iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** V **Month of publication:** May 2020

DOI: http://doi.org/10.22214/ijraset.2020.5169

www.ijraset.com

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue V May 2020- Available at www.ijraset.com

The Effectiveness of Three-Layered Web Application for Resolving Security Issues

Turkea Ayedh Aljuaid[1], Maraim Abdullah Alotaibi[2]
[1, 2]*Lecturer, Shqra University, KSA*

Abstract: ***In the current research effort, it was found that despite the several countermeasures against the proposed attack on the Internet, there are still ongoing threats and attacks. Of the reasons that have led to organizations run on the edge of a sword and since they have immense competition it is necessary that they have fool proof security. This can only be possible if suitable measures are taken for the security of the information and sensitive data that they have .The study highlight what are the major flaws in the architecture of the web applications that must be considered by the web developers and identifying the appropriateness of the three-tiered web applications for developing security and providing confidentiality to the operations carried in different organizations. This study hence is expected to gain insights about the effectiveness of the web architectures (three-tiered web application in particular). We will take up the qualitative method of analyzing various articles that are available on the topic, The methodology adopted for the research will be a case study rather than the survey or observational as that is not applicable to the nature of the topic under study. Therefore, the overall findings will help the web developers decide the best architecture of web applications that can enable the firms adopts browsers. Finally, the result is achieved that three-tiered web application tends to provide the highest amount of security across the three structure of the organization. It has the potential to provide security to the information and data which is stored and retrieved in the organization across the functioning of the organization.***

Keyword: web applications, security server, three-tiered web application, web attack.

I. INTRODUCTION

Internet security has been a question mark for decades. The security issues have been prevalent since the early 1970s when the history of information security has been unscathed by the digital calamity but has telecommunication technology implemented where the hackers used to evade the system and tried making calls free of cost. Then in the 1980s, when the computers first came into existence, the fraud and abuse related to it became an increasing concern for the users. Not only this, the viruses such as Brain and worm were introduced too. The series of viruses, worms, Trojan horses and attacks became a trend since then and AOL was the first sufferers of phishing attacks where the hackers tried intervening the confidential user information for their own interests during the late 1990s. With such threats, the concept of tracking cookies was introduced which still did no good to the growing criminal concerns related to fastest growing internet technology. In the 21st century, people have been observed tapping into the web security for monetary gains as almost everything is conducted on the internet these days (Semantac, 2009).

Furthermore, Web security in today's world has become of the hottest topics for the reasons that everything is becoming technologically advanced and the use of internet sources such as websites, social media, search portals etcetera have become a trend. People have moved to these internet mediums for information storage and dissemination because of the ease and effectiveness involved in it without realizing the hidden drawbacks of such channels. Since a lot of business and personal related information is stored in the web applications, so it at times suffers the attack of hackers who try breaching the confidentiality of the users and thus impacting the reputation of such web browsers overall. Despite the fact that different software and security mechanisms have adopted, with the growing awareness of and use of internet technology, the threats to these sites have also grown tremendously. All the websites are prone to risks related to security because one party tries competing for the other even if they have to use unfair means such as hacking the confidential information that lets them devise strategy even better than the competitor. Therefore, in order to come up with security solutions, the very first step that web designers must do is familiarise themselves with the probable risks and then how to overcome those which can be hidden in the way web browsers are architected.

Our aim is to evaluate the effectiveness of three-layered web application that would serve a basis for resolving security issues related to web browsing for the purpose of establishing uniformity, security and integrity in the web applications developed throughout the system compared to the other types of architecture developed which approach is best suited to resolve the issues related to web attacks either by the hackers or by viruses. To illustrate more, there might be flaws in the client-server, databases or

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the communication channel between the server, client and cloud. The flaw in any of them in the three-tiered web applications can lead to security issues as a whole. This means particular attention to each layer must be given while the development process to ensure the protection against cyber attacks, fraudulent practices and the thefts, etc. Usually, it is considered that the three-tiered web application is much secure than the other types of two-tier and n-tier web applications. The overall findings of the study will help the web developers decide the best architecture of web applications that can enable the firms adopts browsers that are invulnerable to the security risks such as cyber-attacks, thefts, hackers, viruses, etc. With the increasing events of web browsers targeted by such risks and attacks, it is important to come up with a permanent solution to the problem of web security because in today's era everything is conducted on the internet and a lot of confidential information is shared to maintain separate identification and recognition. Thus, The study is important in analysing what cause the security issues, what the three-layered architecture is and how can it be used for incorporating an efficient and effective system that is safe from security risks.

