



Tip of the Month :

- How to use the Local and Central Alarm Servers

revisit “Tip of the Week” from March 28, 2008

[TINE Alarms

(a short review)

- An alarm belongs to a 'device'
- An alarm has a timestamp
 - Last alarm signal
- An alarm has a start time
 - First alarm signal
- An alarm has a code
 - defines the alarm
- An alarm can have data
 - Up to 64 total bytes (any format)

- Alarm identified by
 - `/context/server/device + code + starttime`

[TINE Alarms]

- An alarm can be persistent
 - Always there (until someone takes care of it)
 - e.g. hardware readout error
- An alarm can be transient
 - A change of state from okay to not okay
 - e.g. beam dump, quench, RF trip
- An alarm can be oscillating
 - There for a while then not there then back again.
 - e.g. intermittent hardware error (a flickering sedac error).

[TINE Alarm Definition]

- Alarm Code cross references static alarm information
 - Severity
 - (Release 4.0: can override dynamically !)
 - System ID
 - Usually = 0 (=> let the CAS decide which system)
 - Tag
 - Short description of alarm
 - Alarm Text, Device Text, Data Text, url
 - Data Type and Size

[TINE Alarm Severities]

- Range of 0 to 15
 - 0 = test alarm
 - 15 = you can't possibly have operations unless you fix this
 - Typically:
 - 0 => not really an alarm (not handled at CAS)
 - 1 – 6 => information (not archived)
 - 7 – 12 => warning
 - > 12 => fatal

The New Alarm Viewer :

Alarm Viewer: DESY2

File View Options Navigate Help

Fatal: 0
Error: 6
Warning: 507
Alarm Display: Live Archive

Fri Dec 1... Warning Severity >= 0 Selected/Total No. of Alarms: 513/513 Active Alar

Magnete	0 0 0	Kicker-Septa	11 0 6 0	Kontrollen	0 0 0
H.Korrekt.Mag.	0 0 39	Peaking-Strip	0 0 200	Front-End	0 0 32
V.Korrekt.Mag.	0 0 0	Temperaturen	0 0 0	Diagnose	0 0 0
HF	0 0 36	Piloth-Wasser	0 0 0	Interlock	0 0 0
AM-Gen.	0 0 0	Targets	0 0 0	Strahlung	0 0 0
Chopper	1 0 0 200	Timing	0 0 0	Vakuum	0 0 0
				Schirmonitore	0 0 0

Calendar Interval Recent Past

December 2010

Mon	Tue	Wed	Thu	Fri	Sat	Sun
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

Alarm Count

The number of alarms with Severity >= 0

513

System	Device Name	Message	Sev	Alarm Descriptor	Alarm Time	Duration
H.Korrekt.Mag.	H44	PS IST-SOLL WARNUNG	4	New	07:13:00.333 - Dec 17 C...	4.2 min
Chopper	BIAS	Spannung Soll / Istabwe...	8	Terminated	07:11:44.000 - Dec 17 C...	2.0 min
Chopper	BIAS.Uls	Hardware error	8	Terminated	07:11:22.802 - Dec 17 C...	1.3 min
Chopper	BIAS.Uls	Hardware error	8	New	07:10:02.350 - Dec 17 C...	1.3 min
Chopper	BIAS	Spannung Soll / Istabwe...	8	New	07:09:39.616 - Dec 17 C...	2.0 min
Chopper	T2G1.UIDSet	Hardware error	8	Terminated	07:02:15.637 - Dec 17 C...	1.3 min
Chopper	T2G1.UIDSet	Hardware error	8	New	07:00:55.730 - Dec 17 C...	1.3 min
HF	DEVICE 0	DESY2	5	Heartbeat	06:54:57.489 - Dec 17 C...	22.3 hr
Chopper	HV1.UASet	Hardware error	8	Terminated	06:53:55.472 - Dec 17 C...	1.3 min
Chopper	HV1.UASet	Hardware error	8	New	06:52:35.315 - Dec 17 C...	1.3 min
Chopper	T1G2.IDSet	Hardware error	8	Terminated	06:51:11.427 - Dec 17 C...	1.3 min
Kicker-Septa	Kicker2_Plnj	Triggerfrequenz	9	Terminated	06:49:52.000 - Dec 17 C...	2 sec
Chopper	T1G2.IDSet	Hardware error	8	New	06:49:51.426 - Dec 17 C...	1.3 min
Kicker-Septa	Kicker2_Plnj	Triggerfrequenz	9	New	06:49:49.826 - Dec 17 C...	2 sec
Chopper	HV2	Spannung Soll / Istabwe...	8	Terminated	06:44:10.000 - Dec 17 C...	2.0 min
Chopper	HV1.UASet	Hardware error	8	Terminated	06:42:57.277 - Dec 17 C...	1.3 min
Chopper	HV2	Spannung Soll / Istabwe...	8	New	06:42:05.621 - Dec 17 C...	2.0 min
Chopper	HLIDSet	Hardware error	8	Terminated	06:42:00.262 - Dec 17 C...	1.3 min
Chopper	HV1.UASet	Hardware error	8	New	06:41:38.214 - Dec 17 C...	1.3 min
Chopper	HLIDSet	Hardware error	8	New	06:40:40.433 - Dec 17 C...	1.3 min

