1. create an Influx DB and Grafana monitoring on the Linux cluster
2. commission REMS temperature/humidity monitoring with data output to Influx DB
3. comission particle counter with data output to Influx DB
4. survey of cleanroom to identify places where temperature/humidity monitors and particle counters should be added
5. add aditional monitoring devices (if they are available)

# **Notes from UK emails:**

[31/03/2021]

Hi Ben (including others for info),

Distracted myself with REMS whilst in a meeting.  Suggestion from me would be:

1.       Add rems user to the dialout group (gets around issues with sudo for access so sudo is not needed for running script)

2.       Create a service in systemctl (<https://lucacorbucci.medium.com/how-to-run-a-python-code-as-a-service-using-systemctl-4f6ad1835bf2>), I made rems.service:

/etc/system/system/rems.service:

[Unit]

Description=REMS Service

RequiresMountsFor=/media/rems/REMS

[Service]

User=rems

WorkingDirectory=/home/rems/serial

ExecStart=/usr/bin/python3 /home/rems/serial/serial\_read\_influx.py > /home/rems/serial/out.log 2>&1

Restart=always

[Install]

WantedBy=multi-user.target

And then it runs in the background on start-up (can see data appearing in rems.txt).  Weirdly the piping of the terminal output does not seem to work but the data is definitely appearing where it should so I am not too worried.

I did also try doing it as a cron job but I couldn’t work out how to get it to run only when the USB stick is installed.

Thanks,

Craig

[31/03/2021]

Hi All,

FYI, if you don’t want to comment out the text file writing, if you open a connection via ssh and want to mount the USB stick without logging in graphically, you should be able to do:

sudo mount -o rw,users,umask=000 /dev/sda /media/rems/REMS  # general

which will mount the USB and give it the necessary permissions to run the python without using sudo.

I also thought I had come up with the correct line in /etc/fstab so that it would mount automatically on start-up but having just rebooted remotely I can no longer see the rems pi via ssh so I may have messed up fstab and need to correct something locally before I can do more testing – if so, no more on this until after Easter!!

Thanks,

Craig

[01/04/2021]

Hi All,

Me again!!  Last one, I promise.  Swung by the lab this morning to locally fix my fstab mistake.  Adding this line:

LABEL=REMS /media/rems/REMS vfat rw,users,umask=000  0  2

To the end of the fstab file should load the USB stick correctly.

So, to summarise how to get REMS to work so that all you need to do is plug-in and turn on the pi:

1.       Add rems user to the dialout group

2.       Create a service in systemctl (<https://lucacorbucci.medium.com/how-to-run-a-python-code-as-a-service-using-systemctl-4f6ad1835bf2>), I made rems.service\*

3.       Add a line to /etc/fstab\*\* (you may also need to manually make the directory /media/rems/REMS)

Then hopefully when you reboot the pi everything will start-up automagically without having to login or run any scripts.  Systemctl should also restart the monitoring script if it fails for any reason.

Thanks,

Craig

# **Dylos:**

On 6 Jul 2021, at 18:36, Juergen Thomas <Juergen.Thomas@cern.ch> wrote:

﻿Hello Craig and Andy,

A quick question as you have experience with the Dylos 1700:

In Craig's 'quickDylos' script, the 'raw' integer output values read

from the Dylos are multiplied with a constant factor

of about 3500, to convert to ppm for the logs and plots:

----

corrFactor = 1./0.0283168\*100

'small' : format(float(data[0])\*corrFactor,'.2f'), # >0.5um

'large' : format(float(data[1])\*corrFactor,'.2f') # >2.5um

----

Is that correct, ie do you get always 3500-sized steps ?

See below from our log using this script.

Laura has spotted that in the RAL SQ plots, there are

'smooth' plots and normally below 1000, no such steps.

So this seems to come from a different calculation.

All tips welcome...

Indeed do we need to adjust something on the Dylos

itself too ?

Regards,

Juergen

========================================

From: Craig Anthony Sawyer

Sent: 06 July 2021 23:31

To: Juergen Thomas

Cc: Andrew James Blue

Subject: Re: Dylos 'correction factor' ?

Hi Juergen,

This was the correction factor I calculated and checked with Ingo. The Dylos outputs a count per cubic foot so this then corrects to ppm, and indeed this does somewhat limit the resolution possible.

The RAL SQ plots are not Dylos based but based on the all singing all dancing system installed as part of our cleanroom installation. Up until recently I did not have a Dylos to compare that to (and I still don’t as our Dylos is now tied up monitoring our separate room for ASIC probing), but Ingo tells me that comparing his Dylos to the expensive monitoring he has at DESY was very similar.

When I wrote that quick Dylos code a few days ago, the correction factor I included did seem about right as it gives a sensible ISO estimate of the air quality in my office at RAL.

Thanks,

Craig

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[07/07/2021, 12:14]

Thanks for the info, Craig !

That all makes sense.

I'm noticing that Andy plots the 'imperial' raw values from the

Dylos, so that's consistent with having 'smooth' plots without the

steps.

