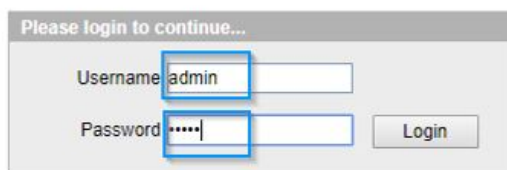


## Port forwarding for ZTE H298N

Connect your personal computer via ethernet cable or via wifi to the router. Open a web browser and type **192.168.1.1** in the search line of the browser. You should then see a login page, as below (Image 1).



Please login to continue...

Username

Password

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Image 1. Login screen of ZTE H298N router

In the Username field, type "**admin**". You'll be able to find the password associated with your router written on the back of the router itself. Once identified, type this into the Password field.

Once logged in, navigate to **Applications > Application List**. Select **Click here to add an application** in order to make new port mapping, as illustrated in Image 2.



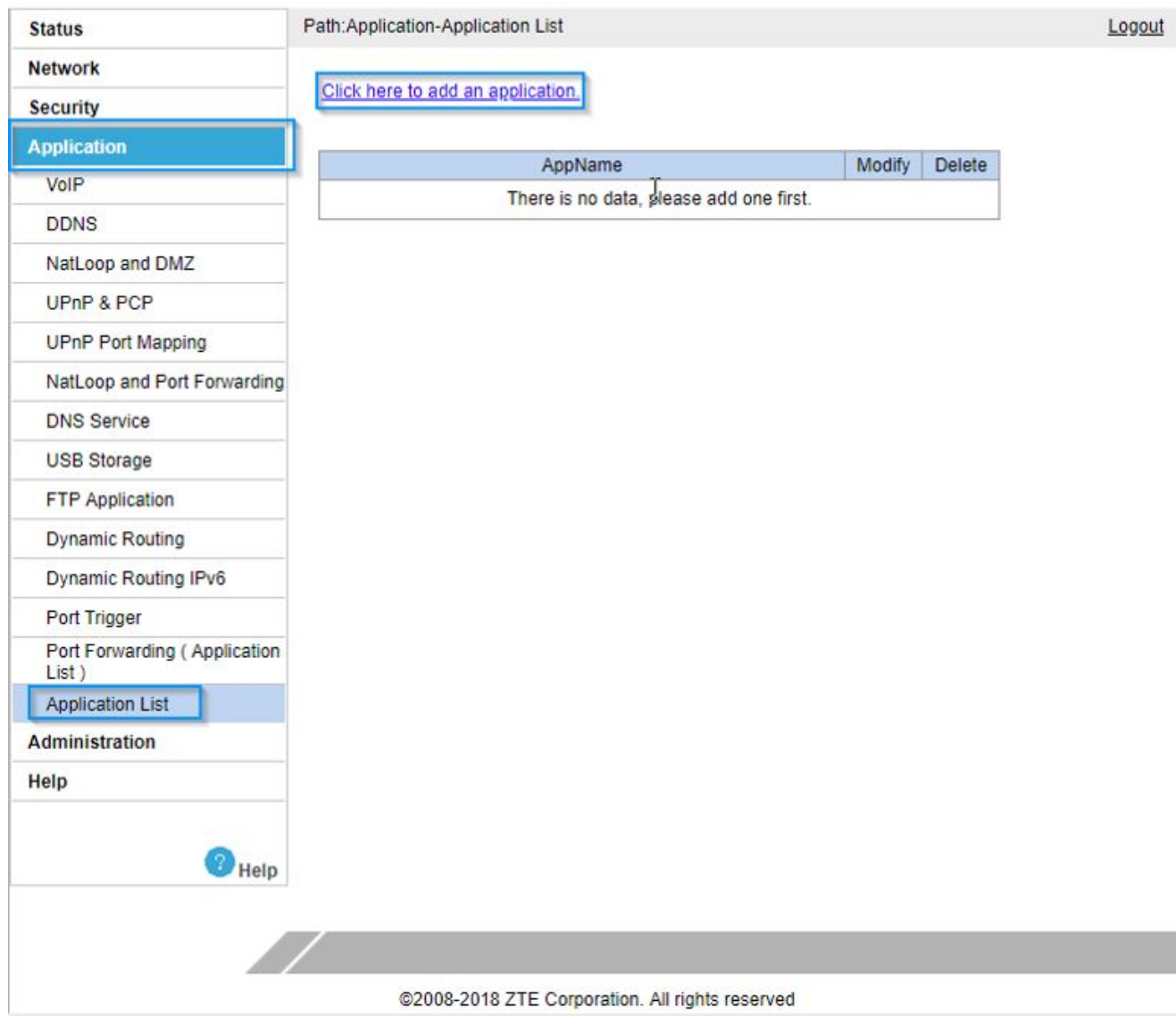


Image 2. Defining local application on router

You should then be presented with the webpage illustrated in Image 3. List any name in the **Application Name** field. In case of local web server, use **TCP Protocol**.



