Ethical Hacking As A Method To Enhance Information Security. Cyber attack protection methodology

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Abstract

In modern technical world internet is the main information provider and storing method. The security state on the internet is getting worse. Ethical Hacking techniques are introduced to increase online security in case of identifying ascertained security vulnerabilities related with programs of others. The national and private organizations immigrate most of their crutial data to the internet, hackers and crackers have wide opportunity to yield access to sensory information via the online application. Therefore, the importance of securing the systems from the affliction of immense hacking is to encourage the individuals whowill caster back to the illegal attemptive attacks on a computer system. Ethical hacking is an examination to revise an information technology surrounding for potential exhausted links and vulnerabilities. Mainly, ethical hacking traverses the technique based on hacking going on a network in an ethical manner including with virtuous viewpoint. This research paper explores ethical hacking introduction, types of ethical hackers, ethics behind ethical hacking, ethical hacking methodology, kinds of tools that are used for the process of ethical hack, cyber security concepts.

Keywords-Hacker,Cracker,Ethical hackers,Security,vulnarabilities

I. INTRODUCTION

The immense advancement of the Internet exist to brought large amount of improvements like electronic commerce, electronic mail, easy access to giant depot of reference material, distance learning facilities, electronic banking. Calling to the disadvantages, the technical development, criminal hackers who will furtively steal the organization’ s or administrative data and information to transmit them to the open internet without privacy. This process is done by black hat hackers. The white hat hackers or Ethical hackers are another group of hackers who came into persistence to plug up security holes and effects of cyber security. Ethical hackers conduct the hacking always legally and trustworthy manner as a security test for the systems. Therefore, ethical hacking raised as the testing of wealth for the technological betterment with focusing on s and protecting and securing IP systems. For the enhancement of Information security ethical hacker teams are applying the similar techniques and methodologies of a hacker but in a legal manner without harming the targeted systems or stealing the information. They evaluate the targeted system’ s security activation and report back to the owners with the bad attacks. They encountered and ordering with rectification instructions. Completing an ethical hack assessment through a system does not mean that the system is fully secured. An ethical hack’ s quotient is a well explained report based on the explorations and evidences. There by, a hacker consisting of certain amount of skills is oris not possible for the victoriously attack to a system and get access to the information. The ethical hacking can be classified as a security assessment, a way of practicing, an examination for protection of information technology background. The Ethical hack illustrate the risks that information technology background is confront of, and procedures that allows to minimize certain risks or to accept them. The following figure shows security life cycle which shows the Ethical hacking procedure ideally.

silence and overcome from the major issues done by black hat hackers. This research paper explains about ethical hackers, their skills, how ethical hackers helping their customers and

