

Ubuntu Serveri paigaldus

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Virtualiseerimine



- füüsilise arvuti riistvaralised ressursid (protsessor, muutmälu, kõvaketas jne) jagatakse virtuaalse arvutiga (VM – Virtual Machine)
- ressursid eraldatakse kohe kui VM käivitatakse
 - dünaamilise suurusega kõvaketas kasvab vastavalt andmete hulgale, fikseeritud suurusega hõivab kohe määratud ruumi
- VirtualBox on kasutusel kuna on:
 - kasutatav põhilistes operatsioonisüsteemides: MS Windows, GNU/Linux, macOS
 - vabavara
 - võimaldab hetktõmmiseid kasutada, virtuaalrakendusi luua
- virtualiseerimistarkvara võrdlus https://en.wikipedia.org/wiki/Comparison_of_platform_virtualization_software

VirtualBox'i dokumentatsioon

- https://www.virtualbox.org/wiki/Documentation
- https://www.virtualbox.org/manual/UserManual.html
- levinumad tõrked ja nende lahendused
 - http://enos.itcollege.ee/~edmund/materials/VirtualBox-common-issues.html



VirtualBox'i paigaldamine oma arvutisse

- https://www.virtualbox.org/wiki/Downloads
 - laadida alla (Linuxis soovitav kasutada varamut (*repository*))
 - põhiprogramm "VirtualBox x.x.x platform packages"
 - laienduste pakett "...VirtualBox Extension Pack"
 - laienduste paketi toetuse virtuaalmasinas annab külalise pakett "Guest Additions"

Veendume

lisamises.

ISO

 kui VM töötab siis valida rippmenüüst Devices->Insert Guest Additions CD image...

Kunagi ei paigaldata füüsilise riistvara juhtprogramme (*driver*) otse VM'i. Külalise lisandid ongi need juhtprogrammid, mida VM'i paigaldada. Peale külalise lisandite paigaldamist taaskäivitada VM.

IDE Secondary Master: /usr/share/virtualbox/VBoxGuestAdditions.iso

🤌 🗐 🛃 🔐 🔟 🚫 💽 Right Ctrl

IDE



Laienduste paketi haldamine käsurealt

- https://www.virtualbox.org/manual/ch08.html#vboxmanage-extpack
 - haldamiseks vajalikud superkasutaja õigused, vaadata saab ka tavakasutajana
 - käske teostame füüsilises masinas (host)
 - paigaldamine (kui on midagi paigaldatud siis --replace vajalik)
 - vboxmanage extpack install [--replace] <tarball>
 - vboxmanage extpack install Oracle_VM_VirtualBox_Extension_Pack-5.2.4-119785.vbox-extpack --replace --acceptlicense=56be48f923303c8cababb0bb4c478284b688ed23f16d775d729b89a2e8e5f9eb
 - eemaldamine
 - vboxmanage extpack uninstall [--force] <name>
 - ajutiste failide eemaldamine
 - vboxmanage extpack cleanup
 - vaatame, millised laienduste paketid on paigaldatud:
 - vboxmanage list extpacks
 - VirtualBox'i versiooni vaatamine (peaks olema sama versiooni laienduste paketiga):
 - vboxmanage --version





VirtualBox'i vanemad versioonid



- https://download.virtualbox.org/virtualbox/
 - sealt saab alla laadida ka üksikuid faile eraldi näiteks külalise lisandite (*Guest Additions*) ISO ja ka antud versiooni kohta käiva kasutusjuhendi PDF-failina

VirtualBox'i tööriistariba (*toolbar*)

- klõpsata menüüribaga samal real hiire paremklahvi
- avanenud kiirmenüüst saab valida kas tööriistariba näidatakse (pildil näidatud ala punase joonega)
- tööriistaribal on nupud New, Settings, Discard, Show, Machine Tools, Global Tools





Virtualiseerimisega seotud mõisteid ja termine<mark>id</mark>

- *host* füüsiline arvuti, millel töötab hüperviisor
- **guest** virtuaalarvuti, mis töötab hüperviisori keskkonnas
- hüperviisor (hypervisor) tarkvara (ka püsivara, riistvara), mis võimaldab virtuaalarvutite haldust ja tööd
- virtuaalarvuti (ka: virtuaalmasin) (virtual machine) arvutiriistvara emulaator, mis võimaldab emuleerida arvutit tervikuna – pakkuda sama või ligilähedast funktsionaalsust kui seda pakub tegelik riistvara. Sõltub riistvara arhitektuurist, nt macOS nõuab Apple'i riistvara.

Virtualiseerimisega seotud mõisteid ja termine<mark>id</mark>

- emulaator (emulator) arvutitarkvara (ka -riistvara), mis imiteerib teise seadme või programmi tööd
- virtuaalne õpiruum (ka: õpiruum) (learning space) –
 veebipõhisest haldusliidesest ning virtuaalarvuti(te)st koos kaughaldusega koosnev keskkond õppimiseks, töötamiseks, harjutamiseks, koolitamiseks, jne
- virtuaalrakendus (virtual appliance) ühe faili kujule (nt .ova) eksporditud virtuaalarvuti(d) (sh virtuaalsed kõvakettad kus paiknevad andmed, sh operatsioonisüsteem paigaldatud ja seadistatud kujul). Sisaldab ka kõiki virtuaalarvuti käivitamiseks vajalikke sätteid. Saab teises arvutis töötavas hüperviisoris taas importida, võimalik selle käigus ka sätteid muuta ja peale importimist (vajadusel ka seadistamist) on valmis käivitamiseks.

Viiteid



Alustame uue virtuaalmasina loomist



<u>File Machine Help</u>



New

New





Settings Discard Start



Create Virtual Machine



Please choose a descriptive name for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.

N <u>a</u> me:	Ubuntu	Server			
<u>Type</u> :	Linux			_	
<u>V</u> ersion:	Ubuntu	(64-bit)		_	
<u>E</u> xpert M	lode	< <u>B</u> ack	<u>N</u> ext >	Cancel	









Create Virtual Machine

Hard disk

If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.

If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.

The recommended size of the hard disk is 10,00 GB.

Create

- O Do not add a virtual hard disk
- Create a virtual hard disk now
- O Use an existing virtual hard disk file

< Back

Cancel





Create Virtual Hard Disk

Hard disk file type

Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.