12:00:48: Alarms loaded.

[The New Alarm Viewer :]

Alarm Details: Chopper: Chop.CDI/HV2.UASet

Property	Value
Alarm System	Front-End
Device Server	Chop.CDI
Alarm Device	HV2.UASet
Device Text	device
FEC Name	d2chopperHw
Host Address	131.169.154.212
HostName	AccXpD2R1c.desy.de
Location	bldg 30 rm 102 IE-R1 (Sw/8)
Alarm Text	general hardware error
Severity	8
Alarm Data Text	hardware device description
Alarm Tag	Hardware error
URL	
Code	34
Format	4
Dimension	64
Mask	-1

Alarm Descriptor	Alarm Time	Duration
Terminated	04:58:49.310 - Dec 17 CET	1.3 min
New	04:57:29.371 - Dec 17 CET	1.3 min

Alarm Data: hardware device description

SEDPC-line1 : SEDPC 20 144 0 0 (79)

Close

The New Alarm Viewer :

Alarm Analysis

Order By: Device Server Code Severity

#	Device	Server	Code	Sever...	Tag	AI. Data	AI. Data Text	Descriptor	St. Time	Duration
8	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	11:41:06...	2.0 min
9	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	11:44:51...	2.0 min
10	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Oscillatin...	23:59:30...	3.8 min
11	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	00:20:56...	2.0 min
12	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	00:41:29...	2.0 min
13	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Oscillatin...	01:06:04...	2.9 min
14	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	01:19:15...	2.0 min
15	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	01:50:31...	2.0 min
16	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	02:16:02...	2.0 min
17	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	02:18:47...	2.0 min
18	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	02:43:36...	2.0 min
19	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	03:08:49...	2.0 min
20	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	03:19:02...	2.0 min
21	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	03:43:31...	2.0 min
22	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	06:14:28...	2.0 min
23	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	06:30:43...	2.0 min
24	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	07:09:39...	2.0 min
25	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	07:19:22...	2.0 min
26	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	07:35:06...	2.0 min
27	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	07:38:14...	2.0 min
28	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	07:41:43...	2.0 min
29	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	07:58:30...	2.0 min
30	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	08:01:25...	2.0 min
31	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	08:04:53...	2.0 min
32	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Oscillatin...	08:26:19...	2.4 min
33	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	08:48:49...	2.0 min
34	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	08:53:18...	2.0 min
35	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	09:45:39...	2.0 min
36	- -	- -	- -	- -	Spannung Soll / Istabwe. > 30%		no data associated with al...	Terminat...	09:58:16...	2.0 min
37	- -	- -	518	3	Spannung Soll / Istabwe. < 30%		no data associated with al...	Terminat...	01:33:26...	2.0 min
38	BIAS.UASet	Chop.CDI	34	8	Hardware error	SEDPC-line1 : SEDPC 20 144 0 0 (79)	hardware device description	Terminat...	01:18:33...	1.3 min
39	BIAS.IASet	- -	- -	- -	Hardware error	SEDPC-line1 : SEDPC 20 144 0 0 (79)	hardware device description	Terminat...	01:38:42...	1.3 min
40	BIAS.UASet	- -	- -	- -	Hardware error	SEDPC-line1 : SEDPC 20 144 0 0 (79)	hardware device description	Terminat...	03:09:19...	1.3 min
41	BIAS.IASet	- -	- -	- -	Hardware error	SEDPC-line1 : SEDPC 20 144 0 0 (79)	hardware device description	Terminat...	03:26:53...	1.3 min
42	- -	- -	- -	- -	Hardware error	SEDPC-line1 : SEDPC 20 144 0 0 (79)	hardware device description	Terminat...	07:49:27...	1.3 min
43	BIAS.IAdj	- -	- -	- -	Hardware error	SEDPC-line1 : SEDPC 20 112 0 0 (79)	hardware device description	Terminat...	11:56:35...	1.3 min
44	BIAS.UIs	- -	- -	- -	Hardware error	SEDPC-line1 : SEDPC 20 144 0 0 (79)	hardware device description	Terminat...	03:25:58...	1.3 min
45	- -	- -	- -	- -	Hardware error	SEDPC-line1 : SEDPC 20 144 0 0 (79)	hardware device description	Terminat...	07:19:02...	1.3 min

