

Monitoring ILRI's Biorepository

azizi.ilri.org

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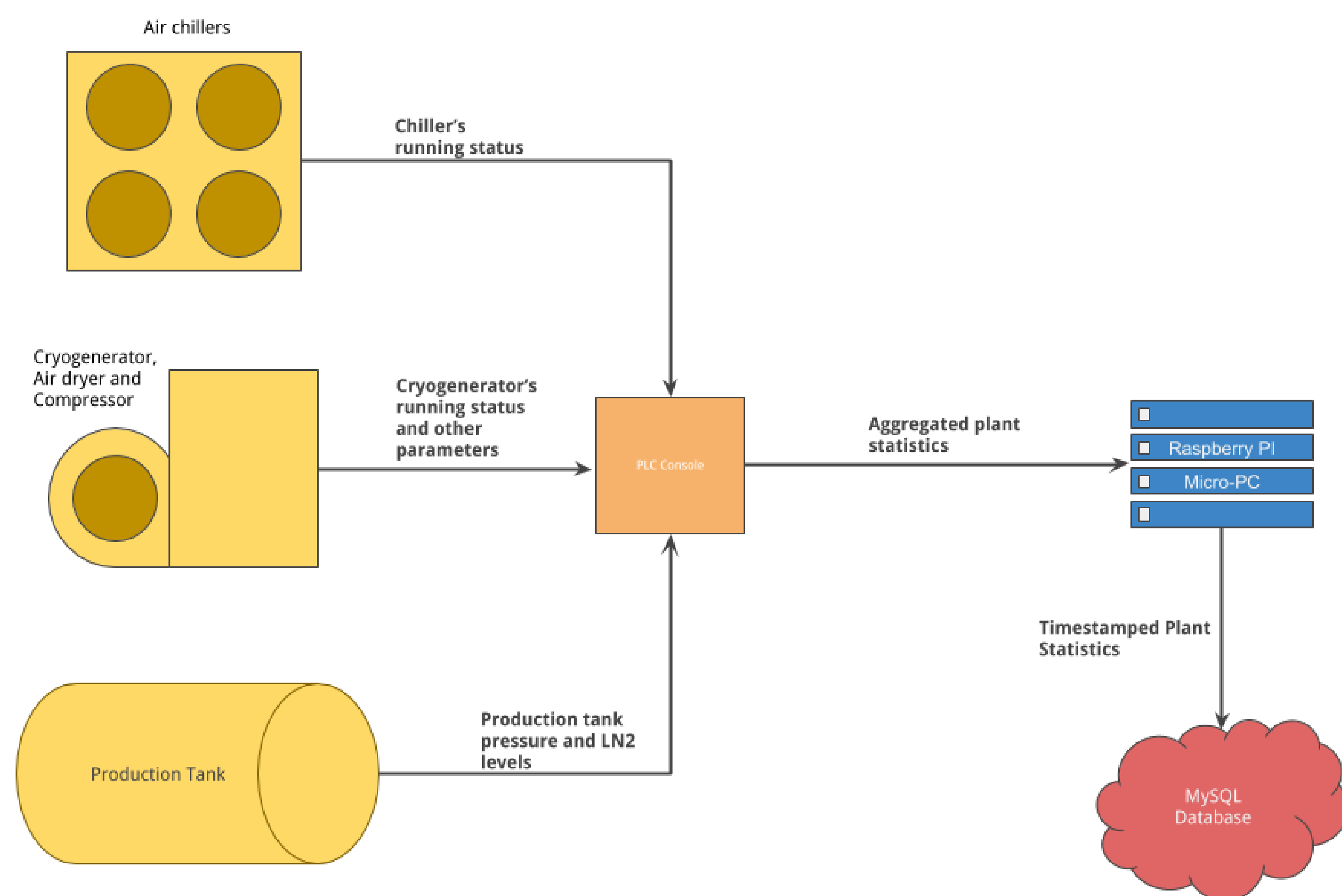
ILRI's Biorepository currently stores close to half a million samples in 6 liquid nitrogen (LN2) tanks. In an effort to ensure the viability of the samples and facilitate fast problem solving, we have developed a suite of systems that monitor the statuses of different equipment in the Biorepository and sends out alerts in case of various events, alarms, warnings, unexpected access, etc.



