Chapter 9
Citizen Data in Distributed Computing Environments: Privacy and Protection Mechanisms

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ABSTRACT

Data security is paramount in the increasingly connected world. Securing data, while in transit and rest, and while under usage, is essential for deriving actionable insights out of data heaps. Incorrect or wrong data can lead to incorrect decisions. So, the confidentiality and integrity of data have to be guaranteed through a host of technology-inspired security solutions. Organizational data is kept confidentially by the businesses and governments, often in distant locations (e.g., in cloud environments), though more sensitive data is normally kept in house. As the security mechanisms are getting more sophisticated, cyber security attacks are also becoming more intensive, so there is a constant battle between the organisations and the hackers to be one step ahead of the other. In this chapter, the aim is to discuss various mechanisms of accomplishing citizens' data confidentiality and privacy and to present solution approaches for ensuring impenetrable security for personal data.

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INTRODUCTION

We are completely surrounded by data and it is generated from everything we can think of and every activity we carry out. One kind of data is provided by human beings on voluntary sharing basis; on the other hand, however, the data is created from our activities such as our shopping habit, travel history online products order etc. These data are eventually very much precious and valuable. Data is a powerful tool to make decisions based on patterns hidden in them. Artificial Intelligence of machines helps to understand and analyse the data, learn from the hidden patterns, and make potential decisions which are almost impossible for the human beings if carried out manually. Technology based companies are working hard to buy or collect such genuine data; these data are revenue and the new currency in this mechanised world. Technological advancements are enabling us to understand the value of such data. The interesting fact is that the complete potential of data is not utilized and this is yet to be explored. Numerous businesses and researches are based on this intriguing data to predict the future and further automate the activities. There are several queries that arise for discussion and consideration, such as: who is the owner of the data? What are the rights of others for accessing these data? Is there any constraint or limits to use them? Will the data be exploited?

Legal institutions across the globe are working on the privacy and protection of their people. But this is even more complicated as many nations demand the access to the data of citizens for authentication purposes; which leads to numerous queries such as: Can the governments demand the data for providing basic services or for their benefit? Can there be any national security defect of such data, respecting the privacy of its citizen?

In August 2017, Supreme Court of India held that, the citizens right to privacy is the fundamental right, that is assured by the Part III of the Indian constitution; right to data privacy is available, by law, undeniably.

DATA AND DATA PRIVACY

Information Technology Act of 2000 defines "DATA" as representation of information, knowledge, facts, concepts or instructions that are being prepared in a formal manner (The Gazette of India, 2000). It is intended for processing and may be stored in any form on papers or on a storage device or in the computer memory.

This 21st century is referred as "information age". It is witnessing an exponential growth of digital data, and this digital revolution also brings larger disruptions in all the sectors of the society, especially in the digital economy of the world. Personal data processing is ubiquitous and nearly every single transaction activity involves data transaction. Largest global companies of today are data driven. Internet has borne the digital markets with innovative ideas, that only deal with collection, processing, storing and organising the personal data directly or indirectly as a significant component of such businesses. For instance, World's largest taxi company (known as Uber) owns no vehicles; worlds popular social media "Facebook" creates no content on its own; world's largest accommodation provider (called Airbnb) owns no real hotels etc; and world's largest online shopping "amazon" owns no inventory of goods (Tom Goodwin, 2015).

In the last twenty years or so, there has been a significant growth in the amount of data collected or generated through various mobile applications and inter-connected electronic smart devices. These big