



TINE Release 4.0 News

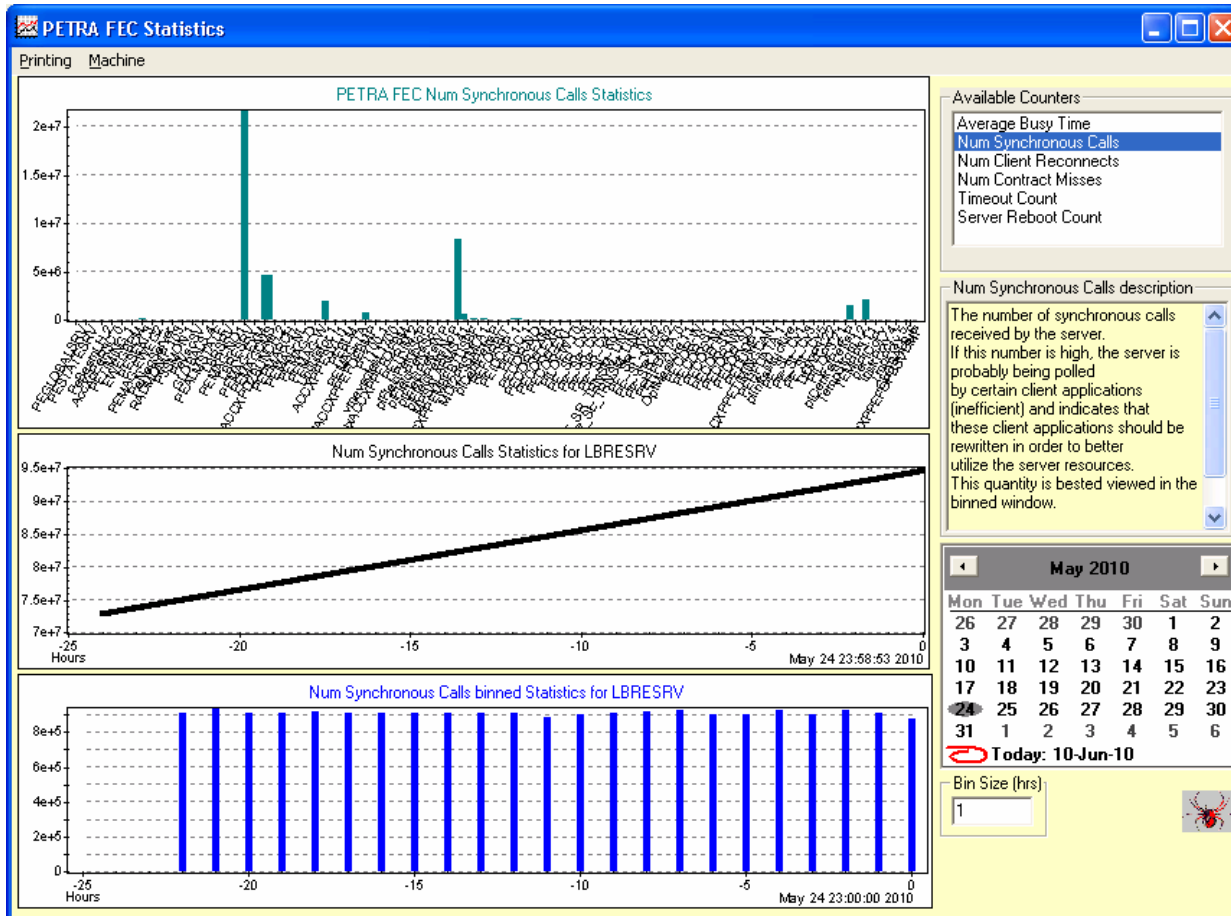
(June 11, 2010: That was the month that was !)

“What a long, strange trip it’s been”

[Release 4.1.6]

- Two defining 'Issues' driving recent developments (and recent chaos) ...

[Libera Server in May ...]



~1000
synchronous
calls per sec

Or

~ 1000000
per hour !

Magnet Server : PETRA

Device servers: Cms.MagnetPs

Description: PE Central Magnet Server

Ping
Control
Restart

Activity Contracts Clients Alarms Log File Stats

Server	PEMAGCMS
Local Time	Thu May 06 16:28:11
Start Time	Thu May 06 13:14:32
Sys Poll Rate	100
Nr bkg tasks	0
[SRV] Nr total contracts	38
[SRV] Nr total clients	12
[SRV] PETRA/Cms.MagnetPs contracts	7
[SRV] PETRA/Cms.MagnetPs clients	1
[SRV] Nr UDP packets received	59880
[SRV] Nr TCP packets received	0

Device servers: Cms.MagnetPs

Description: PE Central Magnet Server

Ping
Control
Restart

Activity Contracts Clients Alarms Log File Stats

Refresh

Ave Busy Time (%)	0
Cycle Counts	150
Max Cycle Counts	823
Sgl Link Counts	4378
Client Misses	0
Client Reconnects	2
Client Retries	1
Contract Misses	0
Contract Delays	0
Burst Limit Reached Count	0
Data Timestamp Offset (ms)	0

A Tale of Two Servers ...