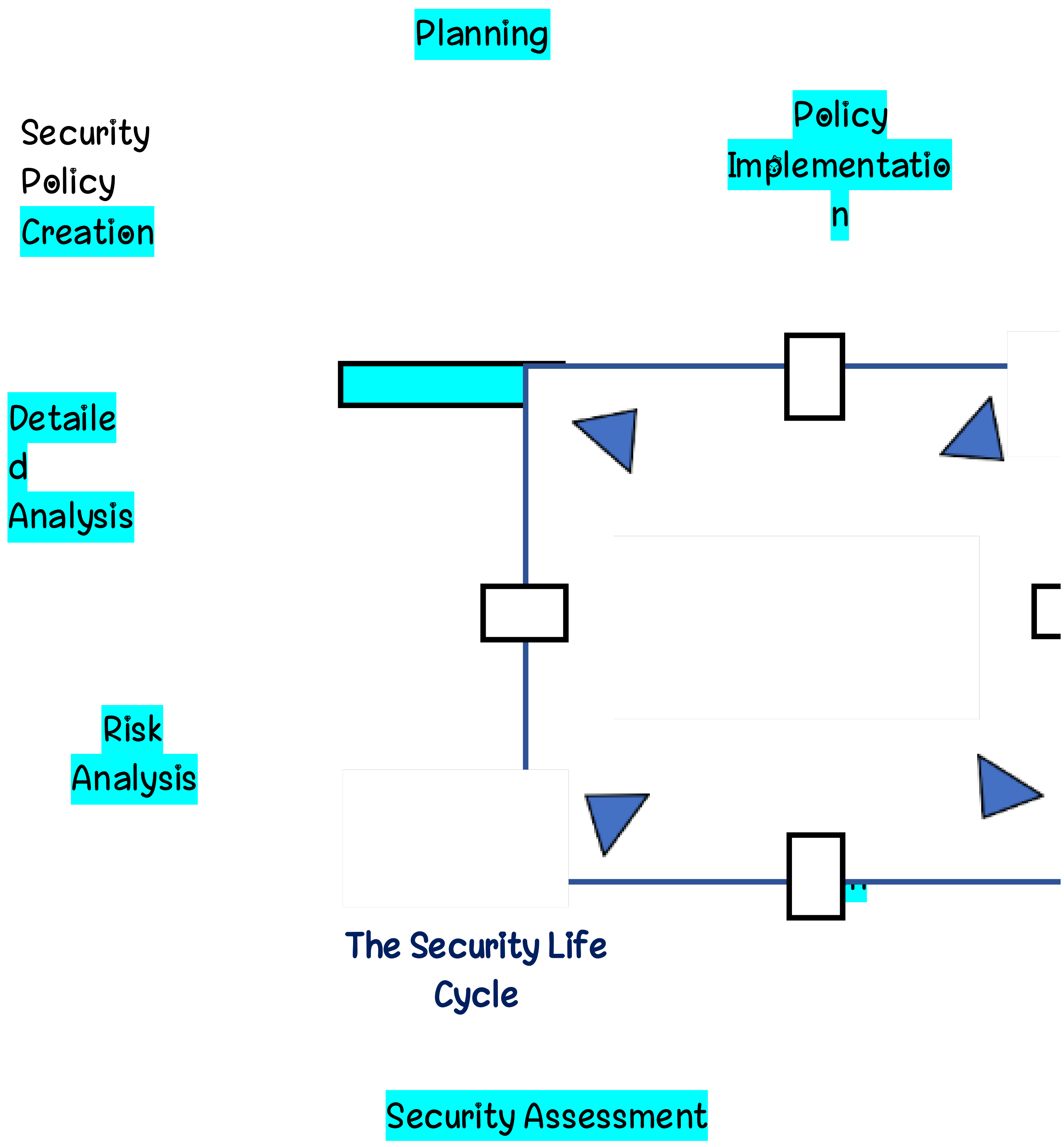


Figure 1

II. LITERATURE REVIEW

[4] Hacking can be explained as one of the misunderstood major cyber concepts. The greatest number of individuals think that hacking as something illegal or evil, but nothing can be farther from represented truth. It is clear that, hacking may be an actual threat, but to stop hacking yourself by someone ,it is a must for you to learn hacking techniques.[3]Aman Gupta explained well about techniques and methods such as Wi-Fi hacking ,penetration testing and DOS attacks with the aim of providing a better knowledge in hacking methodologies and eventually preclude your devices or computer from being a target easily.[10] History of Computing carries all together up on to one minute coverage about all basic hacking concepts, issues and terminology , with all skills you have to keep developed in this field. The research thoroughly cover ups core hacking topics, such as assessments of vulnerabilities, virus attacks to the sites, hacking techniques, spyware and its activities, network defenses, passwords protection and detections, firewalls and its behavior, intrusion detection and VPN.[2] Ethical Hacking: The Security Justification Redux is a research with all extensively and clearly mentioned about art in both attacks and defense .

III.I DENTIFICATION ABOUT TYPES OF HACKERS

Hackers are malicious computer and technical experts in both software and hardware. He is a computer master and enthusiast in security, programming language and network knowledge. According to the manner of his performing and based on the individual intensions HACKERS can be classified as follows.

a. Black Hat Hackers
b. Grey Hat Hackers
c. White Hat Hackers

a. Black Hat Hackers

Black Hat Hackers also define as a " Cracker" . A cracker is a computer software and hardware expert brain who breaks into the security protection of other external person with having a malicious or bad desire or intentions to damage or steal their secret, curtail and important information. This is compromising the protection of the large organizations, closing down or functions altering of networks and websites. They exceed the security of the computer for their personal benefits. They are individuals who are generally needs to prove their comprehensive knowledge inside the computers and accomplish different types of cybercrimes like credit card fraud and identity stealing.

b. Grey Hat Hackers

Grey Hat Hackers are kind of computer hackers with knowledge on security expert sides who are sometimes violate the laws but they do not have intentions of any malicious activity. The word Grey Hat is formed from the

White Hat and the Black Hat since the White Hat Hackers find and able to know the vulnerabilities inside the network

,computer system the networks and they do not reveal to any one else until the wrong is being fixed, on the other side the Black Hat Hackers illegally abuse the network or the computersystem to search and identify vulnerabilities and inform other parties the way of doing such thing whereas the Grey Hat Hacker never ever illegally dispose or exploits to anybody else as such. The Grey Hat Hackers are stand in between the Black Hat Hackers who proceed malicious works to exploits the computer systems and White Hat Hackers who proceed with maintaining of a system in security protection.