- O VDI (VirtualBox Disk Image)
- VHD (Virtual Hard Disk)
- VMDK (Virtual Machine Disk)



Create Virtual Hard Disk



Storage on physical hard disk

Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).

A **dynamically allocated** hard disk file will only use space on your physical hard disk as it fills up (up to a maximum **fixed size**), although it will not shrink again automatically when space on it is freed.

A **fixed size** hard disk file may take longer to create on some systems but is often faster to use.

Dynamically allocated

🗋 <u>F</u>ixed size

X



Create Virtual Hard Disk

File location and size

Please type the name of the new virtual hard disk file into the box below or click on the folder icon to select a different folder

Select the size of the virtual hard disk in megabytes. This size is the limit on the amount of file data that a virtual machine will be able to store on the hard disk.



< Back

Create

Cancel





💙 New group



Ubuntu Server () Powered Off

۵ ج	<u>N</u> ew Machine <u>A</u> dd Machine		Ctrl+N Ctrl+A	
2	Rena <u>m</u> e Group	N	Ctrl+M	_
	<u>U</u> ngroup	2	Ctrl+U	

👂 OSadmin



Ubuntu Server





Gruppi lisatud virtuaalmasinaid on hiljem lihtsam hallata, sh koos virtuaalrakenduseks eksportida

Lõikepuhver ja lohistamine

		Ubuntu Server - Settings
	General 🚺	General
¥	System	Racic Advanced Description Encryption
	Display	
2	Storage	Snapshot Folder: /shared/linux/user/VirtualBox VMs/Snapshots
	Audio	Shared Clipboard: Bidirectional 🔹 2
7	Network	Drag'n'Drop: Bidirectional 🔻 🔇
>	Serial Ports	
ŷ	USB	Nende funktsioonide toimiseks on vajalik laienduste paketi (Extension Pack) paigaldamine VirtualBoxi ja külalise
	Shared Folders	lisandite (<i>Guest Additions</i>) paigaldamine VM'i. Eelnevalt on
	User Interface	soovitav VM'is paigaldada veel pakett <i>dkms</i> (<i>Dynamic Kernel</i> <i>Module Support</i>), et VirtualBox'i tuuma moodul automaatselt uuesti kompileeritaks kui tuum VMis uueneb. Sellega koos paigaldatakse sõltuvustena ka kõik vajalikud paketid. See omab küll rohkem efekti <i>desktop</i> masina puhul ent siiski on laienduste paketis teisi võimalusi veel, vt https://www.virtualbox.org/manual/ch01.html#intro-installing

Käivitusjärjekorra muutmine

Image: System System Image: System Motherboard Image: Display Motherboard Image: Storage Motherboard Image: Audio Base Memory: Image: Memory 512 MB Image: Audio Boot Order Image: Serial Ports Image: Shared Folder Image: Shared Folder Chipset: Image: Chipset: PIX3	
General System System Motherboard Processor Acceleration Display Base Memory: Storage 4 MB Audio 64512 MB Motherboard Processor Acceleration Base Memory: General Base Memory: General Base Memory: General Base Memory: General Base Memory: General Base Memory: General Base Memory: General Base Memory: General Base Memory: General Base Memory: General Base Memory: General Boot Order Boot Order Boot Order Boot Order Base Memory: General Boot Order Boot Order Boot Order Boot Order Base Memory: Boot Order Boot Order Base Memory: Base Memory: Boot Order Base Memory: Base Memory: Base Memory: Base Memory: <th></th>	
System Display Storage Audio Audio Network Serial Ports VISB	
Image Image<	
Storage Base Memory: 512 MB Audio 4 MB 64512 MB Audio Boot Order Boot Order Serial Ports VSB	
 Audio Boot Order Network Serial Ports USB Chipset: PIIX3 	* *
Network Serial Ports USB Chipset: PIIX3	
Serial Ports USB Shared Folders Chipset: PIIX3	
USB Chipset: PIIX3	
Chipset: PIIX3 🔻	
User Interface Pointing Device: USB Tablet	
Extended Features: 🗵 Enable I/O APIC	
Enable <u>E</u> FI (special OSes only)	
Hardware Clock in UTC Time	





× Please choose a virtual optical disk file		
Look in: Shared/linux/student/ISO/	 ∞ -> 	📔 🎛 🔳
Computer Name	🛆 Size	Туре
ubuntu-16.04.3-desktop-amd64.iso	1,48 GB	iso File
ubuntu-16.04.3-server-amd64.iso	825,0 MB	iso File
En m-College		
		•
File <u>n</u> ame: ubuntu-16.04.3-server-amd64.iso		<u>O</u> pen
Files of type: All virtual optical disk files (*.dmg *.iso *.cdr *.cue *.viso)	_	<u>C</u> ancel



×		Ubuntu Server	Settings
	General	Storage	
	System	Storage Devices	Attributes
	Display	Controller: IDE	Name: IDE
	Storage	Controller: SATA	Use Host I/O Cache
	Audio	💹 🕖 Ubuntu Server.vdi	
₽	Network		
	Serial Ports		
Ø	USB		
	Shared Folders		
	User Interface		
		ç 🔶 🔁 🚍	
			<u>C</u> ancel <u>O</u> K

VirtualBox'i võrgud

- https://www.virtualbox.org/manual/ch06.html
- IT Kolledžis kasutame
 - ainult server
 - Adapter1: NAT
 - Adapter2: Host-only (VM<->Host)
 - server, desktop
 - Adapter1: NAT
 - Adapter2: *Internal* (*VM1<->VM2*)



NB! Paneme tähele, mis suunas on näidatud tabeli päises nool – samas suunas saavad liikuda ka andmed üle võrgu.

