pfSense_ISP
(Virtual Internet)

WAN 10.0.2.15
WAN fdc7:ca30:907e::1

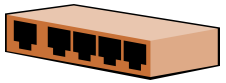
LAN1 192.168.241.1
LAN1 fd51:be27::1

LAN2 192.168.242.1
LAN2 fd51:be28::1

WAN1

WAN2

pfSense_client
(Virtual Router)



LAN1

LAN2

Interfaces

WAN	↑	1000baseT <full-duplex>	10.0.2.15 fdc7:ca30:907e::1
LAN	↑	1000baseT <full-duplex>	192.168.241.1 fd51:be27::1
LAN2	↑	1000baseT <full-duplex>	192.168.242.1 fd51:be28::1

General Configuration

Enable	☑ Enable interface
Description	LAN Enter a description (name) for the interface here.
IPv4 Configuration Type	Static IPv4
IPv6 Configuration Type	Static IPv6

Static IPv6 Configuration

IPv6 address	fd51:be27::1 / 32
IPv6 Upstream gateway	None — Add a new gateway

If this interface is an Internet connection, select an existing Gateway from the list or add a new one using the "Add" button.
On local LANs the upstream gateway should be "none".

DHCPv6 Options

DHCPv6 Server	☑ Enable DHCPv6 server on interface LAN
Subnet	fd51:be27::
Subnet Mask	32 bits
Available Range	fd51:be27:: to fd51:be27:ffff:ffff:ffff:ffff:ffff:ffff
Range	fd51:be27::1000 From — fd51:be27::2000 To
Prefix Delegation Range	fd51:be27:1:: From — fd51:be27:2:: To
Prefix Delegation Size	48 A Prefix range can be defined here for DHCP Prefix Delegation. This allows for assigning networks to subrouters. The start and end of the range must end on boundaries of the prefix delegation size.
DNS Servers	DNS 1 / DNS 2 / DNS 3 / DNS 4 Leave blank to use the system default DNS servers, this interface's IP if DNS forwarder is enabled, or the servers configured on the "General" page.
Domain name	The default is to use the domain name of this system as the default domain name provided by DHCP. An alternate domain name may be specified here.
Domain search list	The DHCP server can optionally provide a domain search list. Use the semicolon character as separator.
Default lease time	Lease time in seconds. Used for clients that do not ask for a specific expiration time. The default is 7200 seconds.
Max lease time	Maximum lease time for clients that ask for a specific expiration time. The default is 86400 seconds.
Time Format Change	☐ Change DHCPv6 display lease time from UTC to local time By default DHCPv6 leases are displayed in UTC time. By checking this box DHCPv6 lease time will be displayed in local time and set to time zone selected. This will be used for all DHCPv6 interfaces lease time.

Leases

IPv6 address	IAID	DUID	MAC address	Hostname	Start	End	Online	Lease Type	Actions
fd51:be27::2000	0	00:01:00:01:1f:fed1:ee:08:00:27:f4:fd:f4	08:00:27:73:ee:5f (Oracle VirtualBox virtual NIC)		2017/01/05 23:20:49	2017/01/06 01:20:49	online	active	

Delegated Prefixes

IPv6 Prefix	IAID	DUID	Start	End	State
fd51:be27:1::/48 Routed To: fd51:be27::2000	0	00:01:00:01:1f:fed1:ee:08:00:27:f4:fd:f4	2017/01/05 22:58:46	2017/01/06 00:58:46	active

Success!
Client acquired a full /48 block for its subnet.

Interfaces

WAN	↑	1000baseT <full-duplex>	192.168.241.12 fd51:be27::2000
LAN	↑	1000baseT <full-duplex>	192.168.1.1 fd51:be27:1:0:a00:27ff:fe9f:141d

General Configuration

Enable	☑ Enable interface
Description	WAN Enter a description (name) for the interface here.
IPv4 Configuration Type	DHCP
IPv6 Configuration Type	DHCP6