Therefore, the aim of this study can be achieved by fulfilling the following research objectives: Review the literature related to Web attacks against in some organizations. Study the three-tiered web application architecture that involves the client server, database and the communication channel between the server and the client, the report will teach the web developers and architects as to what measures they must take within each layer to enhance the security of web browsing for the targeted customers. Evaluate different web application architectures and how can they be used to enhance the security of the websites; the problem of web security will be addressed. Analysis the successful conducted for determining the best approach for web applications and the benefits of three-tiered architecture will enable building a strong argument against the elimination of these threats and an implementation of a secure web portal. To come up with the solution to a prevailing problem related to web security and also devising a strategy to overcome this problem in the long run.in order to give the intended audience an idea of what will be the research questions addressed, the following has been stated below:

II. RESEARCH METHODOLOGY

Research methodology refers to the process through which the research would be carried out and the research objectives would be obtained through collecting data from different sources. The different paradigms of research methodology have been shown in the sections provided below. There is a great impact of the methodology selected as the topic involves identifying the appropriateness of the three-tiered web applications for developing security and providing confidentiality to the operations carried in different organisations. These operations are evaluated and based on it, the research objectives are derived through the different levels of organization including the three tiers of the web development phase. Methodology that is implemented helps in establishing the factors and the connection between them throughout the processes carried out in the system. These processes are of equal importance whenever they are considered through the development of processes among the web developers who are working on live projects.

III. DATA ANALYSIS

A. CIA Triad

CIA triad stands for "Confidentiality, Integrity and Availability" can be termed as the model developed for ensuring that the different processes in the field of information security are carried out effectively. These processes have a huge impact on the overall functioning of the organisation as it helps in obtaining the required levels of security as well as intactness in the company. Organisations have many resources that are to be managed well and at the same time, its functioning should be made smooth whenever there are different activities carried out through it. There are many important factors contributing to the state of holding the confidentiality of the information stored in the company. This information has to be stored and recalled whenever it is needed for different purposes in the company. Hence, the term CIA triad was developed. Thus, CIA triad can be referred to as a model that provides guidelines for handling different operations related to the maintaining and security of information in an organisation (Cherdantseva & Hilton, 2013).In the following concepts used in the evaluation of the data analysis:

1) *Confidentiality:* Refers to the holding of the details of information used in the organisation and keeping it intact from being accessed to sources outside the company. It also helps in maintaining confidentiality within the company between the different departments regarding the performance of the employees in the company. It limits the access of specific information when the information is not be disclosed to everyone in the organisation. It also provides an in-depth understanding of the activities and information which should be kept hidden from others in the organisation. It is useful for protecting the information from getting into unwanted hands and hence, it helps in managing the security of the data and information flowing through different activities carried in the organisation (Chong, Vikram, & Myers, 2007).

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2) *Integrity:* refers to the method through which information is used in the organisation and its consistency as well as worthiness is retained through its high performance (Grozev & Buyya, 2015). It provides the requirements of the organisation with an altogether new approach. The information that is used in the organisation should not get into wrong hands and at the same time, the data that is flowing through it must be kept true and unadulterated or manipulated by any other harmful source of person. It involves providing the authority of changing the data or altering it to a selected panel of personnel and that any of the unauthorised personnel cannot alter the data even if they can see it (Chong, Vikram, & Myers, 2007).
3) *Availability:* Refers to the process of availing the information and obtaining it from the system whenever it is required through retrieving it from the database. There are many activities to be carried out for making the system completely functional. There are other features which reflect the details of the activities carried by the personnel in the company. It is therefore equally important for the organisation to make the data or information available throughout the process that is to be followed across the company. It involves keeping the entire system upgraded and ensuring that the different parameters involving the development of system related information and data pertaining to different employees in the organisation.

Figure 1:CIA triad in web security



(Cherdantseva & Hilton, 2013).

