

Due to the Covid-19 pandemic in 2020 there was a big development of contact tracing schemes and applications. In this thesis, we describe the DP3T scheme and some possible attacks against it mainly the replay and relay attacks. In order to resist these attacks, we formally define and construct Pietrzak's Delay-MAC (INDOCRYPT 2020). Using this construction and the definition of a DCT scheme by Danz et al. (IACR Cryptol. ePrint Arch. 2020: 1309), we formally define Pietrzak's (INDOCRYPT 2020) contact tracing scheme, which we call DP4T. Using the security model presented in (IACR Cryptol. ePrint Arch. 2020: 1309), we prove that DP4T is resistant to replay attacks and discuss if the improvement of DP4T presented in (INDOCRYPT 2020) is resilient to relay attacks. Using definitions and properties from (IACR Cryptol. ePrint Arch. 2020: 1309) we discuss privacy of DP4T. We then present two new attacks on DCT schemes and prove that other schemes from literature are not resistant to them. We prove that DP4T is resilient against one of those attacks and discuss the importance of this result to the improvement of DP4T resistant to relay attacks.