Status

Network

Security

Application

VoIP

DDNS

NatLoop and DMZ

UPnP & PCP

UPnP Port Mapping

NatLoop and Port Forwarding

DNS Service

USB Storage

FTP Application

Dynamic Routing

Dynamic Routing IPv6

Port Trigger

Port Forwarding ( Application List )

Application List

Administration

Help

Help

Path:Application-Application List

Logout

Application Name

Web\_server

(1 ~ 256)

Save

Protocol

TCP

WAN Start Port

8080

(0 ~ 65535)

WAN End Port

8080

(0 ~ 65535)

Start Mapping Port

8080

(1 ~ 65535)

End Mapping Port

8080

(1 ~ 65535)

Add

Protocol	WAN Start Port	WAN End Port	Map Start Port	Map End Port	Modify	Delete
There is no data, please add one first.						

Back

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Image 3. Defining LAN application in router GUI

List the port that will be used for the local web server (in this case, the server will be listening for connections on TCP port 8080). Populate **WAN Start Port**, **WAN End Port**, **Start Mapping Port** and **End Mapping Port** with the value **8080**. Once completed, click **Add**. Confirmation should appear as illustrated in Image 4.



Status

Network

Security

Application

VoIP

DDNS

NatLoop and DMZ

UPnP & PCP

UPnP Port Mapping

NatLoop and Port Forwarding

DNS Service

USB Storage

FTP Application

Dynamic Routing

Dynamic Routing IPv6

Port Trigger

Port Forwarding ( Application List )

Application List

Administration

Help

Help

Path:Application-Application List

Logout

Application Name

Web\_server

(1 ~ 256)

Modify

Protocol

TCP

WAN Start Port

(0 ~ 65535)

WAN End Port

(0 ~ 65535)



Start Mapping Port

(1 ~ 65535)

End Mapping Port

(1 ~ 65535)

Add

Protocol	WAN Start Port	WAN End Port	Map Start Port	Map End Port	Modify	Delete
TCP	8080	8080	8080	8080		

Back

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Image 4. Confirmation of application creation

After creating the application, navigate to **Application > Port Forwarding (Application List)**. This section will link the application with the relevant LAN device's IPv4 address. Enter **LAN Host IP Address** and click **Add**. This configuration is illustrated in Image 5.



Status

Network

Security

Application

VoIP

DDNS

NatLoop and DMZ

UPnP & PCP

UPnP Port Mapping

NatLoop and Port Forwarding

DNS Service

USB Storage

FTP Application

Dynamic Routing

Dynamic Routing IPv6

Port Trigger

Port Forwarding ( Application List )

Application List

Administration

Help

Help

Path:Application-Port Forwarding ( Application List )

Logout

WAN Connection

WAN-DHCP-Connection

LAN Host IP Address

192.168.1.100

AppName

Web\_server

Add

WAN Connection	LAN Host IP Address	AppName	Delete
There is no data, please add one first.			

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Image 5. Linking application with the LAN host

If the application is linked with the LAN device, you should see confirmation as illustrated in Image 6.



Status

Network

Security

Application

VoIP

DDNS

NatLoop and DMZ

UPnP & PCP

UPnP Port Mapping

NatLoop and Port Forwarding

DNS Service

USB Storage

FTP Application

Dynamic Routing

Dynamic Routing IPv6

Port Trigger

Port Forwarding ( Application List )

Application List

Administration

Help

Help

Path:Application-Port Forwarding ( Application List )

Logout

WAN Connection


WAN-DHCP-Connection

LAN Host IP Address

AppName

Web\_server

Add

WAN Connection	LAN Host IP Address	AppName	Delete
WAN-DHCP-Connection	192.168.1.100	Web_server	

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Image 6. Confirmation that port forwarding is configured

Alternatively, the router can be configured to perform port mapping (port translation) during port forwarding. In order to configure the router in this way, navigate to **Application > NatLoop and Port Forwarding** (see Image 7). In this example, the router will map traffic with destination port 12001 to port 8080. Inbound traffic on WAN ethernet port with destination port 21001 will be forwarded to LAN server. After all parameters are set, click **Add** to save router configuration.

