

The CIA triad, which stands for confidentiality, integrity, and availability is the top-level framework used to guide cybersecurity protocols. These three terms are the fundamental basics on which our modern cybersecurity regulations and processes are guided by and they each serve an important purpose when it comes to protecting data. Almost every aspect related to cybersecurity can be traced back to one of these three ideals.

Confidentiality refers to the security of data. This means that the data can only be accessed by those it belongs to as well as those on a “need-to-know” basis. This could also be referred to as privacy. Sensitive data should not be accessed by any unauthorized individuals, nor should it be available to those who don’t need to see it (Chai, 2022).

There are two processes that should happen to maintain confidentiality: authentication and authorization. Authentication consists of things like passwords, MFA, and biometrics(Chai, 2022). It validates that users are who they claim to be and is usually the first step to making sure data is secure (2024). After authentication comes authorization, which grants users permissions to access certain data. It is sometimes also referred to as access control or client privilege (2024). Once a user is authenticated, they’re allocated privileges by the system. These privileges allow the user access to certain data and deny access to others. Authorization is given on a “need-to-know” basis, meaning that users are typically only given access to data that they require as opposed to being able to access all data (2024). In a company, HR has access to employees’ PII because that data is typically essential for their job. HR wouldn’t have access to the same employees’ network usernames and passwords because they have no reason to access that data. Proper authorization protocols would ensure that these types of data are separate from one another and are only accessed by their respective departments.

The second part of the CIA triad is integrity, which refers to “maintaining the consistency, accuracy and trustworthiness of data” (Chai, 2022). It’s important that data is not changed or tampered with by anyone other than who it belongs to. When money is transferred between bank accounts, the amount that is sent should match the amount that is received. Any changes could indicate an interception in the transfer. Companies that release software have anti-tampering measures that let the end user know if their software downloads have unauthorized changes. Integrity also means keeping records of all transactions that go on in the system. These are important because even normal transactions can indicate that a breach has occurred through unusual activity.

The final part of the triad is availability. A user should be able to immediately access their data at any time. Maintaining availability typically means having robust hardware and multiple backups of software. This ensures that users are able to access their data even in the event of a system failure, system maintenance, or power outage. Any time spent with systems down could mean financial loss or disruption of operations (Cyber Writes Team). A user should be able to always log into a system to access their data. A user should also be confident that even in the event of a disaster of some sort, their data is still recoverable as lost data has devastating consequences (Chai, 2022).

The CIA triad serves as a fundamental basis on which cybersecurity protocols are built. While the concepts are simple, they have a major impact on the data that governs our everyday life. Every regulation and guideline can be traced back to one of these principles because they serve as the foundation that protects our data.

References

“Authentication vs. Authorization.” *Okta*, Okta, www.okta.com/identity-101/authentication-vs-authorization/. Accessed 13 Sept. 2025.

Chai, Wesley. “What Is the CIA Triad?: Definition, Explanations, Examples.” *TechTarget*, 21 Dec. 2022, www.techtarget.com/whatis/definition/Confidentiality-integrity-and-availability-CIA?jr=on.

Team, Cyber Writes. “What Is the CIA Triad (Confidentiality, Integrity, Availability)?” *Cyber Security News*, CybersecurityNews, 13 Nov. 2024, cybersecuritynews.com/cia-triad-confidentiality-integrity-availability/.