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Exploring Data Stewardship in Fog Networking Using Blockchain Algorithm

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Abstract : IoT networks today solve various consumer problems, from home automation systems to aiding in driving autonomous vehicles with the exploration of multiple devices. For example, in an autonomous vehicle environment, multiple sensors are available on roads to monitor weather and road conditions and interact with each other to aid the vehicle in reaching its destination safely and timely. IoT systems are predominantly dependent on the cloud environment for data storage, and computing needs that result in latency problems. With the advent of Fog networks, some of this storage and computing is pushed to the edge/fog nodes, saving the network bandwidth and reducing the latency proportionally. Managing the data stored in these fog nodes becomes crucial as it might also store sensitive information required for a certain application. Data management in fog nodes is strenuous because Fog networks are dynamic in terms of their availability and hardware capability. It becomes more challenging when the nodes in the network also live a short span, detaching and joining frequently. When an end-user or Fog Node wants to access, read, or write data stored in another Fog Node, then a new protocol becomes necessary to access/manage the data stored in the fog devices as a conventional static way of managing the data doesn't work in Fog Networks. The proposed solution discusses a protocol that acts by defining sensitivity levels for the data being written and read. Additionally, a distinct data distribution and replication model among the Fog nodes is established to decentralize the access mechanism. In this paper, the proposed model implements stewardship towards the data stored in the Fog node using the application of Reinforcement Learning so that access to the data is determined dynamically based on the requests.

Keywords : IoT, fog networks, data stewardship, dynamic access policy
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