Magnet Server : FLASH

Device servers

Device servers	Description	Ping	Control	Restart
TTFMAG	TTF Magnet Server			

Activity Contracts Clients Alarms Log File Stats

Server	TTFMAG
Local Time	Thu May 06 16:31:20
Start Time	Thu May 06 07:55:07
Sys Poll Rate	50
Nr bkg tasks	0
[SRV] Nr total contracts	1058
[SRV] Nr total clients	22
[SRV] TTF2/TTFMAG contracts	19
[SRV] TTF2/TTFMAG clients	2
[SRV] Nr UDP packets received	1850664
[SRV] Nr TCP packets received	0

Device servers

Device servers	Description	Ping	Control	Restart
TTFMAG	TTF Magnet Server			

Activity Contracts Clients Alarms Log File Stats

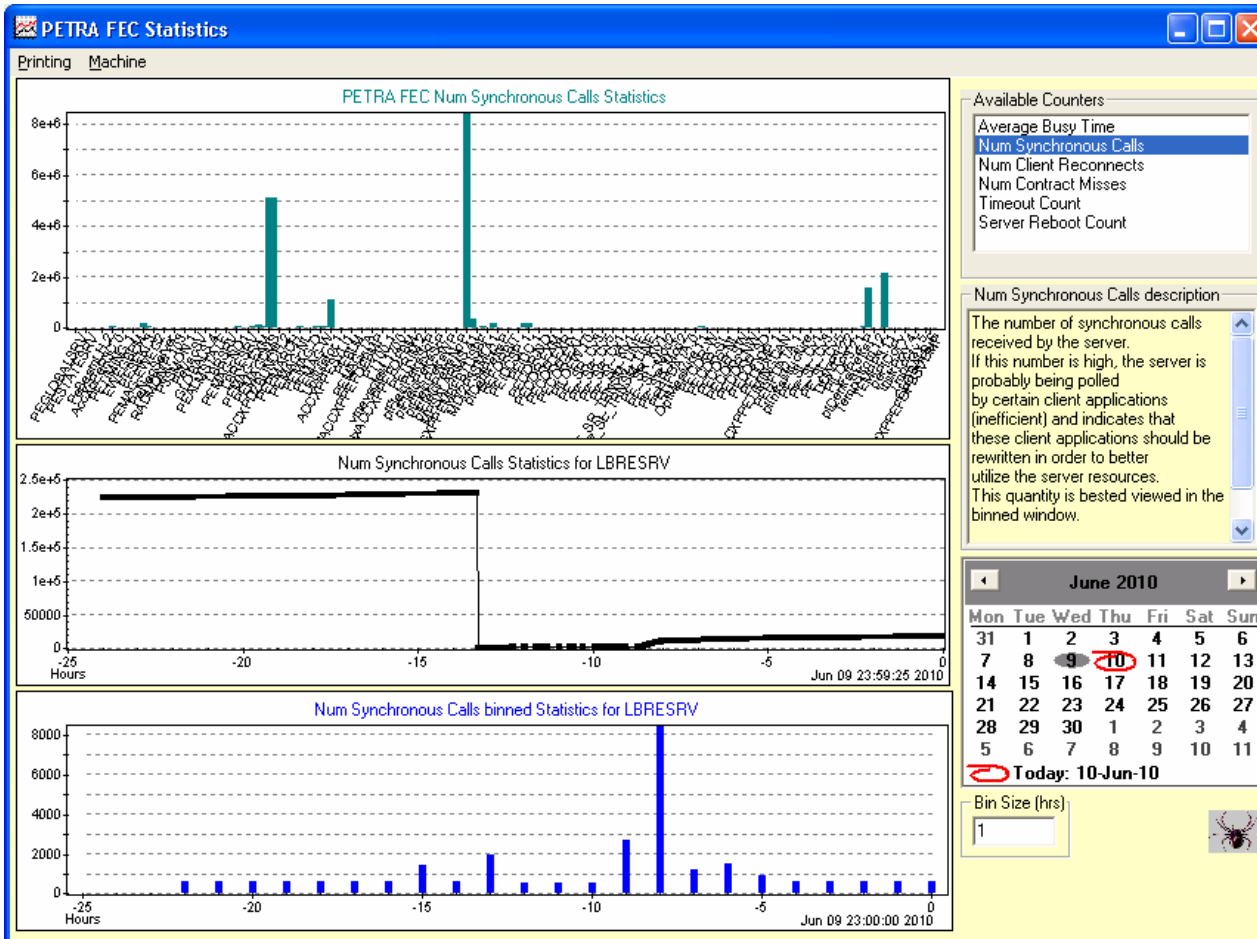
Refresh

Ave Busy Time (%)	17
Cycle Counts	38
Max Cycle Counts	773
Sgl Link Counts	496078
Client Misses	0
Client Reconnects	21049
Client Retries	484
Contract Misses	155
Contract Delays	0
Burst Limit Reached Count	0
Data Timestamp Offset (ms)	0

[How to 'coerce' efficiency ...]

