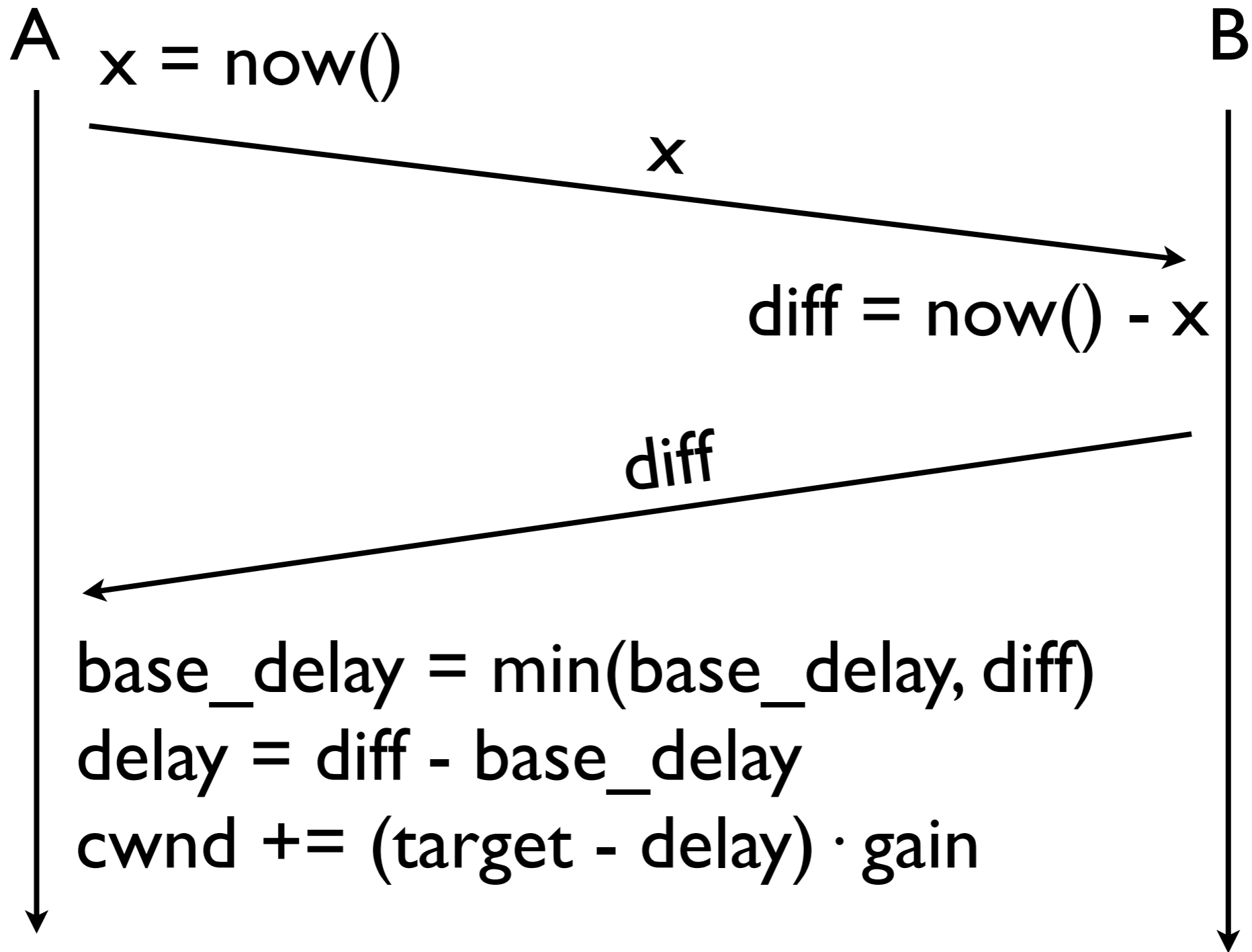


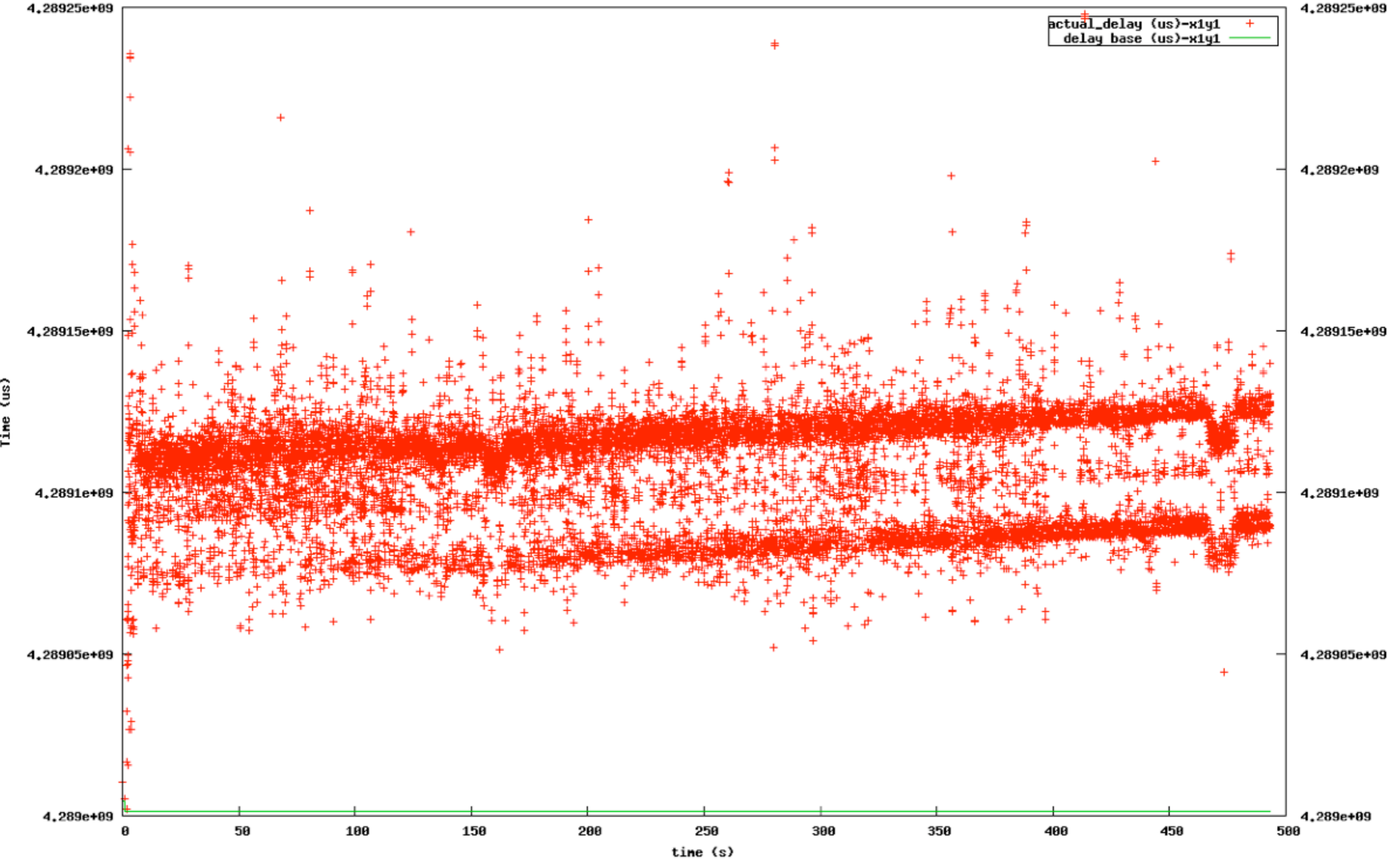
correcting for clock drift in uTP and LEDBAT

