

TINE Release 5.x.x News

(Oct 13, 2020: inching toward perfection ...)

“Remember: *Only the dead fish go with the flow ...*”



[Release 5.2.2]

- Fixes, Features, and Issues ...
 - *exotica* : a few edge cases
i.e. things that somehow managed to happen ...
 - *new features* in C and java
 - death handlers ...
 - some doocs/jddd issues
 - *new command line tool*

[Release 5.2.2]

■ C-Lib edge cases:

- `GetPropertyListStruct()` not thread-safe
 - gets info for a registered property
 - usually called often but only within the server cycle thread.
 - but: `PyTine.push_data()` call also makes use of this!
 - so: chance of a concurrency problem !
 - e.g. calling *push_data @ 10 Hz* on a python server with clients lasted ~ 1 hour or so before `!^!^*@!`
 - add mutex protection!

Thank you, FLASH
LASER guys!



[Release 5.2.2]

- **C-Lib edge cases:**

- **TCP vs. UDP** (revisited for the 100th time).

- **UDP**

- much more efficient concerning resources (you just need 2 sockets: listener and sender).
- also faster.
- BUT: no flow control and not 'reliable'.

default protocol

- **TCP**

- 1 socket (and thread) per connection (client-server pair).
- Client talks to 10 servers -> 10 sockets
- Server has 10 different clients -> 10 sockets.

- If a connection is *idle* for > 5 minutes then socket is closed.



- the (C-Lib) routine **RemoveldleConnection()** was also not thread-safe and needed a Mutex !

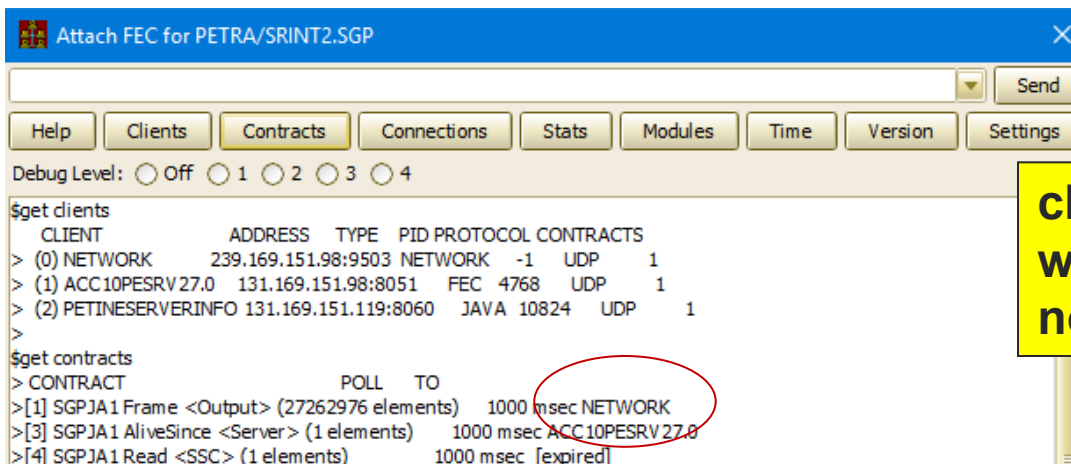
Thank you, S. Weisse!



Release 5.2.2

■ C-Lib/java edge cases: (*Network Client*)

- A client asks for (or is forced to ask for) contract results as a multicast.
 - all clients collapse to the *network client* ← and there's only one of these
 - CPU load: $O(0)$ vs. $O(1)$ (pub/sub) vs. $O(N)$ (req/rep)
- **BUT:** a client has a distinct protocol level (release 5 vs. release 4).
- old MatLab client was interfering with modern clients!



```
Attach FEC for PETRA/SRINT2.SGP
Send
Help Clients Contracts Connections Stats Modules Time Version Settings
Debug Level: Off 1 2 3 4
$get clients
CLIENT ADDRESS TYPE PID PROTOCOL CONTRACTS
> (0) NETWORK 239.169.151.98:9503 NETWORK -1 UDP 1
> (1) ACC10PESRV27.0 131.169.151.98:8051 FEC 4768 UDP 1
> (2) PETINESERVERINFO 131.169.151.119:8060 JAVA 10824 UDP 1
>
$get contracts
CONTRACT POLL TO
> [1] SGPJA1 Frame <Output> (27262976 elements) 1000 msec NETWORK
> [3] SGPJA1 AliveSince <Server> (1 elements) 1000 msec ACC10PESRV27.0
> [4] SGPJA1 Read <SSC> (1 elements) 1000 msec [expired]
```

clients with wrong protocol now get an error!