In the above figure, the three aspects of the CIA triad model have been shown. They are interdependent on each other as shown in the form of the sides of the triangle. The triangle would be incomplete without even one of them; similarly the CIA triad would be incomplete without all the three elements. It is necessary that these three parameters namely, Confidentiality, Integrity and Availability are determined for the three-tiered web architecture structure and its suitability would be obtained from the developers.
The questionnaire that was circulated among the participants was collected through surveys. 20 responses were obtained through the surveys. The population taken into consideration were the developers who have worked on three-tiered architecture and have a significant exposure to the different factors and parameters offered by the functionalities available in this kind of architecture. It has been statistically analysed by developing the important factors in the form of variables in the research. There is a huge emphasis on the development of three-tiered web architecture throughout the organisation. It facilitates the flow of information through the clients, retrieved from the database and accessed through the web application taken into consideration. These factors have been analysed through the development of variables across its structures and it involves developing considerable evaluation of the factors taken into account through the responses obtained from the participants.

4) *Cost, Complexity and Performance:* The variables would be analysed on the basis of the cost, complexity and performance of the different tiered web applications through the web architecture (Florescu & Kossmann, 2009). The suitability of the three-tiered web architecture on the basis of these three parameters would be evaluated and it has been shown statistically through graphs displaying the result of the survey collected from the developers through the developed questionnaire. The main functioning of the three- tiered application has been determined by the several responses obtained from the participants. There is an in-depth involvement of these parameters for obtained the overall suitability of the process for managing the flow of information through the organisation as well as ensuring that this information and data is secured and kept intact (Joshi J. B., Aref, Ghafoor, & Spafford, 2001).

The analysis of the information collected is on the basis of the variables developed from the questionnaire which has been collected from the web developers in the form of a survey. The complexity as well as the performance of the three-tiered web architecture has been evaluated through the survey developed on the basis of the questionnaire provided in Appendix A.

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IV. RESULTS AND DISCUSSION

The data collected from the participants through surveys has helped in identifying the importance of a three-tiered web application in the industry. It has also helped the formation of selective strategies that would inculcate development of higher levels of security in the organisations across the globe.

It can be obtained from the data collected for different questions through the survey that three-tiered web application is gaining significance in the field of securing the organisations and providing them with the required level of integrity throughout their functioning. It has a huge impact on the overall functioning of the subject. It can be stated that the majority of the respondents were aware of the three-tiered web application. They responded in a positive manner where about 14 out of 20 web developers participating in the survey had some knowledge of three-tiered web application. It involves developing considerable amount of work throughout the framing of security and its related network across the system. The work required for maintaining the network across the globe related to the security of the organisations can be achieved with the help of a three-tiered web application. It is imperative to form ideal structure and strategies through a proper planning process for the development of a three-tiered web application. It is through this that the main element of the three-tiered web application referred as the best use of it has been evaluated from the participants through their responses. It has been observed that there is a significant impact of the established options which involves considering it for connecting servers, transferring information, providing security through web application and storage of data. There is a considerable amount of networking required for ensuring high levels of system security across the organisation. It has the potential to develop adequate number of factors for ensuring that the coding of different applications in the system is carried out successfully. It is through the development of these strategies that there is a continuous development of appropriate strategic plan throughout the development of three-tiered web application across the structure. There are many specific reactions which are developed across the functioning of the security to be provided through the information and data that is to be shared among the employees across the organisation.

The previous deduce that impact of using three-tiered web application for reducing Web attacks, findings will be discussed in detail in the six points: Firstly, It was observed through question 3 in the survey that three-tiered structure helps in providing security different organisations which other web architecture cannot. It also involves developing an intense structure throughout the development of strategies and formation of appropriate structure which would help in establishing considerable amount of benefit for the strategies developed across the system. The web developers have stated that they think that three-tiered web application is highly efficient in providing web security which cannot be provided by other styles of web architecture. It refers to developing adequate parameters and factors which would have a considerable role in the development of strategies and related plans related to the handling of data throughout the organisation. It also provides the characteristic of retrieving the information throughout the data.