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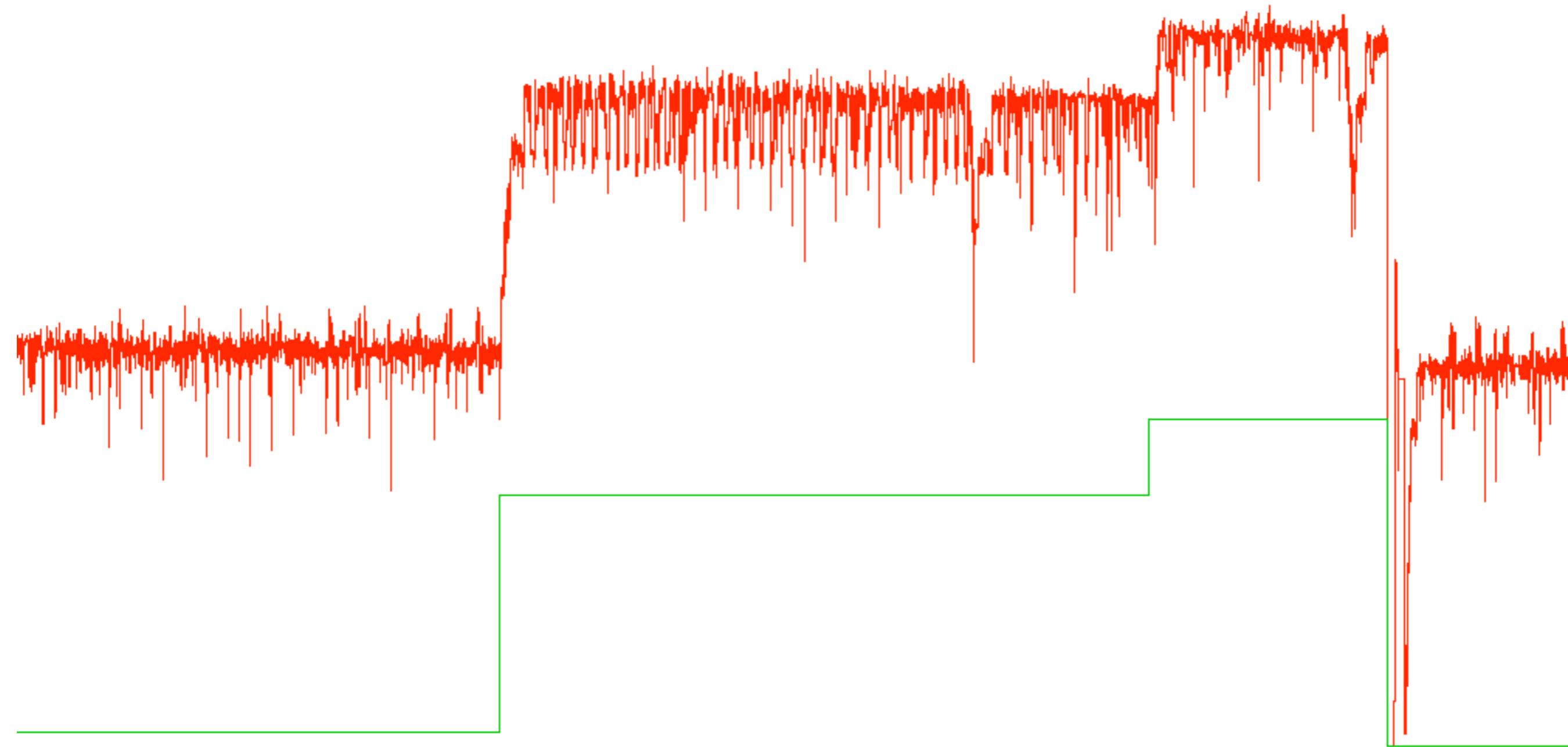
- using a base delay of the lowest ever received *diff* assumes that at least one packet will get through with no buffering delay
- only ever adjusting `base_delay` downwards assumes no clock drift

base_delay [5461953] 0x015cfc18; UTP_Connect conn_seed:2660758874 packet_size:300 (B) target_delay:100 (ms) delay_history:3 delay_base_history:13 (minutes) socket: 0x015a9a60