3. White Hat Hackers

White Hat Hackers are possessed with specialist knowledge on computer security that breaks down into for the finding gaps in the fully secured networks and computer systems related to some of the organizations and companies. Then theywork for correcting malicious actions by improving the protection or the security. The White Hat Hackers use their expert knowledge and experienced skills to protect the organization or the company before malicious are putting theirhands on it and prevent the harm which is going to happen within the computer system or the network. Therefore, White Hat Hackers are type of authorized individuals in the industry, wherever the methods applied by both the party' s white hat and black hat hackers are similar and work with thepermission from the company or the organization who hires them to proceed such.

IV. ETHICS TO FOLLOW IN ETHICAL HACKING

A. Conform with the Ethical Hacking Principles:

Every Ethical Hacker must follow and obey with a few basic principles to avoid from bad occurring. Most probably these principles get forgotten or ignored in planning or executing ethical hacking tests. This causes most dangerous results.

B. Operate in Ethical way:

As the word suggests ethical means working or proceeding with high professional principles and morals. In conducting ethical hacking tests for your own systems or for a person who has metered you, all you perform as an Ethical Hacker must support the company' s goals and must be approved. Any kind of hidden agendas are not allowed. The ultimate objective is to ensure trustworthiness by un-allocating misuse of data and information.

C. Respecting towards the Privacy of the owners and information:

Behave with having a great respect towards the data and information you gather in the hacking process. The privacy of all the data and information which you gather during your testing from Web application log files to clear-text passwords must be protected.

D. Not crashing with your systems

When people try to hack other systems; they ended up with crashing their own systems is a significant mistake identified in this process. Poor planning is identified as the main reason in behind. Not reading the guidelines critically, not study the documentation or wrongly understand the usage and power of the protective tools and methodologies by testers are few of the points identified as poor planning. It is easy to createmiserable situations inside your systems when examine. Allowing to run many examines rapidly on a system causes wide system lockups. Many security assessment tools can control over number of tests are performed on a system at the parallel time periods. At the occasions which needs to proceedthe tests on production systems during regular business hours these tools are capable enough.

E. The Plan Execution:

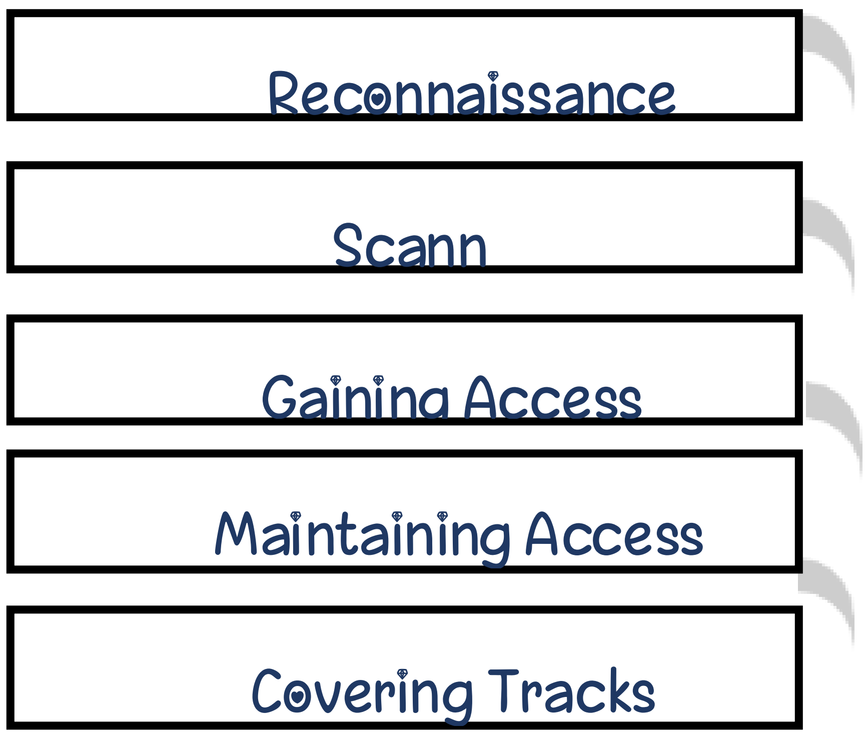
The most significant and most important attitudes of a hacker is time and patience bonded with skills towards the action launching. When performing ethical hacking procedures, it is better to be more careful.