	VM ↔ Host	VM1 ↔ VM2	VM → Internet	VM ← Internet
Host-only	+	+	_	_
Internal	_	+	_	_
Bridged	+	+	+	+
NAT	_	-	+	Port forwarding
NAT Network	-	+	+	Port forwarding

Võrguliides interneti jaoks

×		Ubuntu Server - Settings
	General	Network
	System	Adapter 1 Adapter 2 Adapter 4
	Display	Adapter <u>1</u> Adapter <u>2</u> Adapter <u>3</u> Adapter <u>4</u>
\bigcirc	Storage	Enable Network Adapter
	Audio	Attached to: NAT
₽	Network	Name:
	Serial Ports	Advanced
Ø	USB	
	Shared Folders	
=	User Interface	
		Cancel OK

Adapter 1 on internetiühenduse jaoks, võrgurežiimiga NAT



×	Ubuntu Server - Settings	- >>
🧾 General	Network	
 System Display Storage Audio Network Serial Ports USB Shared Folders 	Adapter 1 Adapter 2 Adapter 3 Adapter 4 Image: Provide the selected Image: Not selected Image: Advanced	
User Interface	Network: Adapter 2 page: No host-only network adapter is currently selected. 2 Invalid settings detected Cancel OK	

Kui puudub virtuaalne võrguliides (1), nt *vboxnet0* siis tuvastatakse vigased sätted (2). Virtuaalne võrguliides tekib füüsilises masinas (*host*), hiljemalt VM'i käivitamisel.



Kui virtuaalne võrguliides (*host*) on eelnevalt lisamata siis katkestame siin protsessi (ei luba praegu 2.võrguliidest) ja lisame teise dialoogi kaudu virtuaalse võrguliidese *host*'ile ära. Siiski salvestame eelnevalt tehtud muudatused *OK* nupu vajutamisega.







Virtuaalse võrguliidese lisamiseks avada *Host Network Manager*, saab kasutada ka menüüs näidatud kiirklahvi.

× – + Oracle VM VirtualBox Manager				
<u>File H</u> elp				
Host Network M	anager 😫 🧪 Machine Tools	Global Tools		
Create Remove Properties				
Name Create Host-only Network (Ctrl+A) ess/Mask	IPv6 Address/Mask	DHCP Server 🛆		
Create new host-only network				

Uue virtuaalse võrguliidese lisamiseks vajutame "*Create*" nuppu





× – + File Help	Oracle VM Virt	tualBox Manager	
Create Remove Properties	Host Networ	rk Manager 🔉 💦 Machine T	ools Global Tools
Name	IPv4 Address/Mask	IPv6 Address/Mask	DHCP Server
vboxnet0	192.168.56.1/24		🗌 Enable
Adapter DHCP Server Configure Adapter Automaticall Configure Adapter Manually	у		
IPv4 Address: 192.168.5	6.1		
IPv4 Network Mask: 255.255.2	55.0		
I <u>P</u> v6 Address:			
IPv6 Prefix Length: 0			
			Reset Apply

Satete muutmiseks lulitada sisse "*Properties"*. Virtuaalne võrguliides määrata staatilise IP-aadressi peale (*Configure Adapter Manually*). Valida sobiv IPv4 aadress, üldjuhul vaikimisi pakutav sobib.





VirtualBox 5.1 ja vanemad





2.võrguliidese lubamine



Nüüd kus virtuaalne võrguliides on lisatud, saame selle ka vastava virtuaalarvuti sätetest lubada.



Host-only Adapter'i lubamine

×		Ubuntu Server - Settings
	General	Network
	System	Adapter 1 Adapter 2 Adapter 4
	Display	Adapter 1 Adapter 2 Adapter 3 Adapter 4
\bigcirc	Storage	Enable Network Adapter
	Audio	Attached to: Host-only Adapter
₽	Network	Name: vboxnet0
	Serial Ports	▶ A <u>d</u> vanced
Ø	USB	
	Shared Folders	
	User Interface	
		4
		Cancel OK

Kui virtuaalne võrguliides (*vboxnet0*) lubatud, saame lubada ka teise võrguliidese (*Adapter 2*).





Kiire ülevaade enne käivitamist



Eriti jälgida käivitusjärjekorda: optiline seade, kõvaketas. Veenduda, et sobiv tõmmisfail (.iso) on optilises seadmes.

Kui kõik sobib siis võib virtuaalmasina käivitada (*Start*).
× - -

+

Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

	Lar	nguage	
Amharic	Français	Македонски	Tamil
Arabic	Gaeilge	Malayalam	తెలుగు
Asturianu	Galego	Marathi	Thai
Беларуская	Gujarati	Burmese	Tagalog
Български	עברית	Nepali	Türkçe
Bengali	Hindi	Nederlands	Uyghur
Tibetan	Hrvatski	Norsk bokmål	Українська
Bosanski	Magyar	Norsk nynorsk	Tiếng Việt
Català	Bahasa Indonesia	Punjabi(Gurmukhi)	中文(简体)
Čeština	Íslenska	Polski	中文(繁體)
Dansk	Italiano	Português do Brasil	
Deutsch	日本語	Português	
Dzongkha	ქართული	Română	
Ελληνικά	Қазақ	Русский	
English	Khmer	Sámegillii	
Esperanto	ಕನ್ನಡ	ສິ∘ກ⊚	
Español	한국어	Slovenčina	
Eesti	Kurdî	Slovenščina	
Euskara	Lao	Shqip	
ىسراف	Lietuviškai	Српски	
Suomi	Latviski	Svenska	
F1 Help F2 Language F:	3 Keymap F4 Modes	F5 Accessibility F6 O	ther Options
		0 🗗 🗐 💭 🗐	🕽 🎯 🛃 Right Ctrl







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- +

Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

ubuntu®

Install Ubuntu Server Install Ubuntu Server with the HWE kernel Install MAAS Region Controller Install MAAS Rack Controller Check disc for defects Test memory Boot from first hard disk Rescue a broken system

F1 Help F2 Language F3 Keymap F4 Modes F5 Accessibility F6 Other Options

🔯 📀 🍡 🗗 🏈 🚍 🚰 🛄 🎯 🧭 Right Ctrl

HWE https://wiki.ubuntu.com/Kernel/LTSEnablementStack MAAS (*Metal as a Service*) https://docs.ubuntu.com/maas/ https://www.ubuntu.com/server/maas



П

Π

Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

[!!] Select a language

Choose the language to be used for the installation process. The selected language will also be the default language for the installed system.

