

Interactive comment on “Automated observatory in Antarctica: real-time data transfer on constrained networks in practice” by Stephan Bracke et al.

S. Flower (Referee)

smf@bgs.ac.uk

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General Comments

This is a useful paper for anyone evaluating this type of communication problem (reliable data delivery from a remote location over an unreliable network) and is not limited to the Geomagnetism community. It summarises well the decisions that the authors made and gives clear details on how to implement a similar solution.

Specific Comments

The 56kb/s that you have available for your WAN link is a large bandwidth for geomagnetic data. It equates to about 5000 bytes per second of uncompressed data (when

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using 8 bit data with 2 framing bits and 1 parity bit). You are transmitting 16 bytes / second from the vector magnetometer and 8 bytes from your scalar magnetometer, so you have plenty of bandwidth overhead (suing less than 10% of available bandwidth).

Another option that you don't list is to write your own TCP or UDP protocol. This is not complex with modern languages access to the Sockets library (for example). Did you consider this alternative?

Allowing for loss of network connection of up to 4 hours - is this enough? I see you recovered a longer period than this using ftp, so you have some sort of backup file store on the data logger that you can acces remotely? When we have lost network connections, the time taken to recover can be in days or even weeks. With the low cost of memory, would it be posible to introduce a much larger memory buffer into the MQTT transfer system? If this large buffer were ever to be needed, does MQTT allow for prioritisation of current data over older data (some seismic data loggers protocols allow for this)?

Technical Corrections

Some line by line typographical corrections / suggestions.

Page 1: Line 8: "values *up* to" should read "values down to" Line 9: "lemi-25" should read "lemi-25 vector magnetometer" Line 10: "gems proton magnetometer" should read "GEM Systems scalar proton magnetometer" Line 11: "DI-flux" should read "DI-fluxgate magnetometer" Line 12: "real-time" should read "real-time capability" Line 14: What is UGCS? Line 16 "it and arrives at" should read "and it arrives" Line 25 "profit of" should read "profit from" Line 27: "meters of" should read "meters from" Line 28: by "pillars" do you mean the pillars used for geomagnetic measurement?

Page 2: Line 2: Did you have a power budget? Line 6: "chose for the" should read "chose for this the" Line 8: "GEMS" should read "GEM Systems" Line 15: Is it well documented? This would be neccessary to make adaptations. Line 20: What has the

software been re-written from? Was there a Windows version of the software that had to be re-written?

Page 3: Line 8: "data capturing on the serial port" should read "data logger's serial port"
Line 12: "this one" should read "this" Line 14: "differences" should read "differences between two files" Line 26: "where" should read "were": "on" should read "to"

Page 4: Line 2 "earth" should read "Earth's": "a shared knowledge" might be better as "shared techniques" Line 4: I think Antelope software is created by Boulder Real Time Technologies and sold through Kinemetrics. USGS are only one user of this software. If you are mentioning SeisComp3, you should credit GFZ where the software originates. Line 19: I've used Earthworm and found the support to be excellent. The commercial software providers, Instrumental Software Technologies Inc, even did some work for us without asking for payment. Line 24: "scientist" should read "scientists" Line 25: "profit of" should read "profit from" Line 26: "on remote" should read "at remote"

Page 5: Line 9: Isn't MQTT and ISO standard (ISO/IEC 20922:2016)? Line 11: "While taken the definition from there respectively website" doesn't make sense. Do you mean "Here are the definitions of each of these protocols from the relevant websites". Can you add the website links to your list of references? Line 21: "my" should read "our"

Page 6: Line 3: "from several seconds to hundreds of seconds" - this means the real-time performance got worse! Line 14: "on regular intervals a temperature" should read "at regular intervals a thermometer" Line 24: "This topic is also linked with a description of the message 25 structure posted on it" - what does this mean? Does MQTT include metadata that describes the topic? Line 27: "before the" should read "before they" Line 29: "these server can" should read "of the server to"

Page 7: Line 7: "what the possibility of losing messages during transfer is" should read "the possibility of losing messages during transfer" Line 9: "send" should read "sent": "It will be doing so never introduce duplicates" - doesn't make sense? Line 11: "send" should read "sent" Line 14: "send" should read "sent"

Page 8: Line 28: "realisation in" should read "realisation of"

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