SC B5 2018 CIGRE SESSION

SECURITY OF TIME SYNCHRONISATION FOR GOOSE, SV AND MMS

PS 2 , Q2.3

Rod Hughes (AU)

rgh@rodhughesconsulting.com

rodney.hughes@ghd.com

presented by Peter Bishop

CIGRE AU B5 Convenor

Must ask: ***Is*** spoofed time a problem to GOOSE, SV and MMS?

- GOOSE does not rely on any time synch at all!
  (neither did wire-based protection trips)

- Header time stamp "T" is when that repetition message was created and sent on the LAN (as per Publisher's clock), not when the event occurred.
  - Really only useful for testing of LAN "3 ms" latency

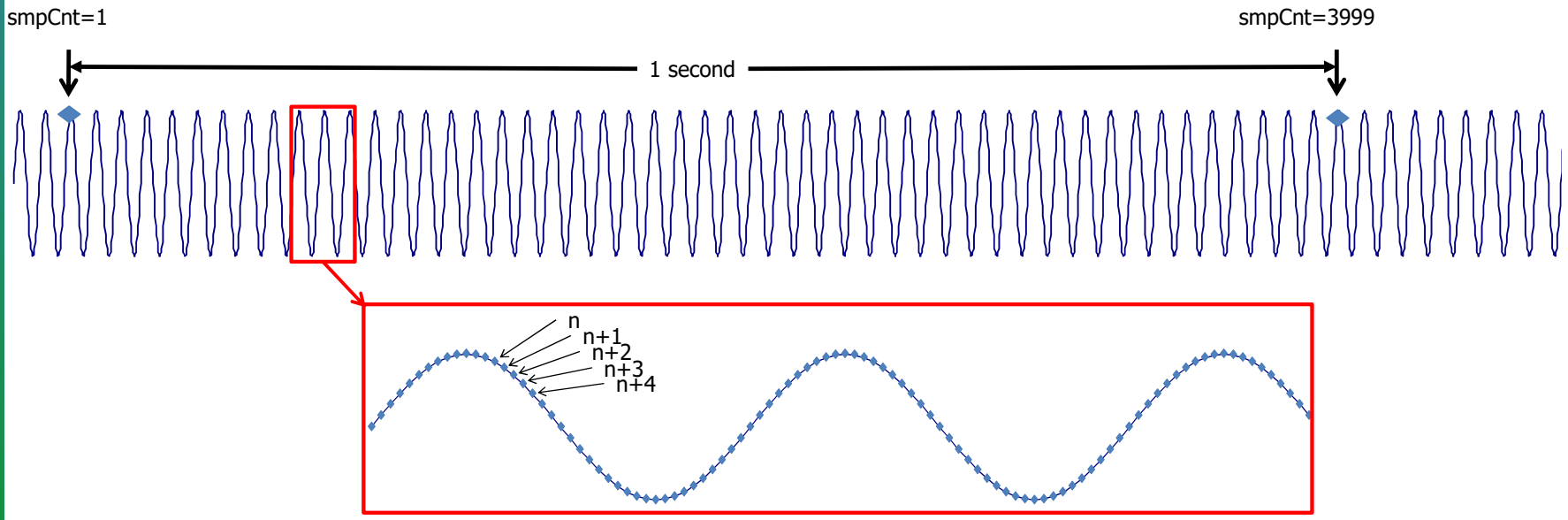
- GOOSE relies on <<stNum>> and <<seqNum>> to identify valid message sequence
  - Yes, they could be spoofed too, but hacker has to already be in the system to identify the right sequence to make a valid spoof

- Time stamp of the event <<Pxxx.Op.t>> is not a "usual" inclusion in high speed tripping GOOSE as it is total 64 bits bits long (32 seconds, 24 fraction of seconds, 8 bit timeQuality)
  - <<Pxxx.Op.t>> only used for Sequence Of Events time tagging at source
    - Arguably SOE investigations may need to know "Sequence Of Reception" by Subscriber
  - Adding <<Pxxx.Op.t>> for each of multiple data set elements unnecessarily & significantly increases the length of the dataset (arguably still small)
    - wasted bandwidth and delays in next message arriving!

- Subscribers react to first new stNum message, regardless of what the real time is, and regardless of the event time stamp <<Pxxx.Op.t>>

Spoofing the actual time is irrelevant to GOOSE

SV does not have the time of the sample in the dataset.
It only has the sample number <<seqNum>> within the 1-second window
i.e. <<seqNum>> = 1 to 4000 for 50 Hz @ 80 samples/cycle



All MUs require 1 us COHERENCY of start of the 1-second window in each IED even if the actual time is "10 years inaccurate"

Spoofing the actual time is irrelevant to SV,
as long as all start the 1-second window together

MMS requires time stamps accurate to 1 ms.
SOE from IEDs all with the same time synch would still be coherent

Spoofing the actual time may distort SOE investigations