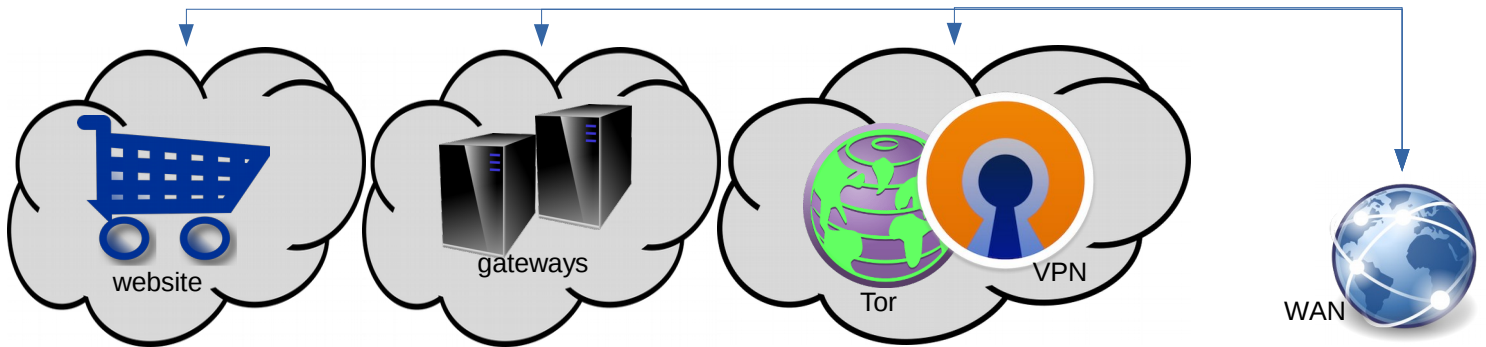


**CoreAutoSSH** is a portable administrative tool to access logical networks of computers through SSH tunnels across redundant physical networks.

A script file, an “ops” file, and credentials files are the only requirements. There is no requirement for, and no conflict from, system-wide installation, specialized network interfaces, or reserved IP ranges.

As a automatic last resort, the configuration can be set to access computers through a Tor/VPN address. As long as a WAN connection is available, the computer remains reachable.

CoreAutoSSH is an efficient means to access all computers in this complete network.

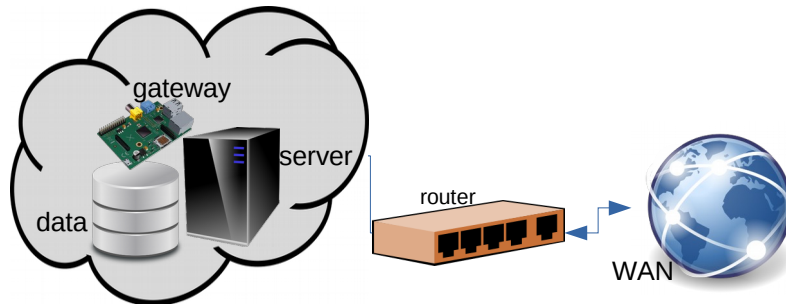


## Gateway, Data, Server

Directly accessible computers. Likely just a single computer, or managed hosting.

Typical use cases.

- \*) Default jump host for SSH, OpenVPN, etc (gateway).
- \*) Random data collection, mySQL cluster, etc (data).
- \*) Internal web pages, files (server).



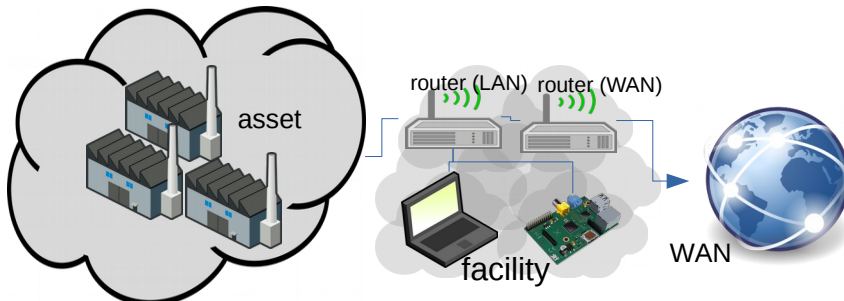
## Asset, Facility

Expensive capital equipment, on-site.