Secondly, through the question 4 in the survey, the different types of web application were obtained. It was though this that the main functioning of the three-tiered web application was obtained. The different web application structure which are developed include the formation of web application architecture across the system and it includes the following web applications:

A. Single tiered web application
B. Two-tiered web application
C. Three-tiered web application
D. Multi-tiered web application

These are the different tiers of web application which can be used and there are different characteristics attributed by each one of these applications across their functioning in the organisation. It has a considerable impact over the development of the entire structure of the web security in a company. It performs the function of storing the data in one of the most secure ways and then retrieve it accurately through the data base which is kept secure.

Thirdly ,there is formation of several layers of security over the information which is stored and shared through the company. There is an external factor acting in the provision of specific action related to the development of specific course of activities to be carried out through the execution of web security and development of web security application in the system. It is one of the most critical factor helping in the development of appropriate structure related to the establishment of specific factors related to the same.

Fourthly**,**through the 6th question in the survey, it can be evaluated that there are different characteristics displayed across the working of the three-tiered web application in the structure adopted across the organisations. It involves developing several parameters on the basis of the requirements of the organisation. It is through this characteristic that the different features of the three-tiered web application can be obtained across the system. These characteristics involve confidentiality, integrity, Availability,

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Performance, Cost and complexity. Evaluating the need for web security tends to be one of the most important elements in developing the characteristics. It is through the formulation of strategies that the different characteristics are developed across the functioning of the security related applications which are carried out in the organisation. It has the potential to store data without any physical form of storage and hence, it tends to be more secure and integrated across the system. There is a great contribution of the available factors through the system which would encourage the flow of information throughout the system and the structure adopted in the system across the functionalities of the server taken into consideration for securing the web applications in an organisation. It can also be stated that there is a considerable amount of migration to the development of strategic factors related to the establishment of related security concerns throughout the organisation. There is an additional advantage along with this characteristic obtained through the use of three-tiered web application. It includes the feature of saving the data even ne one of the tier fails. This helps in keeping the information secure and intact. The logic of business in the three-tiered web application is more secure as the clients do not have any kind of direct access to the database of the organisation obtained through securing the information in it.

Fifthly, It also involves parameters related to the development of strategies by the developers having an in-depth understanding of the subject throughout the different researches developed on the subject of web security applications. Three-tiered web application has been critically evaluated by many types of research. The traditional organisational structure of security has also been analysed in the research paper. It has been observed that there is formation of an interrelationship between the different factors related to the development of web security across the globe. It is one of the most prominent element which also involves the factors like confidentiality, integrity and availability of the system implemented in the organisation. This system is adopted for providing security to the organisation and maintaining the information shared across the organization. It also involves formation of specific structure pertaining to the inclusion of cost, complexity and flexibility across the web security application which is to be implemented in the organisation for securing the information and retrieving the secured information whenever it is needed. Moerver ,The factors which are mentioned above were ranked on the basis of their importance by the participants that were contacted through the survey. It involves a complete evaluation as well as understanding of the parameters that tend to influence the working of the system across the functioning of the organization in the company. Confidentiality and Integrity obtained the highest ranking in the system across the functioning of the system. It also involves developing appropriate strategies pertaining to the establishment of strategic as well as technical aspects of security which is to be considered across the system. It involves establishing a considerable part of the system and introducing it in the organisation. There are many factors pertaining to the development of suitable techniques as well as methods pertaining to the development of appropriate security related applications providing an extensive web security to the different structures observed in the organization. It is through the formation of several elements that the determination of the correct web security can be determined from the evaluated data obtained through the web developers in the form of direct responses. Thus, it can also be stated that cost and complexity is one of the least ranked characteristics of three-tiered web application.

Finally**,**the nature of complexity of the different web security applications was obtained through question 7 and it was obtained that there is a significant role of the vertical two tier web structure has the highest level of complexity for web application. It can be stated that diagonal three-tiered application has the lowest complexity as provided by the participants. It can also be stated that there is a significant impact of the factors pertaining to the development of complexity in the web security application industry. It is one of the most significant element in establishing a suitable role for the development of strategies and formulating them across the globe. It can be evaluated through the obtained information that two-tiered web application in the form of two-tiered levels has the highest complexity and it cannot be adopted for implementing several security related factors in the organisation. It is also imperative that the development of norms and other policies is through the establishment of factors contributing to the establishment of appropriate structure throughout the network.