- MatLab
 - Uses 'listener' API
 - Set min polling interval @ 100 msec
 - Introduce property registration flag `CA_NOSYNC`
 - Return 'async_access_required' if property accessed synchronously
 - Win 64-bit MatLab specific 'work-arounds'
 - Some problems related to 'MCA' single-element logic found and fixed.

Libera Server this Wednesday



Mostly ~500 synchronous calls per hour.

Some renegade client with ~8000 calls @ 3:00 p.m.

[How to 'coerce' efficiency ...]

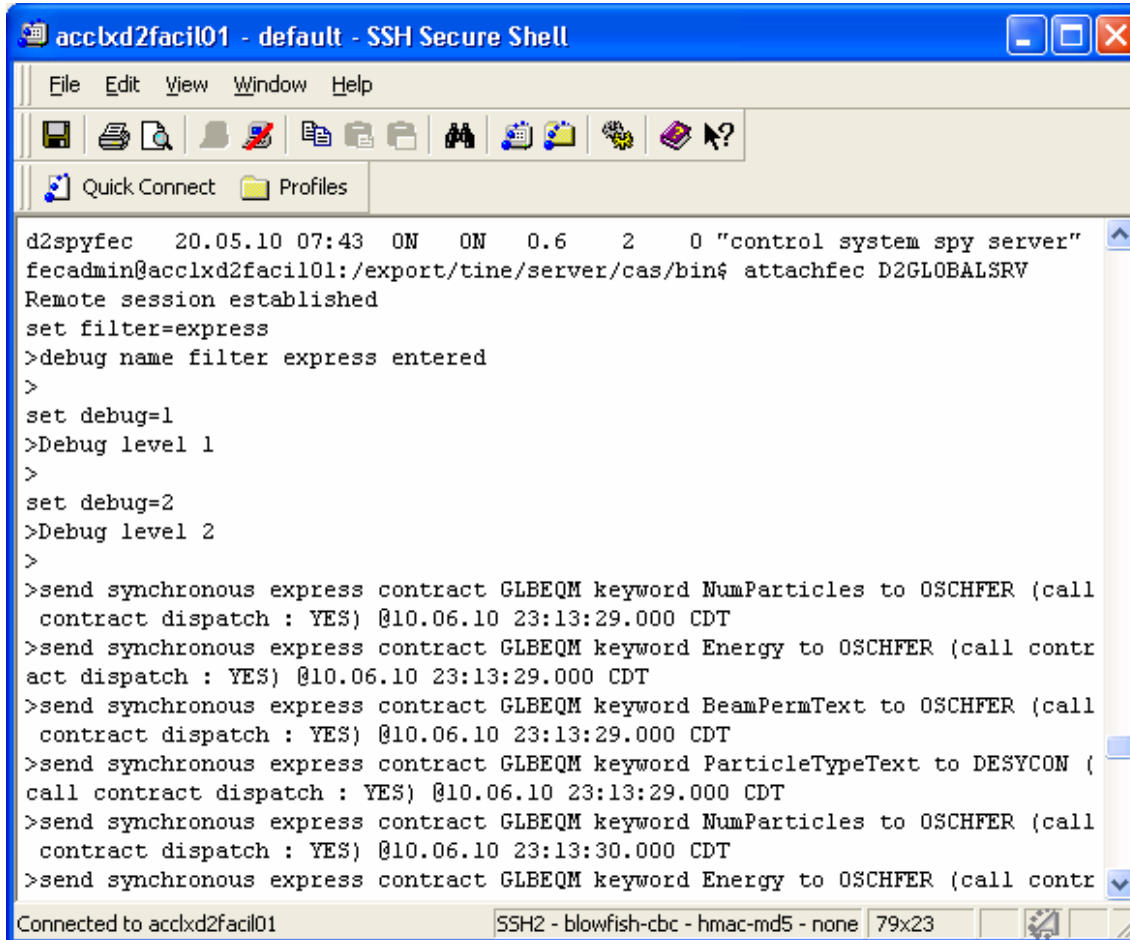
■ TTFMAG

- > 1000 regular contracts
- ~ 10 - 50 synchronous calls / second
- Note:
 - A synchronous call is also a 'transient' contract
 - Forces a scan through the contract table (old way)
 - Number contracts *small* + Number synchronous calls/sec *small* -> negligible *interference*.
 - Number contracts *large* + Number synchronous calls/sec *large* -> noticeable *load* !

[How to 'coerce' efficiency ...]

- Introduce '*express delivery*'
 - Single synchronous contracts
 - Handle *immediately* with 'targeted' contract and client !
 - no journey through the contract and client tables.
 - **IF** contract also exists as a persistent contract **AND** last dispatch is within the allotted timeout: *return cached data to caller!*
 - i.e. avoid calling the dispatch routine unnecessarily