Release 5.2.2

death handlers ...

■ C-Lib: new functions

- **SetDieFunction**(void(*) (const char *) fcn)

from last time:

will call the provided function with the reason for exiting as a message string

- *address in use, invalid port, socket bind error, fec has an alias, shared memory unavailable, library wrong endian type ...*

new !

- **SetDieAnotherDay**(int value)
- **SetSufferInSilence**(int value)

relevance to
PyTine !

■ Big Idea:

- the Server is unable to *serve* !
- log the problem + **hard exit!** (a slap in the face!)
- **BUT** maybe ... you want to catch this and do your own cleanup?



Release 5.2.2

Java, .NET, Python have a **boolean** type and that's what you use in the TINE API for those languages.

- **C-Lib:** new functions
 - **SetMarshalBooleanAsByte**(int value)
 - pre-C99 : no 'Boolean' type
 - now there is!

```
#define TRUE 1
#define FALSE 0

int a = TRUE;
int b = FALSE;
printf("sizeof TRUE: %d bytes\n",sizeof(TRUE)); // it's 4 !
printf("sizeof comparison: %d bytes\n",sizeof(a == b)); // it's also 4!
printf("sizeof CF_BOOLEAN: %d bytes\n",GetFormatSize(CF_BOOLEAN)); // it's also 4

DTYPE d;
int boolArray[10];
_Bool realBoolArray[10]; ← sizeof(_Bool) = 1 !

d.dArrayLength = 10;
d.dFormat = CF_BOOLEAN;
d.data.vptr = boolArray;
// or
d.data.vptr = realBoolArray;
// ?
```

By default:
CF_BOOLEAN refers to
a 4-byte object.

But: you can still have it
your way in the code
you write in C/C++ !

Thank you, Karol!



[Release 5.2.2]

■ C-Lib/java :

- property handler called in its own thread
 - **SetCallPropertyInSeparateThread()** (C-Lib) or
 - **TExportProperty.setRunInSeparateThread()** (java) or
 - some Stock/Meta properties (e.g. **.HIST** calls).
- now return **not_posted** if the call does not complete within the timeout specified.

In such cases, the caller will see **not_posted** instead of a **link_timeout** !

Thank you, Mark!



[Release 5.2.2]

- **All platforms**

- *watched* alarms now allow specific alarm codes, tags, and severities for
 - high, warn_high, low, warn_low threshold violations.
- default alarm codes :
 - value_too_high, warn_too_high, value_too_low, warn_too_low.
- **BUT**: alarms belong to a device!
 - e.g. two different watched property values too high for the same device
 - property shows up in the tag ... but the alarm itself appears to oscillate or have data changes when it really doesn't!

LOCALNAM	DEVICENAM	PROPERTY	SIZE	FORMAT	SEVERITY	HIGH	LOW	HIGHWARN	LOWWARN	ALARM_CODE_HIGH	ALARM_CODE_HIGHWARN
SINEQM	SineGen0	Amplitude	10	float.CHANNEL	10	600	10	500	30	519	518
SINEQM	SineGen0	Frequency	10	float.CHANNEL	10	20	0	15	0	517	517