Often, assets are factory equipment (eg. 3D printers), facility is a “LapRack” - Laptop, RasPi, routers.

Typical use cases.

- \*) Remotely technical support.
- \*) Internal web pages, files.
- \*) Tunneling of web interfaces to public IP/ports for use without SSH client or VPN client.



## Random

Inexpensive, possibly low-power, embedded. Usually a remote sensor or actuator. Cannot maintain a continuous SSH or VPN tunnel, or does not require administration.

Typically will check in with a public web page, uploading data, downloading commands. May include a command to connect SSH to a public IP/port for administration.

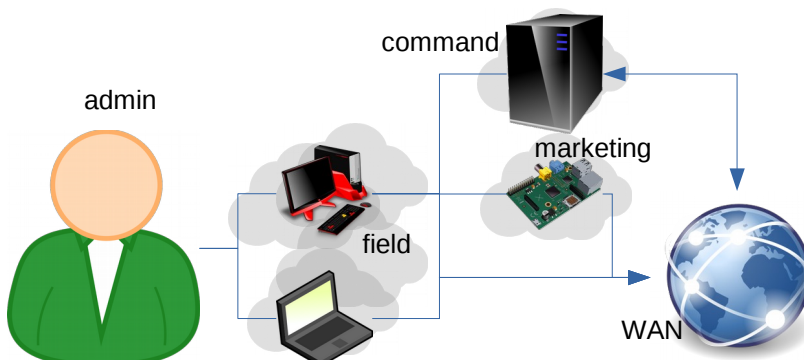


## Field, Command, Marketing

Administrator physical field computers (eg. laptop, desktop), command computer with public IP/port, and marketing computer connected continuously.

Typical use cases.

- \*) Field – a laptop or desktop with the software to access organization’s resources and provide technical support.
- \*) Command – port forwarding from public IP/port to field computers. An endpoint for reverse tunnels from random computers.
- \*) Marketing – Organization specific email, instant messaging.



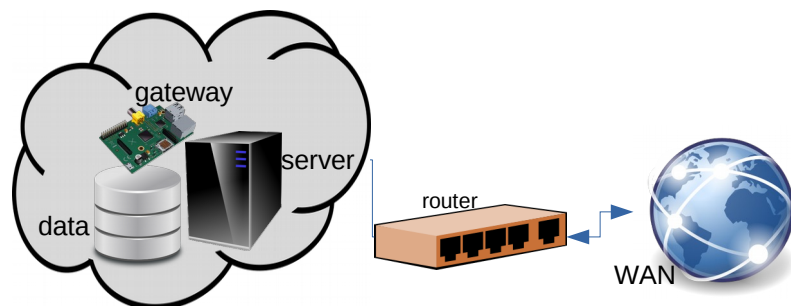
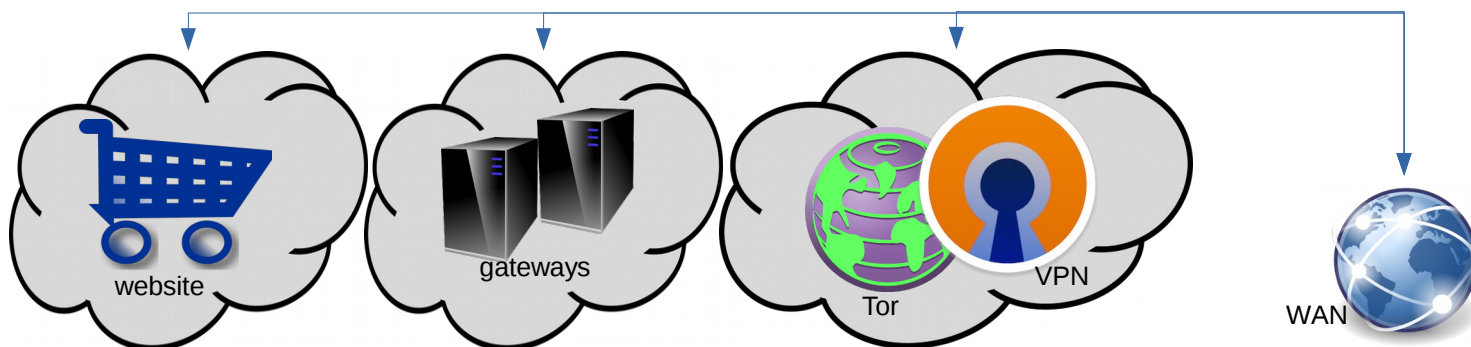
# Network – Logical