aside: Filter on 'express' :



```
accbxd2facil01 - default - SSH Secure Shell
File Edit View Window Help
Quick Connect Profiles
d2spyfec 20.05.10 07:43 ON ON 0.6 2 0 "control system spy server"
fecadmin@accbxd2facil01:/export/tine/server/cas/bin$ attachfec D2GLOBALSRV
Remote session established
set filter=express
>debug name filter express entered
>
set debug=1
>Debug level 1
>
set debug=2
>Debug level 2
>
>send synchronous express contract GLBEQM keyword NumParticles to OSCHFER (call
contract dispatch : YES) @10.06.10 23:13:29.000 CDT
>send synchronous express contract GLBEQM keyword Energy to OSCHFER (call contr
act dispatch : YES) @10.06.10 23:13:29.000 CDT
>send synchronous express contract GLBEQM keyword BeamPermText to OSCHFER (call
contract dispatch : YES) @10.06.10 23:13:29.000 CDT
>send synchronous express contract GLBEQM keyword ParticleTypeText to DESYCON (
call contract dispatch : YES) @10.06.10 23:13:29.000 CDT
>send synchronous express contract GLBEQM keyword NumParticles to OSCHFER (call
contract dispatch : YES) @10.06.10 23:13:30.000 CDT
>send synchronous express contract GLBEQM keyword Energy to OSCHFER (call contr
Connected to accbxd2facil01 SSH2 - blowfish-cbc - hmac-md5 - none 79x23
```

**Why is
"OSCHFER"
synchronously
polling DESY2
Globals?**

**Global Servers
will soon
specify
'CA_NOSYNC'
on properties !**

[How to 'coerce' efficiency ...]

- Express Delivery Initial Results (TTFMAG)
 - - POLL MODE (not REFRESH)
 - ~ 1000 Contracts with typically 4 clients/contract)
 - BEFORE :
 - ~ 90% CPU utilization for 70 Synch Calls per second
 - AFTER:
 - ~ 80% CPU utilization for 200 Synch Calls per second

[How to 'coerce' efficiency ...]

- Introduce Multi-Channel Array element *negotiation* for 'device-oriented' servers.
 - RegisterMultiChannelGroupDevice()
 - Registers specific devices as members of a device group
 - Participates in MCA negotiation as per registered MCA Properties ('property-oriented' servers)
 - Any persistent link to a single element gets re-routed to a link to the entire Array
 - Reduces the number of contracts and dispatches considerably!

How to 'coerce' efficiency ...

- Initial Results (TTFMAG) + ddd panel
 - BEFORE (no MCA logic):
 - >Registered clients : 21
 - >Registered contracts: 273
 - AFTER (with MCA logic):
 - >Registered clients : 22
 - >Registered contracts: 17
 - sample contract
 - >[17] PSCEQM PS <GROUP> (41 elements) 1000 msec HERB



[How to 'coerce' efficiency ...]

- Pitfalls (MCA negotiation plus ...):
 - CF_DEFAULT requests
 - jDDD or DDD panels, PHP, tget, etc.
 - Now are 'informed' that the proper 'size' is '1' for designated MCA properties.
 - Property Query Functions
 - doocs servers, Magnet server
 - Need to 'signal' an MCA negotiation
 - Some refactoring for efficiency
 - Multiple Identical links
 - CloseLink within a link callback (listener).

Device vs. Property Servers

(vs. EPICS IOCs)

- EPICS:
 - NOT Object Oriented
 - Database View of Control System
 - Everything is a 'Process Variable'
 - Control System Protocol is always
 - Put, Get, Monitor ... some 'Process variable'
 - 'Commands' or 'Calls' are 'kluged'
 - epics2tine allows 'composites' which are Multi-Channel Arrays !

Device vs. Property Servers

(vs. EPICS IOCs)

- Pure Device Oriented Views
 - Doocs, Tango, some Tine servers
 - Object Oriented with “instantiated devices”
 - Name resolution lands on a ‘device’
 - knows which properties it supports
 - knows nothing about other devices (?)
 - how to map into a MCA call ?
 - might use ‘property query functions’
 - doocs, Magnet Server
 - ‘hook’ into a ‘foreign’ property registry
 - alternative:
 - Register all properties
 - Assign property lists to registered devices

Device vs. Property Servers

(vs. EPICS IOCs)

- Pure Device Oriented Views
 - ‘property’ specific calls are ‘kluged’
 - e.g. ‘*’ is NOT a device !
 - ‘group’ devices
 - Not a physical device
 - An array of local devices
 - Query for members, etc.
 - Can be configured to supply MCA information!
 - Java device server wizard
 - DOES support MCA grouped calls!

Device vs. Property Servers

(vs. EPICS IOCs)

- Property Oriented View
 - Doocs, Tango don't offer this
 - Name resolution lands on 'Property'
 - 'device name' is often a misnomer for 'key' or 'keyword'
 - Most Central Services have this view
 - Archiver, CAS, Globals, State, ENS, ...
 - CDI has this view
 - CDI server has strong resemblance to EPICS IOC
 - Device like calls are kluged
 - Handled at the property level.
 - MCA logic is easy to configure

Device vs. Property Servers

(vs. EPICS IOCs)

The screenshot shows the Instant Client interface for a Device Server. The 'Device Context' is set to TTF2 and the 'Device Subsystem' is ALL. The 'Device Server' is LONGARCHIVER and the 'Device Name' is CH.00. The 'Device Property' is VALUE. The 'Data Size' is 1 and the 'Data Type' is FLOAT. The 'Description' is 'value'. The 'Device Property' dropdown menu is open, showing options: STS.ONLINE, SVR.ADDR, SYS_MASK, UPDATE_THREAD, VALUE (selected), VALUE.FILT, Z_POS, and Z_POS.STRING. The main display area shows the path /TTF2/LONGARCHIVER/CH.00 VALUE and the value (0) 0.