V. THE PROCESS OF ETHICAL HACKING

The advance type planning can be seen in Ethical hacking. All kinds of technical, strategical and management issues should be considered. The proper planning is much more important for any kind of testing starting from a very simple and small password test to all the outer penetration tests on a web application or a web site. Backup offing data or information must be ensured. Since the testing might be break off unexpected way. If some person claims or suspended, they never authorize for the tests. Therefore, a well explained scope is involving with the following mentioned information.

a. What are the specific systems that should be tested?
b. What kind of Risks are involved?
c. Prepare a schedule to have test and overall based timeline.
d. Find out and explore the knowledge of systems that we are engage with before start testing.
e. The precautions to be done after a major vulnerability is exposed?
f. Clear outlet about the significant deliverables which includes the reports based on security assessment reports and the premium level reports about the popular vulnerabilities to be called.

VI. PHASES OF HACKING



Reconnaissance

Scann

Gaining Access

Maintaining Access

Covering Tracks

First Phase: Reconnaissance

A hacker should have knowledge well about the hacking targetto do an attack systematically for a system. It is noticeable to take an overview about the used systems and the network. Information transverse as DNS servers, the administrator contacts and IP address ranges are collected. Different kinds of tools are used in this phase like network, network mapping, and vulnerability scanning tools are most commonly used tools. As an example, Cheops can be mentioned. It is an excellent network mapping tool which can produce networking graphs. Those networking graphs are doing a big help on the upcoming attack phase and to have an network overview. To do a successful internal ethical hacking this tool is essential. The attacker must possess a bundle of informationand data about the target at the end of this phase. A promising attack path is built up using this all information collected by reconnaissance phase.

Second Phase: Scanning

During the Scanning phase probe and attack are the two main processes that are proceed on. There by, excavate in, reaching to the closer and sensing a feeling to the target. Therefore, in this time, hacker must compete for the gathered, feasible vulnerabilities founded from the first phase (reconnaissance phase). Tools that are assigned to this phase are multi sided like web exploits. Buffer overflows and the brute force are required in this phase tool activating process. Here, Trojans like Net Bus able to deploy for capturing keystrokes, take screenshots and start applications and a host. This phase consumes very big time slot to complete. If brute force attack techniques are get used by hackers or when an individual petition of software to be improved and analyzed this phase is doing a massive work.

Listening is another second phase process. Probe, attack and listening are the main combinations of Scanning process. Having a listening to the network traffic or to having a listening to application data are instantly helpful to riposte a system for developing deep into a corporate or an associate network. Since the listening is more activate as soon as the one has limited with an essential bottleneck of communication. During the listening phase most, usable tools are Sniffers. These sniffers are built from simple to more complex forms as multiple sniffers. They are existing in all the operating systems as console based to GUI driven. Ettercap isa sniffer that can even poison ARP tables for enabling the sniffing action in switched surroundings. And, uncover totally new situations for network traffic listening.

Third Phase: Gaining Access

This is known as first access wherever this phase is not about the taking of root access only about taking any kind of access to the system, maybe it is a user account or root account. Sincethis access action is available with, this makes relevant time for going a premium access levels or newer systems which are currently reachable through the acquired system.

Fourth Phase: Maintaining access

This phase is an addition of stealth process and advancement. An advancement phase is presumably the vast creative demanding step, from all the unlimitedly opened possibilities. Sniffing network-traffic might uncover significant passwords, wanted usernames and traffic related to e-mail with the associated information. Sending e-mails to the administrators by faking the certain well-known users or clients might help in taking expected information, data or access to a fresh system. Probably, the person also must commute the configuration records to disable or enable features and services. At last installing of new tools to the devices and contributory scripts will helps to go in deep levels and to scan the logging records and files for descriptive details. Stealth: Few systems are having higher valued systems which are acting as firewalls or routers, the systems, where there is having root account should be acquired. For the accessing to such kind of systems with a passed time, it is a must to clean and clear all the relevant logged records and files.

