How does my device report speed?

Link: https://help.wextelematics.com/deep-dive/how-does-my-device-report-speed/ Last Updated: November 10th, 2016

QUESTION:
I noticed three different speed values on my report (Max, Avg, and Inst). How are each of those calculated, and why doesn't the system use the vehicle speed from my engine's computer if diagnostics are supported?

Speed Definitions

Wex Telematics calculates speed using point to point GPS measurement, which is done by analyzing the straight-line distance traversed by the vehicle between two geographic points and dividing this by the time traveled to get the mph of the vehicle:

- **Average speed.** The average speed during a device's report interval, which is obtained at the device level and then verified by calculating the distance traveled (beginning and ending odometer values) and time (update period).
- **Instantaneous speed.** The last speed value sampled during a device's report interval. For example, if a device's report interval is 2 minutes, the Instantaneous speed is the last data point obtained of the 480 data points collected during the update period (4 times per second x 2 minutes).
- **Maximum speed.** The highest speed value sampled during a device's report interval. For example, if a device's report interval is 2 minutes, the Max Speed is the highest data point of the 480 data points collected during the update period (4 times per second x 2 minutes).

Speed in Alerts

Any alert* that supports a speed threshold will default to using the **Inst speed** value. None of our alerts use the "Vehicle Speed" as reported from diagnostics (if your device supports it). That diagnostic output varies by make/model/year and sometimes isn't reported at all. Using point to point GPS calculations ensures a consistent benchmark against which to measure all vehicles.

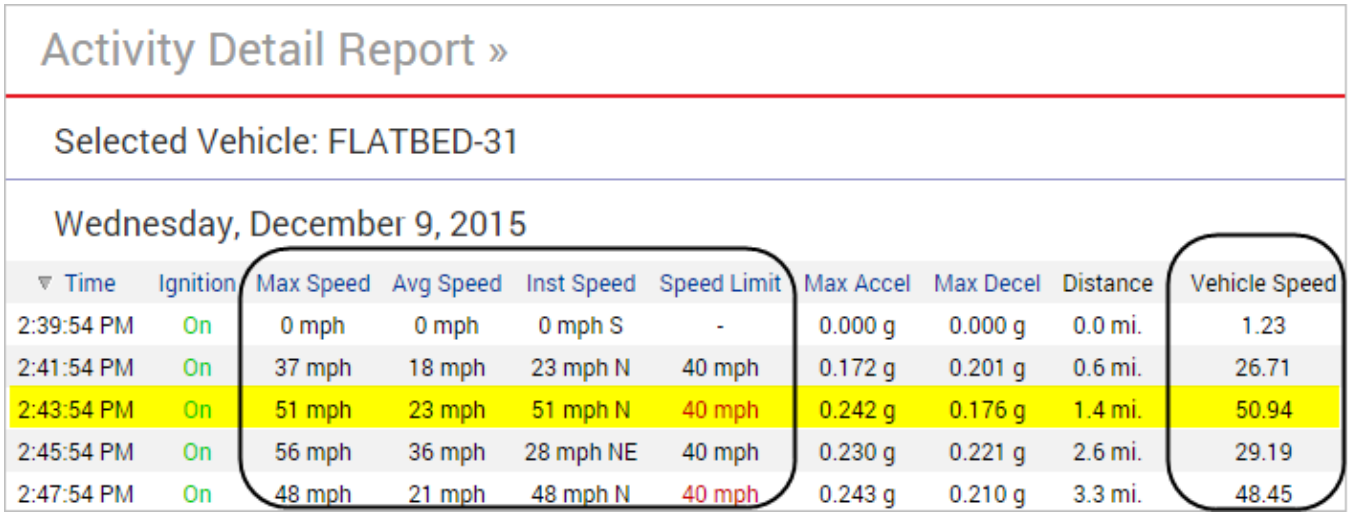
The Speeding Alert is the only alert that includes the *option* to change the default Inst speed to Avg speed. This option is valuable when you need to deduce that a violation occurred at a fixed time and location (e.g., speeding inside the boundaries of a relatively small landmark). The Avg speed option is valuable when you already know a vehicle will have been inside a landmark (e.g., speeding inside the boundaries a vehicle yard in which the vehicle never leaves or speeding inside a relatively large landmark, such as county lines).