Device Server

The screenshot shows the Instant Client interface for a Property Server. The 'Device Context' is set to FLASH and the 'Device Subsystem' is ALL. The 'Device Server' is ARCHIVER and the 'Device Name' is 1GUN. The 'Device Property' is BLMLoss. The 'Data Size' is 85 and the 'Data Type' is FLOAT. The 'Description' is empty. The 'Device Property' dropdown menu is open, showing options: BLMLoss (selected), BLMLossAlarms, BLMLossBeam, BLMLossBeamSum, BLMLossBunches, BLMLossBunchesSum, BLMLossDark, and BLMLossDarkSum. The main display area shows the path /TTF2/LONGARCHIVER/CH.00 DEVICE.INFO and the value (0) 0.

Property Server

[java News]

- Multiple ethernet cards (with no clear metric)
 - FEC_ADDRESS environment variable can specify the 'canonical' host IP address
 - myaddr.csv File can specify the 'canonical' host IP address.
 - As per C-Library

CDI News

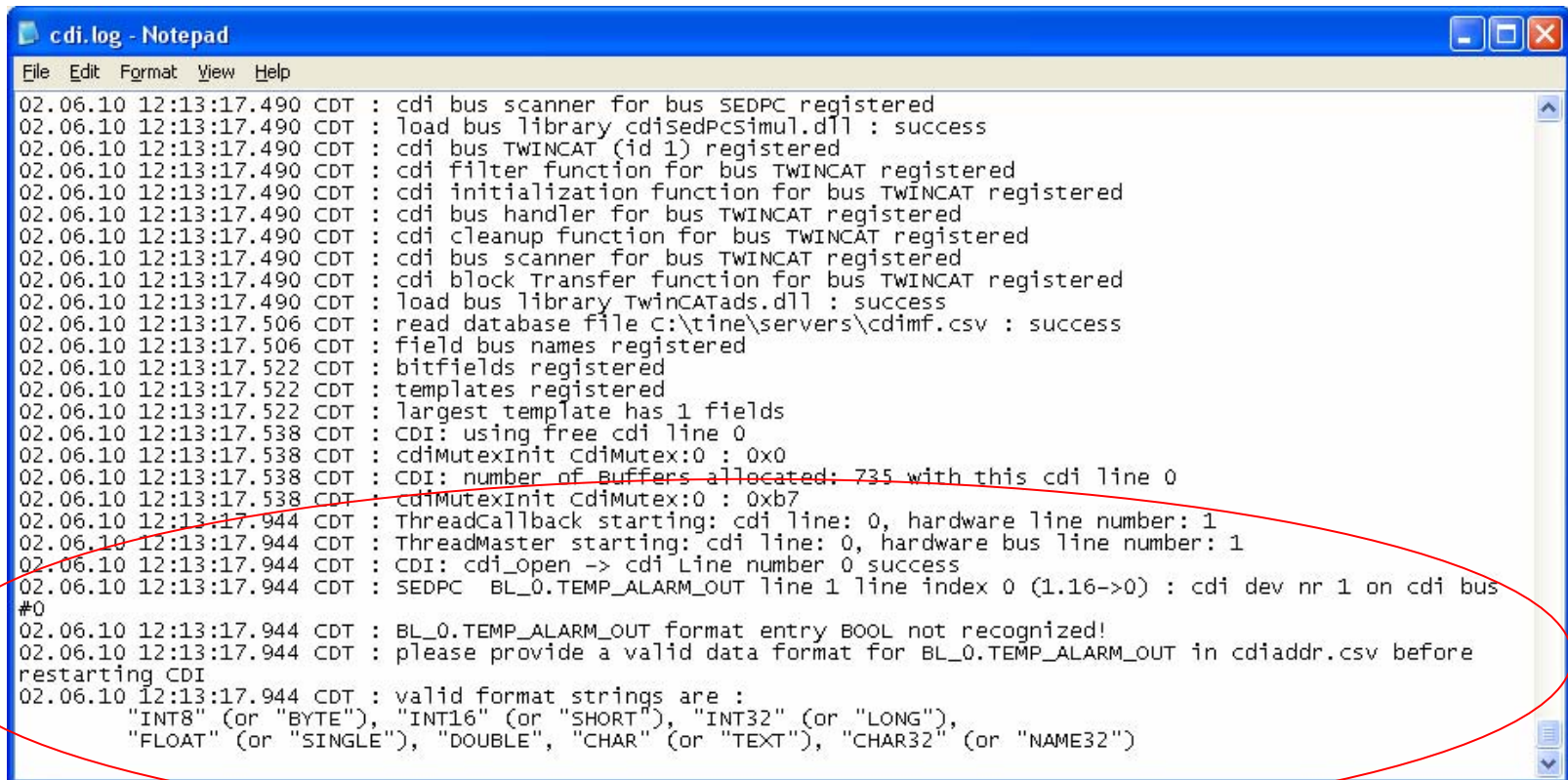
- Memory leak (on certain kinds of device errors) fixed.
- More diagnostics in log file
 - caller information supplied with device error

```
cdi.log - Notepad
File Edit Format View Help
11.06.10 10:01:40.085 CDT : SEDPC T_LM_1_S.P08 line 1 line index 122 (1.16->0) : cdi dev nr 123 on cdi bus #0
11.06.10 10:01:40.101 CDT : SEDPC T_OPTIK_MODE.P08 line 1 line index 123 (1.16->0) : cdi dev nr 124 on cdi bus #0
11.06.10 10:01:40.101 CDT : SEDPC T_PS_1_A.P08 line 1 line index 124 (1.16->0) : cdi dev nr 125 on cdi bus #0
11.06.10 10:01:40.101 CDT : SEDPC T_PS_2_A.P08 line 1 line index 125 (1.16->0) : cdi dev nr 126 on cdi bus #0
11.06.10 10:01:40.117 CDT : SEDPC T_SVK_0_RESET.P08 line 1 line index 126 (1.16->0) : cdi dev nr 127 on cdi bus #0
11.06.10 10:01:40.117 CDT : SEDPC T_SVK_1_RESET.P08 line 1 line index 127 (1.16->0) : cdi dev nr 128 on cdi bus #0
11.06.10 10:01:40.117 CDT : SEDPC T_V_0_A.P08 line 1 line index 128 (1.16->0) : cdi dev nr 129 on cdi bus #0
11.06.10 10:01:40.132 CDT : SEDPC T_V_1_A.P08 line 1 line index 129 (1.16->0) : cdi dev nr 130 on cdi bus #0
11.06.10 10:01:40.132 CDT : SEDPC T_V_2_A.P08 line 1 line index 130 (1.16->0) : cdi dev nr 131 on cdi bus #0
11.06.10 10:01:40.132 CDT : SEDPC T_V_3_A.P08 line 1 line index 131 (1.16->0) : cdi dev nr 132 on cdi bus #0