Language:

Albanian Arabic Asturian Basque Belarusian Bulgarian Catalan Chinese (Simplified) Chinese (Traditional) Croatian Czech Danish Dutch	No iocalization Shqip عربي Asturianu Euskara Беларуская Воsanski Български Català 中文(简体) 中文(徽體) Hrvatski Čeština Dansk Nederlands
English Esperanto Estonian Finnish French Galician German Greek	 English Esperanto Eesti Suomi Français Galego Deutsch Ελληνικά

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edasiliikumine *Enter* klahviga

<Go Back>

Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

[!!] Select your location

The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.

This is a shortlist of locations based on the language you selected. Choose "other" if your location is not listed.

Country, territory or area:

Antigua and Barbuda Australia Botswana Canada Hong Kong India Ireland New Zealand Nigeria Philippines Singapore South Africa United Kingdom United States Zambia Zimbabwe other

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<Go Back>



× – + Ubuntu Server [Running] - Oracle VM Virtua	alBox
File Machine View Input Devices Help	
[!!] Select your location	
The selected location will be used to set your time zone and also select the system locale. Normally this should be the country wher	for example to help re you live.
Select the continent or region to which your location belongs.	
Continent or region:	
Africa Antarctica Asia Atlantic Ocean Caribbean Central America Europe Indian Ocean	
North America Oceania South America other	
<go back=""></go>	

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<Tab> moves; <Space> selects; <Enter> activates buttons

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Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

[!!] Select your location

The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.

Listed are locations for: Europe. Use the <Go Back> option to select a different continent or region if your location is not listed.

Country, territory or area:

Estonia Faroe Islands Finland France Georgia Germany Gibraltar Greece Greenland Guernsey Holy See (Vatican City State) Hungary Iceland Ireland Isle of Man Italy Jersey Latvia Liechtenstein Lithuania

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<Go Back>



× – +

П

File Machine View Input Devices Help

[!] Configure locales

There is no locale defined for the combination of language and country you have selected. You can now select your preference from the locales available for the selected language. The locale that will be used is listed in the second column.

Country to base default locale settings on:

Antigua and Barbuda	-	en_AG
Australia	-	en_AU.UTF-8
Botswana	-	en_BW.UTF-8
Canada	-	en_CA.UTF-8
Hong Kong	-	en_HK.UTF-8
India	-	en_IN
Ireland	-	en_IE.UTF-8
New Zealand	-	en_NZ.UTF-8
Nigeria	-	en_NG
Philippines	-	en_PH.UTF-8
Singapore	-	en_SG.UTF-8
South Africa	-	en_ZA.UTF-8
United Kingdom	-	en_GB.UTF-8
United States	-	en_US.UTF-8
Zambia	-	en_ZM
Zimbabwe	-	en_ZW.UTF-8

<Go Back>

<F1> for help; <Tab> moves; <Space> selects; <Enter> activates buttons





X + Ubuntu Server [Running] - Oracle VM VirtualBox File Machine View Input Devices Help	
[!] Configure the keyboard You can try to have your keyboard layout detected by pressing a series of keys. If you do not want to do this, you will be able to select your keyboard layout from a list. Detect keyboard layout? <go back=""> </go>	edasiliikumine nooleklahvidega vasakule, paremale või TAB-klahviga
(Tab> moves; <space> selects; <enter> activates buttons</enter></space>	

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Ubuntu Server [Running] - Oracle VM VirtualBox

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File Machine View Input Devices Help

[!] Configure the keyboard

The layout of keyboards varies per country, with some countries having multiple common layouts. Please select the country of origin for the keyboard of this computer.

Country of origin for the keyboard:

Bambara Bangla Belarusian Belgian Bosnian Braille Bulgarian Burmese Chinese Croatian Czech Danish Dhivehi Dutch Dzongkha English (Cameroon) English (Ghana) English (Nigeria) English (South Africa) English (UK) English (US) Esperanto Estonian

<Go Back>



File Machine View Input Devices Help

[!] Configure the keyboard

Please select the layout matching the keyboard for this machine.

Keyboard layout:

Estonian

Estonian	-	Estonian	(Dvc	orak)				
Estonian	-	Estonian	(US	keyboar	ď	with	Estonian	letters
Estonian	-	Estonian	(eli	iminate	de	ead ke	eys)	

<Go Back>



valimine nooleklahvidega üles, alla; edasi (kinnitamine) *Enter*'iga



	× -	- +				Ubuntu Server [Running] - Oracle VM VirtualBox	N 😽
	File	Machine	View	Input	Devices	Help	
ų							
						Loading additional components	
						31%	
	R	etrieving	(rdnss	:d-udeb			
						🛛 🕞 🗗 🥢 🗔 🖳 🕼 🔘 🔇 💌 Right Ctrl	47/96

	× – + Ubuntu Server [Running] - Oracle VM VirtualBox	
	File Machine View Input Devices Help	
 		
	[!!] Configure the network	
	Your system has multiple network interfaces. Choose the one to use as the primary network interface during the installation. If possible, the first connected network interface found has been selected.	
	Primary network interface:	
	enpOs3: Intel Corporation 82540EM Gigabit Ethernet Controller enpOs8: Intel Corporation 82540EM Gigabit Ethernet Controller	
	<go back=""></go>	
	<tab> moves: <snace> selects: <enter> activates buttons</enter></snace></tab>	
	🔊 💿 🗗 🖉 🛄 🖳 🕼 🔇 💽 Right Ctrl	48/96

	× -	+				Ubuntu Server [Running] - Oracle VM VirtualBox	🔰 📐 💎
	File	Machine	View	Input	Devices	Help	
┝╀╄							
					Co	onfiguring the network with DHCP	
,						100%	
	N	etwork au	toconf	igurati	lon has s	succeeded	
_							
						🙆 💿 🗗 🌽 🛄 🖳 🚱 🛃 Right Ctrl	49/96

× – + Ubuntu Server [Running] - Oracle VM VirtualBox	
File Machine View Input Devices Help	
[!] Configure the network Please enter the hostname for this system. The hostname is a single word that identifies your system to the network. If you don't know what your hostname should be, consult your network administrator. If you are setting up your own home network, you can make something up here.	väljade vahel liikumine
Hostname: server	TAB- klahviga
<go back=""> <continue></continue></go>	
<tab> moves; <space> selects; <enter> activates buttons</enter></space></tab>	5