netName=default

netPrefix=dflt

netStart=20000

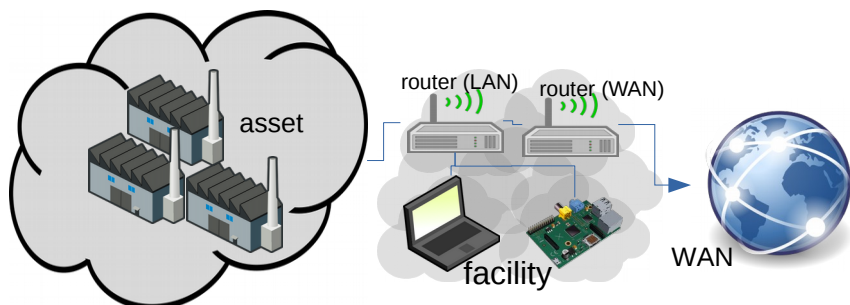
offset=+100



## Gateway, Data, Server

```
gateway
gw-"$netName"
spare-"$netName"
data
data-"$netName"                "$netPrefix"d        20008

server
server-"$netName"              "$netPrefix"srv      20009
```



## Asset, Facility

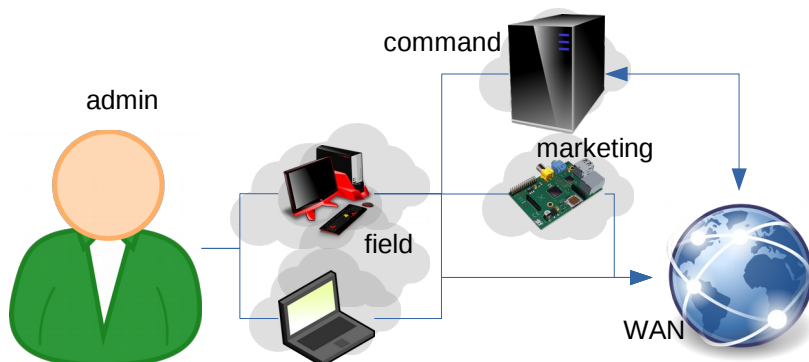
```
asset
a1-"$netName"      a1        20010["+ "$offset"]

facility
pc-"$netName"      "$netPrefix"pc      20001
raspi-"$netName"   "$netPrefix"rpi     20002["+ "$offset"]
lan-"$netName"     "$netPrefix"l
wan-"$netName"     "$netPrefix"w
```



## Random

<https://example.com/random/report.php?name1=value1&name2=value2>



## Field, Command, Marketing

```
admin
example

command
example-cmd-"$netName"  "exmp"c        20039

field
example-desk-"$netName" "exmp"d        20030
example-lap-"$netName"  "exmp"l        20031
example-mrk-"$netName"  "exmp"m        20035
```

