## **TINE Release 5.x.x News**

(Sep. 19, 2019: That was the year that was !)

"What a long, strange trip it's been ...."

- Last Release 4 release: 4.6.3.
- Release 4 issues
  - As discussed in collaboration Meeting 2012 ...
  - IPv6 functional in 4.6.3
  - Additional information in protocol headers
    - Client Request Header
      - o pid
      - o user type
      - specific version fully identified
      - message size -> int32 vs. int16
      - endianess
      - character encoding

#### Release 4 issues (continued)

- Additional information in protocol headers (continued)
  - Server Response Header
    - o size in elements
    - contract data size (data format already there)
      - aids in resolving CF\_DEFAULT
    - message size -> int32 vs. int16
    - o endianess
    - character encoding

#### Release 4 issues (continued)

- compatibility with C++ (and STL or MFC)
  - (obviously not relevant for java)
- explicit format codes for ...
  - CF\_UINT8, CF\_UINT16, CF\_UINT32, CF\_UINT64
- o auto re-sizing of client side connection table
  - (but not for VxWorks)
- o refactoring
  - some rationalization of variable names
  - so that the core team can trudge through the code more easily.

#### New Headers => New Major Release!

- Old and New must be able to interact seamlessly!
  - R4 client <-> R5 server
    - will speak R4 and the server understands that !
  - R5 client <-> R4 server
    - o either learns from the ENS that it should speak R4
    - o rreceives 'illegal\_protocol' and backs off.
  - And don't forget R5 client <-> R5 server …

#### Notes:

- New headers in place
  - 'header size' field => extensible in theory
  - So far:
    - o endianess still fixed as *little endian* 
      - so big endian guys are still always swapping
    - o encoding still fixed as ascii
      - property data can do what it wants but
      - address names, etc. are still ascii

#### Solutions ...

- IPv6 is in place (as of 4.6.3)
  - dual stack if both supported
  - ethernet card can still prefer IPv4

fecadmin@mcslxterm01:/export/tine/server/gens/bin\$ attachfec FECSIM.MSTR Remote session established get clients						
>		CLIENT	ADDRESS TYP	E PID	PROTOCOL	CONTRACTS
$\geq$	(O)	mcslxterm01.20	::ffff:131.169.9.38 8051 FE	C 9337	UDP6	1
>	(1)	TSTCASFEC	::ffff:131.169.9.38 8071 FE	C 9257	UDP6	1
>	(2)	TSTMARCH	::ffff:131.169.9.38 8053 FE	C 9197	UDP6	7
>	(3)	RGGLOBALSRV	::ffff:131.169.153.213 8063 FE	C 25347	UDP6	1
$\geq$	(4)	FECSIM.MSTR	::ffff:131.169.9.38 8056 FE	C 9435	UDP6	1
$\mathbf{A}$	(5)	DUVAL	::ffff:131.169.9.38 8080 CMDLI	IE 9455	UDP6	1
γνν	(4)	FECSIM.MSTR	::ffff:131.169.9.38 8056 FE	C 9435	UDP6	

## Solutions ...

- o pid and application type now available at the server side ...
- o can trap work-around logic based on application type ...

BLM Server					- • ×	
≻ >get clients					^	
CLIENT	ADDRESS	ТЧРЕ	PID	PROTOCOL	CONTRACTS	
> <0> PEFECSTATS	131.169.151.233:8067	FEC	17782	UDP	1	
> (1) AccW7PeSrv23.0	131.169.151.129:8051	FEC	4772	ŪDP	1	
> <2> PECASFEC	131.169.151.233:8063	FEC	17760	UDP	2	
> <3> PEMARCH	131.169.151.32:8053	LEGACY	Ø	UDP	1 1	
> <4> TSTMARCH	131.169.9.38:8053	FEC	9197	UDP	1	
> <5> PEMARCH.SLAU	131.169.75.70:8053	LEGACY	Ø	UDP	1	
> <6> DUVAL	131.169.9.205:8056		18380	UDP	1	
> <7> DUVAL	131.169.9.205:8068	Acop.NET	25760	UDP	7	
						1
>get clients	*******					1
CLIENT	ADDRESS	TYPE			CONTRACTS	
> (Ø) PEFECSTATS	131.169.151.233:8067	FEC	17782	UDP	1	
> (1) AccW7PeSrv23.0	131.169.151.129:8051	FEC	4772	UDP	1	
> (2) PECASFEC	131.169.151.233:8063	FEC	17760	UDP	2	
> (3) PEMARCH	131.169.151.32:8053	LEGACY	0	UDP	1	
> (4) TSTMARCH		FEC	9197	UDP	1 1	
> (5) PEMARCH.SLAU	131.169.75.70:8053	LEGACY	40200	UDP		
> (6) DUVAL > (7) DUVAL	131.169.9.205:8056 131.169.9.205:8068	PyTine	18380 25760	UDP UDP	<b>1</b> 7	
> (8) DUVAL	131.169.9.205:8068	Acop.NET JAVA	25760	UDP	1	
CON DOAHT	131.107.7.205.8050	ОНОН	17700	UDF	T	
K .					-	-