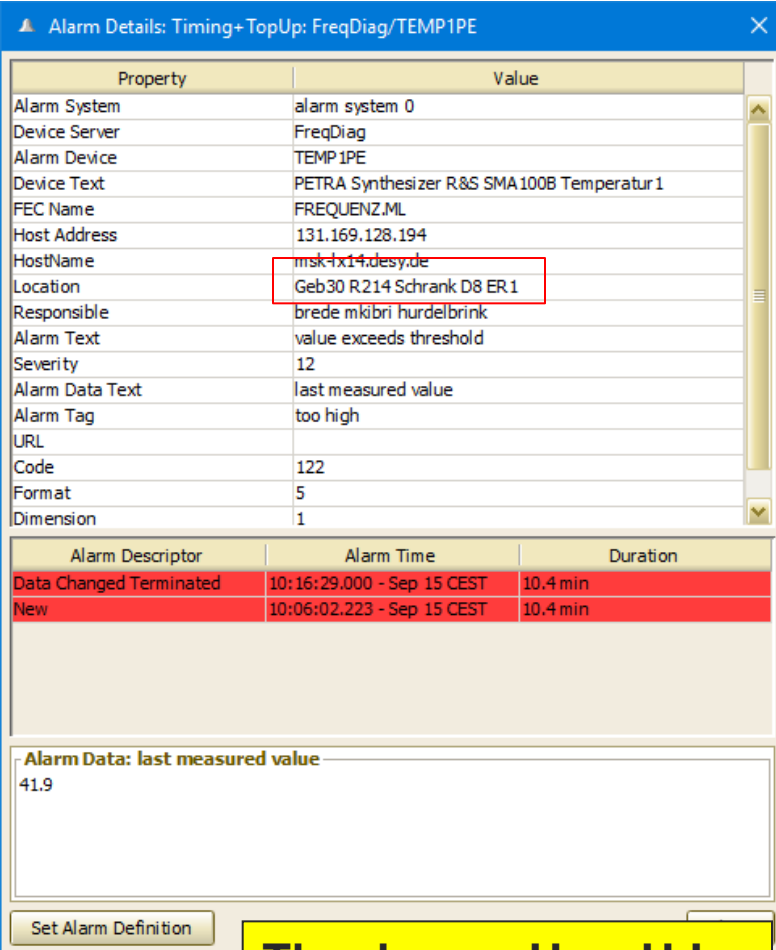
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And ...

Archive Viewer will attempt to use the value of Stock Property **“DEVLOCATION”** in the details panel.

Note:

If not set then **“DEVLOCATION”** will return the contents of **“SRVLOCATION”**



Alarm Details: Timing+TopUp: FreqDiag/TEMP1PE

Property	Value
Alarm System	alarm system 0
Device Server	FreqDiag
Alarm Device	TEMP1PE
Device Text	PETRA Synthesizer R&S SMA100B Temperatur 1
FEC Name	FREQUENZ.ML
Host Address	131.169.128.194
HostName	mstk-tx14.desy.de
Location	Geb30 R.214 Schrank D8 ER 1
Responsible	brede mkibri hurdelbrink
Alarm Text	value exceeds threshold
Severity	12
Alarm Data Text	last measured value
Alarm Tag	too high
URL	
Code	122
Format	5
Dimension	1

Alarm Descriptor	Alarm Time	Duration
Data Changed Terminated	10:16:29.000 - Sep 15 CEST	10.4 min
New	10:06:02.223 - Sep 15 CEST	10.4 min

Alarm Data: last measured value
41.9

Set Alarm Definition

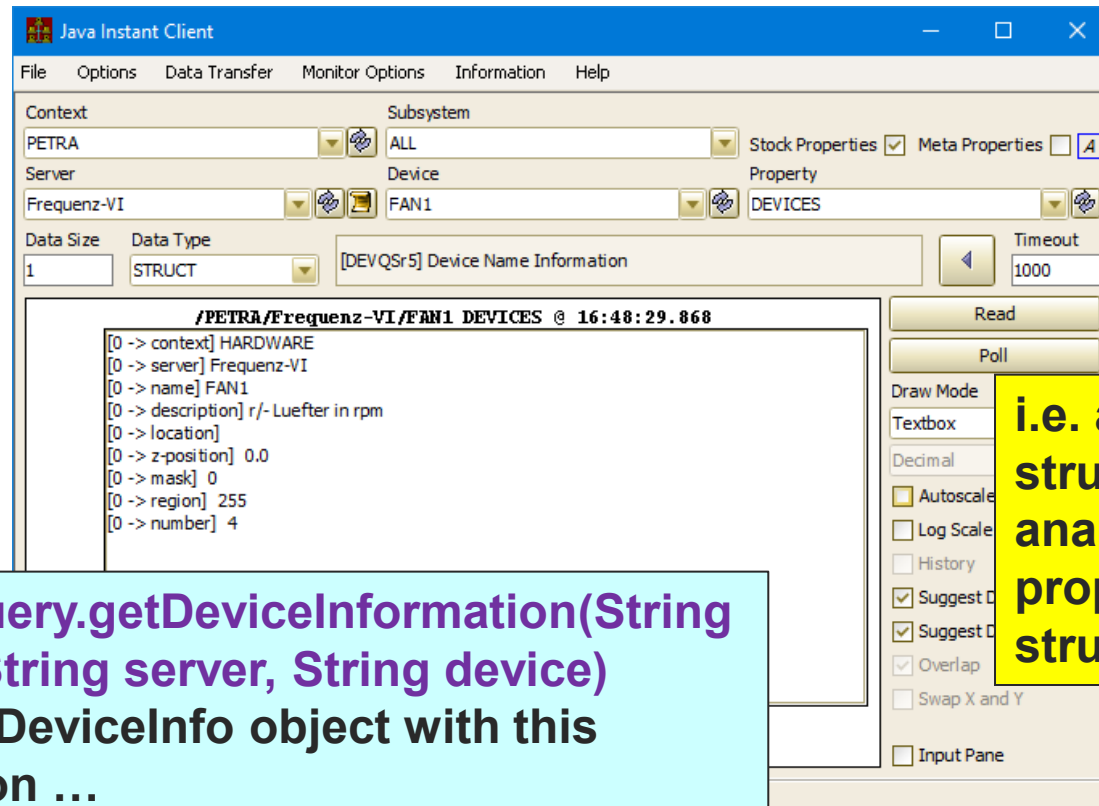
Thank you, Uwe H.!



