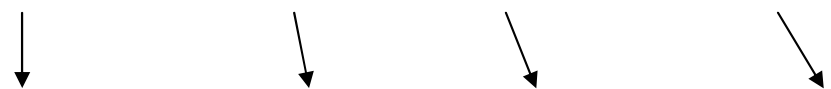
e.g. "Command" Properties: "RESET", "INIT", "START", ...

ExecLink("/HERA/Transfer/P", "STOP", NULL, NULL, WRITE, 1000)



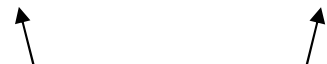
Client API: Asynchronous Calls

Analogous to synchronous parameters ...

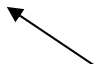


AttachLink(devName, devProperty, dout, din, access, pollrate,
void (*callback)(int,int), callbackID, mode)

Callback with callback id
and status code ...



DATACHANGE
TIMER
SINGLE
EVENT (scheduled)
NETWORK
GROUPED
WAIT
+ ...



TINE API

(Application Programmer's Interface)



- C, C++
- VB
- ActiveX
- Java
- C#, VB.NET (rudimentary, but more coming soon!)
- Command line scripts
- Python Bindings
- Plus ...

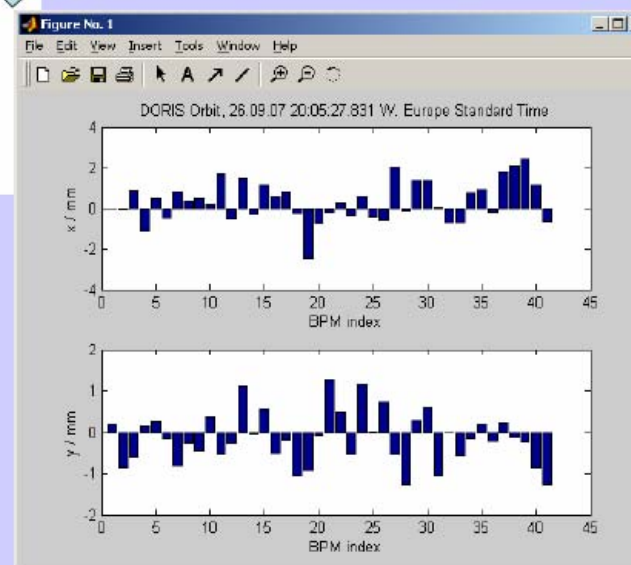


TINE and MatLab ...

Example: DORIS Orbit

Simple script ("M-file") to read and plot the DORIS orbit

```
val = tineread('/DORIS/DOORBIT/#0 [ORBIT]');  
  
figure(1)  
subplot(2,1,1)  
bar(1:41, val.ORBIT(2:42))  
xlabel('BPM index')  
ylabel('x / mm')  
title(['DORIS Orbit, ' val.timestamp])  
subplot(2,1,2)  
bar(1:41, val.ORBIT(44:84))  
xlabel('BPM index')  
ylabel('y / mm')
```



TINE and LabView ...



HelpOnTinePolymorphicVIs.vi Block Diagram *

File Edit View Project Operate Tools Window Help

13pt Application Font

There are only 4 Library's Client Get & Client Put Server Pull & Server Push

You should mostly use the Top- Level VIs.e.g: lvTine_xxx_AnyType.vi

CLN GET Any Data, CLN PUT Any Data, Pull Server, Push Server, lvTineClnGetAnyType.vi, lvTineClnPutAnyData.vi, PullAnyData.vi, PushAnyData.vi

You'll then get an instance of one of the VIs above, which will morf according to the pin connections.

CLN GET STR, CLN GET [STR], CLN PUT STR, CLN PUT [STR], SRV PULL String, SRV PUSH String, CLN GET SHORT, CLN GET [SHORT], CLN PUT SHORT, CLN PUT [SHORT], SRV PULL SHORT, SRV PUSH SHORT, CLN GET SHORT, CLN GET [SHORT], CLN PUT SHORT, CLN PUT [SHORT], SRV PULL SHORT, SRV PUSH SHORT, CLN GET LONG, CLN GET [LONG], CLN PUT LONG, CLN PUT [LONG], SRV PULL LONG, SRV PUSH LONG, CLN GET LONG, CLN GET [LONG], CLN PUT LONG, CLN PUT [LONG], SRV PULL LONG, SRV PUSH LONG, CLN GET SINGLE, CLN GET [SGL], CLN PUT SGL, CLN PUT [SGL], SRV PULL SINGLE, SRV PUSH SINGLE, CLN GET SINGLE, CLN GET [SGL], CLN PUT SGL, CLN PUT [SGL], SRV PULL SINGLE, SRV PUSH SINGLE, CLN GET DBL, CLN GET [DBL], CLN PUT DBL, CLN PUT [DBL], SRV PULL DBL, SRV PUSH DBL, CLN GET DBL, CLN GET [DBL], CLN PUT DBL, CLN PUT [DBL], SRV PULL DBL, SRV PUSH DBL

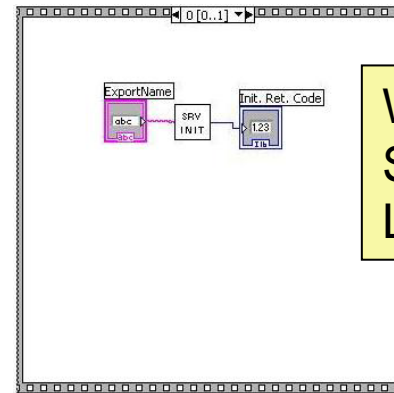
Example:

Text

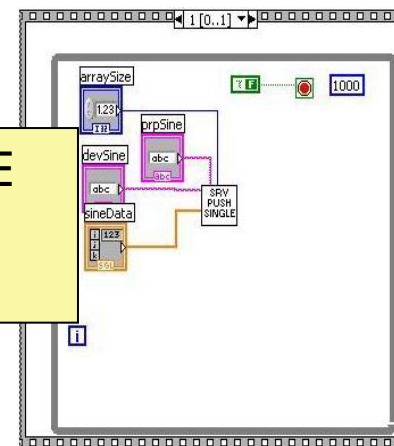
Here you should simply edit the constant "Representation" ==>>> . Thus change to I16; I32; SGL or DBL. You'll then see how the VIs change. It's also possible to convert to String. However, note that there are currently no String- Arrays available. Hence the corresponding sub VIs are indeterminant.