#### Solutions ...

The 'CF\_DEFAULT' problem

Client says: I've got 128 bytes and I'll take whatever data type you want to send ...

Server says: Here's a Text string with 15 characters Client now thinks: the contract should be for 15 text characters ...

- Release 4 returned the data type and some number of bytes
- Release 5 returns the data type and the proper contract size (64 bytes and not 15 !)

### Solutions ...

- Much fewer macro #defines
  - e.g. out\_of\_range is now part of an enum
  - no more clashes with STL or MFC.
- C++
  - Can make use of a namespace wrapper or not ...

```
namespace tine
{
   #include "tine.h"
}
```

```
int cc = tine::link_not_open;
cc = tine::TErrorList::link_blacklisted;
int f = tine::TFormat::CF_BITFIELD64;
tine::DTYPE dout;
DTYPEZER0(dout);
int bfmt = BFMT(tine::CF_FLOAT);
printf("error string : %s\n", tine::cc2str(cc));
printf("dout fmt : %s\n", tine::GetFormatAsString(dout.dFormat));
tine::SystemInit(TRUE);
tine::RegisterEquipmentModule("MyServer", "MYEQM", 1, NULL, NULL, NU
```

 Command line tools with more explicit error messages ...

tget /TEST/ABCDF/device66 Property23 attempted tget: target server = "/TEST/ABCDF/device66" property = "Property23" (format: DEFAULT, size: 0)

Error: the requested target address could not be found (request will be blacklisted)

```
tget /PETRA/VAC.ION_PUMP/OL153.77 P
attempted tget: target server = "/PETRA/VAC.ION_PUMP/OL153.77"
property = "P" (format: DEFAULT, size: 0)
```

Error: requested property is not exported by the server or service (request will be blacklisted)

#### Solutions

- O NEW routine: SetAllowAutoGrowConnectionTable(true/false)
  - default = true
  - still a good idea to fix this at startup
  - not available for VxWorks …
- access denied: more explicit info

access denied ...

o more explicit information

tputget /TEST/SineServer/SineGen7 Amplitude 444.3 attempted tputget: target server = "/TEST/SineServer/SineGen7" property = "Amplitude" (format: double, size: 1)

Error: call was refused by the security subsystem

Java Instant Client						
File Options Data Transfer Monitor Options Information Help						
Context Subsystem	Write Access					
TEST 🛛 🖉 ALL 🔽 Stock Properties 🗌 Meta Properties 🗌 🕖	Input Data Type					
Server Device Property	FLOAT					
SineServer SineGen0 Maplitude	555					
Data Size     Data Type       1     FLOAT       Image: Sine Curve Amplitude         Timeout       1000						
/TEST/SineServer/SineGen0 Amplitude @ 16:40:28.451 Write & Read						
(0,0) access denied: user DUVAL refused access Poll						
Draw Mode						
Textbox						
Decimal						
Autoscale						
Log Scale						
History						
Suggest Decorations						
Suggest Draw Mode						
V Overlap	Post-Fix (TEXT Input)					
Input Pane	None ○ LF ○ CR ○ LF					
Settings: UDP, Timer   Suppress Query Properties, Property Query Precedence Last request: 16:40:33.926 (1 ms)						

- Longstanding 'permissions' problem with cache and manifest files on linux/mac ...
  - o /var/lib/tine/cache/
    - All files need to be written with everyone allowed !
    - Problem with e.g. tget + local repeater when local repeater started from a different user !