Release 5.2.2

■ All platforms:

- new stock property overload for **DEVICES**



Java: `TQuery.getDeviceInformation(String context, String server, String device)` returns a `DeviceInfo` object with this information ...

i.e. a device query structure analogous to a property query structure .

[Release 5.2.2]

- **All platforms:** (sticking with Alarms ...)
 - new automatic alarm for *low main memory*
 - If a threshold has been set via
 - API call `SetAvailableMemoryThreshold()` or
 - environment: `FEC_MINIMUM_FREE_MAINBLOCKS`
 - automatic alarm threshold for *low disk space* can now also be set via environment :
 - `FEC_MINIMUM_FREE_DISKBLOCKS`
in addition to the API call `SetFreeBlocksAlarmThreshold()`
 - new routines: `Get/SetAllowOfflineAlarms()`
 - If `false` (default) and device *off-line* then no alarm !



[Release 5.2.2]

A very short review

- **All platforms:** (sticking with Alarms ...)
 - What are *automatic* alarms ?
 - A server will automatically set a (*warning*) alarm when
 - a *link error* occurs
 - alarm data = link key
 - synchronous command error -> transient alarm
 - a *file error* occurs
 - alarm data = file name (log file or local history)
 - almost *out of disk space* occurs
 - alarm data = threshold and current value
 - almost *out of main memory* occurs
 - alarm data = threshold and current value
 - **CAS** will automatically set an alarm when
 - configured server is *not responding*
 - *cycle number is stale* (from the **CYCLER** server)
 - *invalid epoch* occurs
 - server's current timestamp is more than 6 months ago!
 - e.g. **VxWorks** could claim Jan. 1, 1970, **ELINOS** could claim it's sometime in 2003



[Release 5.2.2]

- **All platforms: RegisterErrorCode():**

- **C:** RegisterErrorCode(int code, char *msgShort, char *msgLong)
- **Java:** TErrorList.registerErrorCode()

- **the point:**

- standard error code comes with a canonical message text.
- e.g. **access_denied** => “access denied”
- You can change this (and for the past many years).

```
if (!isAdministrator(usr))
{
    sprintf(daqUpdateErrStr,"access denied: user %.16s is not an administrator",usr);
    SetEqmCompletion(HSTEQM_NAME,daqUpdateErrStr);
    return access_denied;
}
```

[Release 5.2.2]

- **All platforms: RegisterErrorCode():**
 - you can invent your own error code (512 or higher)
 - if no call to *SetEqmCompletion()* inside the handler then the caller sees:
 - “Error: 512” as the message text.
- Now you can register your own error code with a short and long message text!
 - and use Stock Property **SRVERRORTTEXT** to query it.
- More to come when we cover **PyTine** changes ...