0

CLN GET Any Data, CLN PUT Any Data, Pull Server, Push Server, CLN GET Any Data, CLN PUT Any Data, Pull Server, Push Server



Write TINE Servers in LabView !



Write TINE Clients in LabView !



TINE Device Layer

- “Do it yourself” + your hardware API
 - Use those Windows drivers your hardware comes with!
- EPICS IOCs (asyn drivers) + Epics2Tine
- LabView VIs + TINE LabView
- DOOCS + DOOCS API

- **CDI** (Common Device Interface) !!!
 - Bus plugs for CANOpen, SEDAC, RS232, SiemensPLC, TwinCatADS, Libera, ... (asyn?)
- **TICOM** (TINE CanOpen Manager) WPPB21

TINE Archive System

(lickity split data retrieval !)

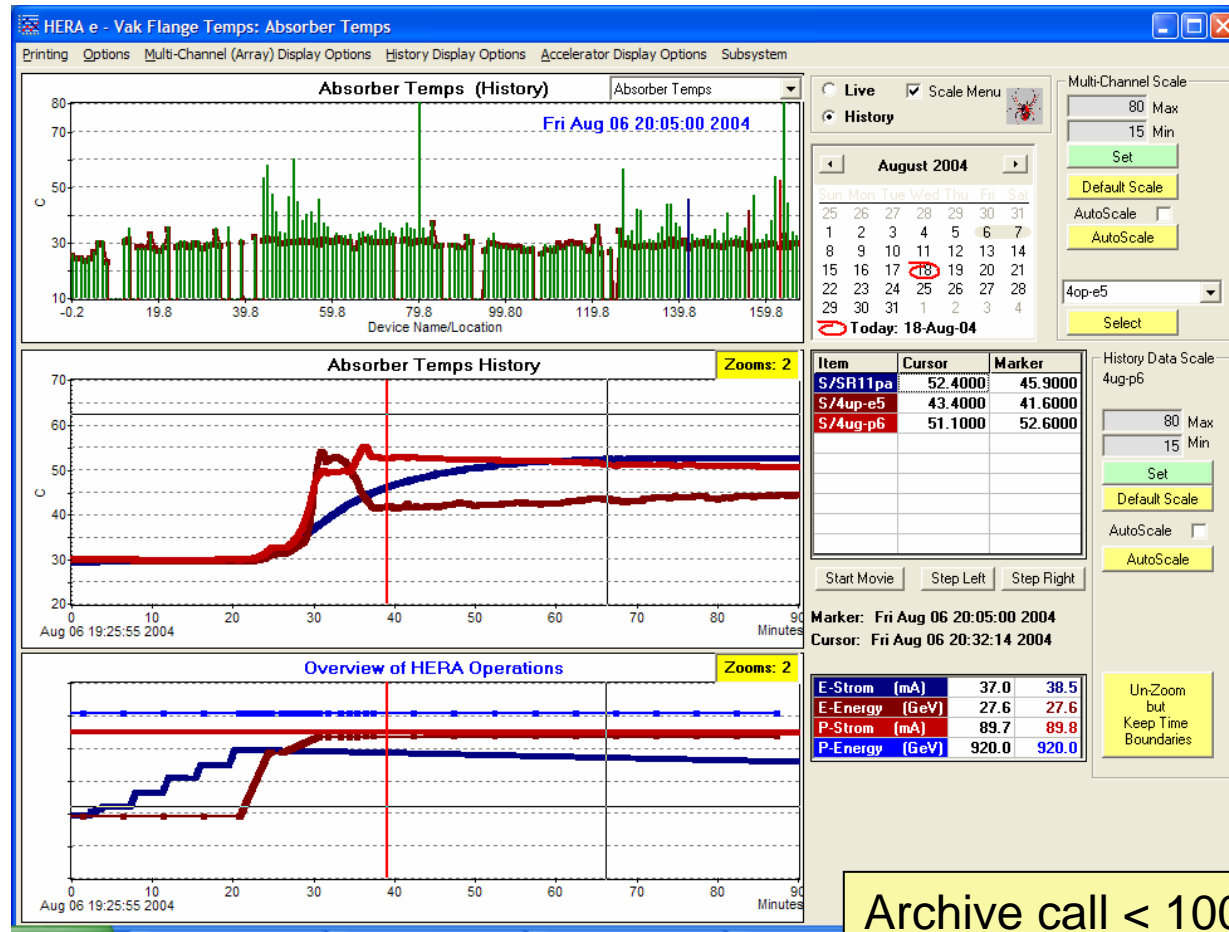


Example: Multi-Channel Analyzer:

All temperatures as “snapshot” (vs. selected reference)

Histories of selected sensors:

Histories of machine operation parameters:



Archive call < 100 msec

TINE Alarm System



DESY2 Alarm Viewer

Printing Display Compact! Acknowledge Alarms! Ack Options View Options Ma

Info (Sev < 7)	Warnings (7 <= Sev < 12)	Fatal Alarms (Sev >= 12)
0	0	0

Sun Oct 14 12:58:19 FATAL Alarms: Severity >= 12

Alarm Subsystem	Alarms	Alarm Subsystem	Alarms
Magnet	5	SeKi	
HCorr		Peak-Strip	
VCorr		Zyklus Gen	
HF		Trigger Mod	
AM-Gen		Timing	
Vac		Schirme	
Per.Interlock			

DESY2 Alarm Viewer: Archived Data

Printing Display Compact! View Options Machine Alarm List to File Extra Forms

Info (Sev < 7)	Warnings (7 <= Sev < 12)	Fatal Alarms (Sev >= 12)
- Not Archived	469	43

