

Abbreviations
$\sim X_1 = (\sim M_1, \sim M_2, \sim M_3) = \text{choice}[(\text{attvid}_4, \text{attsk}_4, \text{cert}(\text{attvid}_4, \text{pk}(\text{attsk}_4), \text{cask}_4)), (\text{attvid}_5, \text{attsk}_5, \text{cert}(\text{attvid}_5, \text{pk}(\text{attsk}_5), \text{cask}_5))]$
$\sim M_5 = \text{choice}[\text{aenc}((\text{groupkey\_request}, \text{sign}(\text{groupkey\_request}, \text{vsk}_9), \text{cert}(\text{vid}_{13}, \text{pk}(\text{vsk}_9), \text{cask}_4)), \text{pk}(\text{cask}_4)), \text{aenc}((\text{groupkey\_request}, \text{sign}(\text{groupkey\_request}, \text{vsk}_{11}), \text{cert}(\text{vid}_{15}, \text{pk}(\text{vsk}_{11}), \text{cask}_5)), \text{pk}(\text{cask}_5))]$
$\sim M_7 = \text{choice}[\text{aenc}((\text{groupkey\_request}, \text{sign}(\text{groupkey\_request}, \text{vsk}_8), \text{cert}(\text{vid}_{12}, \text{pk}(\text{vsk}_8), \text{cask}_4)), \text{pk}(\text{cask}_4)), \text{aenc}((\text{groupkey\_request}, \text{sign}(\text{groupkey\_request}, \text{vsk}_{10}), \text{cert}(\text{vid}_{14}, \text{pk}(\text{vsk}_{10}), \text{cask}_5)), \text{pk}(\text{cask}_5))]$
$\sim M_8 = \text{choice}[\text{aenc}(((\text{groupkey\_response}, \text{vid}_{13}, \text{gsk}(\text{vid}_{13}, \text{gmsk}_4), \text{gpk}(\text{gmsk}_4)), \text{sign}((\text{groupkey\_response}, \text{vid}_{13}, \text{gsk}(\text{vid}_{13}, \text{gmsk}_4), \text{gpk}(\text{gmsk}_4)), \text{cask}_4)), \text{pk}(\text{vsk}_9)), \text{aenc}(((\text{groupkey\_response}, \text{vid}_{15}, \text{gsk}(\text{vid}_{15}, \text{gmsk}_5), \text{gpk}(\text{gmsk}_5)), \text{sign}((\text{groupkey\_response}, \text{vid}_{15}, \text{gsk}(\text{vid}_{15}, \text{gmsk}_5), \text{gpk}(\text{gmsk}_5)), \text{cask}_5)), \text{pk}(\text{vsk}_{11}))]$