[Release 5.2.2]

- **All platforms:**
 - **SetAutoRemoveUnsynchronizedHistories()**
 - or environment variable
TINE_HISTORY_AUTOREMOVE_UNSYNCHRONIZED
 - If **true** then check the *devices manifest* for Multi-Channel Array (**MCA**) integrity at local history initialization !
 - The Issue:
 - History of e.g. all Vacuum Pressures as an MCA.
 - Someone inserts/removes a device in the middle and restarts the server.
 - **Central Archiver** : *no problem*. It knows what the channel names were then and what they are now.
 - **Local History**: *big problem* ! The 'someone' should flush the current local history data or there will be channel mismatches !
 - If *AutoRemove* is **true** this flush will happen automatically!

Thank you, Thomas and Thorsten !



Release 5.2.2

- **All platforms:**
 - and by the way, there's now a devices *manifest*
 - and a properties *manifest* !
- A TINE host has an address cache and FEC *manifest* located in
 - %SystemDrive%\tine\cache (windows) or
 - /var/lib/tine/cache (linux/mac/solaris)
- An individual server's manifest files are now found in <EQM>\cache or <EQM>/cache. e.g. :

```
fecadmin@acclxpesrv1:/export/tine/server/p04comb/bin$ ls
CMBEQM      combobulate.csv          combobulate.csv-18-04-20  error.bak  fec.bak  messages.log  serverlog.log
combobulate combobulate.csv-02-06-20  commands.log              error.log  fec.log  restart       update
fecadmin@acclxpesrv1:/export/tine/server/p04comb/bin$ cd CMBEQM/
fecadmin@acclxpesrv1:/export/tine/server/p04comb/bin/CMBEQM$ ls
cache  followers.csv
fecadmin@acclxpesrv1:/export/tine/server/p04comb/bin/CMBEQM$ cd cache/
fecadmin@acclxpesrv1:/export/tine/server/p04comb/bin/CMBEQM/cache$ ls
devmf.csv          Monitor.PollingInterval-members.csv  Position-members.csv  Values-members.csv
EnergyMean-members.csv  Monitor.StartAll-members.csv        Pressures-members.csv
Monitor.Options-members.csv  Monitor.StopAll-members.csv         prpmf.csv
fecadmin@acclxpesrv1:/export/tine/server/p04comb/bin/CMBEQM/cache$ █
```



[Release 5.2.2]

■ C-Lib:

- new console command: *get memory*:

```
fecadmin@acclxpebpm:/export/tine/server/lbrbpm$ attachfec LBRESRV
Remote session established
get memory
>Current memory usage : 2687.582 MB
>
```

n.b. 'top' and 'wctrl' only check every few seconds.

■ Java:

- TQuery.getServerCommands(String context, String server, int depth)
 - retrieves most recent commands sent to server (from commands.log)
 - potential use in MstApp status bar? See Acop.NET status bar and TINE RESTful.



[Release 5.2.2]