Please also note that ports 80 and 443 **should never be used on WAN side**, as these ports are reserved for Hyperoptic Ltd. remote management. If you would like to use these ports on your server in a LAN, then you can use different ports on WAN side as shown on Image 7 (e.g. you can use ports on WAN side 12000, 12001 and map them to LAN ports 80, 443 respectively).



Status

Network

Security

Application

VoIP

DDNS

NatLoop and DMZ

UPnP & PCP

UPnP Port Mapping

NatLoop and Port Forwarding

DNS Service

USB Storage

FTP Application

Dynamic Routing

Dynamic Routing IPv6

Port Trigger

Port Forwarding ( Application List )

Application List

Administration

Help

Help

Path:Application-NatLoop and Port Forwarding

Logout

Enable ☒

Name

Protocol

Remote Host

WAN Connection

WAN Start Port

WAN End Port

Enable MAC Mapping ☐

LAN Host IP Address

LAN Host Start Port

LAN Host End Port

Add

Enable	Name	WAN Start Port	LAN Host Start Port	WAN Connection	Remote Host	Modify	Delete
	Protocol	WAN End Port	LAN Host End Port	LAN Host Address			
There is no data, please add one first.							

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Image 7. Port forwarding with port mapping

A list of commonly used port is illustrated in Image 8. For additional information about TCP and UDP port numbers, please refer to [https://en.wikipedia.org/wiki/List\\_of\\_TCP\\_and\\_UDP\\_port\\_numbers](https://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers).



Port Number(s)	Protocol	Application
20	TCP	FTP data
21	TCP	FTP control
22	TCP	SSH
23	TCP	Telnet
25	TCP	SMTP
53	UDP, TCP	DNS
67	UDP	DHCP Server
68	UDP	DHCP Client
69	UDP	TFTP
80	TCP	HTTP (WWW)
110	TCP	POP3
161	UDP	SNMP
443	TCP	SSL
514	UDP	Syslog
16,384 – 32,767	UDP	RTP (voice, video)

Image 8. List of commonly used ports



## DMZ for ZTE H298N

If a LAN device needs to be placed in a demilitarized zone, navigate to section DMZ as illustrated in Image 9 (**Application > NatLoop and DMZ**). Devices placed in DMZ will not be affected by a router's firewall. **Placing LAN devices in DMZ can therefore pose an IT security risk and this action should be taken with caution.**

The screenshot displays the router's configuration interface. On the left, a sidebar menu includes 'Status', 'Network', 'Security', 'Application', 'VoIP', 'DDNS', 'NatLoop and DMZ' (highlighted), 'UPnP & PCP', 'UPnP Port Mapping', 'NatLoop and Port Forwarding', 'DNS Service', 'USB Storage', 'FTP Application', 'Dynamic Routing', 'Dynamic Routing IPv6', 'Port Trigger', 'Port Forwarding ( Application List )', 'Application List', 'Administration', and 'Help'. The main content area is titled 'Path:Application-NatLoop and DMZ' and contains the following settings: 'Enable' is checked, 'WAN Connection' is set to 'WAN-DHCP-Connection', 'Enable MAC Mapping' is unchecked, and 'LAN Server IP Address' is '192.168.1.100'. A 'Logout' link is in the top right corner. At the bottom right, there are 'Submit' and 'Cancel' buttons. The footer text reads '©2008-2018 ZTE Corporation. All rights reserved'.