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		N (1997)
[!!] Set up users and pas	swords	
A user account will be created for you to use instead	of the root account for	
non-administrative activities.		
Please enter the real name of this user. This informat default origin for emails sent by this user as well as the user's real name. Your full name is a reasonable c	ion will be used for instance as any program which displays or uses hoice.	
Full name for the new user:		
<go back=""></go>	<continue></continue>	

	× -	- +				Ubuntu Server [Running] - Oracle VM VirtualBox	
	File	Machine	View	Input	Devices	Help	
╉╃┦							
						[!!] Set up users and passwords	
		Select a	usernar	me for	the new	account. Your first name is a reasonable choice. The	
		of number	rs and r	more lo	with a . Wer-case	e letters.	
		Username	for you	ur acco	ount:		
		student					
		<go e<="" td=""><td>3ack></td><td></td><td></td><td><continue></continue></td><td></td></go>	3ack>			<continue></continue>	
	<tab></tab>	• moves; <	(Space>	select	:s; <e<u>nt€</e<u>	er> activates buttons	
						👂 💿 🗗 🥢 🗔 📃 🕼 💽 Right Ctrl	52/96

× – + Ubuntu Server [Running] - Oracle VM VirtualBox	<u>k</u> 😴
File Machine View Input Devices Help	
[!!] Set up users and passwords A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals. Choose a password for the new user:	märkeruudu
student [*] Show Password in Clear <go back=""> <go back=""></go></go>	valimine voi valiku tühistamine tühikuga,
	väljade vahel TAB-klahviga
<tab> moves; <space> selects; <enter> activates buttons 2 ⓒ 🗗 🌽 🔲 🖳 🕼 💭 Right Ctrl</enter></space></tab>	53





Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help



- [!!] Set up users and passwords -

Please enter the same user password again to verify you have typed it correctly. Re-enter password to verify:

<Continue>

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student_

[*] Show Password in Clear

<Go Back>

×	-	+				Ubuntu Server [Running	g] - Oracle VM V	/irtualBox				
Fil	le N	/lachine	View	Input	Devices	Help						
Ĩ												
						[!!] Set up users and	d passwords					
		ou ente	red a	nassuor	rd that i	consists of less that	o eight char	acters which	h is co	nsidered		
	ti	oo weak	. You	should	choose a	a stronger password.	r orgine ondi	400010, 000100	10 00			
	U	se weak	passw	ord?								
		<go< td=""><td>Back></td><td></td><td></td><td></td><td></td><td><</td><td>Yes≻</td><td><no></no></td><td></td><td></td></go<>	Back>					<	Yes≻	<no></no>		
	L											
KTa	D> M	oves; <	space>	Select	(s; <ento< td=""><td>er> activates button:</td><td>5</td><td></td><td></td><td></td><td></td><td></td></ento<>	er> activates button:	5					
							9	🕑 🗗 🥢 📖 📒) 🛄 🔟 (🔊 🛃 Right Ctr	rl	

2

	× -	+				Ubuntu Server [Running] - Oracle VM VirtualBox	
	File	Machine	View	Input	Devices	Help	
++							
						[!] Set up users and passwords	
		You may remain p	config private	ure you even i	ur home if your i	lirectory for encryption, such that any files stored there computer is stolen.	
		The syst automati	em wil cally	l seam] unmount	lessly m t when y	ount your encrypted home directory each time you login and bu log out of all active sessions.	
		Encrypt	your h	ome dir	rectory?		
		<go< td=""><td>Back></td><td></td><td></td><td><yes> <<u>No></u></yes></td><td></td></go<>	Back>			<yes> <<u>No></u></yes>	
	<tab></tab>	moves; <	(Space>	select	ts; <ent< td=""><td>n> activates buttons</td><td></td></ent<>	n> activates buttons	
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Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

[!!] Partition disks

The installer can guide you through partitioning a disk (using different standard schemes) or, if you prefer, you can do it manually. With guided partitioning you will still have a chance later to review and customise the results.

If you choose guided partitioning for an entire disk, you will next be asked which disk should be used.

Partitioning method:

Guided – use entire disk Guided – use entire disk and set up LVM Guided – use entire disk and set up encrypted LVM Manual

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<Go Back>





Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

[!!] Partition disks

Before the Logical Volume Manager can be configured, the current partitioning scheme has to be written to disk. These changes cannot be undone.

After the Logical Volume Manager is configured, no additional changes to the partitioning scheme of disks containing physical volumes are allowed during the installation. Please decide if you are satisfied with the current partitioning scheme before continuing.

The partition tables of the following devices are changed: SCSI3 (0,0,0) (sda)

Write the changes to disks and configure LVM?



<No>

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X = +

Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

[!] Partition disks

You may use the whole volume group for guided partitioning, or part of it. If you use only part of it, or if you add more disks later, then you will be able to grow logical volumes later using the LVM tools, so using a smaller part of the volume group at installation time may offer more flexibility.

The minimum size of the selected partitioning recipe is 1.4 GB (or 14%); please note that the packages you choose to install may require more space than this. The maximum available size is 10.2 GB.

Hint: "max" can be used as a shortcut to specify the maximum size, or enter a percentage (e.g. "20%") to use that percentage of the maximum size.

Amount of volume group to use for guided partitioning:

10.2 GB,

<Go Back>

<Continue>

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Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

[!!] Partition disks

If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.

The partition tables of the following devices are changed: LVM VG server-vg, LV root LVM VG server-vg, LV swap_1 SCSI3 (0,0,0) (sda)

The following partitions are going to be formatted: LVM VG server-vg, LV root as ext4 LVM VG server-vg, LV swap_1 as swap partition #1 of SCSI3 (0,0,0) (sda) as ext2

Write the changes to disks?

(Yes)

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<No>

<Tab> moves; <Space> selects; <Enter> activates buttons

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×	- +			Ubuntu Server [Running] - Oracle VM VirtualBox	- 🌭 🤕
File	le Machine	View Input	Devices	Help	
			[!] Configure the package manager	
	If you ne here. Oth	ed to use a erwise, leav	HTTP prox /e this bi	xy to access the outside world, enter the proxy information lank.	
	The proxy	, information	n should b	be given in the standard form of	
	"http://[[[user][:pas:	s]@]host[:	:port]/".	
	HTTP prox	(y informatio	on (blank	for none):	
	<go e<="" td=""><td>}ack≻</td><td></td><td><<u>Continue></u></td><td></td></go>	}ack≻		< <u>Continue></u>	
KTab	b> moves; <	(Space> sele(cts; <ente< td=""><td>er> activates buttons</td><td></td></ente<>	er> activates buttons	
				🔯 🕑 🗗 🌽 🛄 🔛 🔛 Right Ctrl	6





File Machine View Input Devices Help

[!] Software selection

At the moment, only the core of the system is installed. To tune the system to your needs, you can choose to install one or more of the following predefined collections of software.

