Abstract

In the last 6-7 years, there is a rapid growth in the development of Smart Grid Network on earth. Smart Grid (SG) is an advancement to the traditional power grid which integrates the power grid with Information and Communication Technology (ICT). SG is a multilayer environment. In this multilayer environment, there are different layers of communications such as Appliance to Home Area Network (HAN), HAN to Building Area Network (BAN) and BAN to Neighbourhood Area Network (NAN). NAN finally connects to Smart Grid Control Center. There are various security challenges at each layer of communication in SG. In this paper, a comprehensive survey of various authentication protocols to address the security threats in SG environment is presented. Study on five different types of authentication protocols such as simple password based, mutual authentication consensus based and password authentication with Juggling is conducted. Simulation study shows that among all protocols, SG-MCPAK and MCEPAK outperforms in terms of number of hashes, passwords, phases, random number and number of packets transferred. Moreover, an improved protocol SG-JMCPAK is suggested, which
combines the best of J-PAKE and SG-MCPAK.

References

Index Terms

Computer Science  Networks

Keywords

Smart Grid (SG), Security, Authentication, Elliptic Curve Cryptography (ECC).