Archived Alarms Severity >= 12 from Sun Oct 14 to Sun Oct 14 2007

System	Alarms	System	Alarms	System	Alarms
Magnet	30	SeKi		System	
HCorr		Peak-Strip		Hardware	4
VCorr	3	Zyklus Gen		Radio	
HF	6	Trigger Mod		Tim. Mon	
AM-Gen		Timing		Bunche	
Vac		Schirme		I-Hist	
Per.Interlock				Profile	

Severity: 12

The number of alarms with Severity >= 12: 43

refresh

Alarm View

Show All Alarm-Events

Collect arch data ONLY for

Subsystem: MAG

Extra Info in Grid

Alm-Subsystem: VCorr

Archived Alarm list for all alarm subsystems : 43 alarms. Show Terminated Alarms

SubSystem	Loc.	Error	Severity	Alarm Time	Duration / Info
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 10:50:46	16 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 10:22:31	18 sec
Hardware	H12	SEDAC-Err	15	Oct 14 10:04:27	5 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 09:58:37	16 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 09:53:02	17 sec
Hardware	H18	SEDAC-Err	15	Oct 14 09:25:38	5 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 09:07:36	18 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 09:05:20	17 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 08:46:35	18 sec
HF	DEVICE 9	HF-D2	15	Oct 14 08:26:01	26 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 08:25:43	16 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 07:42:26	17 sec
HF	DEVICE 0	DESY2	15	Oct 14 07:41:54	44.1 min
HF	DEVICE 0	DESY2	15	Oct 14 07:41:54	44.1 min
VCorr	DEVICE 48	VCorr-D2	15	Oct 14 07:40:31	23 sec
VCorr	V45	(C)st-Soll	15	Oct 14 07:40:31	Data, 11 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 07:40:30	20 sec
VCorr	V45	Ist-Soll	15	Oct 14 07:40:30	Data, 12 sec
Magnet	DEVICE 19	Magnet-D2	15	Oct 14 07:21:31	19 sec

Alarm Description

(CoS)Ist-Soll (stat)
Dev. info: Corrector
Device: V45
Data info: Ist-Soll
Data: 3076923

The alarm is Terminated.