# Network – Physical Simulated

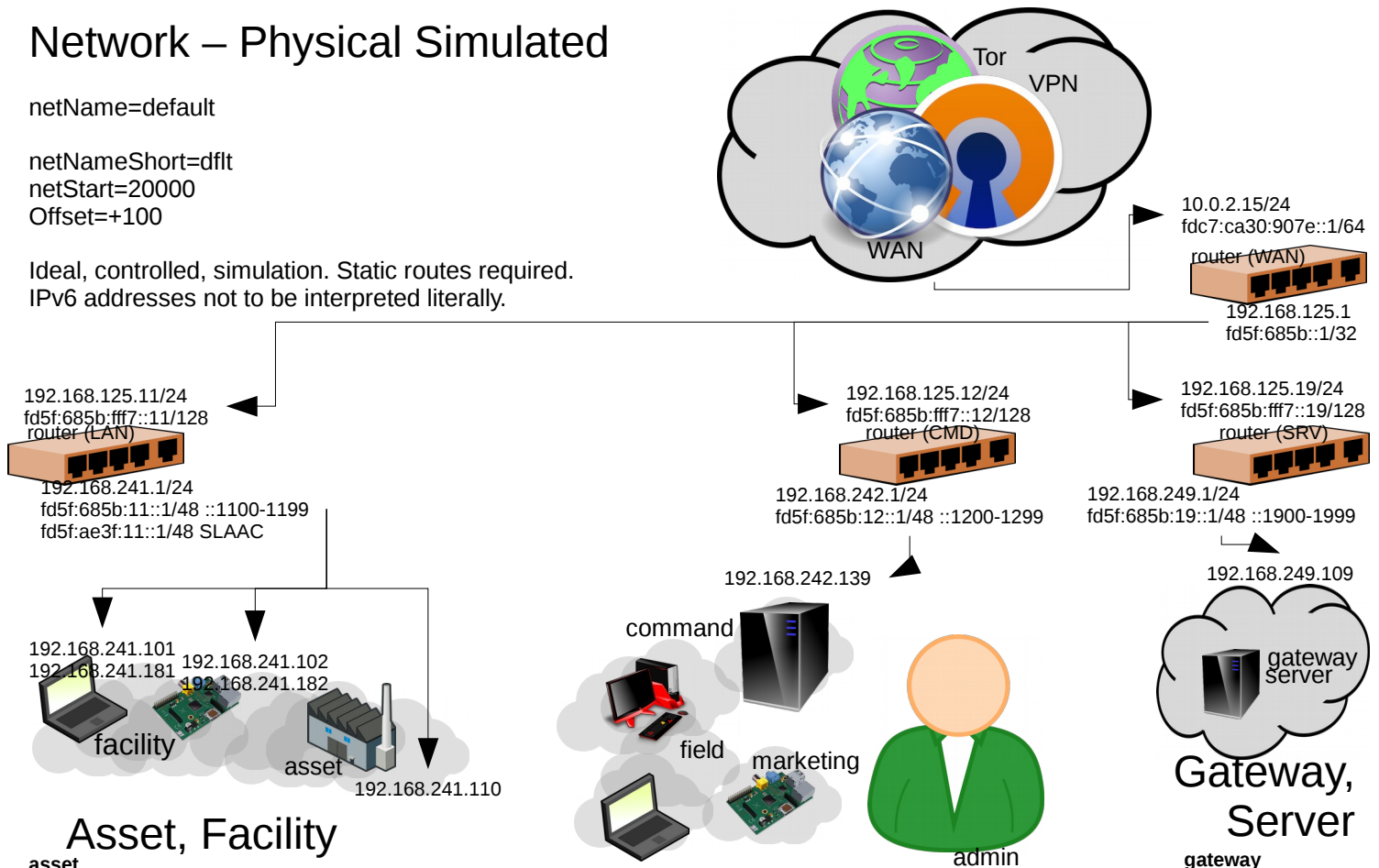
netName=default

netNameShort=dflt

netStart=20000

Offset=+100

Ideal, controlled, simulation. Static routes required.  
IPv6 addresses not to be interpreted literally.



## Asset, Facility

**asset**  
a1-"\$netName" a1 20010["+offset"]  
a2-"\$netName" a2 20011["+offset"]

**facility**  
pc-"\$netName" "\$netPrefix"pc 20001  
raspi-"\$netName" "\$netPrefix"rpi 20002["+offset"]  
lan-"\$netName" "\$netPrefix"l  
wan-"\$netName" "\$netPrefix"w

## Field, Command, Marketing

**admin**  
example

**command**  
example-cmd-"\$netName" "exmp"c 20039

**field**  
example-desk-"\$netName" "exmp"d 20030  
example-lap-"\$netName" "exmp"l 20031  
example-mrk-"\$netName" "exmp"m 20035

## Gateway, Server

**gateway**  
gw-"\$netName"

**server**  
server-"\$netName"  
"\$netPrefix"srv  
20009

Typically, a short standard password is used.  
root/6ddk0m  
admin/6ddk0m  
gateway/6ddk0m

commonadmin/6ddk0m  
user/6ddk0m

For convenience, Router "LAN", typically will accept and forward ports.  
:30122 Router "LAN" SSH  
:30143 Router "LAN" HTTPS

For convenience, Router "CMD", typically will accept and forward ports.  
:30222 Router "CMD" SSH  
:30243 Router "CMD" HTTPS

For convenience, Router "SRV", typically will accept and forward ports.  
:30922 Router "SRV" SSH  
:30943 Router "SRV" HTTPS  
:20009 Server SSH