Choose software to install:



<Tab> moves; <Space> selects; <Enter> activates buttons

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OpenSSH paigaldame hiljem käsitsi turvalisuse kaalutlustel

https://lists.debian.org/debian-devel/2013/09/msg00240.html https://security.stackexchange.com/questions/3422/what-is-the-openssh-blacklist-package-is-it-related-to-the-debian-openssl-bug 65/96



kui OpenSSH server kohe peale panna siis:

- tulemüür ei kaitse (vaja seadistada)
- OpenSSH blacklist pakid paigaldamata
- kui on sisevõrgus ja välisvõrgust ligi ei pääse siis võiks olla mõeldav ka kohe paigaldada



× -	- +				Ubuntu Server [Running] - Oracle VM VirtualBox	
File	Machine	View	Input	Devices	Help	
					[!!] Finish the installation	
	Installat the insta than rest ≺Go E	ion is llatio arting ack>	comple n media the ir	ete, so a (CD–ROI nstallat	Installation complete it is time to boot into your new system. Make sure to remove 4, floppies), so that you boot into the new system rather ion. < <u>Continue></u>	
<tab></tab>	> moves; <	(Space>	select	:s; <ent≀< td=""><td>er> activates buttons</td><td>67/06</td></ent≀<>	er> activates buttons	67/06
						01190







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Ubuntu Server [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Ubuntu 16.04.3 LTS server tty1

<u>s</u>erver login:

operatsioonisüsteem ja selle versioon

1. virtuaalne konsool vaikimisi on kokku
6 virtuaalset konsooli tty1...tty6 vaadata saab käsuga: tty+Enter

sisselogimiseks sisestada kasutajanimi vajutada Enter sisestada salasõna (selle sisestamist ei näidata turvakaalutlustel) ja vajutada Enter







Liikumine virtuaalkonsoolide vahel

- alljärgnev puudutab VirtualBox'i tarkvara
- ALT+nooleklahvid vasakule, paremale
- ALT+F1...F6
- tty1...tty6 näitab, mitmes virtuaalkonsool hetkel on
- jooksvalt saab vaadata käsuga: tty
 - /dev/tty3

Ubuntu 16.04.3 LTS server tty3 server login: _


VM'i sulgemise võimalused

 VirtualBox'i virtuaalarvuti (VM – virtual machine) sulgemine aknasulgemisnupu abil



Power off the machine ... on sisuliselt toitejuhtme väljavõtmine, ei ole mõistlik valida. Vaid juhul kus VM on praktiliselt kinni jooksnud ja muud võimalused enam ei aita siis võib rakendada "Power off the machine" valikut.





VM'i sulgemise võimalused

- VirtualBox'i virtuaalarvuti (VM virtual machine) sulgemine käsureal
 - systemctl poweroff + Enter
 - sudo poweroff + Enter
 - sudo halt -p + Enter

VM'i teised võimalused

- taaskäivitamiseks
 - systemctl reboot + Enter
 - sudo reboot + Enter
 - sudo halt --reboot + Enter
- väljalogimiseks
 - CTRL+D
 - logout + Enter #exit login shell



Hetktõmmis (s*napshot*)

- tehakse seisvast virtuaalmasinast (VM)
 - on olnud probleeme kui VM töötab
 - tasub omada vähemalt ühte hetktõmmist seisvast masinast
 - töötavast masinast on ka võimalik hetktõmmist teha
- võimaldab taastada seisu (sisuliselt "undo" kogu operatsioonisüsteemi tasandil sõltumata süsteemist)
- taastamine samuti seisva virtuaalmasina korral









×

Take Snapshot of Virtual Machine

Shapsi	14
clean	ir

Snapshot Name nstall

Snapshot Description

siia võib kirjutada kommentaari tehtud hetktõmmise kohta (mis seisus VM oli kui hetktõmmist tehti; enne millist tegevust või tegevusi hetktõmmis tehti jne).



<u>0</u>K

Take Delete Restore Properties Clone	
Name	Taken
🖻 🚰 clean install	
Current State	
Attributes Information	
Attributes Information	
<u>A</u> ttributes Information <u>Name:</u> clean install	
Attributes Information Name: clean install Description:	
Attributes Information Name: clean install Description:	
Attributes Information Name: clean install Description:	
Attributes Information Name: clean install Description:	
Attributes Information Name: clean install Description:	
Attributes Information Name: Clean install Description: Image: Clean install	
Attributes Information Name: clean install Description:	
Attributes Information Name: clean install Description:	
Attributes Information Name: clean install Description:	



kui on kiri *"Current state"* ja *"Taken"* veerg on tühi siis VM'i hetkeseis on sama, mis hetktõmmise tegemise momendil



Take Delete	Restore Proper	ties Clone					
Name		Taken					
🖻 😭 clean	install	05.02.18 5:31 (3 mi	nute(s) ago)				
🛶 🍚 Cui	rent State (change	ed)					
<u>A</u> ttributes	Information						
Name: Enter a name for the new snapshot							
<u>D</u> escription:							

Reset

võrreldes hetktõmmisega tegemise momendiga

kui "*Current state*" taga on sulgudes

"Taken" veerus on

tegemise aeg siis

"*changed*" ja

hetktõmmise

on hetkeseis

muutunud





Hetktõmmise taastamine

- kui VM on välja lülitatud siis saab taastada selle seisu, mis oli hetktõmmise tegemise momendil
 - kui veel ei ole siis sulgeda VM (1)
 - valida üks tehtud hetktõmmistest (2)
 - taastamiseks vajutada nupule "Restore" (3)





Hetktõmmise taastamine

- viimase sammuna küsitakse kinnitust
- veel on võimalik ka olemasolevast seisust omakorda hetktõmmis teha, näiteks juhul kui taastamine ei anna soovitud tulemust – siis saab omakorda praeguse seisu taastada
- töötavast masinast tehtud hetktõmmise taastamisel taastatakse täpselt sama töötav seis, mis oli hetktõmmise tegemisel – kui toimib siis on mugav viis kiirelt vahepealseid seisundeid salvestada



VirtualBox - Question



You are about to restore snapshot clean install.