Speed on Reports

If the device supports a diagnostic installation, Vehicle Speed may be reported directly from the vehicle's diagnostic port. (Engine speed may also be included, but it is important to note that this variable is measured in RPMs instead of MPH.) If reported, you can add those values to applicable reports–such as the Activity Detail Report. The variance between Vehicle Speed from diagnostics and speed values calculated by the GPS system depends on your reporting interval or other factors. Speed provided from diagnostics is always the instantaneous speed (max not available).

The following example shows an actual report from an employee who was served with a photo radar ticket for

traveling 51 mph in a 40 mph zone. The vehicle's reporting interval is 2 minutes. In this case, the Inst speed matched the photo radar value exactly (51 mph); the Vehicle Speed (from diagnostics) was also reliable (50.94).



Activity Detail Report »

Selected Vehicle: FLATBED-31

Wednesday, December 9, 2015

Time	Ignition	Max Speed	Avg Speed	Inst Speed	Speed Limit	Max Accel	Max Decel	Distance	Vehicle Speed
2:39:54 PM	On	0 mph	0 mph	0 mph S	-	0.000 g	0.000 g	0.0 mi.	1.23
2:41:54 PM	On	37 mph	18 mph	23 mph N	40 mph	0.172 g	0.201 g	0.6 mi.	26.71
2:43:54 PM	On	51 mph	23 mph	51 mph N	40 mph	0.242 g	0.176 g	1.4 mi.	50.94
2:45:54 PM	On	56 mph	36 mph	28 mph NE	40 mph	0.230 g	0.221 g	2.6 mi.	29.19
2:47:54 PM	On	48 mph	21 mph	48 mph N	40 mph	0.243 g	0.210 g	3.3 mi.	48.45

Although this driving instance might be considered aggressive, it is hardly egregious. Whenever possible, shape your driver policies on summary data rather than calculations that are affected by single points of data, such as instant speed and g-force. For example, the Speed Summary Report can mitigate these potential inaccuracies by reviewing the data over a significant period of time, which will better identify drivers that *continually* trend higher with respect to speed rather than isolated instances.

Posted Speed

If a posted speed limit is not correct in the report, you can report an incorrect speed through the portal.

The Posted Speed Violations Report is based on currently available speed limit information from HERE.COM (formerly NAVTEQ). This data does not include temporary speed reductions such as construction or school zones. Many speed limits are 5-10 MPH different in either direction in actuality, and the data is not guaranteed. In some cases, an "average" (such as 42 MPH) between two speeds (40 & 45) is used, which certainly differs from the actual speed limit. As much information as is available is provided for a management individual to reach a reasonable conclusion when it comes to speeding offenses. We strongly encourage you to weigh all the facts before discussing speeding violations with drivers or acting upon this data. Wex Telematics offers the Posted Speed Report free of charge, but with no guarantees that the information provided is 100% accurate, or that the report will continue to be made available free of charge or at all, due to licensing restrictions. By using the Posted Speed Violations Report you acknowledge that the data may not be 100% accurate, and that reasonable interpretation is required to make use of this report. You also acknowledge that Wex Telematics will not be held liable for any misinterpretation of or inaccurate data within the Posted Speed Violations Report, and that this report may be removed from the suite of reports at any time and with no guarantees.