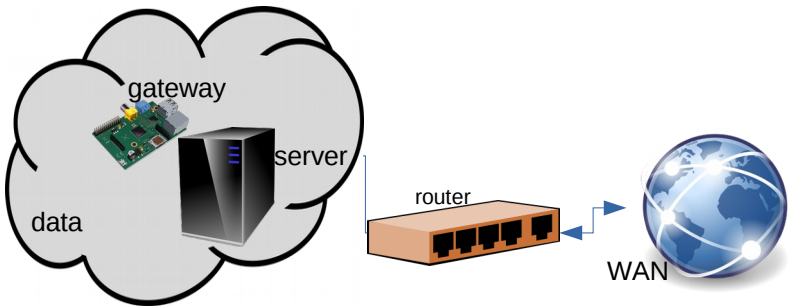
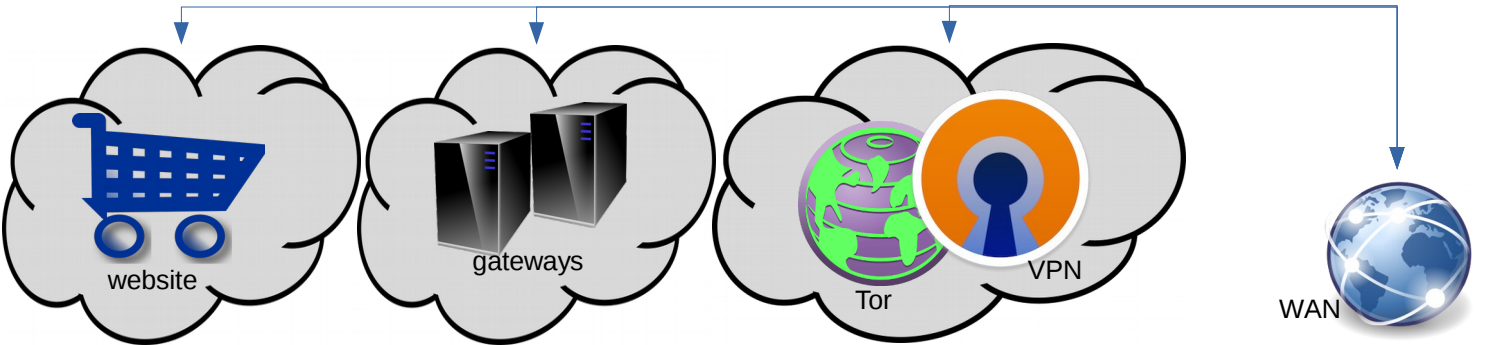
For convenience, Router "WAN", IP 10.0.2.15 and/or 192.168.125.1, typically will accept and forward ports.  
WARNING: Do not use ports >35500 . See "ubiquitous\_bash.sh", "\_get\_ssh\_external()".  
:30022 Router "WAN" SSH  
:30043 Router "WAN" HTTPS  
:30122 Router "LAN" SSH  
:30143 Router "LAN" HTTPS  
:30222 Router "CMD" SSH  
:30243 Router "CMD" HTTPS  
:30922 Router "SRV" SSH  
:30943 Router "SRV" HTTPS  
:20009 Server SSH

Typically all NAT will be bypassed through gateway server available.  
10.0.2.15 :20009 Server SSH  
192.168.125.1 :20009 Server SSH  
192.168.125.19 :20009 Server SSH  
192.168.249.1 :20009 Server SSH

