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Geoscientific Instrumentation Methods and Data Systems Discussions

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

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The paper is good but it would be interesting to see a more detailed example of the implemented work. From understanding your infrastructure limitations at the remote observatories, it is understandable that any file transfer protocol (RSYNC, FTP, etc.) are far too demanding on bandwidth. The Beaglebone is definitely interesting piece of hardware and MQTT does look like a promising alternative to data transfer. It would be interesting to briefly mention why Belgium requires real-time data. Is it for emergency management?

On the section "Traditional ways of data transfer", it might be good to note that none of these protocols are meant for real-time data transfer. To say that these protocols

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Discussion paper

can attain near real-time in terms of minute delay is against their intended purpose. RSYNC, for one, is meant for archival purposes. It might be good to simply restate that all these protocols are bandwidth intensive. Even RSYNC needs to send content to determine what needs to be updated.

On the section "Protocol used in seismology", Gempa's SeisComP3 has to be ability to receive SeedLink but also has CAPS. CAPS is their own documented real-time acquisition server with additional capabilities of synchronizing gaps from other data sources; for example a backup data center. Their protocol allows safe duplication in disaster recovery solutions with relatively small messages. CAPS server can also be purchased at reasonable cost and with very good support. As for IRIS SeedLink server (ringserver), it doesn't require much effort to install as it can be done with a single "make" command. As a note, miniSeed is not limited to seismological data as many other institutes use it for other non-seismological instruments. In fact, SEED did reserve a code for magnetometer (F). miniSeed supports almost any type of fixed sampling rate data. In other words, SeedLink is not reserved for seismologic data. FDSN, on other hand, is very seismological centric but they do not limit anyone from getting a network code for miniSeed (if you ever intend to make miniSeed public). However, available network codes are limited.

On the section "Experience after one year of data flow", it is not clearly explained so I will assume your MQTT broker is located at the data center. This means that the remote station must make the connection to the data center and must have the data center IP hard-coded on site. What happens if the data center IP changes (ex: disaster recovery)? The data center is the most accessible system; wouldn't it be easier to initiate connections from there (no hard coding at remote stations)? Also, the purpose of the MQTT broker is to buffer messages if connections are lost. In your case, you implemented your own buffer on site. What is the purpose of the MQTT buffer at the data center?

On the section "Conclusion", it might be good to evaluate ActiveMQ (message broker). In seismology, ShakeAlert is a complex system where it exchanges messages between internal modules using ActiveMQ. This system will eventually alert the public in real-time about incoming earthquakes. Clients will get the alerts by connecting to an ActiveMQ broker located at a warning center.

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