Refresh Save Close

[Alarm Configuration]

- Static information from either
 - 'alarms.csv' (relative to the equipment module)
 - 'fec.xml' (the <ALARM_DEFINITION> tag)
 - API Calls (java device server wizard)

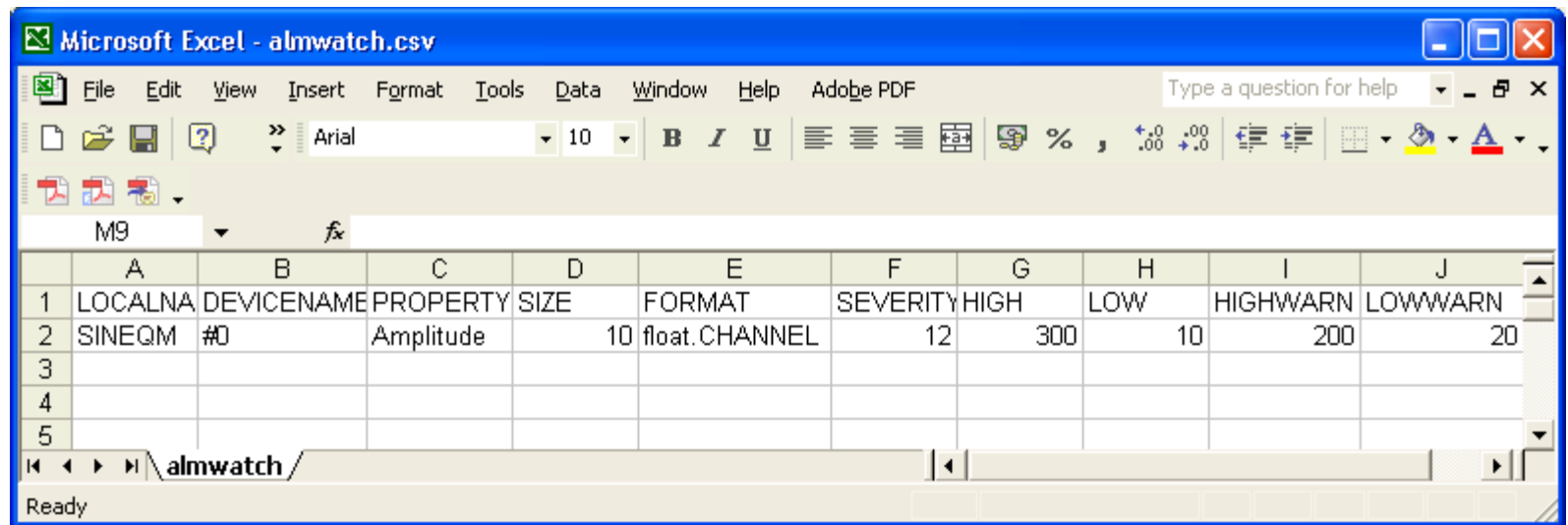
Automatic Alarm Generation

- An Alarm Watch Table
 - Threshold alarms
 - readback is out of bounds !
 - value_too_high, value_too_low, warn_too_high, warn_too_low
 - Value Mask alarms
 - masked readback does not match the ! 'normal' value
 - invalid_data
- Configure via either
 - 'almwatch.csv' (relative to the equipment module) or
 - 'fec.xml' (the <ALARM> tag) or
 - API Calls
- You do NOT have to Set/Clear these alarms yourself!