### Stock Property SRVLOGFILES

#### Overloaded with format NAME64I

Instant Client	- <b>- X</b>	
File Options Data Transfer Monitor Options Information Help		
Context Subsystem		
TEST 🛛 🖉 ALL 🔽 Stock Properties	Meta Properties 🗌 📕	
Server Device Property		
SineServer SRVLOGFILES	<b>~</b>	
Data Size     Data Type       32     NAME64I   get log file list + file lengths	Timeout 1000	
/TEST/SineServer/SineGen0 SRVLOGFILES @ 16:45:56.565	Read	
(0,0) [alias.csv, 31] (0,1) [exports.csv, 213] (0,2) [feid.csv, 156] (0,3) [history.csv, 585] (0,4) [hstmf.csv, 126] (0,5) [messages.log, 10027] (0,6) [regionrules.csv, 47] (0,7) [error.log, 50468] (0,8) [LabuddaReadingFileByTineChar.txt, 184] (0,9) [fec.log, 150002] (0,10) [cshosts.csv, 283] (0,11) [serverlog.log, 6256] (0,12) [commands.log, 67911] (0,14) [LabuddaReadingFileByTine.txt, 184]	Read Poll Draw Mode Textbox Decimal Autoscale Log Scale History Suggest Decorations Suggest Draw Mode Overlap	
	Input Pane	
Settings: UDP, Timer   Suppress Query Properties, Property Query Precedence Last	request: 16:45:57.154 (2 ms)	

File name and Size in bytes ...

#### Stock Property SRVLOGFILE

- Overloaded with format Int32 : gives current file size
- Sets timestamp to last modified time.

🙀 Java Instant Client	- <b>- X</b>				
File Options Data Transfer Monitor Options Information Help					
Context Subsystem					
	Meta Properties 🗌 🖌				
Server Device Property					
SineServer					
Data Size     Data Type       32000     TEXT   get specific log file	Timeout 1000				
/TEST/SineServer/LabuddaReadingFileByTineChar.txt SRVLOGFILE	Read				
time stamp: 2018-Aug-30 09:18:18.000 (0,0) The quick brown fox jumps over the lazy dog. The hound takes no notice and sleeps like a log	Poll				
(c))) The quick of own flow jumps over the lazy dog. The hound takes no house and skeps like a log	Draw Mode				
	Textbox				
	Decimal				
	Autoscale				
	Log Scale				
	History				
	Suggest Decorations				
	Suggest Draw Mode				
	V Overlap				
	Input Pane				
Settings: UDP, Timer   Suppress Query Properties, Property Query Precedence Last request: 16:47:25.396 (3 ms)					

### Upgrade strategy

- As much testing with Unit Servers as possible
  - R5 Unit Client with R4 Unit Server
  - R4 Unit Client with R5 Unit Server
- Adiabatic testing during Machine Studies
  - (I owe Gajendra several rounds of his favorite beverage ...)
  - several .... hiccups ...

Ο

- Long standing bug found related to large TCP/IP transfers
  - Client to server as input !
    - R4 : response header is only the 1<sup>st</sup> two bytes
    - R5: response header is now 48 bytes.
    - Need the get the complete header before knowing how big the entire message is.
      - R4: It's possible to just get 1 byte of the 1<sup>st</sup> two but this almost never happens
        - S. Weisse could see this happening on the client receiving large data sets from server ...
        - Ancient bug from the ISOLDE days, but fixed server -> client several years ago.
        - Alas: not properly fixed client -> server !
        - R5: it's much easier not to get all of the 48 bytes in the header.

#### Remember: TCP is a stream and not a datagram ...

Jaka's calendar server ...

#### Forgotten logic bug ...

- MCA single-element coercion came into being @ Release 4.0.11
  - R4 header carried the protocol level in 1 short
    - and thus can infer Release 4.
  - can carry the minor release and revision in another
    - And thus can infer 0 and 11 and test: *is* >= 4.0.11
- Unfortunately :
  - 5 > 4 but
  - 0.0 < 0.11
- As of build id 5509:
  - Server: just test if >= Release 4
  - Client: send minor release = revision = 99 to any Release
     4 server ...

#### No real changes in the API

- But always a good idea to recompile anything that uses tine headers.
- Lessons learned
  - A few new unit tests in the Unit Server
    - There now a java Unit Client but
    - No Unit Server ! (anybody?)
  - When you shake things up, you might alter the time signature a bit and expose race conditions that were otherwise never an issue ...

# Acop.NET status Lots of new Acop.NET controls ...