We'll leave our two Dylos' running now so we'll have the required

data of 14 days for SQ as soon as we can.

I cc Sven, Theo and Sam with this info in case they have

the same question (please see below).

(NB Sven, Theo and Sam:

Here the UDEV rules for the RS232-to-USB cable, they

have no serial number (always 0):

SUBSYSTEM=="tty", ATTRS{idVendor}=="067b", ATTRS{idProduct}=="2303", SYMLINK+="ttyDylos", MODE="0666"

from 'lsusb':

Bus 001 Device 007: ID 067b:2303 Prolific Technology, Inc. PL2303 Serial Port

Be aware if you have a REMS node on the same Pi, this cable

may 'capture' /dev/ttyUSB0 or 1 and mess-up REMS, so make

sure to set UDEV for the REMS node eg alias ttyREMS.

For tests without ImpactDB, comment out this line from the script:

----

#write\_api.write("TOTECH","PPD",json\_body)

----

Change here from False to True for writing the csv log file:

----

def read(self, store=True):-

----

Sorry, yes, should have send a new email here maybe

to all of WP3).

Anyways, thanks again.

Regards,

Juergen

============================

[07/07/2021, 12:36]

HI All

The dylos outputs in terms of 'feet', so the following conversion, used by Glasgow, and by other groups is as follows

https://twiki.cern.ch/twiki/bin/viewauth/Atlas/StripUpgradeCleanroom#Cleanroom\_monitoring\_at\_TRIUMF

"Note: the output from the Dylos needs to be multiplied by 100 to gain the number of particles per cubic foot.

In order to obtain the number of particles per cubic meter (which current cleanroom ISO standards are based on), multiply the raw number by 3513.5 (or by 35.135 if you already corrected to particles per cubic foot)."

Cheers

Andy

=============================

[07/07/2021, 12:53]

Thank you Andy, that's pretty clear now!

Dylos raw = particles per 0.01 cubic feet

\* 100 to 1 cubic feet

\* (1 / 0.028316846592) to 1 cubic metre.

Cheers,

Theo.

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[07/07/2021, 12:53]

Thanks, Theo.

A quick comment: The Dylos itself may well have a serial number, but the

RS232-to-USB cables which Craig has kindly also provided always has the '0'

(we think). If you use another cable, you'll get a serial number, eg

https://uk.rs-online.com/web/p/serial-converters-extenders/6877803

But I think nobody will have two Dylos on the same Pi or PC.

Anyway, not to cause too much noise.

Please keep people posted eg on WP12 slides.

Regards,

Juergen

[01/12/2021]

Hi folks,

Today I was double-checking our conversion factor for the Dylos 1700 Particle counter we use to convert particles/0.01 ft^3 (the default units) to particles/m^3 and noticed that two digits were transposed. We obtained our values from the Twiki: <https://twiki.cern.ch/twiki/bin/viewauth/Atlas/StripUpgradeCleanroom#Dust_level_monitoring_LBL>. It's a small change, but I thought I'd let you know just in case several people were affected. The value in the Twiki is 3513.5, but I calculate **3531.5** (Zhengcheng and Google confirmed this :)).

Cheers,

Cole

# SSH into grafana system / rems

Hi Sven,   
  
I think it depends a bit how you want to access it ...   
  
If you want it properly accessible from outside then you would need to ask Rob and John about how to set this up through our web server since I am not aware.  You may be able to do that with some CGI-bin on a personal website but the department blocks some stuff there to avoid security issues   
  
The other way is to setup an ssh tunnel from outside to the local machine that will let you access it as if you are on site.   For example, to see the pixel local DB from my laptop I do:   
  
# Tunnel ssh to hep56 (where local DB runs) through gateway   
  
ssh -L2222:hep56:22 [gwilliam@gateway.ph.liv.ac.uk](mailto:gwilliam@gateway.ph.liv.ac.uk) cat -   
  
# Use that ssh port to tunnel port 5000 (port local DB runs on) as dbuser   
  
ssh -p2222 -L5000:localhost:5000 dbuser@localhost cat -   
  
Then you can point your local laptop browser to   
  
<http://127.0.0.1:5000/localdb/>   
  
Something similar should be possible for Grafana and I can maybe help there (though I am no expert).   
  
Cheers,   
  
Carl

I think hep IT has created a user account for you.  
You can use this to remotely connect to the raspberry pi with the database:  
  
  
ssh -X <hep username>@gateway.ph.liv.ac.uk  
<enter your hep password>  
ssh -X [pi@192.168.202.88](mailto:pi@192.168.202.88)  
<enter pi password>  
  
- use command 'exit' to safely terminate the connection.  
  
  
For the remote desktop connection (VNC) you need to first use an ssh tunnel to gateway.  
There are different ways: <https://helpdeskgeek.com/how-to/tunnel-vnc-over-ssh/>  
(I would probably try an ssh client with tunnelling support)  
  
There are also instructions from HEP IT: <https://hep.ph.liv.ac.uk/twiki/Computing/HepVNCGuide>.