Alarm Watch Table

almwatch.csv

Instruct the Local Alarm Server which properties should be monitored and where the thresholds are :



Microsoft Excel - almwatch.csv

File Edit View Insert Format Tools Data Window Help Adobe PDF

Type a question for help

Arial 10 B I U

M9

	A	B	C	D	E	F	G	H	I	J
1	LOCALNA	DEVICENAME	PROPERTY	SIZE	FORMAT	SEVERITY	HIGH	LOW	HIGHWARN	LOWWARN
2	SINEQM	#0	Amplitude	10	float.CHANNEL	12	300	10	200	20
3										
4										
5										

almwatch/

Ready

Alarm Watch Table

fec.xml

```
</DEVICE>
- <PROPERTY>
  <NAME>Sine</NAME>
  <DEVICE_SET />
  <EGU>V</EGU>
  <XEGU>r</XEGU>
  <MAX>1000</MAX>
  <MIN>0</MIN>
  <XMAX>8092</XMAX>
  <XMIN>0</XMIN>
  <ID>0</ID>
  <DESCRIPTION>Sine Curve</DESCRIPTION>
  <SIZE_IN>0</SIZE_IN>
  <DTYPE_IN>null</DTYPE_IN>
  <SIZE_OUT>1024</SIZE_OUT>
  <DTYPE_OUT>float.SPECTRUM</DTYPE_OUT>
  <ACCESS>READ</ACCESS>
  <REDIRECTION />
- <ALARM>
  <DEVICE_NAME>SineGen0</DEVICE_NAME>
  <SEVERITY_HIGH>12</SEVERITY_HIGH>
  <SEVERITY_LOW>12</SEVERITY_LOW>
  <SEVERITY_HIGH_WARN>10</SEVERITY_HIGH_WARN>
  <SEVERITY_LOW_WARN>10</SEVERITY_LOW_WARN>
  <SYSTEM>100</SYSTEM>
  <VALUE_MASK />
  <VALUE_NORMAL />
  <COUNT_THRESHOLD>3</COUNT_THRESHOLD>
  <VALUE_HIGH>800</VALUE_HIGH>
  <VALUE_LOW>50</VALUE_LOW>
  <VALUE_HIGH_WARN>700</VALUE_HIGH_WARN>
  <VALUE_LOW_WARN>100</VALUE_LOW_WARN>
</ALARM>
- <HISTORY>
  <DEVICE_NAME>SineGen0</DEVICE_NAME>
  <TOLERANCE>10%</TOLERANCE>
```

Can also mask a readback value and compare versus a 'normal' value

Alarm Watch Table

API :

```
int AppendAlarmWatchTable ( char *      eqm,  
                           char *      prp,  
                           char *      dev,  
                           int         siz,  
                           int         fmt,  
                           int         atyp,  
                           int         sev,  
                           int         sys,  
                           ALM_THRESHOLDS * thr  
                           )
```

Inserts a property to be monitored into the local alarm server's Watch Table.

Certain alarms are to be set whenever the value of a property exceeds a defineable threshold. Such alarms can be managed automatically by the local alarm server if the alarm criteria are entered into the alarm watch table. This can be achieved by calling this routine (or supplying a startup configuration file `almwatch.csv`).

Parameters:

eqm is the 6-character local equipment identifier name, which is internal to server.
prp is the property which is to be called by the local alarm server
dev is the device name associated with the property to be called by the local alarm server
siz is the data array size to be called by the local alarm server
fmt is the TINE data format to be called by the local alarm server
atyp is the TINE data array type to be applied to the property called by the local alarm server
sev is the severity of the alarm issued when the data returned by the call exceed the given thresholds.
sys is the alarm system identifier to be associated with the alarm.
thr is an **ALM_THRESHOLDS** object specifying the threshold criteria for setting the alarm

Note: Information can also be entered into the alarm watch table by supplying the startup configuration file `almwatch.csv`, where the input parameters are given in the relevant columns. This is frequently the preferred way of inputting such alarm information, since it does not involve hard-coding such alarm criteria.

Returns:

0 upon success, otherwise a TINE error code.