11.06.10 10:01:40.132 CDT : SEDPC T_V_4_A.P08 line 1 line index 132 (1.16->0) : cdi dev nr 133 on cdi bus #0
11.06.10 10:01:40.148 CDT : SEDPC T_V_5_A.P08 line 1 line index 133 (1.16->0) : cdi dev nr 134 on cdi bus #0
11.06.10 10:01:40.148 CDT : SEDPC TE_GESAMT_OK.P08 line 1 line index 134 (1.16->0) : cdi dev nr 135 on cdi bus #0
11.06.10 10:01:40.148 CDT : SEDPC TEXT line 1 line index 135 (1.16->0) : cdi dev nr 136 on cdi bus #0
11.06.10 10:01:40.164 CDT : SEDPC TEXT_INPUT line 1 line index 136 (1.16->0) : cdi dev nr 137 on cdi bus #0
11.06.10 10:01:40.164 CDT : SEDPC UND_STELLUNG line 1 line index 137 (1.16->0) : cdi dev nr 138 on cdi bus #0
11.06.10 10:01:40.164 CDT : SEDPC UND_F.P08 line 1 line index 138 (1.16->0) : cdi dev nr 139 on cdi bus #0
11.06.10 10:01:40.180 CDT : SEDPC V_0.STELLUNG line 1 line index 139 (1.16->0) : cdi dev nr 140 on cdi bus #0
11.06.10 10:01:40.180 CDT : SEDPC V_1.STELLUNG line 1 line index 140 (1.16->0) : cdi dev nr 141 on cdi bus #0
11.06.10 10:01:40.180 CDT : SEDPC V_2.STELLUNG line 1 line index 141 (1.16->0) : cdi dev nr 142 on cdi bus #0
11.06.10 10:01:40.196 CDT : SEDPC V_3.STELLUNG line 1 line index 142 (1.16->0) : cdi dev nr 143 on cdi bus #0
11.06.10 10:01:40.196 CDT : SEDPC V_4.STELLUNG line 1 line index 143 (1.16->0) : cdi dev nr 144 on cdi bus #0
11.06.10 10:01:40.196 CDT : SEDPC V_5.STELLUNG line 1 line index 144 (1.16->0) : cdi dev nr 145 on cdi bus #0
11.06.10 10:01:40.210 CDT : SEDPC VSE.STELLUNG line 1 line index 145 (1.16->0) : cdi dev nr 146 on cdi bus #0
11.06.10 10:01:40.210 CDT : SEDPC watch.P08 line 1 line index 146 (1.16->0) : cdi dev nr 147 on cdi bus #0
11.06.10 10:01:40.210 CDT : read database file c:\tine\servers\cdiaddr.csv : success
11.06.10 10:01:40.210 CDT : cdi is enabled to generate bus alarms on bus error
11.06.10 10:01:40.226 CDT : cdi library version : 1.00.0003
11.06.10 10:01:40.289 CDT : assign export name MCSXPDUVAL01 from environment
11.06.10 10:01:40.289 CDT : CDI export name : MCSXPDUVAL01.CDI
11.06.10 10:01:40.321 CDT : CDI remote server initialized
11.06.10 10:02:11.523 CDT : device Mydevice was not found !
11.06.10 10:02:11.538 CDT : /LOCALHOST/CDI/Mydevice RECV from caller DUVAL @ 131.169.9.107 returned device not connected
```

