CIS

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An intermittent node—a battery-less energy-harvesting node—frequently switches between off and on, charging energy and operating. From a time perspective, we characterize the node's charge-discharge cycle (or power cycle) using the following notation: $(t_{\text{on}}, t_{\text{p}})$, where t_{on} refers to a node's uptime interval, and $t_{\text{p}} \coloneqq t_{\text{on}} + t_{\text{off}}$, where t_{off} refers to a node's charging time interval.

The Coalesced Intermittent Sensor (CIS) is the abstraction of a group of intermittent senor nodes seeking to mimic the continuous sensing availability characteristic of a battery-powered sensor. Unfortunately, the dependency of CIS on ambient energy and the effect of incoming events on its nodes' power cycles render out the naive option of simply grouping N nodes and hoping that the characteristics of their collective availability would be $(N \times t_{\text{on}}, t_{\text{p}})$. Therefore, the rest of this section will study the CIS's availability, how it evolves when additional nodes are added, the effect of the environment and what is needed to mitigate it, and the effect of approaching continuous sensing availability in a discrete fashion.