[Alarm API :]

- Make sure your alarms are defined !
 - alarms.csv (or fec.xml, or API)
- Make use of ClearAlarm()/SetAlarm() inside your I/O loop.
 - ClearAlarm() at the start of the loop
 - Increments the 'clear counter'
 - If the alarm is still active then SetAlarm()
 - Resets the 'clear counter'

Alarm Definitions

alarms.csv :

	A	B	C	D	E	F	G	H	I	J
1	ALARMTAG	ALARMCODE	SEVERITY	DATAFOR	DATAARRAYSIZE	ALARMTEXT	DEVICETEXT	DATATEXTURL		ALARMSYST
2	hardware erro	34	7	short	3	BLM hardware c	Pforte Beam Los	Line - crate	http://mcs/petra3/servers/bl	0
3	dump threshc	512	12	float	1	Beam Loss cros	Pforte Beam Los	Beam Los: http://mcs/petra3/procedure	http://mcs/petra3/procedure	0

#definition from errors.h

Alarm Definitions

fec.xml :

```
- <EQM>
  <NAME>BLMEQM</NAME>
  <SERVER>BLM</SERVER>
  <CONTEXT>PETRA</CONTEXT>
  <SUBSYSTEM>DIAG</SUBSYSTEM>
  <GROUP />
  <GROUP_INDEX />
- <ALARM_DEFINITION>
  <TAG>hardware error</TAG>
  <DATA_FORMAT>short</DATA_FORMAT>
  <ALARM_TEXT>BLM hardware cassette readback error</ALARM_TEXT>
  <DEVICE_TEXT>Pforte Beam Loss Monitor</DEVICE_TEXT>
  <DATA_TEXT>Line - crate - subaddress</DATA_TEXT>
  <URL>http://mcs/petra3/servers/blm/hardware-trouble.html</URL>
  <ALARM_CODE>34</ALARM_CODE>
  <ALARM_MASK />
  <SEVERITY>7</SEVERITY>
  <ALARM_SYSTEM />
  <DATA_SIZE>3</DATA_SIZE>
</ALARM_DEFINITION>
- <ALARM_DEFINITION>
  <TAG>dump threshold reached</TAG>
  <DATA_FORMAT>flot</DATA_FORMAT>
  <ALARM_TEXT>Beam Loss crossed alarm threshold and triggered dump</ALARM_TEXT>
  <DEVICE_TEXT>Pforte Beam Loss Monitor</DEVICE_TEXT>
  <DATA_TEXT>Beam Loss (cnts/sec) that crossed the alarm threshold</DATA_TEXT>
  <URL>http://mcs/petra3/procedures/restart-following-dump.html</URL>
  <ALARM_CODE>512</ALARM_CODE>
  <ALARM_MASK />
  <SEVERITY>12</SEVERITY>
  <ALARM_SYSTEM />
  <DATA_SIZE>3</DATA_SIZE>
</ALARM_DEFINITION>
```


[Alarm Definitions]

API Call :

```
int AppendAlarmInfoTable ( char * eqm,  
                          ADS * ads  
                          )
```

Inserts an alarm definition into the alarm definition table.

As an alternative to the <local name>-alarms.csv configuration file, the front end server can make use of this API call in order to fill in the alarm definition table describing locally generated alarms. This is particularly useful for embedded platforms where there is no file system, or where a TINE server is used as a translation layer and needs to map a given alarm system onto the TINE alarm system.

Parameters:

eqm is the 6-character local equipment identifier name, which is internal to server.

ads is a pointer to an Alarm Definition Structure (ADS) containing the alarm table information which is to be appended to the alarm definition table.

Returns:

0 upon success, otherwise a TINE error code.

```
strncpy(ads.alarmTag,"Threshold exceeded",16);  
ads.alarmCode = 512;  
ads.alarmMask = 0xff;  
ads.severity = 7;  
ads.alarmDataFormat = BFMT(CF_FLOAT);  
ads.alarmDataArraySize = 1;  
ads.alarmSystem = 640;  
strncpy(ads.alarmText,"Take action immediately!",40);  
strncpy(ads.dataText,"Current threshold setting",40);  
strncpy(ads.url,"alarm512.html",40);  
if ((cc=appendAlarmInfoTable(EQPMODNAME,&ads)) != 0)  
{  
    feclog("appendAlarmInfoTable : %s",erlstr[cc]);  
}
```

Java: from TEquipmentModule


```
public int addAlarmDefinition(int code, TAlarmDefinition adef)
```