Start: Oct 14 07:40:31
Stop: Stop: Oct 14 07:40:42
Duration: 11 sec

Duration: 11 sec

Alarm Data Change
Oct 14 07:40:42: 1.648352
Oct 14 07:40:35: 1.648352

Further Information:
not supplied

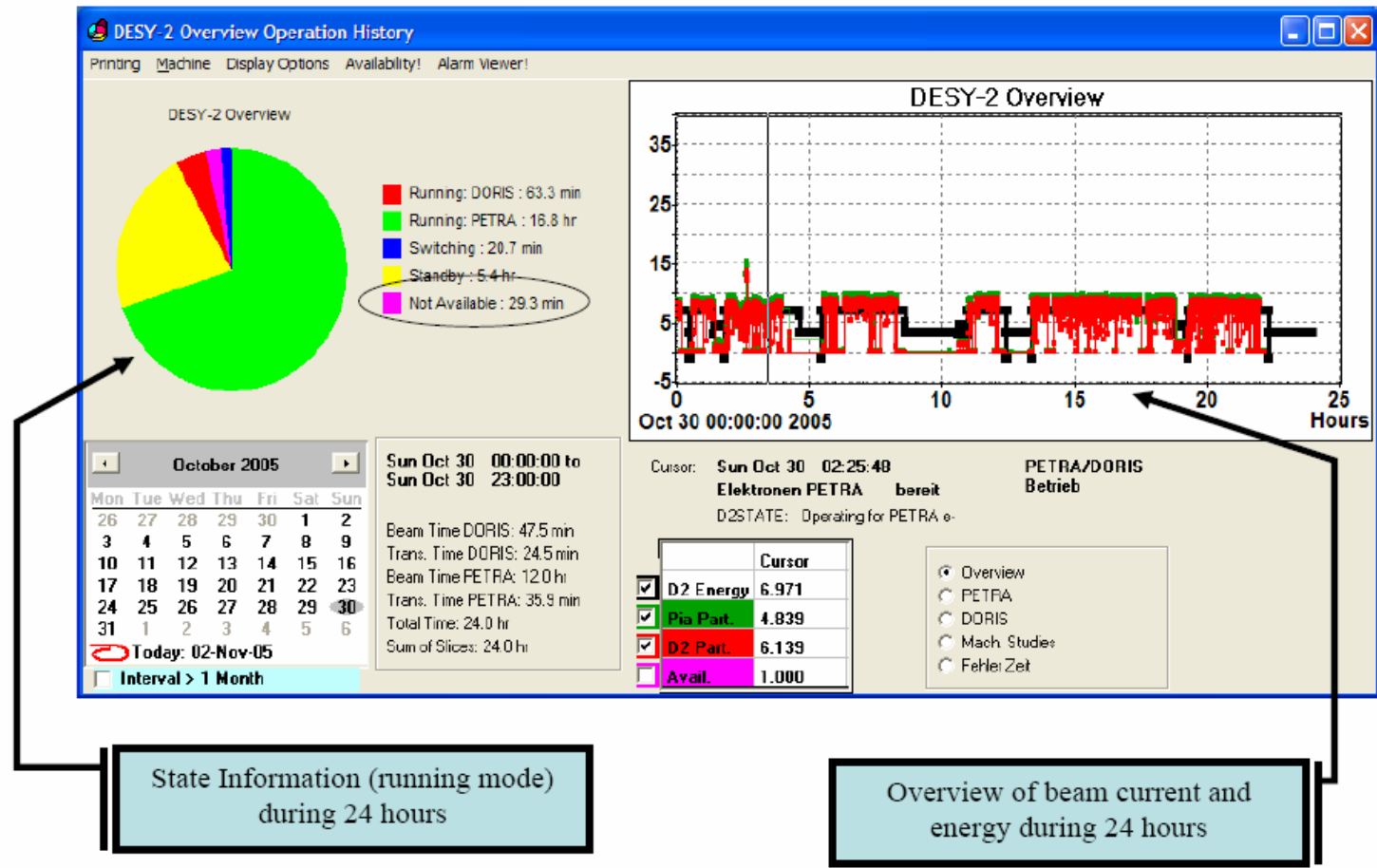
Compact Overview

Detailed view

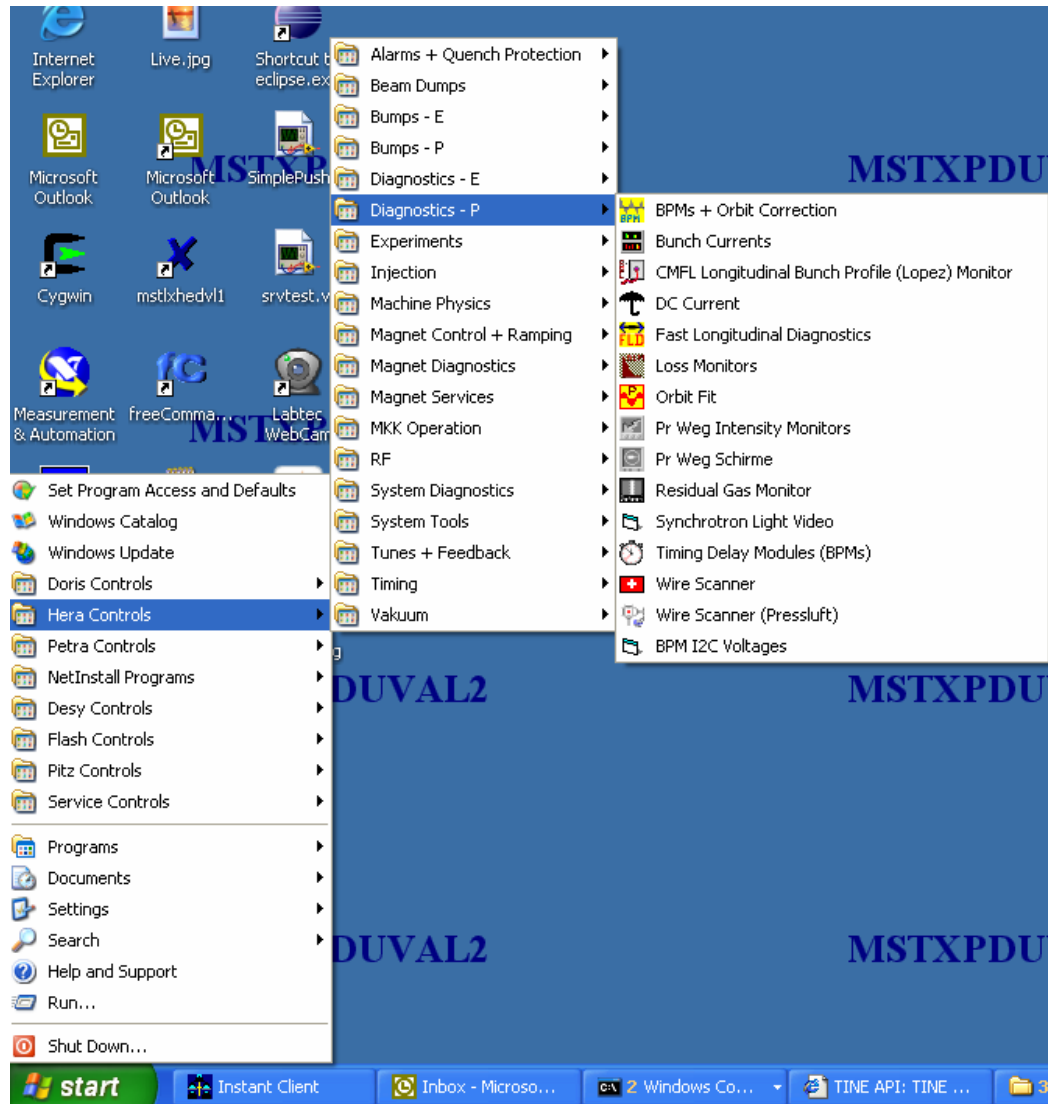


Operations + Availability

Operations Overview: a Typical Day at DESY-2



HERA Console Applications (rich clients)



< 200 Console Applications available

~ 20 Console Applications needed for Normal Operation

Console Applications generally “Rich Clients”

TINE Clients : Rich Clients



DESY 2 Zyklusgenerator

File Maschine(Desy 2) Optionen Hilfe

Geladenes File: PETRA e- (vom 02-20-2007 08:51:44)

Betriebsmode	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Linac 2														
Linac 2 Pia														
Pia 125 MHz														
Pia Desy 2														
Desy 2														
Desy 2 Doris														
Desy 2 Petra														
LTG Vortrg.														
LTG Doris														
LTG Petra														
Reserve														
Schleife														

Archive Viewer

File Machine Options

Betrieb

PETRA
DORIS
PETRA
File 1
Teststr

MstXpDuval

Time: 26.06.2007 16:45:57.000 UTC: 1182869157

Status	Property	Value	Device	Description
Done	HPMAGEN[0]	575.06 GeV	#0	Hera P Energy i...
Done	HPDCCur[0]	-0.13	#0	Hera P Current
Done	HEMAGEN[0]	23.08	#0	Hera E Energy i...
Done	HEDCCur[0]	2.43	#0	Hera E Current
Done	H1PBkg[0]	0.0	#0	proton backgrou...
Done	H1LBkg[0]	7.93	#0	Lepton backgrou...
Done	H1RadMon[0]	12.3	#0	Radiation Monitor
Done	H1PDColRate[0]	0.0	#0	PD Collision rate
Done	H1Lumi[0]	0.0	#0	Instantaneous L...
Done	H1SLumi[0]	0.0	#0	Specific Lumi

Charts

- Main Chart
- Correlation Chart
- Array Chart

Settings

- Extra Digits
- Text
- Chubby Lines

Dots + Line

Start Live Stop Live

10:21:23: History data loaded.

