Reporting modes

Sensors can generate events in different ways called reporting modes; each sensor type has one and only one reporting mode associated with it. Four reporting modes exist.

Continuous

Events are generated at a constant rate defined by the `sampling_period_ns` (/devices/sensors/batching#sampling_period_ns) parameter passed to the `batch` function. Example sensors using the continuous reporting mode are accelerometers (/devices/sensors/sensor-types#accelerometer) and gyroscopes (/devices/sensors/sensor-types#gyroscope).

On-change

Events are generated only if the measured values have changed. Activating the sensor at the HAL level (calling `activate(..., enable=1)` on it) also triggers an event, meaning the HAL must return an event immediately when an on-change sensor is activated. Example sensors using the on-change reporting mode are the step counter, proximity, and heart rate sensor types.

The `sampling_period_ns` (/devices/sensors/batching#sampling_period_ns) parameter passed to the `batch` function is used to set the minimum time between consecutive events, meaning an event shouldn't be generated until `sampling_period_ns` nanoseconds elapsed since the last event, even if the value changed since then. If the value changed, an event must be generated as soon as `sampling_period_ns` has elapsed since the last event.

For example, suppose:

- We activate the step counter with `sampling_period_ns = 10 * 10^9` (10 seconds).

- We walk for 55 seconds, then stand still for one minute.

- The events are generated about every 10 seconds during the first minute (including at time `t=0` because of the activation of the sensor, and `t=60` seconds), for a total of seven events. No event is generated in the second minute because the value of the step count didn't change after `t=60` seconds.

One-shot

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Upon detection of an event, the sensor deactivates itself and then sends a single event through the HAL. Order matters to avoid race conditions. (The sensor must be deactivated before the event is reported through the HAL). No other event is sent until the sensor is reactivated. Significant motion (/devices/sensors/sensor-types#significant_motion) is an example of this kind of sensor.

One-shot sensors are sometimes referred to as trigger sensors.

The `sampling_period_ns` and `max_report_latency_ns` parameters passed to the `batch` function are ignored. Events from one-shot events cannot be stored in hardware FIFOs; the events must be reported as soon as they are generated.

Special

See the individual sensor type descriptions (/devices/sensors/sensor-types) for details on when the events are generated.