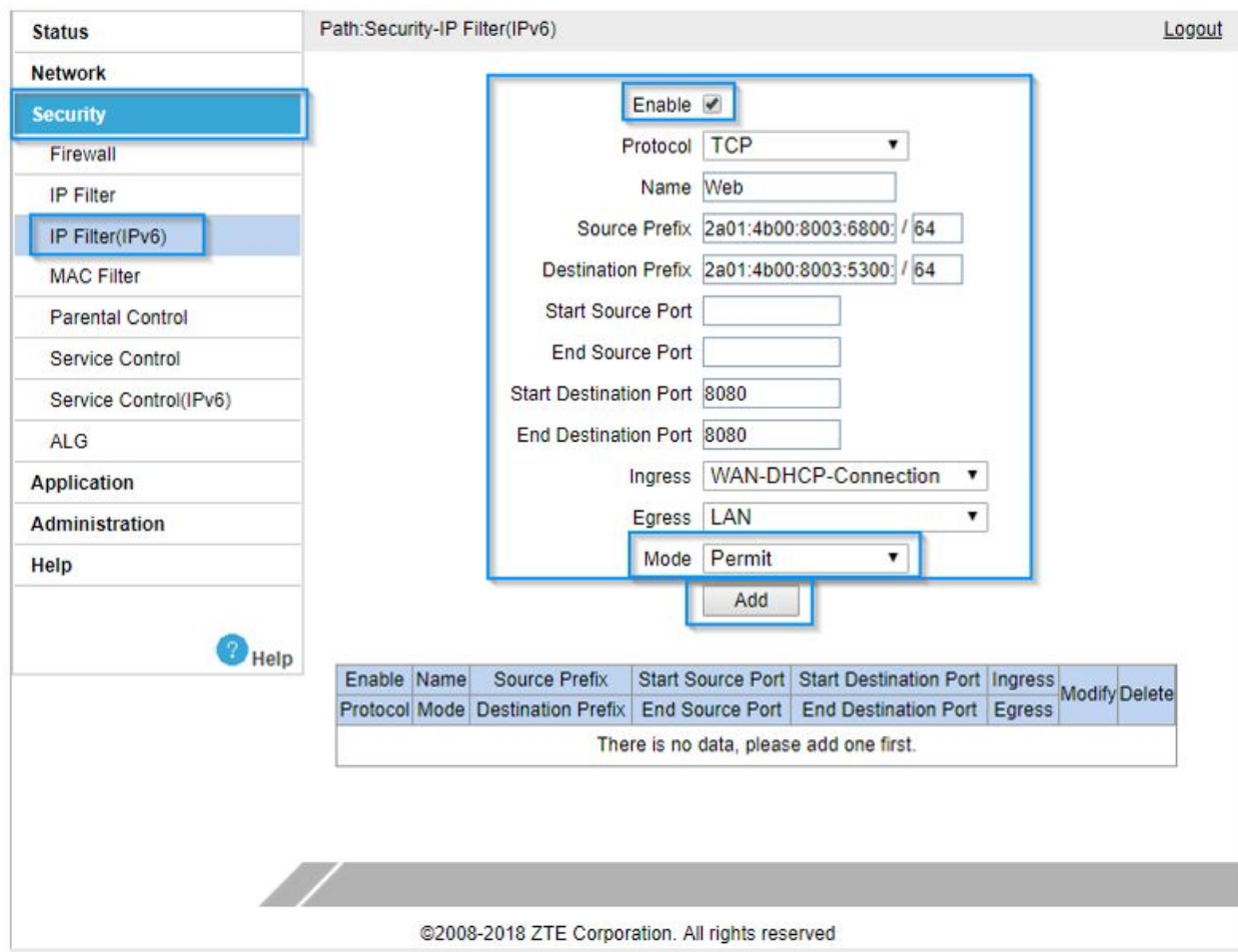
Image 9. DMZ configuration on router

Click **Enable**. Select **WAN Connection** as **WAN-DHCP-Connection**. List the **LAN Server IP address**. Click **Submit** to save router configuration.



## IP Filter (IPv6)

IPv6 servers placed in LAN can be accessed from any remote IPv6 address. Access can be granted using the router's IPv6 filters. To configure a Hyperoptic router, navigate to **Security > IP Filters(IPv6)**. Image 10 illustrates an example of a local IPv6 web server.



Path: Security-IP Filter(IPv6) [Logout](#)

**Enable** ☒

Protocol: **TCP**

Name: **Web**

Source Prefix: **2a01:4b00:8003:6800::/64**

Destination Prefix: **2a01:4b00:8003:5300::/64**

Start Source Port:

End Source Port:

Start Destination Port: **8080**

End Destination Port: **8080**

Ingress: **WAN-DHCP-Connection**

Egress: **LAN**

Mode: **Permit**

**Add**

Enable	Name	Source Prefix	Start Source Port	Start Destination Port	Ingress	Modify	Delete
Protocol	Mode	Destination Prefix	End Source Port	End Destination Port	Egress		
There is no data, please add one first.							

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Image 10. IPv6 filter configuration

Click **Enable** to make the filter rule active.