D2Frequenzkorrektur

File Maschine(Desy 2) Optionen Hilfe

Desy 2 Frequenzkorrektur und S

Frequenz:

Offset:

FM:

Synchronisation:

Desy 2 Synchron:

Desy 2 Referenz:

KickerManager

File Maschine(\$not applicable\$) Optionen Hilfe

DevName	Netz	HV	Soll	Delay	SeKl Modul
KICK 2 -	EIN	EIN	4.596 KV	4.628 µS	1 16 48
KICK 2 +	EIN	EIN	1.944 KV	1.235 µS	1 10 32
SEPT -/+	EIN	-	0.513 KA	372.9 µS	1 25 80
KI 40 E	AUS	AUS	14.002 KV	11.106 µS	1 9 32
SE 42 E	AUS	-	5.563 KA	670 µS	1 25 96
HBB E	AUS	-	47.802 A	35.2 mS	1 20 160
VBB44ER	EIN	-	27.497 A	37.33 mS	1 20 80
KI 24 R	EIN	AUS	4.947 KV	1.565 µS	1 16 32
SE 26 AR	EIN	-	4.425 KA	810 µS	1 25 48
SE 26 BR	EIN	-	5.021 KA	811 µS	1 25 64
HBB R	EIN	-	14.481 A	34.25 mS	1 20 192
KI 16 P	EIN	EIN	4.231 KV	3.214 µS	1 9 48
HKI 36	EIN	AUS	0.112 KV	1.969 µS	1 10 48
V KI 12	EIN	AUS	1.148 KV	1.729 µS	1 17 32

Main Service IEDSEKI

KICK 2 -

Netz

HV

Trigger

Trg. Modul

Error

Error Reset

Delay Modul

Crate 16 SubAdd 144 Kanal 2

Pulse e-

Fri Aug 24 15:46:06 CEST 2007

Reference Pulse

Sollwert 4.596 KV 4.596 KV Delay 4.628 µS 4.628 µS

0.00 1.00 2.00 3.00 4.00 5.00 0.00 1.60 3.20 4.80 6.40 8.00

MstXpDuval 24.08.07 15:46:06 Operations Mode [Betrieb] Serverwahl [Default] (5)KeinInlDatei

Philip

TINE and Java ACOP (for rich clients)



No Frameworks !

Use Eclipse,
NetBeans, or
whatever ...

Browse
Control system
at **design-time**
with property
panels or
customizer ...

The screenshot displays the Eclipse IDE interface. A 'Java Property Editor' dialog is open, showing configuration for a TINE device. The 'Access protocol' is set to 'TINE', 'Device context' to 'HERA', 'Device subsystem' to 'ALL', 'Device server' to 'BPM', 'Device name' to 'WL 197 MX', and 'Property name' to 'STATUS.X'. The 'Access rate' is set to '+1000' and 'Data size' is 'Auto'. The background shows a Java Swing window with a chart titled 'TINE/HERA/BPM/WL197 MX/ORBIT.X' and a palette of UI components.

TINE and Java ACOP + COMA (for simple clients)