You can create a snapshot of the current state of the virtual machine first by checking the box below; if you do not do this the current state will be permanently lost. Do you wish to proceed?

Create a snapshot of the current machine state



hetktõmmis on mõistlik teha enne mistahes muudatust VM'is, eriti kui ei ole kindel, kas tehtav muudatus toimib või on vaja (kiirelt) taastada muudatuse-eelne olukord





VM'i kloonimine

- üks võimalus on ka kloonida
- eelnevalt lülitada VM välja



VM'i kloonimine



- Full clone 100% koopia, kõik on eraldi kasutatav
- Linked clone virtuaalne kõvaketas jääb seotuks originaaliga



VM'i kloonimine



- *Current machine state* kloonitakse vaid viimane seis
- Everything kloonitakse ka hetktõmmiste seisud



Clone Virtual Machine

Snapshots

Please choose which parts of the snapshot tree should be cloned with the machine.

If you choose **Current machine state**, the new machine will reflect the current state of the original machine and will have no snapshots.

If you choose **Everything**, the new machine will reflect the current state of the original machine and will have matching snapshots for all snapshots in the original machine.

Clone

Cancel

• Current machine state

< Back

C Everything

soovitav on kloonida vaid viimane seis – see võimaldab kloontõmmise suurust vähendada. Kui aga siiski soovitakse kõiki hetktõmmiseid ka kloonitud masinas kasutada siis tuleks valida "*Everything*"

• esmalt teha kogu süsteemi uuendamine



- sudo apt-get update #uuendame pakettide varamud
- sudo apt full-upgrade -y #reaalne süsteemi uuendamine
- sudo apt-get clean #eemaldame edukalt paigaldatud paketid (tühjendame APT'i puhvri)
- sudo update-grub #uuendame alglaaduri GRUB
- sudo reboot #taaskäivitame süsteemi
- sudo apt-get update
- sudo apt install dkms -y #paigaldame paketi koos sõltuvustega
- sudo apt-get clean

Uuenduste tulemus

- muuhulgas võis tulla peale ka uus versioon tuuma:
 - mis versioon hetkel kasutusel on:
 - uname -r
 - vaatame, mis on paigaldatud:
 - ls -l /boot
 - kui selgub, et ka peale taaskäivitamist ei ole uus tuum kasutusele võetud siis uuendame alglaadurit ja taaskäivitame:
 - sudo update-grub && sudo reboot
 - info süsteemi kohta:
 - lsb_release -a



Külalise lisandite (*Guest Additions*) paigaldamiseks lisatakse virtuaalne CD tõmmis virtuaalsesse DVD-seadmesse

student@server.~\$ lsh	112	-				
NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINT
sr0	11:0	1	55.2M	Θ	rom	
sda	8:0	Θ	10G	Θ	disk	
—sda2	8:2	0	1K	Θ	part	
—sda5	8:5	0	9.5G	Θ	part	
−servervg-swap_1	253:1	0	508M	0	lvm	[SWAP]
servervg-root	253:0	0	9G	0	lum	/
L-sda1	8:1	0	487M	0	part	∕boot

Isblk – list block devices (füüsiline seade) seade /*dev/sr0* on optiline seade – selle kaudu saame ISO-failile ligi

student@server:~\$ 11 /media/ total 12 drwxr-xr-x 3 root root 4096 Feb 5 03:46 ./ drwxr-xr-x 23 root root 4096 Feb 5 04:17 . / drwxr-xr-x 2 root root 4096 Feb 5 03:46 cdrom/ student@server:~\$ 11 /media/cdrom/ total 8 drwxr-xr-x 2 root root 4096 Feb 5 03:46 ./ drwxr-xr-x 3 root root 4096 Feb 5 03:46 .../ student@server:~\$ sudo mount /dev/sr0 /media/cdrom/ [sudo] password for student: mount: /dev/sr0 is write-protected, mounting read-only student@server:~\$ sudo -i root@server:~# ll /media/cdrom/ total 49579 2226 Jan 15 15:59 ./ dr-xr-xr-x 6 root root 4096 Feb 5 03:46 .../ drwxr-xr-x 3 root root dr-xr-xr-x 2 root root 480 Jan 15 15:59 32Bit/ dr-xr-xr-x 2 root root 480 Jan 15 15:59 64Bit/ 763 Nov 28 11:50 AUTORUN.INF r--r-r-- 1 root root 6384 Jan 15 15:52 autorun.sh* -r-xr-xr-x 1 root root dr-xr-xr-x 2 root root 950 Jan 15 15:59 cert/ dr-xr-xr-x 2 root root 2508 Jan 15 15:59 082/ r-xr-xr-x 1 root root 4821 Jan 15 15:52 runasroot.sh* r--r--r-- 1 root root 449 Jan 15 15:59 TRANS.TBL r-xr-xr-x 1 root root 7300555 Jan 15 15:52 VBoxLinuxAdditions.run* -r--r--r-- 1 root root 16426496 Jan 15 16:53 VBoxSolarisAdditions.pkg -r-xr-xr-x 1 root root 16471688 Jan 15 15:59 VBoxWindowsAdditions-amd64.exe* r-xr-xr-x 1 root root 268504 Jan 15 15:52 VBoxWindowsAdditions.exe* r-xr-xr-x 1 root root 10275944 Jan 15 15:53 VBoxWindowsAdditions-x86.exe*



superkasutajaks logimine: sudo -i

mount käsuga haagitakse peale ISO faili lisamist virtuaalsesse DVD-seadmesse külge: sudo mount /dev/sr0 /media/cdrom

root@server:/media/cdrom# ./VBoxLinuxAdditions.run Verifying archive integrity... All good. Uncompressing VirtualBox 5.2.6 Guest Additions for Linux...... VirtualBox Guest Additions installer Copying additional installer modules ... Installing additional modules ... VirtualBox Guest Additions: Building the VirtualBox Guest Additions kernel modules. This system is currently not set up to build kernel modules. Please install the gcc make perl packages from your distribution.

