

Seguretat en Xarxes de Computadors

Joaquín García Alfaro

Xavier Perramon Tornil

PID_00187021

Material docent de la UOC

**Joaquín García Alfaro**

Enginyer tècnic en Informàtica de Gestió i Enginyer en Informàtica per la Universitat Autònoma de Barcelona. El seu àmbit de recerca és la seguretat en xarxes de computadors i més concretament la criptografia i la detecció d'atacs i intrusions en xarxes TCP/IP. Actualment està realitzant els seus estudis de doctorat al grup CCD de la UAB, a on també col·labora com a personal de suport a la recerca i com a docent de la assignatura de Xarxes de Computadors I de l'enginyeria informàtica.

**Xavier Perramon Tornil**

Doctor Enginyer de Telecomunicació per la Universitat Politècnica de Catalunya. Actualment treballa en la protecció d'informació multimèdia. És professor del Departament de Tecnologies de la Informació i les Comunicacions de la Universitat Pompeu Fabra.

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Introducció

En aquesta assignatura es presenta la problemàtica de la seguretat en les xarxes de computadors, i més en concret en les xarxes TCP/IP.

L'estructuració d'aquesta assignatura segueix el següent model. En primer lloc, es presenta la problemàtica de la seguretat en les xarxes TCP/IP. Cal destacar que aquesta assignatura se centra en la problemàtica de la seguretat en les xarxes i per tant alguns temes de seguretat que fan referència a coses més específiques dels propis sistemes de computadors només les veurem de passada com a conseqüència de la problemàtica de la seguretat en les xarxes.

Un com haguem vist quins són els eventuais problemes de seguretat en aquest tipus de xarxes, ens centrarem en els mecanismes de prevenció que existeixen de cara a intentar minimitzar la realització dels atacs descrits en el primer mòdul. Veurem que fonamentalment, les tècniques de prevenció es basen en el filtrat d'informació.

Posteriorment farem èmfasi en les tècniques específiques de protecció que hi ha. En particular, introduïrem les nocions bàsiques de criptografia que ens permetran entendre el funcionament de diferents mecanismes i aplicacions que permeten protegir-se enfront dels atacs. En concret farem èmfasi en els mecanismes d'autenticació existents i la fiabilitat que ens donen els diferents tipus, veurem quins mecanismes de protecció hi ha a nivell d'enllaç, de xarxa i de transport i veurem com podem crear xarxes privades virtuals. D'altra banda, també veurem com funcionen algunes aplicacions segures com ara el protocol SSH o estàndards de correu electrònic segur.

Finalment, i assumint que no tots els sistemes de prevenció i protecció de les xarxes TCP/IP són infal·libles, estudiarem els diferents mecanismes de detecció d'intrusos que existeixen i quines són les seves arquitectures i funcionalitats.

Objectius

Globalment, els objectius bàsics que s'han d'assolir són els següents:

1. Entendre els diferents tipus de vulnerabilitats que presenten les xarxes TCP/IP.
2. Veure quines tècniques de prevenció hi ha contra els atacs més freqüents.
3. Assolir uns coneixements bàsics del funcionament de les eines criptogràfiques més utilitzades.
4. Conèixer els sistemes d'autenticació més importants tot identificant-ne les seves característiques.
5. Veure diferents propostes existents per a oferir seguretat tant a nivell d'enllaç, de xarxa, de transport o d'aplicació.
6. Conèixer els diferents sistemes de detecció d'intrusos.

Continguts

Mòdul didàctic 1

Atacs contra les xarxes TCP/IP

1. Seguretat en xarxes TCP/IP
2. Activitats prèvies a la realització d'un atac
3. Escoltadors de xarxa
4. Fragmentació IP
5. Atacs de denegació de servei
6. Deficiències de programació

Mòdul didàctic 2

Mecanismes de prevenció

1. Sistemes Tallafocs
2. Construcció de sistemes tallafocs
3. Zones desmilitaritzades
4. Característiques addicionals dels sistemes tallafocs

Mòdul didàctic 3

Mecanismes de protecció

1. Conceptes bàsics de criptografia
2. Sistemes d'autenticació
3. Protecció del nivell d'enllaç: xarxes sense fils
4. Protecció del nivell de xarxa: IPsec
5. Protecció del nivell de transport: SSL/TLS
6. Xarxes privades virtuals

Mòdul didàctic 4

Aplicacions segures

1. Autenticació mitjançant client web: portals captius
2. El protocol SSH
3. Correu electrònic segur

Mòdul didàctic 5

Mecanismes per a la detecció d'atacs i intrusions

1. Necessitat de mecanismes addicionals a la prevenció i protecció
2. Sistemes de detecció d'intrusos
3. Escàners de vulnerabilitats
4. Sistemes de decepció
5. Prevenció d'intrusions
6. Detecció d'atacs distribuïts

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