

LIST OF NOTATIONS

Symbols	Definition
ε	Privacy budget for differential privacy
$T = \{t_1, t_2, \dots, t_n\}$	Set of timestamps generated by the End Device (ED)
T_0	Perturbed timestamps after applying noise
Δf	Query function performed by the Network Server validator
QID	Quasi-Identifier attributes used for k-anonymity
$RT(A_1, A_2, \dots, A_n)$	Anonymized timestamp table ensuring k-anonymity compliance
k	k-anonymity threshold ensuring indistinguishable records
λ	Noise scale parameter in differential privacy
A	Range of noise values in truncated Laplace distribution
$f_{\text{TLap}}(x)$	Probability density function of truncated Laplace noise
t'_k	Perturbed timestamp from the End Device (ED)
t_k	Original timestamp before perturbation
Δt	Time validation threshold (e.g., 14s)
$\text{ano}(t_0)$	Anonymization function for k-anonymity
D_1, D_2	Cloned datasets differing by at most one record
M	Randomized algorithm for differential privacy
$\Pr[M(D_1) \in S]$	Probability of algorithm output given dataset D_1
$\ f(D_1) - f(D_2)\ $	Sensitivity of the query function