DHCP6 Client Configuration

Options	☐ Advanced Configuration Use advanced DHCPv6 configuration options. ☐ Configuration Override Override the configuration from this file.
Use IPv4 connectivity as parent interface	☐ Request a IPv6 prefix/information through the IPv4 connectivity link
Request only an IPv6 prefix	☐ Only request an IPv6 prefix, do not request an IPv6 address
DHCPv6 Prefix Delegation size	48 The value in this field is the delegated prefix length provided by the DHCPv6 server. Normally specified by the ISP.
Send IPv6 prefix hint	☐ Send an IPv6 prefix hint to indicate the desired prefix size for delegation
Debug	☐ Start DHCP6 client in debug mode

General Configuration

Enable	☑ Enable interface
Description	LAN Enter a description (name) for the interface here.
IPv4 Configuration Type	Static IPv4
IPv6 Configuration Type	Track Interface

Track IPv6 Interface

IPv6 Interface	WAN Selects the dynamic IPv6 WAN interface to track for configuration.
IPv6 Prefix ID	0 (hexadecimal from 0 to ffff)The value in this field is the (Delegated) IPv6 prefix ID.

DHCPv6 Options

DHCPv6 Server	☑ Enable DHCPv6 server on interface LAN
Subnet	Prefix Delegation
Subnet Mask	64 bits
Available Range	:: to ::ffff:ffff:ffff:ffff Prefix Delegation subnet will be appended to the beginning of the defined range
Range	::1000 From — ::2000 To
Prefix Delegation Range	From — To
Prefix Delegation Size	48 A Prefix range can be defined here for DHCP Prefix Delegation. This allows for assigning networks to subrouters. The start and end of the range must end on boundaries of the prefix delegation size.
DNS Servers	DNS 1 / DNS 2 / DNS 3 / DNS 4 Leave blank to use the system default DNS servers, this interface's IP if DNS forwarder is enabled, or the servers configured on the "General" page.
Domain name	The default is to use the domain name of this system as the default domain name provided by DHCP. An alternate domain name may be specified here.
Domain search list	The DHCP server can optionally provide a domain search list. Use the semicolon character as separator.
Default lease time	Lease time in seconds. Used for clients that do not ask for a specific expiration time. The default is 7200 seconds.
Max lease time	Maximum lease time for clients that ask for a specific expiration time. The default is 86400 seconds.
Time Format Change	☐ Change DHCPv6 display lease time from UTC to local time By default DHCPv6 leases are displayed in UTC time. By checking this box DHCPv6 lease time will be displayed in local time and set to time zone selected. This will be used for all DHCPv6 interfaces lease time.

Success!
Client computer has obtained an IPv6 address over DHCPv6, within the upstream prefix and client specified range.

Leases

IPv6 address	IAID	DUID	MAC address	Hostname	Start	End	Online	Lease Type	Actions
fd51:be27:1::2000	663741566	00:01:00:01:1f:ff:ee:cb:08:00:27:66:a2:4b	08:00:27:8f:e4:7e (Oracle VirtualBox virtual NIC)		2017/01/05 23:22:44	2017/01/06 01:22:44	online	active	

Delegated Prefixes

IPv6 Prefix	IAID	DUID	Start	End	State

pfSense_ISP
(Virtual Internet)

WAN 10.0.2.15
WAN fdc7:ca30:907e::1

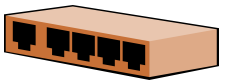
LAN1 192.168.241.1
LAN1 fd51:be27::1

LAN2 192.168.242.1
LAN2 fd51:be28::1

WAN1

WAN2

pfSense_client
(Virtual Router)



LAN1

LAN2

Interfaces

WAN	↑	1000baseT <full-duplex>	10.0.2.15 fdc7:ca30:907e::1
LAN	↑	1000baseT <full-duplex>	192.168.241.1 fd51:be27::1
LAN2	↑	1000baseT <full-duplex>	192.168.242.1 fd51:be28::1

Static assignments, simulated intranet.

General Configuration

Enable	☑ Enable interface
Description	LAN Enter a description (name) for the interface here.
IPv4 Configuration Type	Static IPv4
IPv6 Configuration Type	Static IPv6

Static IPv6 Configuration

IPv6 address	fd51:be27::1 / 32
IPv6 Upstream gateway	None — + Add a new gateway

LAN should have a /32 subnet.

If this interface is an Internet connection, select an existing Gateway from the list or add a new one using the "Add" button.
On local LANs the upstream gateway should be "none".