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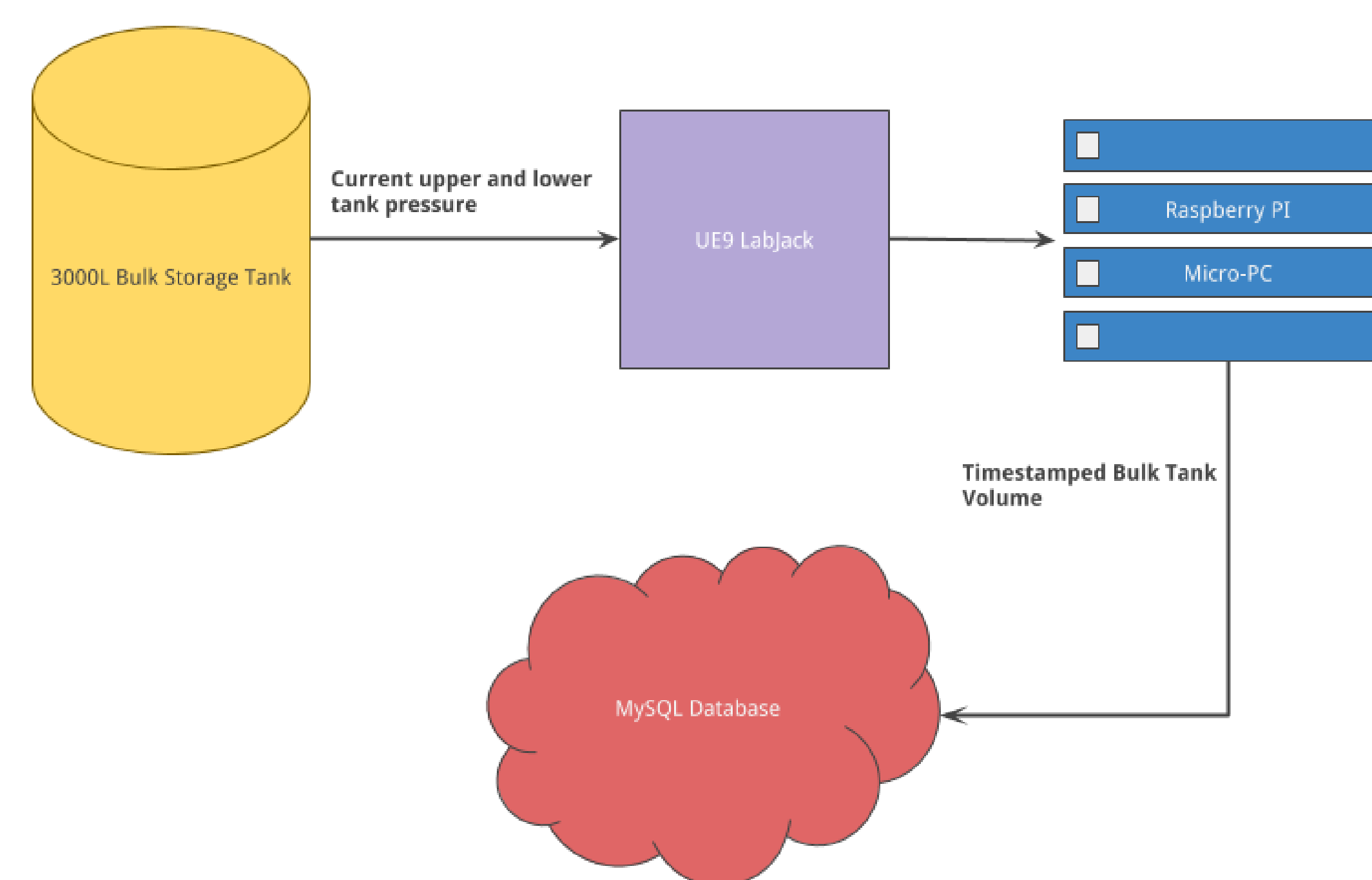
Liquid Nitrogen Plant

The Liquid Nitrogen plant consists of 2 cryogenerators, 2 chillers, a compressor, an air drier and a 1000L tank. The plant has a capacity of generating ~21.5 litres of LN2 per hour. The plant is monitored through the network via its PLC console.