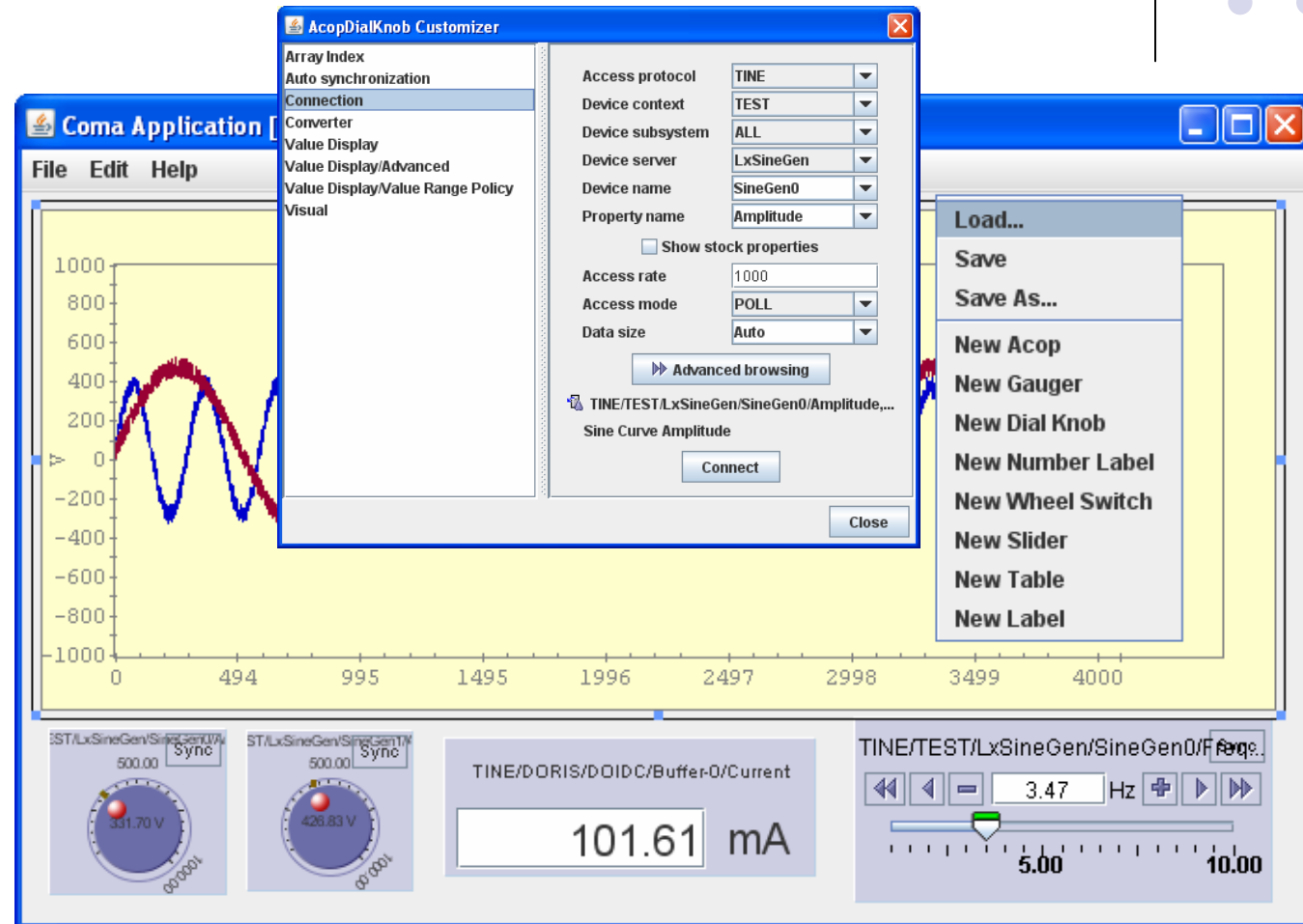


No Frameworks !

Lightweight!

Just start a coma application (e.g. an empty coma application)

Browse
Control system
at **run-time**
with
customizer ...



TINE Video (Multicasting + Scheduling)

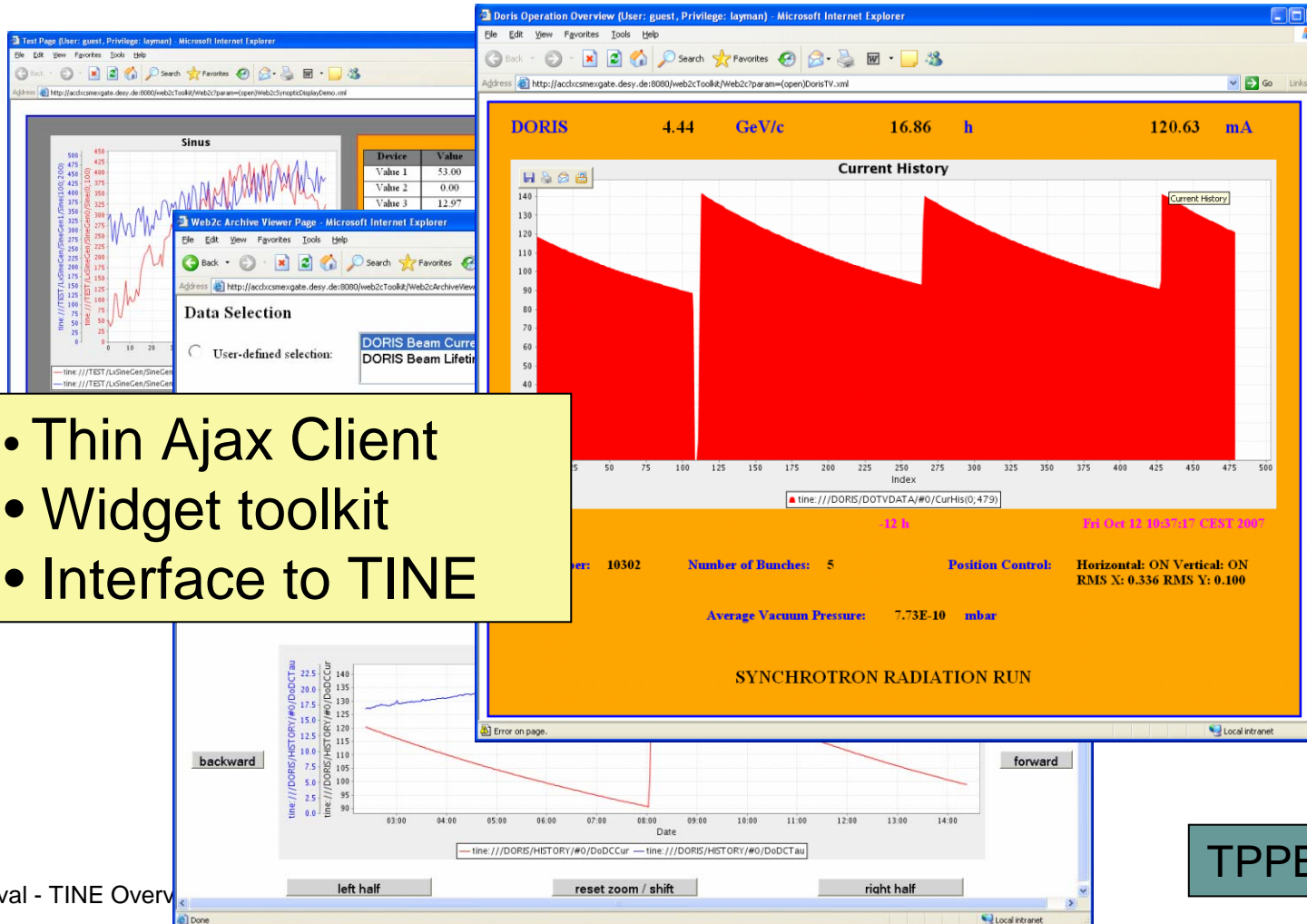


.5 Mbyte Video
Frames @ 10 Hz
multicast (100 Mb
ethernet). (also runs
fine @ 20 Hz)

Uses the **NETWORK**
switch => **as many**
clients as you want!

Server calls the
Scheduler when a
new frame is
grabbed => **as real-**
time as it gets !!!