For web servers, use **TCP** as **Protocol** type.

Use any **Name** for the filter.

List the **Source Prefix** (IPv6 address range of remote computers) - for example, **2a01:4b00:8003:6800::** with prefix length **64**.

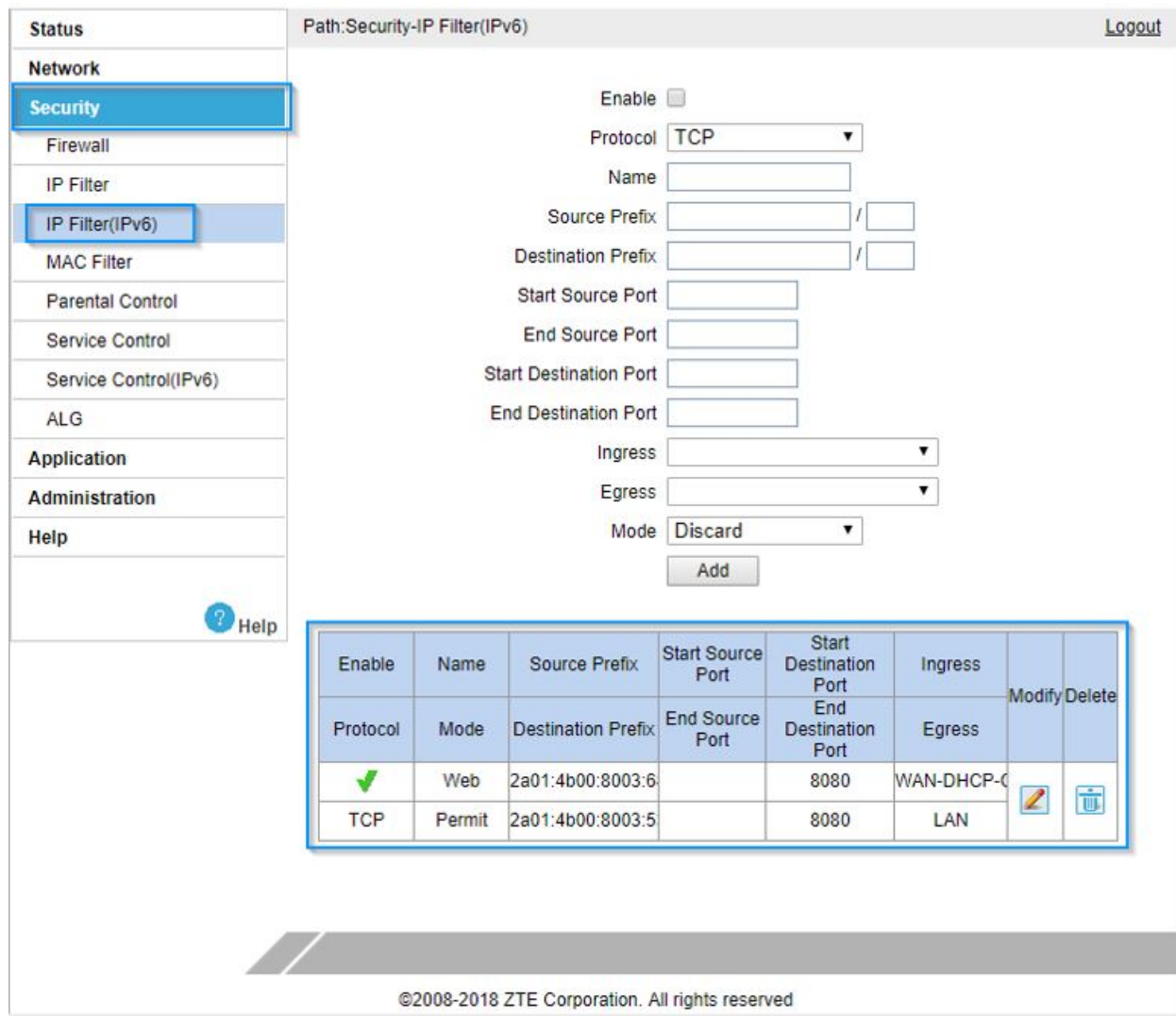
For **Destination Prefix**, use the address range assigned to the router. In the example illustrated in Image 10, this range is **2a01:4b00:8003:5300::** with prefix length **64**.



**Start Destination port** and **End destination port** define the range of ports that will be allowed to pass through local router. In this case only one port is permitted – port **8080**.