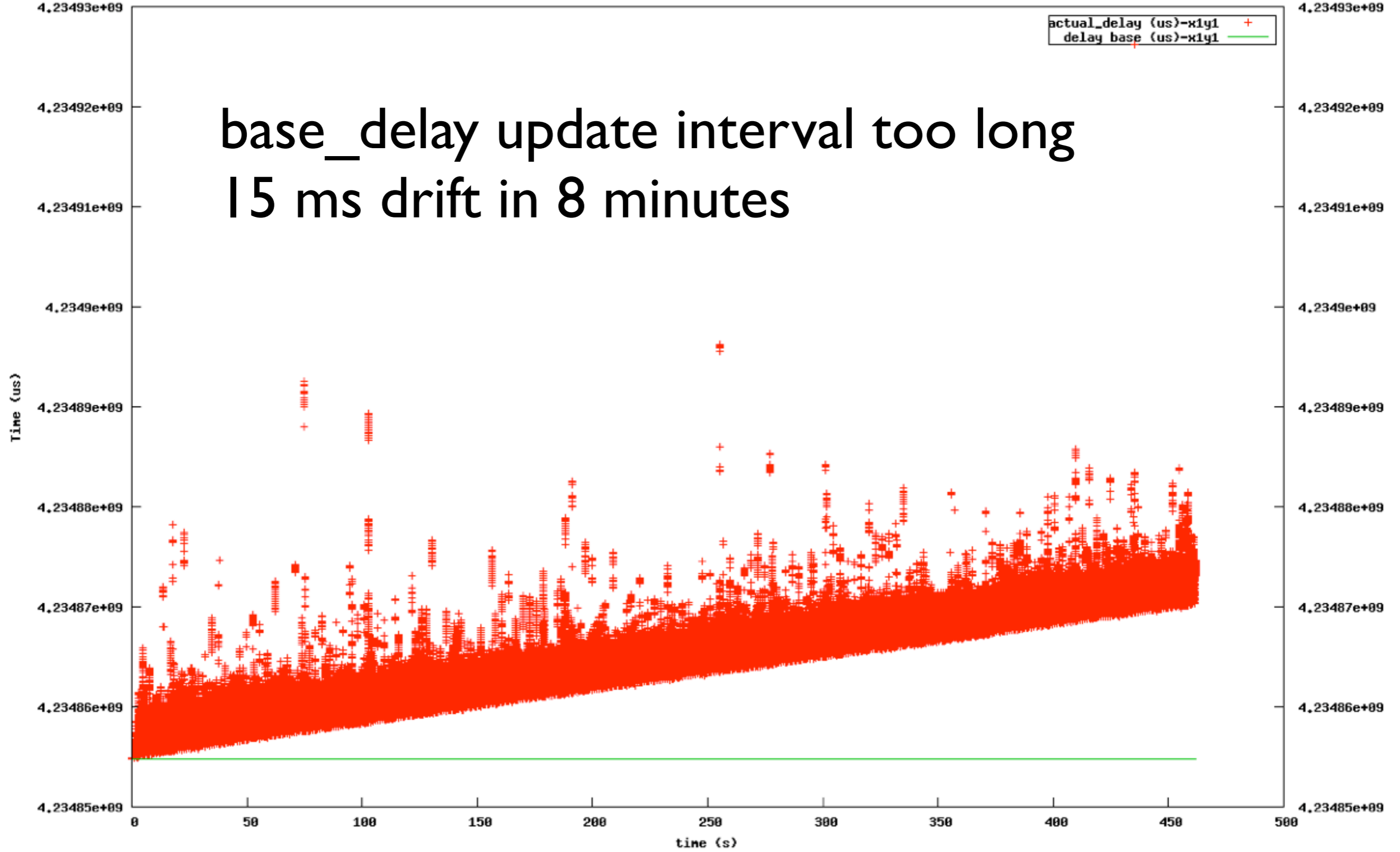


- One solution to clock drift is to update `base_delay` periodically with the lowest seen *diff* in the last period
- What should the interval be?
 - If it's too short, we'll set the base delay to a sample that isn't the true lowest value, and our measurements are unreliable
 - If it's too long, we'll allow a significant drift before adjusting, and our measurements are unreliable

delay_base update interval too short
delays are artificially kept too low for certain periods



base_delay [3051953] 0x015abea8; UTP_Connect conn_seed:4076168982 packet_size:300 (B) target_delay:100 (ms) delay_history:3 delay_base_history:13 (minutes) socket: 0x015aca38