Fifth Phase: Takeover

Takeover is a process which, once the root access is arrived, the is considered as winner. Then after onwards it makes possible for installing any kind of tools, thereby it can perform each and every task and start each and every service upon the particular assigned machine. Based on the machine, now it is possible to wrongly access trust and worthy relationships, create new bondings or damage significant security checkups. Cleanup: This is an instruction set in a finalized report about the way of removing identified trojans. Even though of this is an action of the hacker itself. By removing and cleaning all the traces to the its greater extent is a way of duty for the hacking craft. In an ethical hack, it most occasions have a significant risk, only if the task could not properly complete. Therefore, a hacker is using all the dilated tools to hide its attacks from the attacks formed by the ethical hackers. Also, should try to attack for the attacker' s system, as to take-up the entry for the system of ethical hackers and collection of all the information and data free of charge with an already prepared and sorted. Constructing an ethical hack scheme and holding a higher- level site security is a challengeable task that is became a duty of professionals.

VII. BENEFITS OF ETHICAL HACKING

Since ethical hacking engage with an excellent role model in modern security era, where the network using individuals are frequently increasing. The hacker types who gaining the advantages of network while staying at the home place. The following are the identified main advantages of ethical hacking.

a. The conflict against terrorism issues and security issues.

b. Preventing the action of malicious hackers to take the access of crucial data.

c. Ethical hackers think that an individual can protect in best way , the systems allowing them in the way of causing non damage and eventually fixing the founded vulnerabilities.

d. Ethical hackers deploy their knowledge as risk management techniques.

VIII. PRE-RIQUISIT TO ETHICAL HACKING:

For the purpose to discover the vulnerabilities existing in information systems' operating environments and operating surroundings , Ethical hacking is the methodology adopted by ethical hackers.

One of the better method to evaluate the intruderthreat , is to implement professionals attempt in an independent computer system security towards breaking their identified systems. Powerful and knowledgeable ethical hackers possess different kinds of skills. They must have to be completely trustworthy mindset in engaging ethical hacking purpose. Ethical hackers genarally posses wide strong programming and computer networking skills. Thereby adopt at installing and maintaining of the systems which are more popular operating systems (e.g., Linux or Windows 2000) used on targeted systems. Those first level skills are augmented in brief knowledge target of the software and hardware provided by the vendors who are popular networking and the computer hardware system collaboration.

An ethical hacking engaged person evaluate a system' s security by providing answers to following mentioned questions :

Intruder' s identifications on the target systems
Intruder performance for gathered information
Notice the intruder' s at tempts or successes byending party
Protective document
Against actions
Time, effort, and money willing to expend in obtaining adequate security.

If an ethical hacker is hired by an organization, the person first and foremost asks the organization about the sections that needed to be protected, against whom is this check is going to perform, and resources that are willing to expend to gain protection for the system.

IX. CONDUCTING ETHICAL HACKING :

The steps followed to conduct Ethical Hacking are as follows:

Talking to the client about needs of tests.

Preparation of the documents and asking the client tosignature.

Preparation of an ethical hacking team with drawingup schedule in testing programme.

Conduct the test in scheduled manner.

Analyzation of the results and prepare the report accordingly.

Report delivery to the client.

The 3 components that security evaluation engaged with:

Preparation: Here, a contract which is signed with containing a non disclosured clauses and the legal clause for the protection of the ethical hacker in against any prosecution that might be attract during the conduct phase in formal manner. The contract is outlines infrastructure perimeter, activity evaluation, time schedules, and available resources with him[7].

Conduct: In this phase, the evaluation of technical report has made in the based on testing potential vulnerabilities which are very well identified .

Conclusion : Here the results grabbed inside of the evaluation are collected and communicated to the organization with their sponsors and corrective ways of action performing is taken according to the needs of conclusion.

X. VULNERABILITY RESEARCH

Researching and collecting all types of vulnerabilities that open to an operating system with the included applications to attacking process. This includes both ways of dynamic study of product applications and technologies of innovative and ongoing assessment of the hacking underground level. Relevant innovations are released in the form of alerts and are delivered within product improvements for security systems. They can be classified on:

The level of security provided (low, medium or high)

Exploit range (local or remote)

Ethical Hackers are needed with vulnerability research for :

Recognize and re-correct network vulnerabilities.

Secure the network from being attacked intruders.

Capture the information to prevent problems .

Collect information about viruses.

Find out the weaknesses in the network and to alert the network administrators before an attack caused bythe network.

