

Taking Cloud Computing to the Extreme Edge: A Review of Mist Computing for Smart Cities and Industry 4.0 in Africa

E.M. Dogo, A.F. Salami, C.O. Aigbavboa, T. Nkonyana

The advancement and convergence of Internet of Things (IoT), mobile devices technology, big data and cloud computing with its various technological implementations are finally enabling the vision of Smart Cities and Industry 4.0. However, cloud computing concept has been built with the assumptions of good network connectivity, adequate bandwidth and low latency. But with the proliferation of interconnected smart devices and the expected huge amount of traffic and data to be generated, coupled with the stringent and extremely demanding connectivity, high bandwidth and low latency requirements placed on applications and services were embedded in Smart Cities and Industry 4.0 concepts. The traditional cloud-centric architectural arrangement no longer holds due to these cloud architectural model assumptions. Cloud computing is therefore gradually evolving into new complementary concepts as edge and fog computing, and now mist and dew computing. Mist computing addresses these concerns by extending the capabilities and features of cloud and fog computing, with some level of computing intelligence further on the extreme edge of the network closer or on the sensing devices. With the technological revolution currently spreading across Africa, policy makers, academics and businesses in Africa are gradually recognizing the potential opportunities embedded in embracing emerging and future technologies to tackle issues related to urbanization and industrialization as catalyst for sustainable development and growth. This chapter studies the current trend in mist computing and discusses the application and the potential use case scenarios for Smart Cities and Industry 4.0 in the context of Africa. The chapter also explores practical implementation challenges and drivers supporting growth of these emerging cloud technologies in the region. Finally, pertinent technical recommendations were proposed as solution to the challenges identified together with a qualitative analysis of future opportunities of mist computing in the overall vision of Smart African Cities and Industry Africa 4.0.

https://link.springer.com/chapter/10.1007/978-3-319-99061-3_7