V. DISCUSSION RELATED TO DIFFERENT RESEARCHES

There is a considerable amount of research carried out through reviewing various literatures related to the development of strategies and methods which would be having a considerable effect on the development of appropriate strategies and norms related to the development of this network across the functioning of the security system concerned with the establishment of appropriate factors. It can also be stated the formation of web security through the domain of the three-tiered web application has a significant impact on the development of an accurate flow of activities which is to be regulated in the organisation. The norms related to the development of considerable amount of research have helped in establishing the important elements contributing to the achieving of the required security in the company. It has a major role to play in the development of the required level of security through the web architecture observed in an organisation. (Gottschalk, Graham, Kreger, & Snell, 2002).

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The level of web security provided by the three-tiered web application has been evaluated through the system. It has also helped the development of strategies related to the development of appropriate factors for the provision of web security across the different levels observed in organisations. There is a system prominent that has a considerable impact on the availability of resources for the handling of information and data through handling the information security of the IT system in an organisation. It was agreed by most of the people or participants were taken into consideration that there is a huge impact on the establishment of suitable plans for the same.

There are different factors contributing to the development of various issues and factors pertaining to the development of strategies having a huge impact to the development of security across the organisational structure taken into consideration. It can also be implemented in the manufacturing system because of the above mentioned functionalities as it would help in establishing a secure manufacturing system across the organisation (Lal & Onwubolu, 2007).

Different developers can work simultaneously on different tiers as each and every tier is independent. It also involves the development of strategies contributing to the achievement of different business levels across the security dimension of the organisation (Gómez, Cachero, & Pastor, 2001). There is a major role played by the development of appropriate strategies and factors having a great influence on the development of complex structure as required by the three-tiered web application across the system.

There is development of an accurate web security application throughout the development of the security provided to the organisation and the information that is to be kept safe in the organisation. It is through the development of different kinds of systematic information which is to be shared and developed across the functioning of the system across the organisations. It has a huge role in determining the different purpose for which the organisation is developed and established. The elements of the web security also involve connecting the different domains of information and establishing a proper synchronisation between them (Liu, Heo, & Sha, 2005). It will help in ensuring that the main functioning of the developed strategies and techniques for proper adoption of three-tiered web application in the organisations is imperative.

It was also developed that considerable amount of evaluation is required for identifying a proper and most feasible as well as appropriate solution to the development of three-tiered web application in the system. It also helps in encourages adequate number of features across the establishment of various factors contributing to the success of the organisation. It also helps in tracking the flow of information across the system. The development of system across the functioning of strategies involves the development of strategies that have the potential to establish a considerable amount of data throughout the system ensuring that it is tracked across the organisation whenever it is required.

It also comprises of an architecture model which is to be considered through the development of security related features in the company pertaining to securing the information shared across the different levels in the organisation. It is a complete combination of the three tiers including the client level or tier, web tier and the database tier. The importance of these three tiers is obtained through proper functioning of the web security application in the organisation. It also involves establishing an extensive relationship with the retrieving of information whenever needed from the secure source implemented in the system. It is imperative to understand the flow of the information which is to be carried out through the organisation.

The provision of an accurate and appealing (GUI) Graphical User Interface reflects the proper use of the three-tiered web application across the system. It has a huge role in the development of the system across the different functions that are carried out in it. It ensures that critical level of understanding is carried out through the establishment of certain factors pertaining to the development of suitable characteristics in the system. There is a considerable level of understanding which is required throughout the establishment of the system and it would help in ensuring the right amount of data to be transferred across the organization.

The different elements which are taken into consideration involves the development of appropriate strategies pertaining to the formulation of the entire presentation tier throughout the organization. There is a major role played by the presentation tier in improving the performance of the company across the security dimension involving different kind of information to be established across the organisations. These kind of security related factors are very much dependent on the establishment of parameters related to the development of strategies which would help in deriving an appropriate style of securing the information through the web application developed in the organisation. There is a scope to scale each and every tier horizontally and this provides the feature of accessing each and every tier separately for their evaluation and analysis.