# Network – Logical Simulated

netName=default

netPrefix=df1t  
netStart=20000  
offset=+100

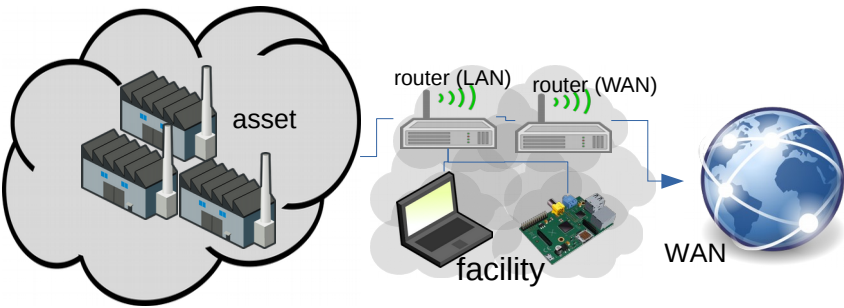


## Gateway, Data, Server

**gateway**  
gw-"\$netName"

**data**

**server**  
server-"\$netName"      "\$netPrefix"srv      20009



## Asset, Facility

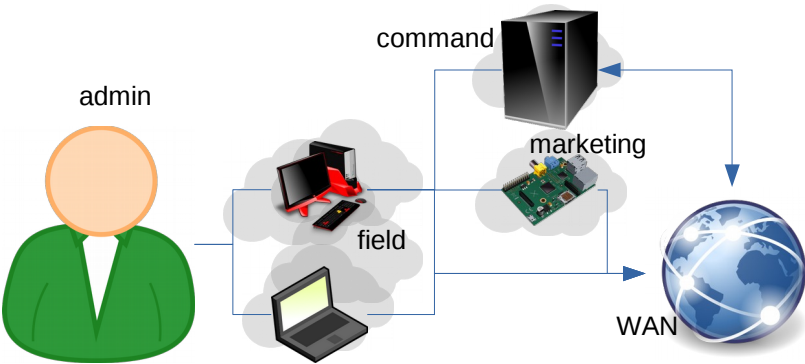
**asset**  
a1-"\$netName"      a1      20010["+ "\$offset"]  
a2-"\$netName"      a2      20011["+ "\$offset"]

**facility**  
pc-"\$netName"      "\$netPrefix"pc      20001  
raspi-"\$netName"      "\$netPrefix"rpi      20002["+ "\$offset"]  
lan-"\$netName"      "\$netPrefix"l      20003  
wan-"\$netName"      "\$netPrefix"w      20004



## Random

<https://example.com/random/report.php?name1=value1&name2=value2>



## Field, Command, Marketing

**admin**  
example

**command**  
example-cmd-"\$netName"      "exmp"c      20039

**field**  
example-desk-"\$netName"      "exmp"d      20030  
example-lap-"\$netName"      "exmp"l      20031  
example-mrk-"\$netName"      "exmp"m      20035



# PFSense – IPv4, IPv6 (Simulated, WAN)

Configuration example only.  
Addresses not to be interpreted literally.

WAN (Simulated, bridge expected.)  
10.0.2.15  
fdc7:ca30:907e::1

LAN1  
192.168.241.1  
fd51:be27::1

LAN2  
192.168.242.1  
fd51:be28::1

Static route example (if relevant).  
network: fd5f:685b:11::/48  
gateway: fdf5:685b:fff7::11

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:ed1:ee08:00:27:14:fd14	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:ed1:ee08:00:27:14:fd14	2017/01/05 22:58:46	2017/01/06 00:58:46	active	

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





# PFsense – IPv4, IPv6 (Simulated, LAN)

Configuration example only.  
Addresses not to be interpreted literally.

WAN (simulated, NAT expected)  
10.0.2.15  
fdc7:ca30:907e::1

LAN1  
192.168.241.1  
fd51:be27::1

LAN2  
192.168.242.1  
fd51:be28::1

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 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:fe: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 – IPv6 (Hurricane Electric)

## IPv6 Tunnel Endpoints

Server IPv4 Address: <public IPv4>  
Server IPv6 Address: <tunnel remote address> 2001:470:g:h::1/  
Client IPv4 Address: <public IPv4>  
Client IPv6 Address: <tunnel local address> 2001:470:g:h::2  
Routed IPv6 Prefixes  
Routed /64: 2001:470:g:h::/64  
Routed /48: 2001:470:i::/48 [X]

GIF Configuration

Parent Interface

WAN

This interface serves as the local address to be used for the GIF tunnel.

GIF Remote Address

Peer address where encapsulated gif packets will be sent.

GIF tunnel local address

2001:470:::2

Local gif tunnel endpoint.

GIF tunnel remote address

2001:470:::1

Remote GIF address endpoint.

GIF tunnel subnet

128

The subnet is used for determining the network that is tunnelled.

ECN friendly behavior

☐ ECN friendly behavior violates RFC2893. This should be used in mutual agreement with the peer.

Outer Source Filtering

☐ Disable automatic filtering of the outer GIF source which ensures a match with the configured remote peer. When disabled, martian and inbound filtering is not performed which allows asymmetric routing of the outer traffic.

