An Analysis of Public-Key Cryptography (PKC) Architecture for Hardware Security

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Abstract

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Abstract:
Hardware security recreates an important part of protecting devices and data from stealing. Hardware-based security solutions deliver better security than software security, which is essential in today's handheld devices. However, hardware trustworthiness has become in this work, and the widely used Public Key Cryptography (PKC)algorithms such as RSA and ECC have been studied and implemented to emphasizetheir importance in data security. The VLSI architecture for the Fast Modular Exponentiation Algorithm (FMEA) and its implementation in the RSA algorithmare presented. Implementation of ECC over GF(p) with underlying mathematical fields is also discussed. The architecture is described using Verilog HDL (Hardware Description Language), synthesized and verified in ZED (Zynq Evaluation and Development) Board (XC7Z020CLG484-1).

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I. INTRODUCTION
Public Key Cryptography plays a significant role in hardware security,asshown in fig. 1. In this regard, cryptography plays a vital role in private key network attacks. Encryption requires elevated information protection with minimum power consumption and significant speed performance in a hardware cryptography system. Elliptic Curve Cryptography (ECC) is public-key cryptography founded on elliptic curves' finite fieldalgebraic structure. The Security level of 160 bits key size in ECC is equivalent to 1024 bits key length of RSA. In ECC,primary operations such as key agreement, signature generation, signing, and verification involve point addition and multiplication.

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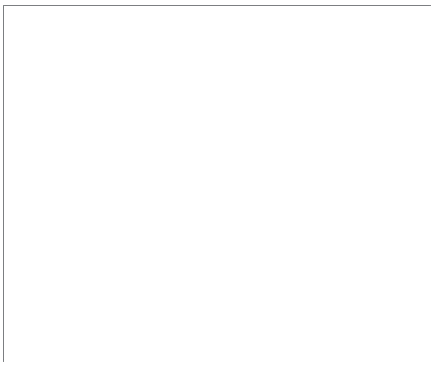

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