DHCPv6 Options

DHCPv6 Server	☑ Enable DHCPv6 server on interface LAN
Subnet	fd51:be27::
Subnet Mask	32 bits
Available Range	fd51:be27:: to fd51:be27:ffff:ffff:ffff:ffff:ffff:ffff
Range	fd51:be27::1000 From — fd51:be27::2000 To
Prefix Delegation Range	From — To
Prefix Delegation Size	48 A Prefix range can be defined here for DHCP Prefix Delegation. This allows for assigning networks to subrouters. The start and end of the range must end on boundaries of the prefix delegation size.
DNS Servers	DNS 1 / DNS 2 / DNS 3 / DNS 4 Leave blank to use the system default DNS servers, this interface's IP if DNS forwarder is enabled, or the servers configured on the "General" page.
Domain name	The default is to use the domain name of this system as the default domain name provided by DHCP. An alternate domain name may be specified here.
Domain search list	The DHCP server can optionally provide a domain search list. Use the semicolon character as separator.
Default lease time	Lease time in seconds. Used for clients that do not ask for a specific expiration time. The default is 7200 seconds.
Max lease time	Maximum lease time for clients that ask for a specific expiration time. The default is 86400 seconds.
Time Format Change	☐ Change DHCPv6 display lease time from UTC to local time By default DHCPv6 leases are displayed in UTC time. By checking this box DHCPv6 lease time will be displayed in local time and set to time zone selected. This will be used for all DHCPv6 interfaces lease time.

Issues /48 prefixes?

Status / DHCPv6 Leases

Leases

IPv6 address	IAID	DUID	MAC address	Hostname	Start	End	Online	Lease Type	Actions
fd51:be27::2000	0	00:01:00:01:1f:fe:d1:ee:08:00:27:f4:fd:f4	08:00:27:73:ee:5f (Oracle VirtualBox virtual NIC)		2017/01/05 17:48:02	2017/01/05 19:48:02	online	active	

Delegated Prefixes

IPv6 Prefix	IAID	DUID	Start	End	State

No prefixes delegated.

Once again,
no prefixes delegated,
no usable IPv6
connectivity to
upstream

Leases

IPv6 address	IAID	DUID	MAC address	Hostname	Start	End	Online	Lease Type	Acti
fd3a:cea5:5feb::2000	1702127664	00:01:00:01:1f:ff:ec:81:08:00:27:66:a2:4b			2017/01/04 17:52:30	2017/01/04 19:52:30	offline	active	
fd3a:cea5:5feb::161f	661037643	00:01:00:01:1f:ff:ee:cb:08:00:27:66:a2:4b			2017/01/04 17:35:08	2017/01/04 19:35:08	offline	active	

Delegated Prefixes

IPv6 Prefix	IAID	DUID	Start	End	State

Interfaces

WAN	↑	1000baseT <full-duplex>	192.168.241.12 fd51:be27::2000
LAN	↑	1000baseT <full-duplex>	192.168.1.1

Console actually shows WAN IP as fd51:be27::2000/128 .

General Configuration

Enable	☑ Enable interface
Description	WAN Enter a description (name) for the interface here.
IPv4 Configuration Type	DHCP
IPv6 Configuration Type	DHCP6

DHCP6 Client Configuration

Options	☐ Advanced Configuration Use advanced DHCPv6 configuration options. — ☐ Configuration Override Override the configuration from this file.
Use IPv4 connectivity as parent interface	☐ Request a IPv6 prefix/information through the IPv4 connectivity link
Request only an IPv6 prefix	☐ Only request an IPv6 prefix, do not request an IPv6 address
DHCPv6 Prefix Delegation size	48 The value in this field is the delegated prefix length provided by the DHCPv6 server. Normally specified by the ISP.
Send IPv6 prefix hint	☐ Send an IPv6 prefix hint to indicate the desired prefix size for delegation
Debug	☐ Start DHCP6 client in debug mode

Should grab a /48 prefix?