VirtualBox Guest Additions: Starting.

olles sisenenud eelnevalt haagitud optilise seadme kausta cd /media/cdrom

... käivitatakse superkasutajana külalise lisandite paigaldamine:

sudo ./VBoxLinuxAdditions.run

... kuid vajalikud tarkvarapakid on paigaldamata ja need kõik saab peale *dkms* paketi paigaldamisega

NB! Paneme tähele, et Linuxis jt UNIXilaadsetes OSides tehakse vahet suur-, väiketähtedel. Enne kui *Enter* vajutate, veenduge, et saate aru, mida antud käsk teeb! Kui ei saa siis palun järgi uurida või küsida abi.



Ubuntu 16.04.3 LTS server tty1

server login: student Password: Last login: Mon Feb 5 06:30:08 EET 2018 on tty1 Welcome to Ubuntu 16.04.3 LTS (GNU/Linux 4.13.0-32-generic x86_64)

* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage

0 packages can be updated. 0 updates are security updates.

 student@server:~\$\$ sudo -i
 Vaja Virtuaal

 Isudol password for student:
 root@server:~# mount /dev/sr0 /media/cdrom/

 mount: /dev/sr0 is write-protected, mounting read-only
 taaskäivitad

 root@server:~# cd /media/cdrom/
 root@server:~# cd /media/cdrom/

 root@server:~# cd /media/cdrom/
 root@server:~# cd /media/cdrom/

 root@server:~media/cdrom#
 ./VBoxLinuxAdditions.run

 Verifying archive integrity... All good.
 Uncompressing VirtualBox 5.2.6 Guest Additions for Linux......

 VirtualBox Guest Additions installer
 Removing installed version 5.2.6 of VirtualBox Guest Additions...

 Copying additional installer modules ...
 Installing additional modules ...

 VirtualBox Guest Additions: Building the VirtualBox Guest Additions kernel modules.

VirtualBox Guest Additions: Running kernel modules will not be replaced until the system is restarte d VirtualBox Guest Additions: Starting. root@server:/media/cdrom# root@server:/media/cdrom#

peale külalise lisandite paigaldamist on vaja virtuaalmasin taaskäivitada



jagatud kataloogi kasutamiseks peab kasutaja olema *vboxsf* grupis

sudo adduser <kasutaja> <grupp>
sudo gpasswd -a <kasutaja> <grupp>
sudo usermod -aG <grupp> <kasutaja>
sudo usermod -aG <grupp1>,<grupp2> <kasutaja>

peale tarkvarauuendamist ja dkms paketi paigaldamist õnnestub ka külalise lisandite paigaldamine



student@server:"\$ service vboxadd status
vboxadd.service
Loaded: loaded (/opt/VBoxGuestAdditions-5.2.6/init/vboxadd: enabled; vendor preset: enabled)
Active: active (exited) since Mon 2018-02-05 06:40:30 EET; 21s ago
Process: 837 ExecStart=/opt/VBoxGuestAdditions-5.2.6/init/vboxadd start (code=exited, status=0/SUC
Main PID: 837 (code=exited, status=0/SUCCESS)
Tasks: 0
Memory: 0B
CPU: 0
CGroup: /system.slice/vboxadd.service
Feb 05 06:40:30 server vboxadd[837]: VirtualBox Guest Additions: Starting.
Feb 05 06:40:30 server vboxadd[837]: /opt/VBoxGuestAdditions-5.2.6/init/vboxadd: 257: /opt/VBoxGuest
Feb 05 06:40:30 server systemd[1]: Started vboxadd.service.

peale taaskäivitamist näeme, et külalise lisandite teenus on edukalt käivitunud service vboxadd status (väljumiseks *q* + *Enter*)

Virtuaalrakendus



- üks võimalus virtuaalmasinast koopiat omada on see eksportida virtuaalrakenduseks (.ova fail), mis sisaldab kõiki sätteid ja virtuaalset kõvaketast
- saab eksportida vaid seisvat (powered off) virtuaalmasinat





Virtuaalrakendus

 ekspertrežiimis saab valida (1) üks või ka mitu virtuaalmasinat korraga (CTRL-klahvi all hoides); vajadusel sätteid muutes (2); valides salvestamise asukoha ja failinime ning vormingu (3) ja tegevuse nupule "*Export*" vajutamisega käivitada

	Export Virtual Appliance
Virtual <u>m</u> achines to expo	Appliance <u>s</u> ettings
Juntu Server	 ✓ Virtual System 1 ✓ Name ✓ Description ✓ Description ✓ License
_ <u>S</u> torage settings 	3 Downloads/Ubuntu Server.ova
F <u>o</u> rmat: Open Virtualizat	tion Format 1.0
□ Write <u>M</u> anifest file	(4)
<u>c</u>	uided Mode Restore Defaults < Back Export Cancel

selle tulemusena tekkinud .ova fail avaneb vaikimisi VirtualBox'iga ning saab otse importida, vajadusel eelnevalt sätteid muutes



•

Virtuaalmasina failid

- kui avada VMi asukoht: hiire paremklahvi alt "Show in File Manager"
 - *.vbox fail on VMi kirjeldus XML-vormingus – seda avades avatakse VM kui VirtualBox on paigaldatud
 - *.vbox-prev on varukoopia
 - teinekord on vaja just see varukoopia kopeerida *.vbox laiendiga failiks
- *.vdi on virtuaalne kõvaketas



					٢	<u>N</u> ew		Ctrl+N
	Logs		2 kirjet	folder	-	<u>A</u> dd		Ctrl+A
	Snaps	hots	1 kirje	folder	ં	Settings	~	Ctrl+S
	😈 Ubunt	tu Server.vbox	6,9 kB	VirtualBox Machine Definition	olemasoleva VMi		Mi	
💯 Ubuntu Server.vbox-prev		6,9 kB	XML document	IISamiseks: Machine->Add				
	Ubunt	tu Server.vdi	2.1 GB	Virtual Disk Image		101001111		

Machine Help

VM võib asuda ka välisel kõvakettal, *.vbox faili abil saab selle koheselt lisada ja kasutada, soovitavalt USB3.x

Küsimused? Tänan tähelepanu eest!

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