TINE and Web Tools (Web2C: Web-based Controls Client)



- Thin Ajax Client
- Widget toolkit
- Interface to TINE



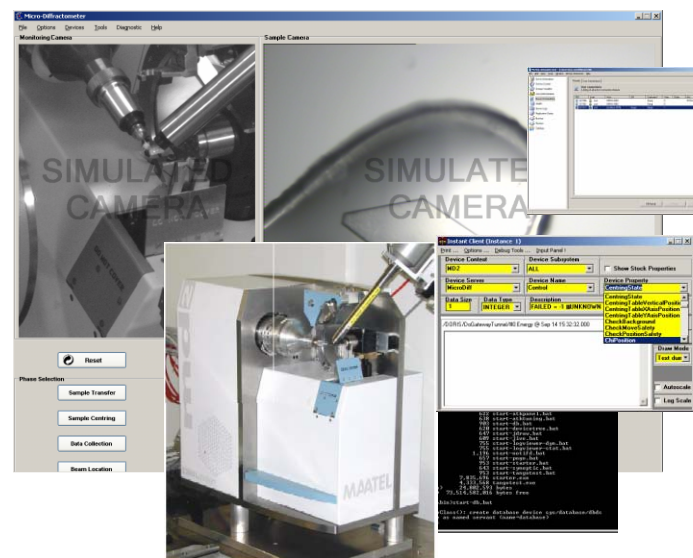
TINE Platforms ...

- DOS
- Win16, Win32 (9x, NT, 2K, XP, ...), Win64 ?
- Win CE (in progress)
- Unix (Solaris, HP, OSF, SGI, Ultrix, ...)
- Linux, FreeBSD (32 bit, 64 bit)
- ELINOS
- MAC OS X
- VxWorks
- VMS (Vax, Alpha)
- LynxOS
- NIOS (plugs, single-threaded LWIP, ...)
- Java



TINE and Connectivity to other systems

- Already embedded in DOOCS
- Epics2Tine runs on any EPICS ioc
- Connect to STARS/COACK via STARS bridge
- Tango2Tine

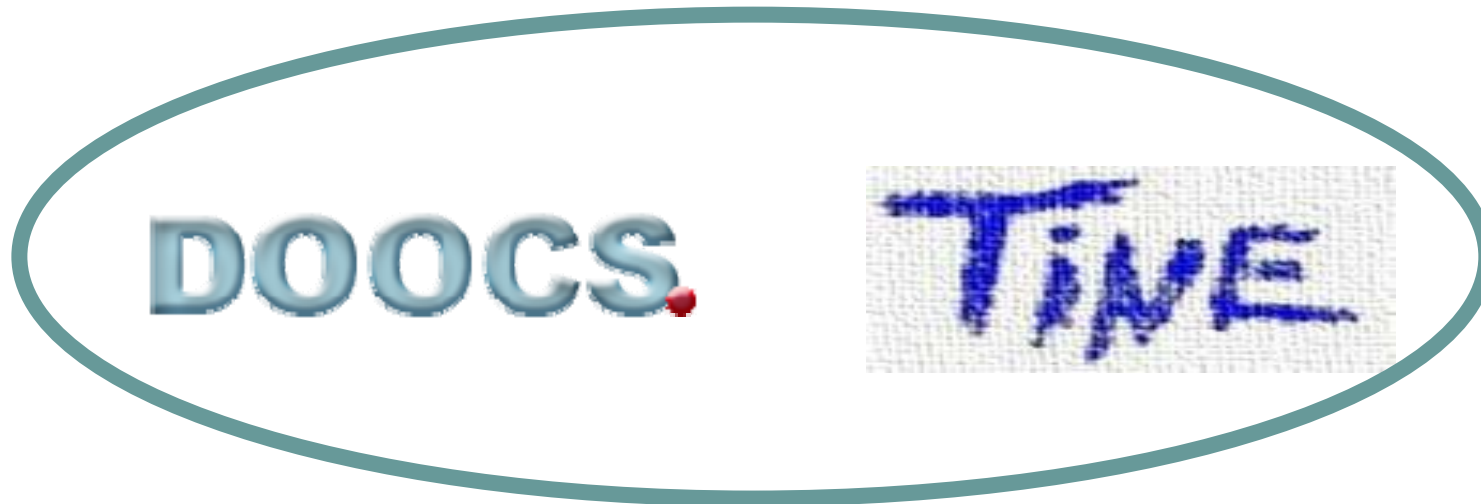


TANGO2TINE example MD2 Goniometer

TINE and DOOCS



- Always a close relationship between the two.

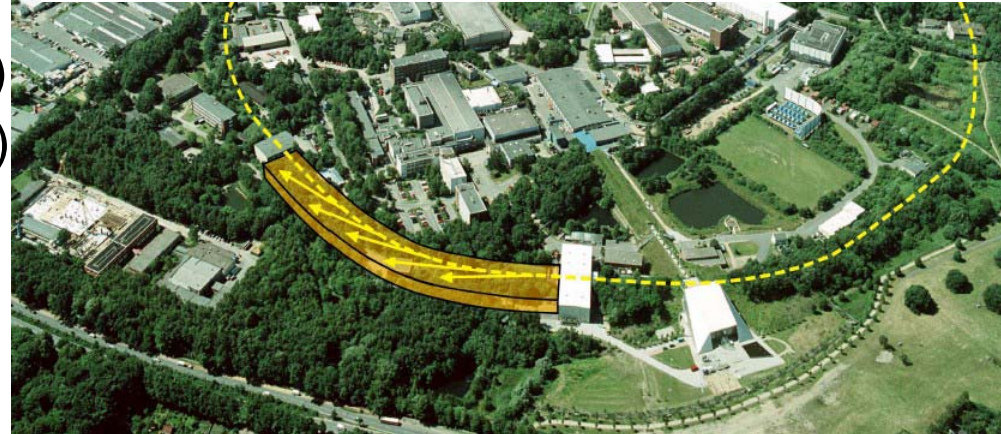
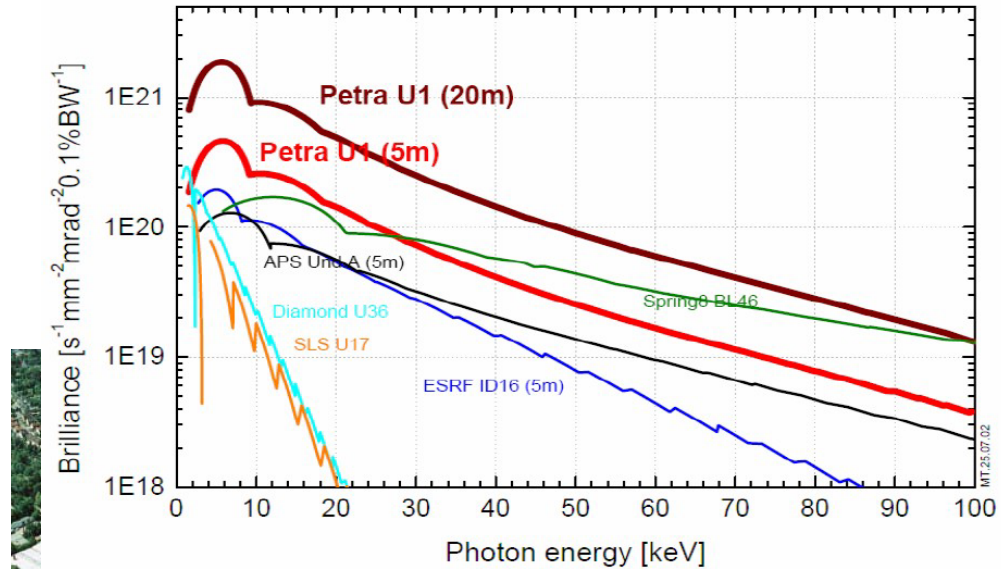


