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Confidentiality, Integrity, and Availability (CIA) Triad

The Confidentiality, Integrity, and Availability (CIA) triad model is a framework used to develop information security policy inside an organization (Chai, 2022). Assurance of system security necessitates the fulfillment of all three criteria (Chai, 2022). Although the CIA triad guarantees data security, the procedures of authorization and authentication protect the system access (Chai, 2022).

CIA Triad Breakdown

The breakdown of the three fundamental concepts is as follows: Confidentiality measures are implemented to deter unauthorized access attempts to sensitive information (Chai, 2022). Data encryption is a widely used technique to guarantee confidentiality by putting sensitive information into encrypted form, therefore restricting access to only authorized systems (Chai, 2022). Integrity refers to the maintenance of consistency, accuracy, and trustworthiness of data throughout its whole lifecycle (Chai, 2022). Integrity digital signatures are employed to incorporate nonrepudiation mechanisms, therefore ensuring that the authenticity of logins, messages, electronic document viewing, and sending cannot be refuted (Chai, 2022). Availability refers to the consistent and easy accessibility of information for authorized parties (Chai, 2022).

Fast and adaptive disaster recovery is crucial as it guarantees prompt restoration of the system (Chai, 2022). It facilitates the company in promptly recovering from periods of outage or loss of data. These three concepts are widely regarded as the most crucial aspects of information security (Chai, 2022). Collectively, the framework of the "triad" can effectively guide the formulation of security policies for organizations.

Authentication VS. Authorization

Authentication serves as a fundamental protection against unauthorized access. Typically, it verifies the authorization of users before providing them with information and credentials to access the relevant application (Mitchell, 2024). Authentication refers to the process of confirming the identification of entities when attempting to gain access to computing resources such as devices, apps, databases, and so on (Mitchell, 2024). Single-factor authentication, two-factor authentication, and multi-factor authentication are the three fundamental types of authentications. Authorization serves as an additional degree of protection control that goes beyond the fundamental authentication safeguards (Mitchell, 2024). Authorization governs the specific features and data that users are allowed to access within applications (Mitchell, 2024). It is more comprehensive access control policies and procedures monitor user capabilities after login. Role-based access control, attribute-based access control, and rule-based access control are certain instances of authorization strategies.

Example of Authentication and Authorization

Think of the wish to access your school account in order to review your academic assignments. Authentication would be performed by accessing Canvas and entering your login

and password. However, after we have been authenticated, we are limited to accessing our classrooms solely with our assigned curriculum, as it is granted authorization we gained.

Conclusion

The CIA Triad is a critically significant and structured paradigm employed to enhance data security. Authentication and authorization enhance the security of the model by guaranteeing that only authorized users can access the accurate information or source materials. Both contribute to and collaborate in establishing a strong security framework to safeguard information and mitigate the risk of data breaches and similar incidents.

References

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