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Network Security

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ABSTRACT

In21stcenturyinternetisexpandingwithtremendousspeedsooneofthebiggestchallangeistosecuretheinternalnetwork .Therearemanyindustries,governmentandbusinessapplicationscontinuetomultiplyontheinternetandthesework-basedapplicationandserviceswhichcanposesecurityrisktoindividualandtoinformationresourcesofindustriesandgovernments.so,ithasnowbecomeaneedofanyorganization.Abestsecuritysolutionnotonlyresolvesecurityproblem,butalsoreducethetotalcostofimplementationandprocessnetwork.Thesecurityhackersincreasingtremendouslyandmakinghighspeednetworkandinternetinsecureandunreliable.Therearemanymethodsfornetworksecuritysuchasfirewall, internetcontainfilters.soourpaperwillemphasisonneedtoprotectvaluabledataandnetworkresourcesfromcurruption andintrusion.Networksecurityischallangingthanever,astodayscorporatenetworkbecometremendouslycomplex.

KeywordsNetworksecurity,Securitytrends,Securutygoals,Hackers,Crackers

I.INTRODUCTION

Computernetworksecurityisconcernedwithpreventingtheintrusionofanunauthorisedpersonintoacomputernetwork. Ascomputerconnectivityincreases,computernetworksecuritybecomesmorecomplex.Networksecurityisdefinedasprotectionofnetworksandtheirservicesfromdestruction,ordisclosure,andprovisionofassurancethatthenetworkperformsincriticalsituationsandhavenoharmfuleffectsforneitherusernorfororganisation[1].Itdealswiththerequirementsneededforacompany,organizationorthenetworkadministratortohelpinprotectingthenetwork.Computers,networks,andtheInternetaffectourliveseverydayorwecansaythatwearesomuchdependentonthemtomakeourlifecomfortable.Weallareconnectedtotheinternetwithoutanyboundary,soNetworkSecurityisessentialinthisenvironmentbecauseanyorganizationalnetworkisaccessiblefromanycomputerintheworldand,therefore,potentialvulnerabletothreatsfromindividualswhodonotrequirephysicalaccesstoit.Ifwehavetheknowledgeofhowvariousattacksareexecutedwecanprotecto urselves.

II.TYPESOFSECURITY ATTACKS

Securityattackscanbeclassifiedunderthefollowingcategories:

2.1)PassiveAttacks

Thistypeofattacksincludesattemptstobreakthesystembyusingobserveddata.Exampleofthepassiveattackisplaintext attacks,wherebothplaintextandciphertextarealreadyidentifiedbytheattacker[1].

Theattributesofpassiveattacksareasfollows:

•Interception:attacksconfidentialitysuchaseavesdropping,“man-in-the-middle”attacks.

•TrafficAnalysis:attacksconfidentiality,oranonymity.Itcanincludetracebackonanetwork,CRTradiation.

2.2)ActiveAttacks

Thistypeofattackrequirestheattackertosenddatatooneorbothoftheparties,orblockthedatastream inoneorbothdirections[1].Theattributesofactiveattacksareasfollows,

•Interruption:attacksavailabilitysuchasdenial-of-serviceattacks.

•Modification:attacksintegrity.

•Fabrication:attacksauthenticity.

III.NEEDOF NETWORKSECURITY

3.1)Confidentiality

Thedatamustbeaccessedandreadonlybytheauthorizedindividualsorparties.Itistheprotectionofthepersonalinformation.Wecancompareconfidentialitywithprivacy.Dataencryption,UserIdsandpasswords,biometricverificationsareso meofthemethodsthroughwhichconfidentialitycanbeprotected[5].

3.2)Integrity

Itistheassuranceofnotonlytheinformationcanbeaccessedormodifiesbytheauthorizedpersonsonly butalsothedatamustbeaccurate,consistentoveritsentirelifecycle.Measurestakentoensureintegrityincludecontrollin gthephysicalenvironmentofnetworkedterminalsandservers,restrictingaccesstodata,andmaintainingrigorousauthen ticationpractices.Cryptographyplaysaverymajorroleinensuringthedataintegrity.Hashingthedatayoureceiveandco mparingitwiththehashoforiginalmessageisanothermethodtoensuredataintegrity[5].

3.3)Availability

Datamustbeavailabletotheauthorizedpersonsattherighttime.Itcanbeensuredbyrigorously maintainingallhardware,preparinghardwarerepairsimmediatelyandmaintainingacorrectlyfunctioning operatingsystemenvironment.Regularbackupmustbetaken,forinformationservicesthatarehighlycritical ,redundancyisappropriatemethodtoensureavailability[5].

3.4)Authenticity

Authenticityisessentially,assurancethatparticipantsincommunicationaregenuineandnot impersonators[5].