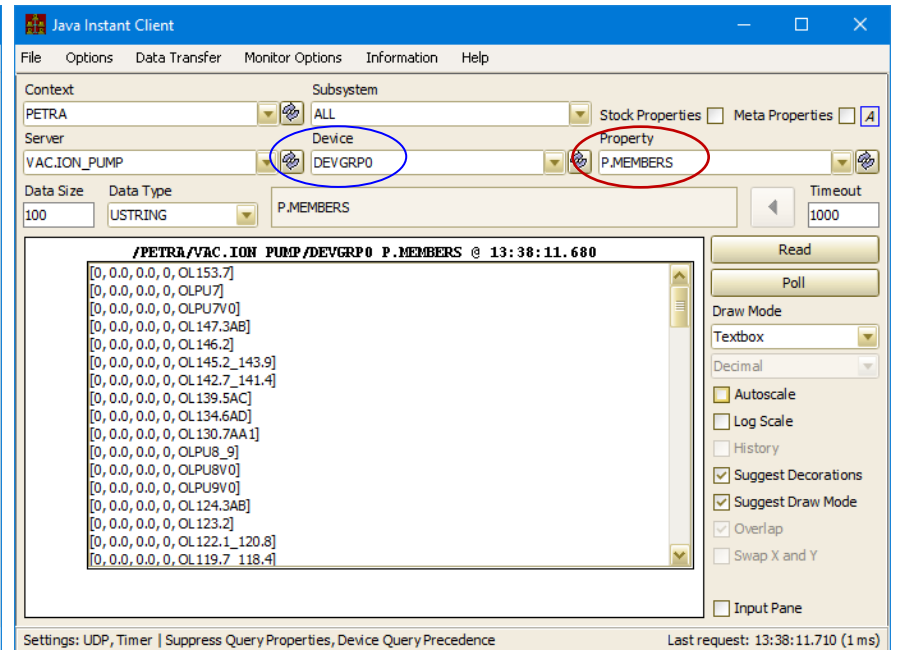
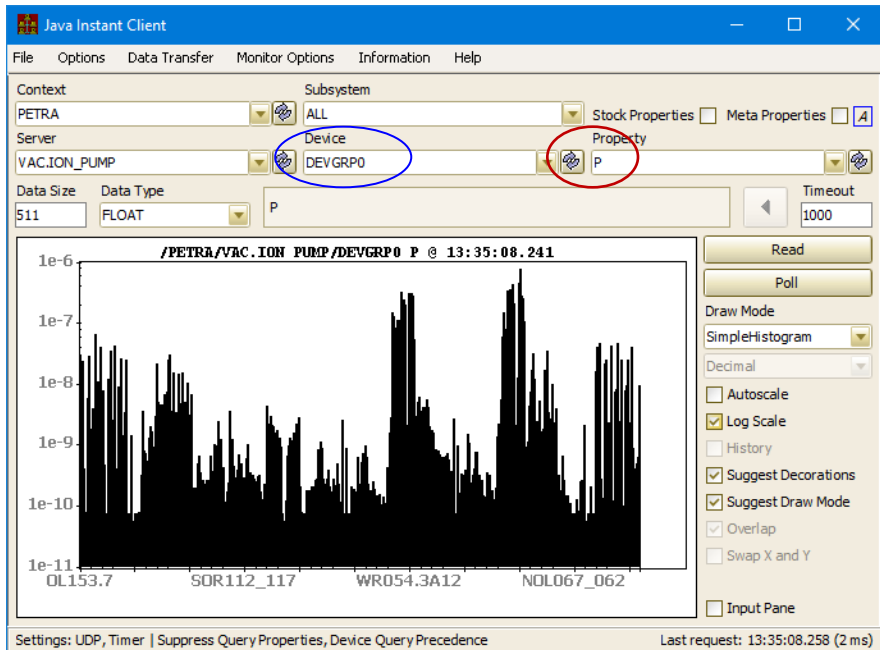
- doocs/jddd issues
 - C/C++ : libdoocs now linked with libtine.so (i.e. Release 5.2.2)
 - Collisions with
 - enum status codes:
 - device_offline, device_error
 - typedef struct GSPECTRUM
 - Resolved via
 - namespace tine { #include "errors.h" }
 - => GSPECTRUM now DGSPECTRUM



[Release 5.2.2]

doocs/jddd issues

mapping **MCA** members in a local history call to a **DEVGRP** device now works just fine!



Release 5.2.2

add many servers to
a CAS with a script !

■ New command line utility: **taddtocas**

```
Command Prompt
H:\>taddtocas

Adds a server to the indicated central alarm server

Usage : taddtocas <context> <device server> /system=<alarm system> [/action=mailto:<address> /action-trigger:<event> /
action=annotate:<keyword> /code=<alarm code> /remove=<TRUE>]

<device server> can either be prefixed with the server's context or not, in which case the CAS
context will be assumed.
The 'system' option must be given to specify which alarm system the added server should belong to
You can add multiple 'action' options (e.g. multiple emails and/or events or annotations)
However, when actions are provided, then the 'code' option must also be provided so as to
indicate which alarm code should trigger the specified action(s)
An 'action' option must be prefixed with one of 'mailto:', 'trigger:', or 'annotate:'
The 'remove' option (set = TRUE) can be used to removed a server from the CAS. Note that the
'system' option must also be specified so as to properly identify the server entry in the CAS database.

e.g.
taddtocas SITE /SERVICE/WD_ACCLXSERVER1 /sys=Infrastructure

or
taddtocas SITE /SERVICE/WD_ACCLXSERVER1 /sys=Infrastructure /action=mailto:Donald.Trump@Skidrow.com /code=512

or
taddtocas SITE ARCHIVER /sys=Infrastructure /action=mailto:Donald.Trump@Skidrow.com /code=999

Finally: make sure to issue a 'RESET' command to the CAS so as to instruct it to re-read its database.

e.g.
tsend /SITE/CAS RESET

Also note that you must be a recognized CAS administrator to successfully use this tool.

H:\>_
```

