M5: SISTEME DE OPERARE IN RETEA

**LUCRARE DE LABORATOR**

**Realizarea unei reţele virtuale (Router PFSENSE)**

**COMPETENTE:**

C1. Utilizeaza sistemele de operare in retea.

C2. Administreaza sistemele de operare in retea.

**I. OBIECTIVE/SCOP:**

O1. Instalarea sistemelor de operare pentru servere.

O2. Configurarea sistemelor de operare in retea.

O3. Utilizarea comenzilor de baza ale sistemelor de operare in retea.

**II. CONSIDERATII TEORETICE NECESARE**

**pfSense** este un [open source](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Open-source_software&usg=ALkJrhhTYniw-FQJMSCudB3x4t3aQzzBCg) [firewall](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Firewall_(computing)&usg=ALkJrhiz13n4rQpQqxsf7e4_w-7Ie_Q06A) / [router](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Residential_gateway&usg=ALkJrhj46P8WPKVyj8RDIu0-RI8q5Saa5w) de distribuție de software bazat pe[FreeBSD](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/FreeBSD&usg=ALkJrhgRkGMOMgRYCEujoGi4QpFu6w5V_A) . Acesta este instalat pe un computer pentru a face un firewall / router dedicat pentru o rețea. Numele a fost derivat din faptul că ajută la [menținerea stării](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Stateful_firewall&usg=ALkJrhiYVVtLt4eirYtCnEZGqsEGP0YfgQ) [de pachete de filtrare](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Packet_filter&usg=ALkJrhjcSnKAtd56LRRugkv4GW4w_RwYFg)instrument [**PF**](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/PF_(firewall)&usg=ALkJrhg3P343OkOFHz4-FfAylAttaqDyEQ) (care actioneaza ca un [firewall](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Firewall_(computing)&usg=ALkJrhiz13n4rQpQqxsf7e4_w-7Ie_Q06A) , filtru de pachete, și [servicii de rutare](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Routing&usg=ALkJrhhT39CrwzJ5EGYCspUPYQ0hvUk-Xg)pe mai multe [BSD](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/BSD&usg=ALkJrhh8r1e401wEU7C4WwaI7_M_TBRCnA) și [Unix](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dpfsense%2Brouter%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Unix&usg=ALkJrhj2S8cujVoQ_nMFsFix0reaz_Ht9A) platforme) pentru a face mai mult sens pentru utilizatorii non-tehnici. VirtualBox și Innotek VirtualBox) este o [virtualizare](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Virtualization&usg=ALkJrhhBcs5A99sVMLBZ7un2UEaShpddiQ) pachet software pentru [x86](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/X86_virtualization&usg=ALkJrhj_p9-tqM27E-wQ5WcmIZvU45Fa8Q) și[AMD64/Intel64](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/AMD64&usg=ALkJrhh-j8p05kCOpDSjnHgWLBMWdEw09g) computere bazate pe la [Oracle Corporation](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Oracle_Corporation&usg=ALkJrhgYWwfLyV09Hm57LADbSENd6nnfNA), ca parte a familiei sale de produse de virtualizare. A fost creat de Innotek GmbH, cumpărat în 2008 de către [Sun Microsystems](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Sun_Microsystems&usg=ALkJrhgpQNFqYqM2SYibW90c-OzSj3Gwuw), și în prezent dezvoltat de către Oracle.Acesta este instalat pe un existent [sistem de operare gazdă](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Host_machine&usg=ALkJrhgSfcejuVVpLNUcnJOokGCoqW0dIA) ca o aplicație, această aplicație gazdă permite sistemelor suplimentare de oaspeți de operare, fiecare cunoscut ca un *sistem de operare oaspeților,* pentru a fi încărcat și rulează, fiecare cu propriul mediu virtual.

Sisteme de operare gazdă suportate includ [Linux](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Linux&usg=ALkJrhi-HwvJHQjlCVeqUSab9xqSX5xBZQ) , [Mac OS X](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Mac_OS_X&usg=ALkJrhjrmfOuSWg7BDxzFg8wfzi3eqoOQw) , [Windows XP](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Windows_XP&usg=ALkJrhi27hhZtl6U5anUkeINDqS30eH0jA) ,[Windows Vista](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Windows_Vista&usg=ALkJrhggNX4I_1--X_i3DoX_MRgVgrF6TQ) , [Windows 7](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Windows_7&usg=ALkJrhhTBDZ9D0_yyOO7SWaxOZjtzrPvcw) , [Windows 8](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Windows_8&usg=ALkJrhgsNl3B224wV4u23OMrvHjvCvvx6A) , [Solaris](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/Solaris_(operating_system)&usg=ALkJrhhvFVCCfJE3KmQyjGIb-YhTdBaRTw) și [OpenSolaris](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/OpenSolaris&usg=ALkJrhjh_ehtXV-t-Ztyf1Gaw757S3CGAw) , există, de asemenea, un port pentru [FreeBSD](http://translate.googleusercontent.com/translate_c?depth=1&hl=ro&prev=/search%3Fq%3Dvirtualbox%26espv%3D210%26es_sm%3D93%26biw%3D1024%26bih%3D676&rurl=translate.google.ro&sl=en&u=http://en.wikipedia.org/wiki/FreeBSD&usg=ALkJrhhornQB1PxehfeNdHs6PZEicNyC3Q) .