Alarm API Example : C


```
|
#define dump_threshold_reached 512
void hdwIo(void)
{
    int i;
    ClearAlarm(BLMEQM_TAG,-1); // clear them all

    for (i=0; i<gNumBlms; i++)
    {
        if ((cc=rdBlmLoss(i)) != 0)
        { // there was a readout problem
            SetAlarm(BLMEQM_TAG,i,hardware_error,blm[i].addr);
            continue;
        }
        if (blm[i].loss > blm[i].dumpThreshold)
        {
            SetAlarm(BLMEQM_TAG,i,dump_threshold_reached,blm[i].loss);
        }
    }
}
```

Pass the hardware address that caused the problem



Pass the readback value that crossed the threshold



[Alarm API : java]

Many convenient constructors for setAlarm()

```
}  
/**  
 * \brief sets an alarm with the given data set  
 *  
 * @param code The alarm code to apply to the alarm  
 * @param data The alarm data associated with the alarm  
 * @return  
 */  
public TAlarm setAlarm(int code, TDataType data)  
{  
    return setAlarm(code, data.getDataBuffer(), TAlarmDescriptor.NEW);  
}  
/**  
 * \brief sets an alarm with the given data set  
 *  
 * @param code The alarm code to apply to the alarm  
 * @param data The alarm data associated with the alarm  
 * @return  
 */  
public TAlarm setAlarm(int code, float data)  
{  
    float[] fdata = new float[1];  
    fdata[0] = data;  
    TDataType td = new TDataType(fdata);  
    return setAlarm(code, td.getDataBuffer(), TAlarmDescriptor.NEW);  
}  
/**  
 * \brief sets an alarm with the given data set  
 *
```

[Alarm API : java]

```
/**
 * Called in the background task.
 *
 * Note the calls to the local alarm server.
 * clearAlarm() increments the clear counter and is called when the routine is entered.
 * setAlarm() is called when an alarm state is detected.
 * This is just an example. Alarms for 'value too high', etc. are better handled
 * through the use of an 'almwatch.csv' configuration file.
 *
 */
public void update()
{
    clearAlarm(512);
    incrementPhase();
    for (int i = 0; i < 1024; i++)
        myData[i] = amplitude * Math.sin(phase + frequency * 6.28 * ((double) i / 1024.0);
    if (amplitude > 100) setAlarm(512); // amplitude too high !
}
public double getPhase()
{
    return phase;
}
```

[Some Notes]

- ClearAlarm()
 - does not remove the alarm
 - Increments the clear counter
 - SetAlarm() resets the clear counter
 - If clear counter increase by more than 1 prior to the next SetAlarm() the alarm is marked as 'oscillating'
 - Clear counter > 8 => alarm has terminated !
- Transient Alarms need to call SetAlarmEx()
 - Can pass the alarm flag 'almINSTANT'
 - Immediately flagged as terminated
- Alarms stay in the local alarm table for the duration of the Alarm Termination Window (default = 30 seconds)
 - Longer if a configured CAS has not read the alarm
- CAS can react to (configured) alarm signals
 - Trigger events
 - Send email
 - Send to central logger

[Reading Alarms from a Server]

- Best Practice:
 - Monitor the Alarms ‘Snapshot’
 - Stock Property “NALARMS”
 - 5 long integer values
 - Total number of alarms
 - UTC Timestamp of the most recent
 - Highest severity
 - Number at the most recent timestamp
 - Number at the highest severity
 - Can incrementally update an alarm cache using this snapshot (CAS)
 - Use DATACHANGE mode
 - If something’s different : get the most recent alarm set.
- Alarm Viewer gets all alarm information from the CAS !
- Java : TAlarmSystem query class with lots of static methods to get alarm information !

Reading Alarms in java

You probably won't be doing this, but just for fun :

- TLink InkJAlms =
TAlarmSystem.monitorNumberOfAlarms("PETRA",null,"RF",12,cbNAlms)
 - Monitors number of alarms from the PETRA CAS, alarm subsystem "RF" with severity >= 12
- TLink InkJAlms =
TAlarmSystem.monitorNumberOfAlarms("PETRA","ELWIS3",null,12,cbNAlms)
 - Monitors number of alarms from server "ELWIS3" with severity >= 12 directly
- Inside cbNAlms(Ink) :
 - timeAlm = Ink.getLastTimeStamp();
 - TAlarmMessage[] almsNew = getAlarms("PETRA","RF",timeAlm,timeNow,12);
 - Join or filter the 'almsNew' list to a cached alarm list.
 - e.g. remove anything older than 1 hour
 - e.g. don't include 'terminated' alarms in the list
 - etc.