Verifysoft TECHNOLOGY

AXIOMA Testwell CTC++ User Testimonial

Axioma building

Axioma Metering develops and manufactures ultrasonic heat, water metering and data management devices since 1992. The company is a part of ICOR Group, which is one of the largest corporate groups in the Baltic States.

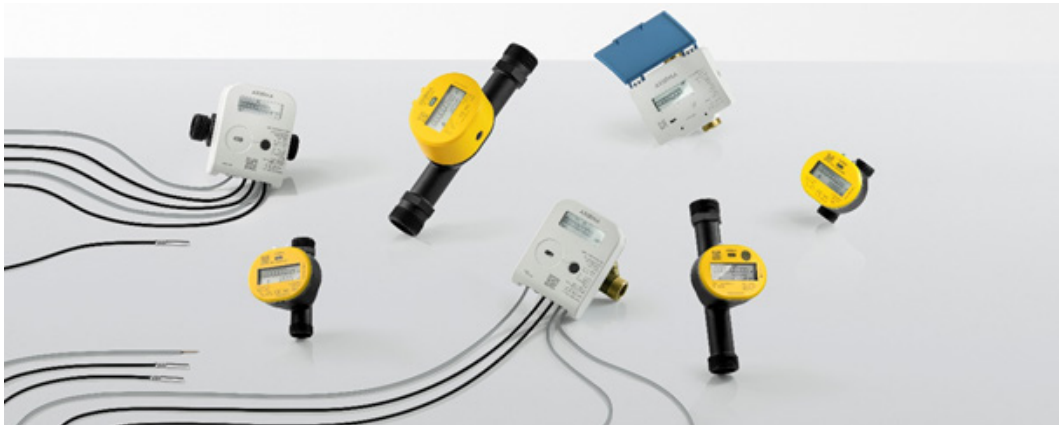
With decades of industry expertise, Axioma Metering provides smart metering products and solutions which are designed for monitoring industrial, commercial and residential buildings. From implementing product ideas to packaging products for delivery – all operations are performed in-house, which allows for the company to ensure the highest quality, flexibility and shorter delivery time for more than 60 countries around the world.

Heating and cooling energy meters assembly section

Verifysoft TECHNOLOGY

Water meters calibration bench

The ultrasonic method is one of the most quickly developing methods in numerous sectors because it can identify and immediately react to the tiniest changes in any system. Therefore, as ultrasonic system developers, we consistently invest in scientific research in this field. Our advanced monitoring devices for different mediums are based on various operation methods: ultrasonic heating and cooling energy meters, ultrasonic heat and water meters, ultrasonic flow sensors.



Ultrasonic heat and water meters

Verifysoft TECHNOLOGY

The software of our meters is quite complex because it uses ultrasound for measuring and communicate through technologies such as: NB-IoT, AMR, NFC, LoRa and wMBus. Every bit of code responsible for functionality must be optimized and energy efficient. Every year the complexity and functionality of the meters is increasing and as a result, the total amount of embedded software in the units is also increasing.
For deeper and more complete testing without a tool analyzing code coverage, it is difficult to assess how fully the unit testing has been completed. To analyze the code coverage for our units we researched and chose Testwell CTC++. It was a bit work to set Testwell CTC++ up, but the tool is flexible enough to support our complex meters.

40 %	(85/210)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\cg_src
79 %	(31/39)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\Lora Stack\Application
90 %	(49/54)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\Lora Stack\Hardware
59 %	(112/189)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\Lora Stack\MacLayer
38 %	(48/126)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\Lora Stack\MacLayer\region
75 %	(21/28)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\Lora Stack\Peripheral\soft-se
60 %	(51/84)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\Lora Stack\Radio
59 %	(16/27)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\Lora Stack\System
100 %	(3/3)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\PFDL
50 %	(110/220)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\user
56 %	(26/46)	100 %	(0/0)	C:\eduomenys\Code Coverage projektas\Firmware\w-Mbus
53 %	(552/1026)	**100 %**	(0/0)	**OVERALL**

Directories	11
Source files	76
Headers extracted	0
Functions	1026
Source lines	50095
TER structural	**53%** (552/1026) function
TER statement	**100 %** (0/0) (N.A. for 1026 functions)

Testwell CTC++ report (summary)

For our meters we use multi-condition coverage. Testwell CTC++ generates clear and informative coverage reports that shows us which conditions were tested and which were not. Using Testwell CTC++, we uncovered sections of dead code that needed rework and sections of code that needed more testing. The results of the coverage analysis are presented as nice HTML pages which show overall statistics for the whole project, as well as coverage data for each project file and for each function.

Verifysoft TECHNOLOGY

```
1      71 void ProcessWmbusSec(void)
       72 {
       73   if (konfig_pointer->Radio_mode)
       74   {
       75       if ((konfig_pointer->Radio_mode & RADIO_MODE_S1_868) && RadioActive)
       76       {
       77           if (0<S1_sinc_timer)
       78           {
       79               S1_sinc_timer--;
       80           }
       81           if (0<S1_asinc_timer)
       82           {
       83               S1_asinc_timer--;
       84           }
       85       }
       86       if ((konfig_pointer->Radio_mode & (RADIO_MODE_T1_868|RADIO_MODE_T1_433)) && RadioActive)
       87       {
       88         if((konfig_pointer->Radio_mode & RADIO_MODE_T1_SYNC)==0x00)
       89         {
       90           if (MainVar.TimeToSend>0)
       91             MainVar.TimeToSend-=1;
       92           else
       93             MainVar.SendMessage=true;
       94         }
       95       }
       96   }
       97 }
       98
Top
0      99 void PrepareRadioConfig(void)
      100 {
      101   MeterData.MeterID=konfig_pointer->Identification_number;
      102   MeterData.MeterManuf=konfig_pointer->Manufacture_code;
      103   MeterData.MeterMedium=konfig_pointer->kalibracija.MEDIUM_TYPE;
      104   MeterData.MeterVersion=0x10;
```

Testwell CTC++ report (source code view)

Povilas Jakavičius, Strategic Procurement Manager, Axioma Metering, Luthuania

Testwell CTC++ is a tool and a trademark of Verifysoft Technology GmbH
For further questions please visit www.verifysoft.com and contact us at +49 781 127 8118-0