Description

HE Tunnel IPv6 64prefix

A description may be entered here for administrative reference (not parsed).

tunnel64

GIF (HE Tunnel IPv6 64prefix)

Delete

System / Routing / Gateways / Edit

Edit Gateway

Disabled

☐ Disable this gateway

Set this option to disable this gateway without removing it from the list.

Interface

TUNNEL64

Choose which interface this gateway applies to.

Address Family

IPv6

Choose the Internet Protocol this gateway uses.

Name

tunnel64

Gateway name

Gateway

dynamic

Gateway IP address

Gateway Monitoring

☐ Disable Gateway Monitoring

This will consider this gateway as always being up.

Gateway Action

☐ Disable Gateway Monitoring Action

No action will be taken on gateway events. The gateway is always considered up.

Monitor IP

2001:4860:4860::8888

Enter an alternative address here to be used to monitor the link. This is used for the quality RRD graphs as well as the load balancer entries. Use this if the gateway does not respond to ICMP echo requests (pings).

Force state

☐ Mark Gateway as Down

This will force this gateway to be considered down.

Description

tunnel64

A description may be entered here for reference (not parsed).

Display Advanced

System / Routing / Gateways

Gateways Static Routes Gateway Groups

Gateways

	Name	Default	Interface	Gateway	Monitor IP	Description	Actions
<input type="checkbox"/>	WAN_DHCP (default)	Default (IPv4)	WAN		8.8.8.8		
<input type="checkbox"/>	tunnel64 (default)	Default (IPv6)	TUNNEL64		2001:4860:4860::8888		
<input type="checkbox"/>	WAN2_DHCP		WAN2		8.8.4.4		

Save Add

Default gateway

Default gateway IPv4

WAN\_DHCP

Select the gateway or gatewaygroup to use as the default gateway.

Default gateway IPv6

tunnel64

Select the gateway or gatewaygroup to use as the default gateway.

General Configuration

Enable ☒ Enable interface

**Description**   
Enter a description (name) for the interface here.

**IPv4 Configuration Type**

**IPv6 Configuration Type**

**MAC Address**   
This field can be used to modify ("spoof") the MAC address of this interface.  
Enter a MAC address in the following format: xx:xx:xx:xx:xx:xx or leave blank.

**MTU**   
If this field is blank, the adapter's default MTU will be used. This is typically 1500 bytes but can vary in some circumstances.

**MSS**   
If a value is entered in this field, then MSS clamping for TCP connections to the value entered above minus 40 (TCP/IP header size) will be in effect.

**Speed and Duplex**   
Explicitly set speed and duplex mode for this interface.  
WARNING: MUST be set to autoselect (automatically negotiate speed) unless the port this interface connects to has its speed and duplex forced.

Static IPv4 Configuration

**IPv4 Address**   /

**IPv4 Upstream gateway**  [+ 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 area network interfaces the upstream gateway should be "none". Gateways can be managed by [clicking here](#).

Static IPv6 Configuration

**IPv6 address**   /

**Use IPv4 connectivity as parent interface** ☐ IPv6 will use the IPv4 connectivity link (PPPoE)

**IPv6 Upstream gateway**  [+ 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".

Reserved Networks

**Block private networks and loopback addresses** ☐  
Blocks traffic from IP addresses that are reserved for private networks per RFC 1918 (10/8, 172.16/12, 192.168/16) and unique local addresses per RFC 4193 (fc00::/7) as well as loopback addresses (127/8). This option should generally be turned on, unless this network interface resides in such a private address space, too.

**Block bogon networks** ☒  
Blocks traffic from reserved IP addresses (but not RFC 1918) or not yet assigned by IANA. Bogons are prefixes that should never appear in the Internet routing table, and so should not appear as the source address in any packets received.  
Note: The update frequency can be changed under System > Advanced, Firewall & NAT settings.

DHCPv6 Server Router Advertisements

DHCPv6 Options

**DHCPv6 Server** ☒ Enable DHCPv6 server on interface LAN

**Subnet**

**Subnet Mask** 64 bits

**Available Range**  to

**Range**  From  To

DHCPv6 Server Router Advertisements

Advertisements

**Router mode**   
Select the Operating Mode for the Router Advertisement (RA) Daemon.

**Router priority**   
Select the Priority for the Router Advertisement (RA) Daemon.