General Configuration

Enable	☑ Enable interface
Description	LAN Enter a description (name) for the interface here.
IPv4 Configuration Type	Static IPv4
IPv6 Configuration Type	Track Interface

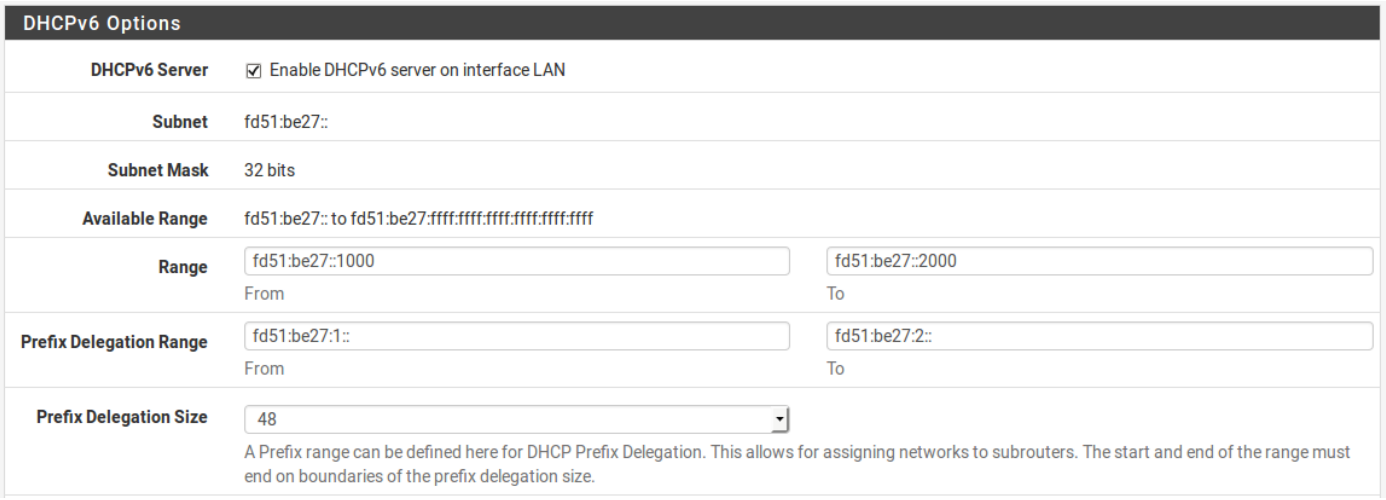
Track IPv6 Interface

IPv6 Interface	WAN Selects the dynamic IPv6 WAN interface to track for configuration.
IPv6 Prefix ID	0 (hexadecimal from 0 to ffff)The value in this field is the (Delegated) IPv6 prefix ID.

DHCPv6 Options

DHCPv6 Server	☑ Enable DHCPv6 server on interface LAN
Subnet	Prefix Delegation
Subnet Mask	64 bits
Available Range	:: to ::ffff:ffff:ffff:ffff Prefix Delegation subnet will be appended to the beginning of the defined range
Range	::1000 From — ::2000 To
Prefix Delegation Range	From — To
Prefix Delegation Size	48 A Prefix range can be defined here for DHCP Prefix Delegation. This allows for assigning networks to subrouters. The start and end of the range must end on boundaries of the prefix delegation size.
DNS Servers	DNS 1 / DNS 2 / DNS 3 / DNS 4 Leave blank to use the system default DNS servers, this interface's IP if DNS forwarder is enabled, or the servers configured on the "General" page.
Domain name	The default is to use the domain name of this system as the default domain name provided by DHCP. An alternate domain name may be specified here.
Domain search list	The DHCP server can optionally provide a domain search list. Use the semicolon character as separator.
Default lease time	Lease time in seconds. Used for clients that do not ask for a specific expiration time. The default is 7200 seconds.
Max lease time	Maximum lease time for clients that ask for a specific expiration time. The default is 86400 seconds.
Time Format Change	☐ Change DHCPv6 display lease time from UTC to local time By default DHCPv6 leases are displayed in UTC time. By checking this box DHCPv6 lease time will be displayed in local time and set to time zone selected. This will be used for all DHCPv6 interfaces lease time.

Should use a /48 prefix for the LAN?



Per a discussion with TandyUK from ##pfsense@irc/freenode.net, attempted to explicitly set a prefix delegation range.

Doing so raises more questions than answers, however. Are clients required to take the entire prefix delegation size? How are multiple clients handled? Why would the range assignment not be handled with an automatic default?

Ultimately, what is a valid range that allows clients to take random blocks of space for their subnetworks?