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**III.**  **MATERIALE NECESARE**

Reteaua de calculatoare din laborator, serverul colegiului, programul Virtual Box

<http://ipttic.ctcnvk.ro/referate> de laborator , un calculator cu un hard disc gol, CD de instalare

**IV. PROCEDURA EXPERIMENTALA DE LUCRU SI INREGISTRAREA DATELOR OBTINUTE (DESFASURAREA LUCRARII)**

1. **CREAREA UNEI MASINI VIRTUALE**

a. Deschiderea aplicatiei VirtualBox : **{Desktop}{Oracle VM VirtualBox}**

b. Crearea masinii virtuale:

- Apasam pe butonul “**Noua**”.

- Apasam pe butonul “**Next**”.

- In casuta “**Nume**” scrieti dupa model : CLASA/INITIALE/PFSENSE/DATA

- In casuta “**Sisteme de operare**” selectam “**BSD**” .

- In casuta “**Versiunea**” selectam “**FreeBSD**”.

- Apasam pe butonul “**Next**”.

- Dimensiunea memoriei RAM alegeti “**128MB**”.

- Apasam pe butonul “**Next**”.

- Bifam casuta “**Boot Hard Disk**” (daca nu este bifata) .

- Selectam “**Creaza disc dur nou**”.

- Apasam pe butonul “**Next**”.

- Apasam pe butonul “**Next**”.

- Selectam “**Imagine expandabila dynamic**”.

- Apasam pe butonul “**Next**”.

- Dimensiunea hard disk : “**2.00 GO**”.

- Apasam pe butonul “**Next**”.

- Apasam pe butonul “**Finish**”.

- Apasam pe butonul “**Finish**”.

c. Setarea masinii virtuale:

- Apasam pe butonul “**Setari”**.

- Apasam pe “**Retea**” .

- Selectam “**Placa de retea 1**”, bifam casuta “Activeaza **placa de retea**”.

- In casuta “**Conectata la**” **alegem “NAT**”.

- Apasam pe sageata “**Avansat”**.

- In casuta “**Tip placa**” alegem **“PCnet-PCI II (Am79C970A)**”.

- Selectam “**Placa de retea 2**”, bifam casuta “**Activeaza placa de retea**”.

- In casuta “**Conectata la**” alegem “**Retea interna**”.

- Apasam pe sageata “**Avansat**”.

- In casuta “**Tip placa**” alegem “**PCnet-PCI II (Am79C970A)**”.

- Apasam pe “**Stocare**” din partea stanga.

- Stergem atasamentul de la “**IDE Controller**” denumit CLASA/INITIALE/PFSENSE/DATA.vdi

- Apasam pe butonul “**Adauga controlor (Ins)**” si selectam “**Adauga controlor SATA**”.

- Apasam pe butonul “**Adauga atasamanet (+)**”.

- Apasam pe CLASA/INITIALE/PFSENSE/DATA.vdi .

- In partea dreapta la “**Proprietati**” apasam pe “**Deschide Administratorul medii virtuale**” de la casuta “**Disc dur**” si selectam discul nostru.

- Apasam pe butonul “**Ok**”.

d. Pornirea masinii virtuale si instalarea sistemului de operare.

- Apasam pe butonul “**Porneste**”.

- Asteptam ca sistemul de operare sa se incarce.

- La intrebarea “**Do you want to set up VLANs now [y:n]?**”, scriem “**n**”.

- Enter the LAN interface name or ‘a’ for auto-detection , scriem “**le1**”.

- Enter the WAN interface name or ‘a’ for auto-detection , scriem “**le0**”.

- La intrebarea “**Do you want to proceed [y:n]?**” , scriem “**y**”.

- Dupa ce s-a incarcat tot si ne apare pfSense console setup, scriem “**2**”.

- Enter the new LAN IP address , scriem “**10.0.0.1**”.

- Enter the new LAN subnet bit count , scriem “24”.

- La intrebarea **“Do you want to enable the DHCP server on LAN [y:n**]?” , scriem “**n**”.

- Selectam “**Accept these Settings**”.

- Selectam “**Install pfSense**”.

- Selectam “**ad4…**”.

- Selectam “**Format this Disk**”.

- Selectam “**Use this Geometry**”.

- Selectam “**Format ad4**”.

- Selectam “**Partition Disk**”.

- Selectam “**Accept and Create**”.

- Selectam “**Yes, partition ad4**”.

- Selectam “**OK”**.

- Selectam “**1: 1.99G…**”

- Selectam “**OK**”.

- Selectam “**OK**”.

- Selectam “**Accept and Create**”.

- Asteptam sa se incarce.

- Selectam “**Uniprocessor kernel (one processor)**”.

- Selectam “**Accept and Install Bootblocks**”.

- Selectam “**OK**”.

- Asteptam sa se incarce.

- Selectam “**Reboot**”.

- Asteptam sa se restarteze masina virtuala.

- La primirea mesajului “**Welcome to pfSense**” , apasam pe bara de lucru si selectam “**Dispozitive**”.

- Alegem “**Dispozitive CD/DVD**” si apasam “**Remove disk from virtual drive**”.