Sustained Speeding

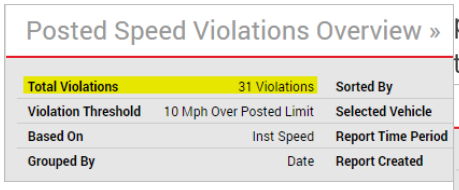
Sustained speeding occurs when two or more consecutive instantaneous speed points are above the speeding threshold within a given time period (customizable). For example, if your device reports every two minutes, a sustained speed instance would occur whenever two instantaneous speed values in a row are above the speeding threshold. Because instantaneous speed values are the last data point received on an update (typically every two minutes), a sustained speed could be determined after four or more minutes of driving

time.

Note. Depending on the device type (e.g., GO9™), sustained speed can be determined in as little as 30 seconds as speed data is collected in seconds.

Let's look at actual examples for a vehicle with a two-minute reporting interval:

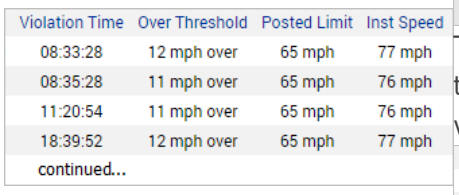
This vehicle had 31 individual posted speed violations.



Posted Speed Violations Overview »

Total Violations	31 Violations	Sorted By	
Violation Threshold	10 Mph Over Posted Limit	Selected Vehicle	
Based On	Inst Speed	Report Time Period	
Grouped By	Date	Report Created	

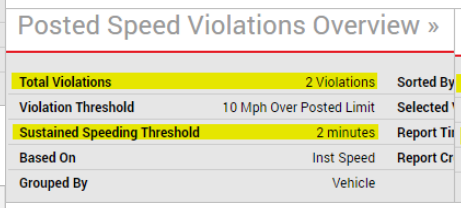
Sustained speeding (duration) is not considered.



Violation Time	Over Threshold	Posted Limit	Inst Speed
08:33:28	12 mph over	65 mph	77 mph
08:35:28	11 mph over	65 mph	76 mph
11:20:54	11 mph over	65 mph	76 mph
18:39:52	12 mph over	65 mph	77 mph

continued...

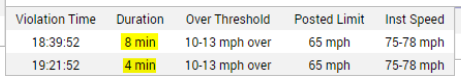
During the same time period, this vehicle only had two sustained posted speed violations for a threshold of **two minutes**.



Posted Speed Violations Overview »

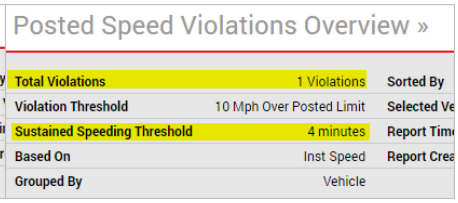
Total Violations	2 Violations	Sorted By	
Violation Threshold	10 Mph Over Posted Limit	Selected	
Sustained Speeding Threshold	2 minutes	Report Ti	
Based On	Inst Speed	Report Cr	
Grouped By	Vehicle		

The minimum driving time required to collect two consecutive inst speed values is **four minutes**.



Violation Time	Duration	Over Threshold	Posted Limit	Inst Speed
18:39:52	8 min	10-13 mph over	65 mph	75-78 mph
19:21:52	4 min	10-13 mph over	65 mph	75-78 mph

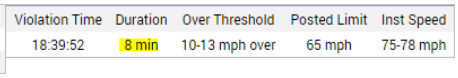
During the same time period, this vehicle only had one sustained posted speed violation for a threshold of **four minutes**.



Posted Speed Violations Overview »

Total Violations	1 Violations	Sorted By	
Violation Threshold	10 Mph Over Posted Limit	Selected Ve	
Sustained Speeding Threshold	4 minutes	Report Time	
Based On	Inst Speed	Report Crea	
Grouped By	Vehicle		

The minimum driving time required to collect four consecutive inst speed values is **eight minutes**.



Violation Time	Duration	Over Threshold	Posted Limit	Inst Speed
18:39:52	8 min	10-13 mph over	65 mph	75-78 mph