The different servers that are present in the system developed throughout the structure observed in the organisation. Web requests has no relation to the development of the data related parameters across the system. It has a crucial role to play in the development of appropriate strategies related to the formulation of separate network which would have an enormous impact on the development of security related parameters in the system. It is very much imperative to store information without actually adding servers to the

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web application and hence, three-tiered web application is very much feasible for the same. The installation of the web application is very simple as compared to other systems pertaining to the system. It has a huge impact on the development of appropriate factors pertaining to the establishment of appropriate techniques for securing the information.

There is a considerable amount of research required throughout the development of appropriate factors which are to be considered through the establishment of factors having a huge role in the development of appropriate security across the system. It helps in obtaining sufficient level of caching through the security option provided across the system.

1) *Summary:* It has achieved the main objective which evaluated the effectiveness of three-layered web application that would serve a basis for resolving security issues related to web browsing for the purpose of establishing uniformity, security and integrity in the web applications developed throughout the system compared to the other types of architecture. Therefore , The impact of using three-tiered web application for securing the information across an organisation has been evaluated and analysed on the basis of the data collected. Furthermore , there is a significant role played by the development of factors related to the development of appropriate strategies in the system. The development of appropriate systems is through the formulation of developed characteristics related to the development of virtues that have a huge impact on the development of security in the company and it has been evaluated in the above sections. Then , appropriate conclusion will be derived in the next section of the research paper.

VI. CONCLUSION AND FUTURE WORK

Thus, it can be concluded that whenever a web security is required in an organisation, there are different tiers of web applications which are available. All of them provide specific and individualistic functionalities. Three-tiered web application tends to provide the highest amount of security across the three structure of the organisation. It has the potential to provide security to the information and data which is stored and retrieved in the organisation across the functioning of the organisation. It is through the development of several critical factors that the demonstration of the main parameters of security in order to protect the information from getting leaked from the organisation or get accessed by unauthorised source can be taken into consideration.

It has also been discussed consecutively in the research that web architecture needs to be implemented on an organisation for securing the flow of information and other data which is transferred from the organisation to its employees. There is a constant threat of this information getting accessed by unauthorised sources within the organisation or outside the organisation. Hence, there is a need to adopt web security application on the server. It should be noted that the elements pertaining to the development of suitable forces need to have a proper implementation of the tiered web structure and three-tiered web application would play a significant role in achieving it throughout the system. It also has the potential to identify the factors pertaining to the development of appropriate means ensuring high levels of security across the organisation. The parameters corresponding to the attainment of security can be achieved through proper installation and implementation of the three-tiered web application taken into consideration in the system.

There is development of a framework related to the data base and the formation of a secure communication channel between them including the client and the user. It involves considering the secure sockets layer throughout the functioning involving the different layers of protection over the security network taken into consideration. The effectiveness of the triple or three-tiered architecture has been compared to the other types of architecture developed for the purpose of establishing uniformity, security and integrity in the web applications developed throughout the system.

It can be stated from the discussion that the three layers of security which are provided by the web architecture in an organisation tends to be one of the most important element in attaining the required level of security in the organisation. It is also through the existence of parallel factors that the main functioning of the security related concerns within the maintenance of information and data flowing through the system is carried out and obtained accordingly.

It has been observed throughout the discussion that the different layers of web architecture provide different levels of security to the organisation. However, in order to obtain the most suitable web architecture for securing the web application, the main functioning of the organisation needs to be taken into consideration. It is also through the existing factors that the forces were pertaining to the development of elements related to the development of appropriate action to be taken across the web security provision across the organization. The three tiers of the clients, database and the system need to be maintained effectively in order to ensure that there are considerable amount of factors to be considered while encouraging the flow of information across the system. It also includes the development of factors pertaining to the existence of the organisational elements pertaining to the provision of Information Security across the system. There is an inclusion of the developed means of action developed across the organisation for ensuring that the proper system throughout the web architecture has been adopted and implemented across the different processes and activities carried out in the organisation.