CDI News

Hard exit(1) (with diagnostic) when

- supplied FORMAT not parseable

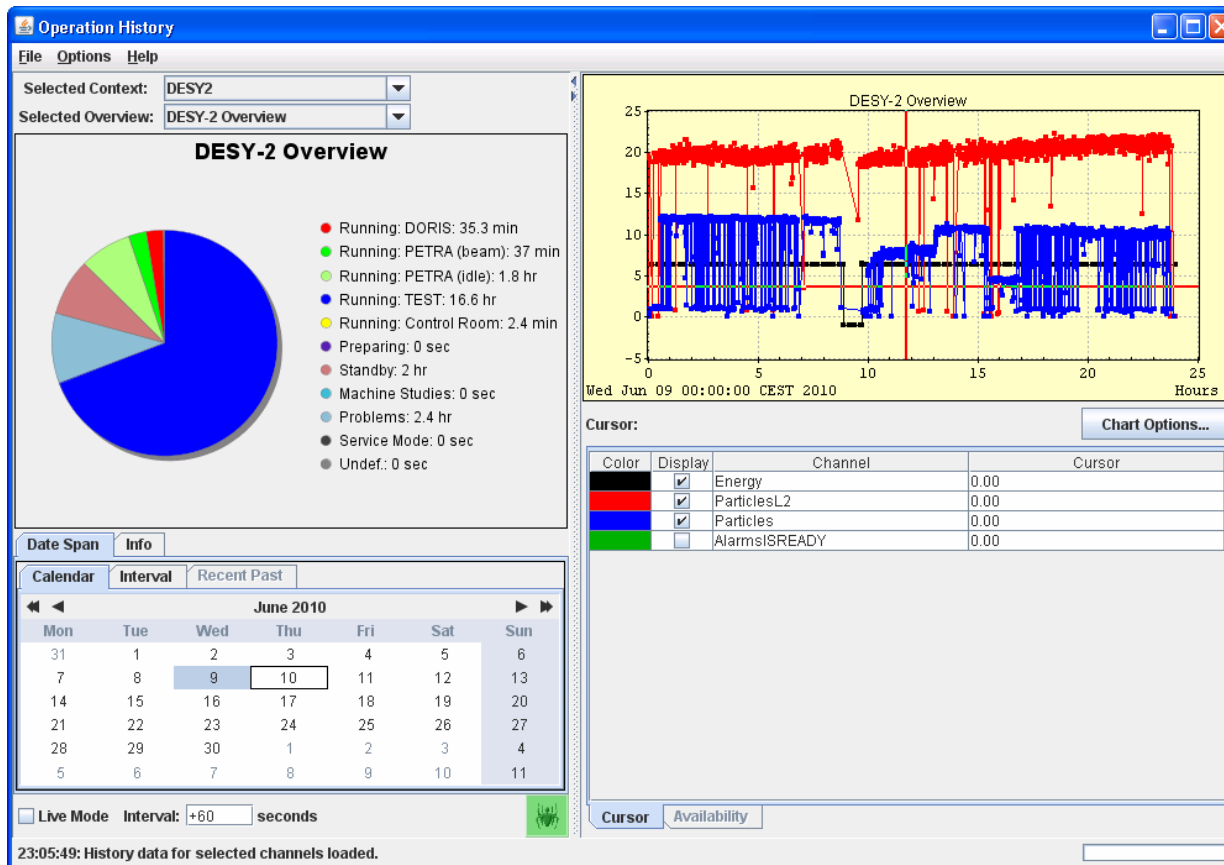


```
cdi.log - Notepad
File Edit Format View Help
02.06.10 12:13:17.490 CDT : cdi bus scanner for bus SEDPC registered
02.06.10 12:13:17.490 CDT : load bus library cdisedPcsimul.dll : success
02.06.10 12:13:17.490 CDT : cdi bus TWINGCAT (id 1) registered
02.06.10 12:13:17.490 CDT : cdi filter function for bus TWINGCAT registered
02.06.10 12:13:17.490 CDT : cdi initialization function for bus TWINGCAT registered
02.06.10 12:13:17.490 CDT : cdi bus handler for bus TWINGCAT registered
02.06.10 12:13:17.490 CDT : cdi cleanup function for bus TWINGCAT registered
02.06.10 12:13:17.490 CDT : cdi bus scanner for bus TWINGCAT registered
02.06.10 12:13:17.490 CDT : cdi block Transfer function for bus TWINGCAT registered
02.06.10 12:13:17.490 CDT : load bus library TwingCATads.dll : success
02.06.10 12:13:17.506 CDT : read database file C:\tine\servers\cdimf.csv : success
02.06.10 12:13:17.506 CDT : field bus names registered
02.06.10 12:13:17.522 CDT : bitfields registered
02.06.10 12:13:17.522 CDT : templates registered
02.06.10 12:13:17.522 CDT : largest template has 1 fields
02.06.10 12:13:17.538 CDT : CDI: using free cdi line 0
02.06.10 12:13:17.538 CDT : cdiMutexinit CdiMutex:0 : 0x0
02.06.10 12:13:17.538 CDT : CDI: number of Buffers allocated: 735 with this cdi line 0
02.06.10 12:13:17.538 CDT : cdiMutexinit CdiMutex:0 : 0xb7
02.06.10 12:13:17.944 CDT : ThreadCallback starting: cdi line: 0, hardware line number: 1
02.06.10 12:13:17.944 CDT : ThreadMaster starting: cdi line: 0, hardware bus line number: 1
02.06.10 12:13:17.944 CDT : CDI: cdi_open -> cdi Line number 0 success
02.06.10 12:13:17.944 CDT : SEDPC BL_0.TEMP_ALARM_OUT line 1 line index 0 (1.16->0) : cdi dev nr 1 on cdi bus
#0
02.06.10 12:13:17.944 CDT : BL_0.TEMP_ALARM_OUT format entry BOOL not recognized!
02.06.10 12:13:17.944 CDT : please provide a valid data format for BL_0.TEMP_ALARM_OUT in cdiaddr.csv before
restarting CDI
02.06.10 12:13:17.944 CDT : valid format strings are :
"INT8" (or "BYTE"), "INT16" (or "SHORT"), "INT32" (or "LONG"),
"FLOAT" (or "SINGLE"), "DOUBLE", "CHAR" (or "TEXT"), "CHAR32" (or "NAME32")
```

