Contents

Preface				
In	Introduction			
Ι	For Beginners	21		
1	Quickstart	23		
	What is OPNsense?	23		
	IP address	23		
	Setup	24		
	Overview	25		
	Summary	26		
2	Lab Network	27		
	Resources	27		
	Virtualization	30		
	Hardware	31		
	Networks	31		
	Firewall	32		
	Addressing	32		
	Lab Server	33		
	Utilization	34		
3	Platform	35		
	Preparation	36		
	VMware	36		

	VirtualBox	41 45
4	Installation Operating system	49 49 51 52
5	Initial Setup Initial setup	55 56 58 61 63 64
II	For Intermediates	65
6	Firewall OPNsense as a firewall Lab setup Firewall rules Logging Throughput Best practice Additional filter Technical background Order of processing Troubleshooting Summary	67 68 69 70 71 72 73 74 79 80 81 82
7	Transparent Firewall Pros and cons	83 83 84 85 87

	Uncover transparent firewall
	Technical background
	Summary
8	Network Address Translation 9
	Lab setup
	Scenarios
	IPv6
	NAT Reflection
	Technical background
	Summary
9	Management Interface 103
	Two-factor authentication
	Summary
III	For Experts 113
10	IPsec VPN 11:
	Security
	Lab setup
	Connection setup
	Address translation
	Dead Peer Detection
	IPv6
	VPN throughput
	Troubleshooting
	Technical background
	Outlook
	Summary
11	OpenVPN 13
	Operation
	Authentication
	Differences to IPsec

	Site-to-Site tunnel	
	Client-server tunnel	144
	Troubleshooting	149
	Certificates	150
	Technical background	151
	Summary	152
12	High Availability	153
	Basics	153
	Lab network	154
	Address translation	158
	Best practice	162
	Quicker failover	165
	Load balancing	165
	IP version 6	167
	Technical background	168
	Summary	169
13	NetFlow	171
	The content of a flow	171
	Lab setup	172
	Collector	174
	Troubleshooting	175
	Insight	175
	Technical background	176
	IPv6	177
	Summary	177
14	Web Proxy	179
	Lab setup	181
	Explicit proxy	
	Proxy cluster	
	TLS Inspection	
	Transparent proxy	
	Technical background	
	Outlook	
	Summary	201

15	Central Authentication		203
	Protocols		203
	Lab setup		205
	Microsoft Server		206
	Directory-as-a-Service		213
	Two-factor authentication		221
	Troubleshooting		221
	Technical background		225
	Summary	•	225
IV	For Hackers		227
16	Multi-WAN		229
	Requirements		230
	Load distribution in the WAN		231
	Lab environment	•	231
	Operation	•	232
	Configuration		
	Scenario		238
	Monitoring		
	IPv6		
	Technical background		
	Summary	•	242
17	DSL router		243
	DSL types		243
	Lab setup		244
	PPPoE Dial-in		245
	LAN adapters		249
	DNS and DHCP		249
	IPv4 with Address Translation		251
	IPv6 with prefix delegation		252
	Firewall		254
	Technical background		256
	Summary		257

18	Intrusion Detection	25	9
	IPS and IDS	. 25	59
	Network integration	. 26	50
	Lab setup	. 26	50
	Attack	. 26	51
	Activate IDS	. 26	52
	Activate IPS	. 26	54
	Transparent IDS	. 26	55
	Technical background	. 26	58
	Summary	. 27	70
19	Command Line	27	'1
	$configd \dots $. 27	71
	Configuration changes	. 27	73
	Undo changes	. 27	77
	Updates	. 27	78
	Summary	. 27	79
20	Performance Tuning	28	
	Lab setup	. 28	31
	Baseline	. 28	32
	Virtual network adapter	. 28	33
	Routing throughput	. 28	36
	IPsec throughput	. 28	38
	Increasing performance	. 29) 1
	Summary	. 29	98
V	For Admins	29	9
21	Best Practice	30	1
	Factory reset	. 30)1
	Benchmark throughput	. 30)2
	SSH login without password		
	Password reset		

22	Configuration	311
	Dropbox	
	Google Drive	
	Summary	319
23	Life Hacks	321
	Access from Windows	322
	Span port	322
	Telegram	323
	Firewall rules with category	326
	Quick search	327
	Snapshots	327
24	Application Programming Interface	329
	How does the API work?	329
	Read Access	333
	Write Access	335
	What does the API cover?	336
	API browser	338
	Security	339
	Technical background	340
	Outlook	340
	Summary	341
Bib	oliography	343
Inc	lex	347
Α	IP Version 6	355
В	Editing Files in FreeBSD	359
С	Pattern Matching	363
D	Bonus Material	369