### Performance measures

Based on the simulation results, we evaluate the performance of the system model by calculating several performance measures. The following definitions are provided for these metrics:

1. Expected number of all packets in the system,

This performance measure represents the mean number of all packets present in the system upon packet arrival. The calculation formulas for this metric are as follows:

1. Expected number of all packets in the queue,

This performance measure represents the mean number of all packets present in the packet queue upon packet arrival. The calculation formulas for this metric are as follows:

1. Throughput,

This performance measure represents the rate at which all packets complete service and exit the system over a specified time period. The calculation formulas for this metric are as follows:

1. Mean waiting time in the system,

This performance measure represents the average duration that an arbitrary packet spends in the system, taking into account the time spent in the queue, the service time, and the duration before becoming impatient. The calculation formulas for this metric are as follows:

1. Blocking probability of all arrived packets,

This performance measure represents the probability that all arrived packets are unable to enter the system due to a full packet queue. It quantifies the likelihood of packet loss under these conditions. The calculation formulas for this metric are as follows:

1. Energy loss probability,

This performance measure represents the probability that harvested energy units are unable to enter the energy queue because it is already full. It quantifies the likelihood of energy loss in such situations. The calculation formula for this metric is as follows:

1. Impatient loss probability of all arrived packets,

This performance measure represents the probability that all arrived packets, including those that are blocked, leave the system due to impatience. It quantifies the likelihood of packet loss due to impatience. The calculation formulas for this metric are as follows:

1. Impatient loss probability of all admitted packets,

This performance measure represents the probability that all admitted packets, excluding those that are blocked, leave the system due to impatience. It quantifies the likelihood of packet loss due to impatience for only the packets that have been successfully admitted into the system. The calculation formulas for this metric are as follows:

1. Total loss probability of all arrived packets,

This performance measure represents the probability that all arrived packets, including both blocked and impatient packets, are dropped or lost in the system. It quantifies the likelihood of complete packet loss due to either blocking or impatience. The calculation formulas for this metric are as follows:

1. Regular energy consumption ratio for serving all packets,

This performance measure represents the ratio of the energy provided by the regular battery to the total energy consumption in the system. It quantifies the contribution of the regular battery in meeting the energy demands of the system. The calculation formulas for this metric are as follows:

where "ENER\_REQ\_H" denotes the number of energy units required for each High-Priority (HP) packet, and "ENER\_REQ\_L" represents the number of energy units required for each Low-Priority (LP) packet. These values determine the energy requirements of different types of packets in the system and are used in the calculation of the energy contribution ratio.