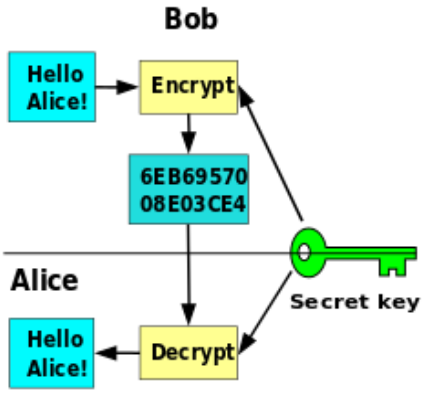
IV.SECURITYMETHODS

4.1)Cryptography

Cryptographicsystemstheyareusedtoprovideprotectionandauthenticationincomputerand

communicationsystems.A decipheringalgorithmisusedfordecryptionordeciphermentinordertorestoretheoriginalinformation.Ingeneral,theencipheringanddecipheringkeysneednotbeidentical.Eavesdroppingistheinterceptionofmessagesbyathirdpartymonitoringacommunicationchannel.Anyonetryingtobreak(solve)acipheriscalledacryptanalyst,anenemyora'badguy'.Thenumberofkeys,messagesandcryptogramsarecalledkeyspace,plaintextspaceandciphertextspace,respectively.Abreakablecipherisoneforwhichitispossibletodeterminetheplaintextand/orthekeyfromtheciphertextorfromplaintext-

ciphertextpairsusingfinitecomputationalresources.Ciphersarecryptographicalgorithms;cryptographyisthescienceofsecretcommunications;cryptanalysisisthescienceofbreakingciphers;andcryptologyisthescienceofcryptographyandcryptanalysis.Cryptosystemsareoftwotypessymmetric,inwhichcaseboththeencipheringanddecipheringkeysmustbekeptsecret,orasymmetric,inwhichcaseoneofthekeyscanbemadepublicwithoutcompromisingtheother[4].



FIG(4.1)Cryptography

4.2)Firewalls

Afirewallissimplyagroupofcomponentsthatcollectivelyformabarrierbetweentwonetworks.Therearethreebasictypesoffirewalls:

4.2.1)ApplicationGateways

Thisisthefirstfirewallandissometimesalsoknownasproxygateways.Thesearemadeupofbastion

hostssotheydoactasaproxyserver.ThissoftwarerunsattheApplicationLayeroftheISO/OSIReferenceModel.Clientsbehindthefirewallmustbecategorized&prioritizedinordertoavailtheInternetservices.Thisisbeenthemostsecure,becauseitdoesn'tallowanythingtopassbydefault,butitalsoneedtohavetheprogramswrittenandturnedoninordertostartthetrafficpassing.

4.2.2)PacketFiltering

PacketfilteringisatechniquewherebyroutershaveACLs(AccessControlLists)turnedon.Bydefault,a

routerwillpassalltrafficsentthroughit,withoutanyrestrictions.Thisislesscomplexthananapplicationgateway,becausethefeatureofaccesscontrolisperformedatalowerISO/OSIlayer.Duetoitslowcomplexityandthefactthatpacketfilteringisdonewithrouters,whicharespecializedcomputersoptimizedfortasksrelatedtonetworking,apacketfilteringgatewayisoftenmuchfasterthanitsapplicationlayercousins.Workingatalowerlevel,supportingnewapplicationseithercomesautomatically,orisasimplematterofallowingaspecificpackettypetopassthroughthegateway.Asaresult,uselayersofpacketfiltersaremustinordertolocalizethetraffic..AlsoItcanbeidentifiedwhichnetworkthepacketcamefromwithcertainty,butitcan'tgetmorespecificthanthat.

4.2.3)HybridSystems

Inanattempttocombinethesecurityfeatureoftheapplicationlayergatewayswiththeflexibilityand

speedofpacketfiltering,somedevelopershavecreatedsystemsthatusetheprinciplesofboth.Insomeofthesesystems,newconnectionsshouldbeauthenticatedandapprovedattheapplicationlayer.Oncethishasbeendone,theremainderofthecconnectionispasseddowntothesessionlayer,wherepacketfilterswatchtheconnectiontoensurethatonlypacketsthatarepartofanongoing(alreadyauthenticatedandapproved)conversationarebeingpassed.Usesofpacketfilteringandapplicationlayerproxiesaretheotherpossibleways.Thebenefitshereincludeprovidingameasureofprotectionagainstyourmachinesthatprovideservicestotheinternet(suchasapublicwebserver),asitprovidesthesecurityofanapplicationlayergatewaytotheinternalnetwork.Additionally,usingthismethod,anattacker,inordertogettoservicesontheinternalnetwork,willhavetobreakthroughtheaccessrouter,thebastionhost,andthechokerouter.

V.LATESTSURVEY

Accordingtolatestnewsinthenewspaper“TheTimesofIndia”‘Govt.failstotappotentialofhackers

despitewebattacks’.Hackersareincreasinglybecomingpartofthemainstream IT industryandcontributingassecurityexperts.Todayprivatecompaniesuseethicalhackerstomakethemselvessecure.TheJharkhandpolicewasthefirstgovernmentbodytostartaprocessofrewardingpeoplewhoareabletofindloopholesonanywebsiteorITinfrastructureofgovernmentdepartments.HackersarepaidaroundRs1lakhpermonthbysocialnetworkingsites,searchenginesandsoftwarecompanies.

VI.FUTUREWORK

Maliciouscodeandotherinsecuritiesareincreasingandthedamagethattheycause.Withlittletimetoreact,industrieshavetobecomemoreproactiveintheirsecuritysyatem.Reactivesecuritywillnolongerwork.Therefore,organizationsneedtobetterunderstandwhatarethetypesofsecuritysystemandwhichisthebetteroption,risks,sothattheycanbebetterpreparedtomaketheirorganizationsasecureone.

VII.CONCLUSION

Securityhasbecomeimportantproblemforlargecomputingorganizationswherethedataismore precious.Therearedifferentdefinitionsandideasforthesecurityandriskmeasuresfromtheperspectiveofdifferentpersons.Thesecuritymeasuresmustbedesignedandprovided,firstacompanyshouldknowitsneedofsecurityonthedifferentlevelsoftheorganizationandthenitshouldbeimplementedfordifferentlevelswithdifferentsecuritymethod.

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