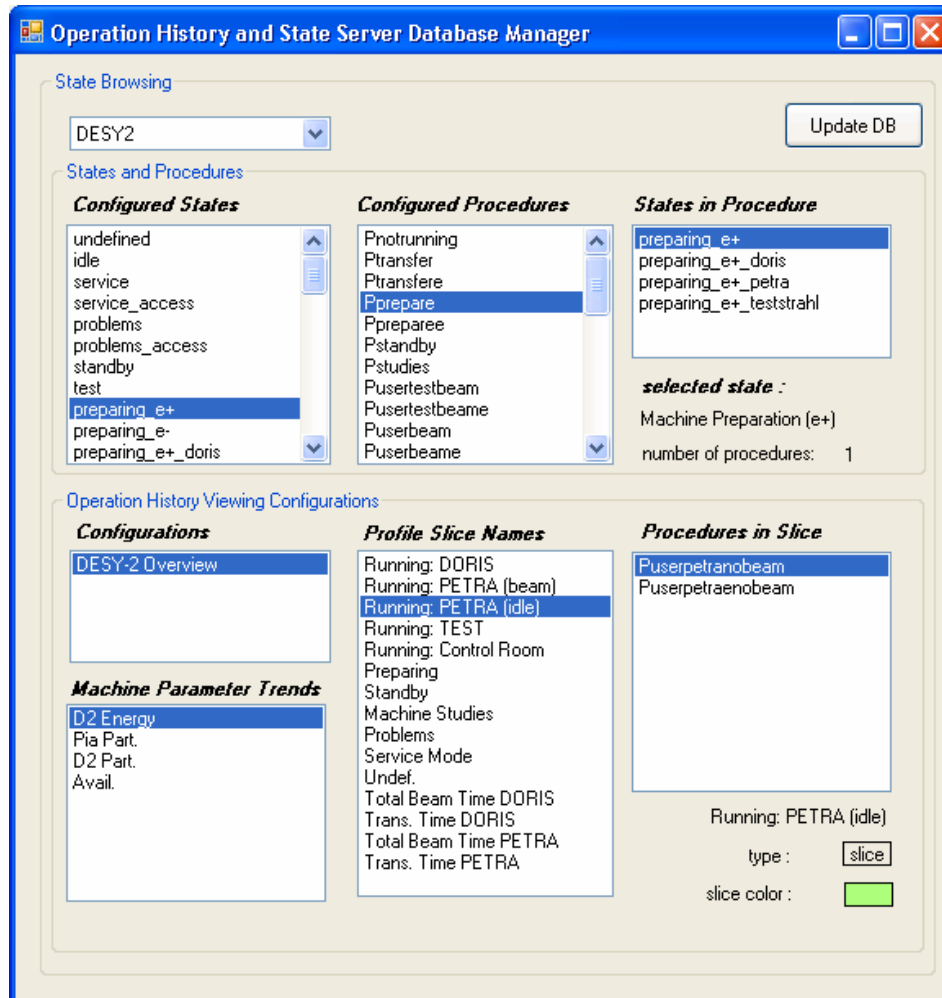
[Notes on security]

- Device, property specific security *Files*:
 - <name>-users.csv or <name>-ipnets.csv
 - **NOT** scanned on VxWorks CPUs unless NSF mount of the FEC HOME directory!
- CIDR notation
 - Currently implemented: only the last byte!
 - 131.169.64.0/18 won't work (yet)

Operation History Viewer



Operation History/State Manager



VB.NET

Reads/Configures

-State server database

-Slice Profiles

-Parameter Trends

Updates

- Archive database (if necessary)