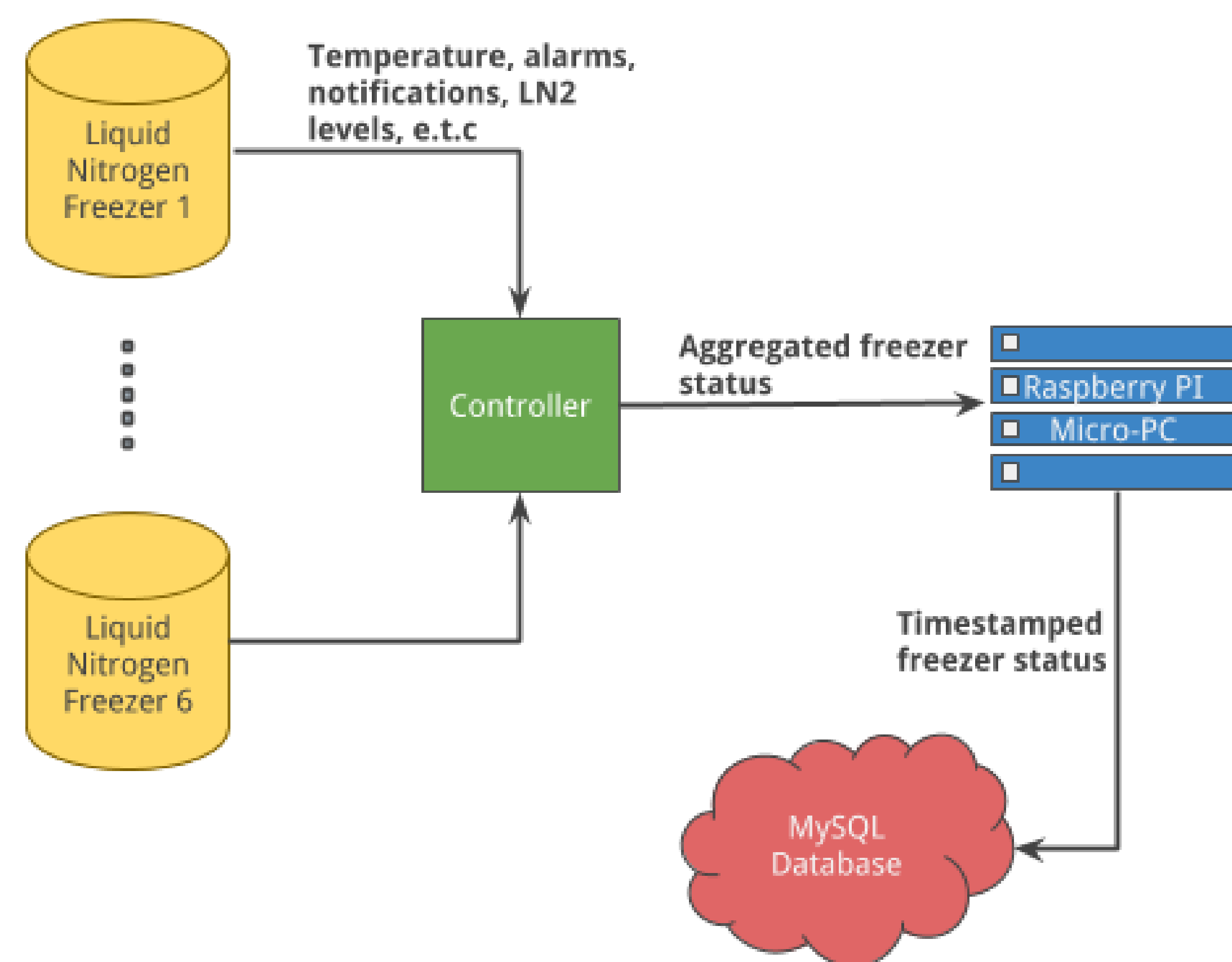
Bulk Storage Tank

The 3000 litre bulk storage tank acts as the main reservoir for the Biorepository. It is monitored by periodically reading its upper and lower pressure. The pressure levels are read from the bulk tank solenoids using a LabJack which is linked to a network attached Raspberry PI micro-PC.



Liquid Nitrogen Freezers

Samples are stored in vapour phase of LN2 in 6 -196 freezers, each with a capacity of 75,400 samples. The freezers are connected to a controller which is then connected to the network attached Raspberry PI micro-PC. A Perl script periodically queries the status of each freezer from the microcontroller and saves the data to the database server.



Alerts

The monitoring systems sends out alerts based on alarms, events, warnings and notifications. An SMS is sent in case of critical notifications while an email is sent out in case of warnings. All the equipment statuses are displayed on the Biorepository webpage, azizi.ilri.org.

Recorded Statistics

Statistics from the monitoring systems as of 7th October 2014:

- System up time: 1,410 days
- SMS alerts sent: 125,273
- Rooms monitored: 13
- Fridges monitored: 6
- Freezers monitored: 6
- Incubators monitored: 3
- Backup power generators monitored: 1



The 6 liquid nitrogen freezers



Liquid nitrogen bulk storage tank



The cryogenerators



The liquid nitrogen chillers

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