Recovery methodologies from an instant attack.

XI. APPROCHES TO ETHICAL HACKING

Ethical hackers are using different kinds of methods to break the security system in an organization at the time of cyber attack from the other side. Ethical hacking can be conducted infollowing ways:

1. **Remote Network**: The process which is significantlyutilized towards the identify of the attacks which are caused throughout internet. Generally the ethical hacker usually tryfor recognize the proxy and default based information into the networks. They may be firewalls, proxy , etc.

2. **Remote Dial-Up Network:** A hack is recognized and makea try on protesting of an attack that is going to happen among the pool of the modern client . In searching the open system, an organization will take the use of method known as war dialling for representative dialling. As the example open system can be mentioned to the attacks happen in this manner.

3. **Local Network:** This kind of hacking is a process that used to access all theinformation that are illegal from an authorized network by having the use of physical access with someone, taking through a local type network . The beginning of this process, the ethical hacker should be energetic enough to access the local network rapidly and directly with a proper understanding about the series.

4. **Stolen Equipment:** This method is easy to recognize the information related to the thefts like the laptops, hard disk
.....etc. The information in the site are secured by owner of the laptop and they can be recognized. Information about the customer, user name, email , security settings and password that are included in the tools are encoded by stealing of the laptop or desktop.

5. **Social Engineering :** This is an attacking proceedure which is used in checking the reliability and accessibility of the organization. Therefore this can be done by taking the usage of the telecommunication and face to face communication with collecting data which are usable in the attacks. This is anspecial method utilized to know the information about the security that are used by the organizations in their usual activities.

6. **Physical Entry :** The Physical entry is used by the organizations to control the attacks that are comming through

the physical premises. With using of physical layer, the ethical hacker can work towards the increasement and can produce virus and other Trojans directly onto the network or the site recognized.

7. **Application Network:** In the logic flawing on in current situation in the applications might be work as result action for the illegal access of the network and in the applications and the other information that are provided inside the applications and systems.

8. **Network Testing :** In here, mainly observes towards the unsecured data that are present inside the internal and external network or sites, not only in the particular network, also inside the devices and virtual private network technologies too.

9. **Wireless Network Testing :** The process is for wireless network minimization of the network liability to the viral attacker by using the radio access towards the given wireless network space area.

10. **Code Review:** The process that can be observed the source code; part of verification system and able to identify the weaknesses and the strength points of the modules that are included to the software application.

11. **War Dialling:** Simply recognizes the information which are default are observed inside the modem ; is hardly harmful to the corporate organization.

XII. DISCUSSION

According to the constructed information for the justificationof security in ethical hacking, it is divided into two types as Exposing security transversions must not be rewarded or encouraged and Every company is not consisting ofresources to shield existing versions on the system software.Though it might be not certain as the past, the present networksystems are significantly dependent on each-other for theaspect of security. One unsecured device placed within amajor network can apply as a platform which is up to activatethe attacks. The spreded denial of service attack actions are of February 2000 used compromision based hardware devices toflood the Electronic commerce sites in indirect manner.Anyway, each of the computer security is depending on thesecurity of other computers which are situated within the itsown community interest. Likewise, the deploying the flaw ofsecurity is a positive procedure in both self-interested andpublic betterment. In consideration with the present site' sprotection types, the week security on internet, the concept ofethical hacking is the most effective methodology toproactively plug all the identified security chambers andprevent from all the intrusions. Ethical hacking tools likescanners are having notorious type of tools for the crackers. Afine-line having in between hacking to public interest andpublic community betterment versus leaving tools that might really enable for the attacks and in the aggregates making the internet as unsecure whenever it used to consider in all.

XIII. CONCLUSION

Network test assignment is the most important way of ethical hacking for putting and storing information asset in secure way. The best three advantages of ethical hacking are ,improving the overall protective postures, Providing security against the intellectual property thiefes and fulfilling legislative mandates. The majority of Information Technology organizations are conducting their ethical hacking on wireless and wireline networks, operating systems and applications in frequent way or annual search .There is no single unique set of methodology for move on with ethical hacking. The reference terms are used for different phases in the hacking anatomy might vary, but includes are similar. Hacking is not for everyone but for an objective mind set. A lots of free time, dedication is needed to keep up with hacking process and they never use the knowledge to the purposes of offence. The lack of the experienced staff is mostly cited as significant challenge in conducting ethical hacking internally and improving the capabilities of ethical hacking.

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