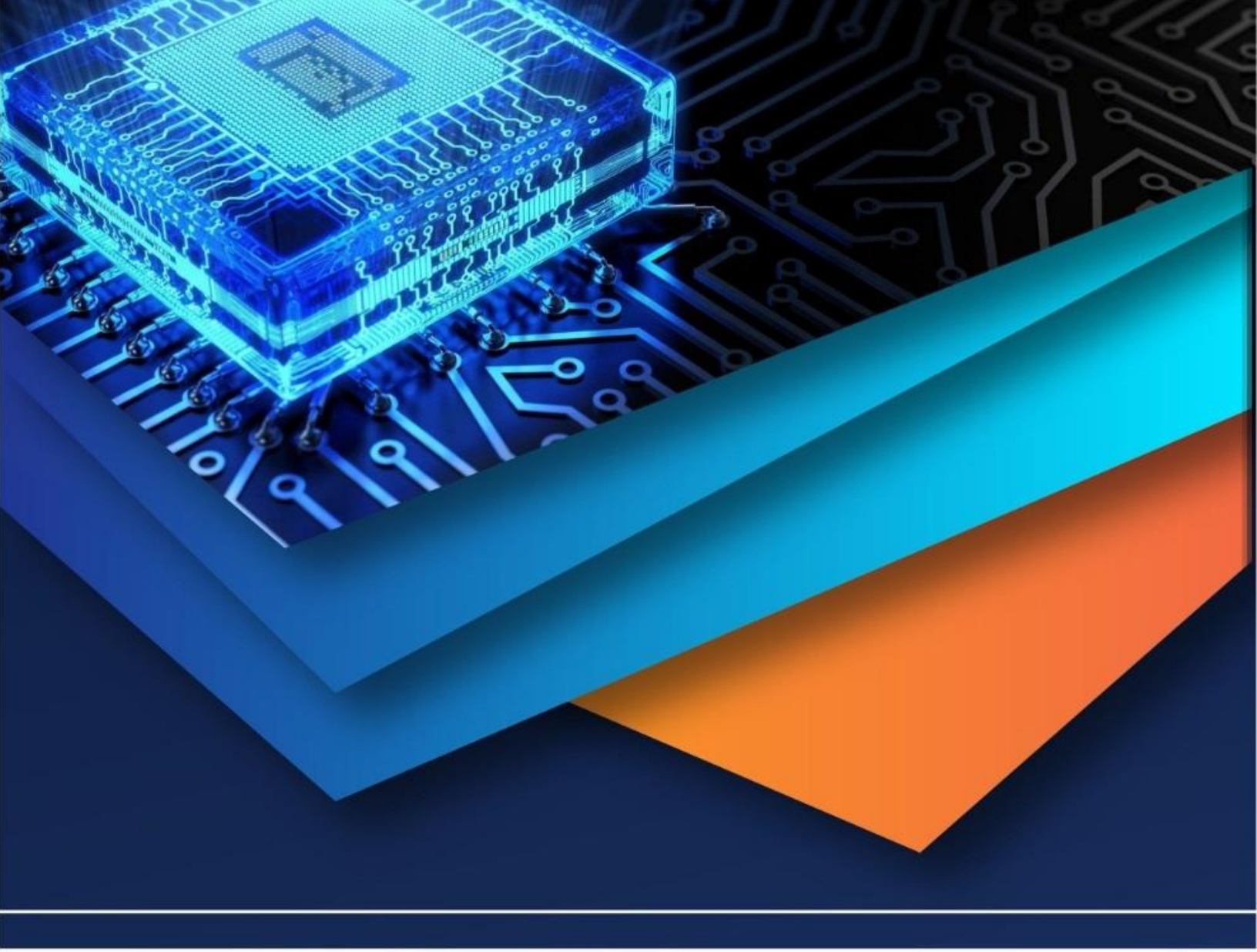
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There is a critical functional factor responsive to the development of security across the different functions carried out across the organisation. Web architecture tends to be manipulated by the factors supporting the existence of the Web applications. These web applications are extremely unique in order to obtain the correct functionalities across the system. It is also through the developed applications that the development of existing factors would be considered as one of the most appropriate elements in working with the system. Future work will be shown from three aspects. Firstly, improving organizational information security. Secondly, security of originations based web application of architecture. Finally, future researchers to conduct research on the same issue. The following will explain the three aspects in detail.

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