- Imagine (we're not there yet, but imagine anyway):
 - Download anything from doocs.desy.de; Install it and use it.
 - Download anything from tine.desy.de; Install it and use it.
 - And it all fits together seamlessly (no tweaking)!

TINE/DOOCS Facilities



- Petra 3
 - 2009: High-brilliance 3rd generation synchrotron radiation source
- DORIS
- Linac2/Desy2
- PIA
- FLASH
- PITZ (Zeuthen)
- EMBL Hamburg (Beamlines)
- GKSS Hamburg (Beamlines)
- PF Beamlines (KEK)
- LLRF at FermiLab



TINE Workshop



- <http://tine.desy.de>
-> workshop 2007

TINE Workshop September 26, 27 2007

Overview

- P. Duval, [TINE Overview and Status of Release 4.0](#)
- M. Lomperski, [TINE Archive and Alarm Services](#)
- S. Herb, [Redirection as a control system tool](#)

Configuration Tools

- P. Duval, [Configuration Wizards \(C, VB, LabView, HPVEE\)](#)
- J. Wilgen, On-line demo: Configuration Wizards (Java)
- J. Wilgen, On-line demo: Watchdogs and Daemons (Unix)
- P. Bartkiewicz, [Watchdogs and Daemons \(Windows\)](#)

RAD Tools

- K. Rehlich, [iDDD + TINE](#)
- J. Hatje, [Control System Studio+ TINE](#)
- I. Kriznar, [Acop Beans + COMA + TINE](#)

LabView + Web Tools

- U. Hurdelbrink, [TINE + HPVee](#)
- U. Ristau, [TINE + LabView @ EMBL](#)
- S. Wilke, [TINE + LabView @ MHF](#) [ppt]
- P. Duval (G. Cox), [Web Tools : WebMex + PHP](#)
- R. Bacher, [Web Tools : Web2cToolkit](#)

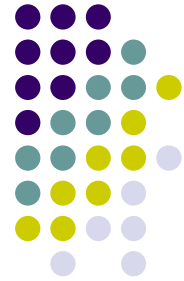
Device Access, Embedded Systems

- H.G. Wu, [Common Device Interface \(CDD\)](#)
- U. Ristau, [CDI interface to Real-time EtherCat](#)
- P. Bartkiewicz, [TICOM \(TINE CanOpen Manager\)](#)
- S. Weisse, M. Penno, [Altera NIOS + Network Queue](#)
- S. Herb, [PC104 Tricks and Tips](#)
- A. Pazos, [Progress on TINE + Windows CE](#)

Connectivity to Other Systems

- P. Duval, K. Rehlich, Status of Doocs2TINE
- A. Kagarmanov (P. Duval), [Status of Epics2TINE](#)
- R. Stefanic, [Status of Tango2TINE](#)

TINE : Where to get it ...



- <http://tine.desy.de>
 - Visit the *download* section and chose your platform.
 - Use setup tools available.
 - Installation takes a few minutes
 - Don't expect too many miracles (you might have to read a README.txt or two).
- Email to tine@desy.de

TINE (Three-fold Integrated Networking Environment)

Note: Remember: *This Is Not Epics!*
But you can run [EPICS](#) iocs on TINE using Epics2Tine.
TINE is embedded in [DOOCS](#), so you can also run DOOCS clients and servers using TINE.
TINE can also be used in a [STARS](#) system and via a STARS-bridge in a [COACK](#) system.
But you might want to go native ...

General	APIs	Services	Examples & Tutorials	Recipes
Bird's Eye View	C API	Alarm System	Getting Started	DOS
Overview	Visual Basic API	Archive System	TINE Server Wizard	UNIX
Features	Java API	Post Mortem System	Console Server (C)	VxWorks
Configuration	Java API (ACOP)	State Server	Console Client (C)	VMS
Data Types	Buffered API	Dialog Server	GUI Server (VB)	Win16
Transfer Modes	LabView API	Name Server	GUI Client (VB)	Win32
Access Flags	MatLab API	Remote Services	Console Client (Java)	Workshop Tutorial (Buffered Server)
Array Types		Network Globals	GUI Client (Java)	Workshop Tutorial (Standard Server)
Time Stamps		Time Synchronization	Console Server (Java)	W
Naming Conventions		Security	Trouble Shooting	C
Data Flow Tips		Netmex		
		Command Line		

TINE is fully supported by [ACOP](#), [Abeans](#), [JoIMint](#), and will be supported by [Control System Studio](#).

You may want to have a look at the release note for versions [3.20](#), [3.30](#) or [3.31](#) or take a quick look at a [Bird's Eye View](#)

Download TINE [Download page](#)