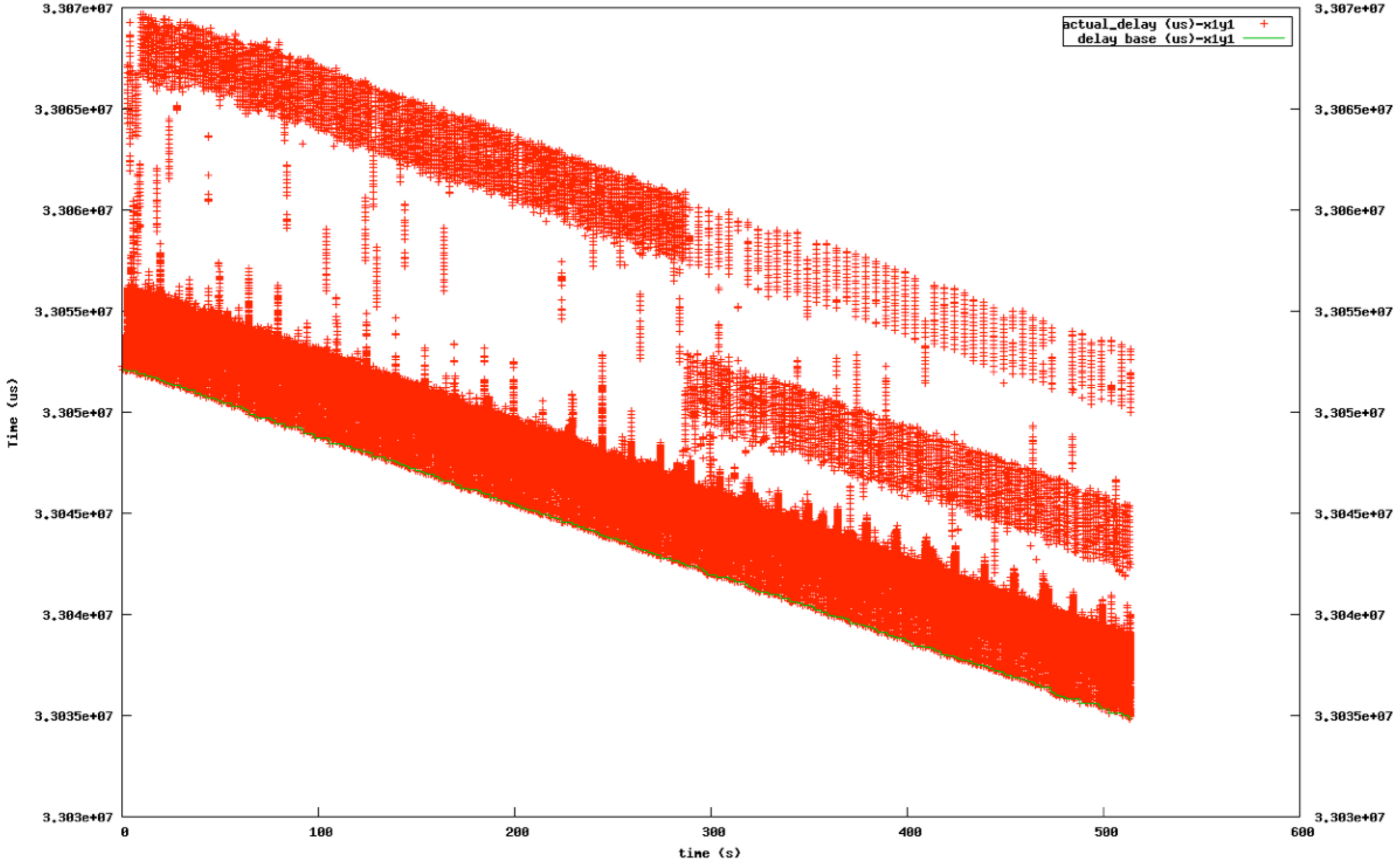


base_delay update interval too long
15 ms drift in 8 minutes

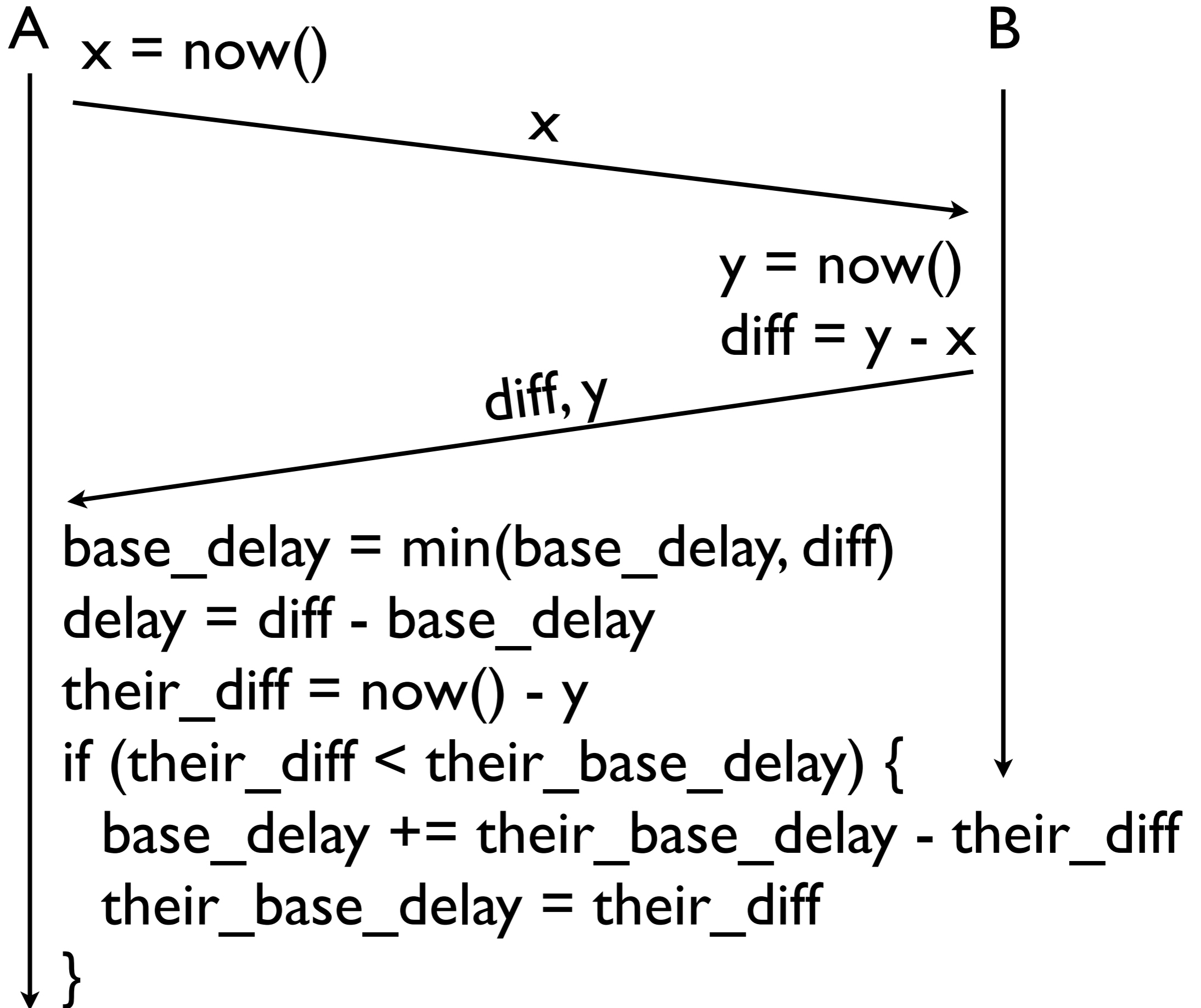
- Tests show that the update interval cannot be less than around 10 minutes on our DSL line
- Other tests on a LAN show a significant drift over 10 minutes
- There is no good magic number for the `base_delay` update interval

- However, if the clock drift is in your favor, it's not a problem
- Since the drift causes the delay measurements to appear smaller, the `base_delay` is updated with the drift

base_delay [853107] 0x0010b4f0; UTP_Connect conn_seed:44316 packet_size:300 (B) target_delay:100 (ms) delay_history:3 delay_base_history:13 (minutes socket: 0x00109890



- We can take advantage of this fact by keeping track of the other end's delay as well as our own
- Whenever the other end's `base_delay` is adjusted downwards, we know it's adjusting for drift and we can adjust our own `base_delay` the same amount upwards



base_delay [6130562] 0x015a92f8; UTP_Connect conn_seed:2915978084 packet_size:300 (B) target_delay:100 (ms) delay_history:3 delay_base_history:13 (minutes) socket: 0x015a92f8

