## Challenger Randomly choose $\{u_1, u_2, ..., u_v\}$ , RP-based Linkage $Q_1, Q_2, Q_3$ $\{r_1, r_2, ..., r_c\}, \{t_{1,1}, t_{1,2}, ..., t_{v,c}\} \text{ in } [1, n),$ Adversary assign $L_{i,i} = ([r_i]G, t_{i,i}, [u_ir_i]G)$ for $1 \le i \le v$ and $1 \le i \le c$ Randomly choose j' in [1, c], t' in [1, n), assign $L' = ([r_{i'}]G, t', [r_{i'}]Q_1)$ Randomly choose j'' in [1, c], replace $L_{i,i''}$ with $(Q_2, t_{i,i''}, [u_i]Q_2)$ for $1 \le i \le v$ Randomly choose $\{u_1'', u_2'', ..., u_w''\}$ , $\{t_1'', t_2'', ..., t_w''\}$ in [1, n), assign $L_k'' = (Q_2, t_k'', [u_k'']Q_2)$ , for $1 \le i \le w$ $L_{i,j; 1 \leq i \leq \nu, 1 \leq i \leq \nu}$ randomly choose d in [1, w], $L' = ([r_{i'}]G, t', [r_{i'}]Q_1)$ replace $L''_d$ with $(Q_2, t''_d, Q_3)$ $L_{k: 1 \le k \le w}^{"} = (Q_2, t_k^{"}, [u_k^{"}]Q_2)$ $ID_{U'}$ in $\{u_1, u_2, ..., u_w\}$ or not