Define **Ingress** and **Egress** ports as per Image 10.

Choose **Permit** mode and click **Add** to save router configuration. Once configured, confirmation should appear as illustrated in Image 11.



**Status** Path: Security-IP Filter(IPv6) [Logout](#)

**Network**

- Security**
- Firewall
- IP Filter
- IP Filter(IPv6)**
- MAC Filter
- Parental Control
- Service Control
- Service Control(IPv6)
- ALG

**Application**

**Administration**

**Help**

Enable ☐

Protocol **TCP**

Name

Source Prefix  /

Destination Prefix  /

Start Source Port

End Source Port

Start Destination Port

End Destination Port

Ingress

Egress

Mode **Discard**

**Add**

Enable	Name	Source Prefix	Start Source Port	Start Destination Port	Ingress		
Protocol	Mode	Destination Prefix	End Source Port	End Destination Port	Egress	Modify	Delete
✓	Web	2a01:4b00:8003:6		8080	WAN-DHCP-C		
TCP	Permit	2a01:4b00:8003:5		8080	LAN		

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Image 11. Confirmation that IPv6 filter is made and Enabled

DHCP Binding for ZTE H298N

(Using user account)



Specific LAN client can have same IPv4 address all the time. In order to define which LAN client will have which IPv4 address, configuration of binding must be completed. This is described in photo 12. Navigate to section **Network > LAN**.

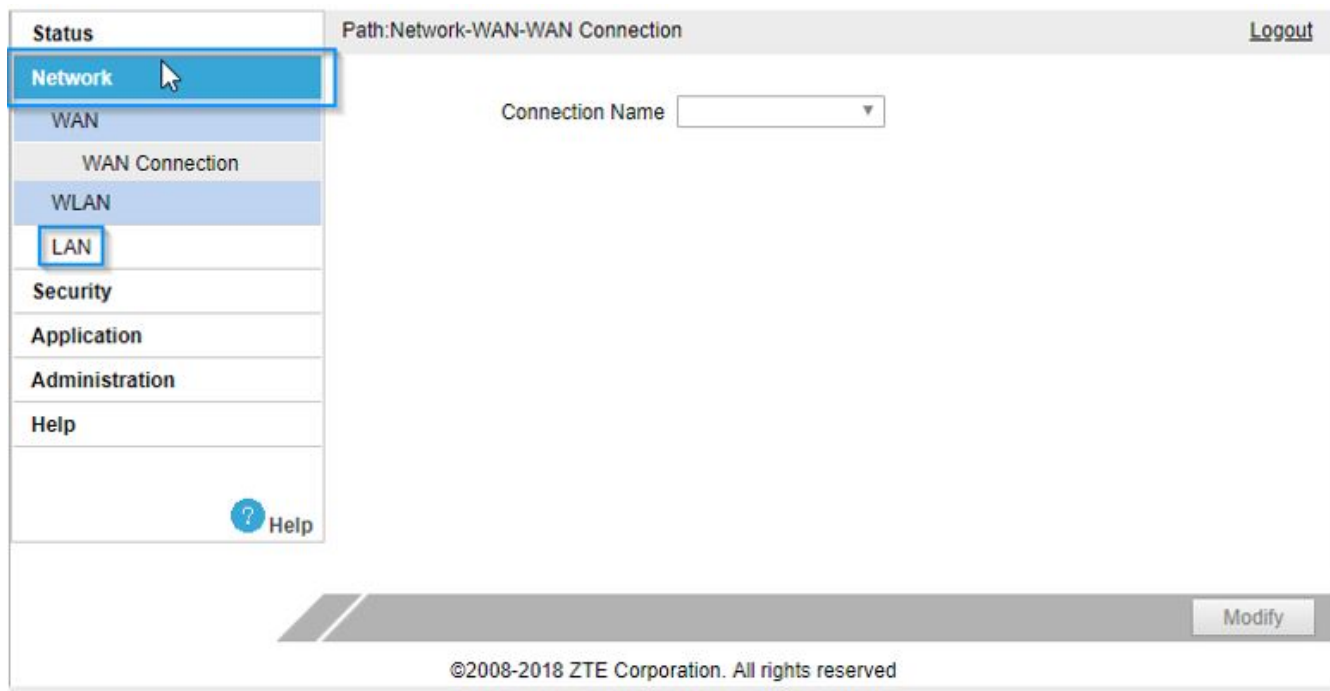
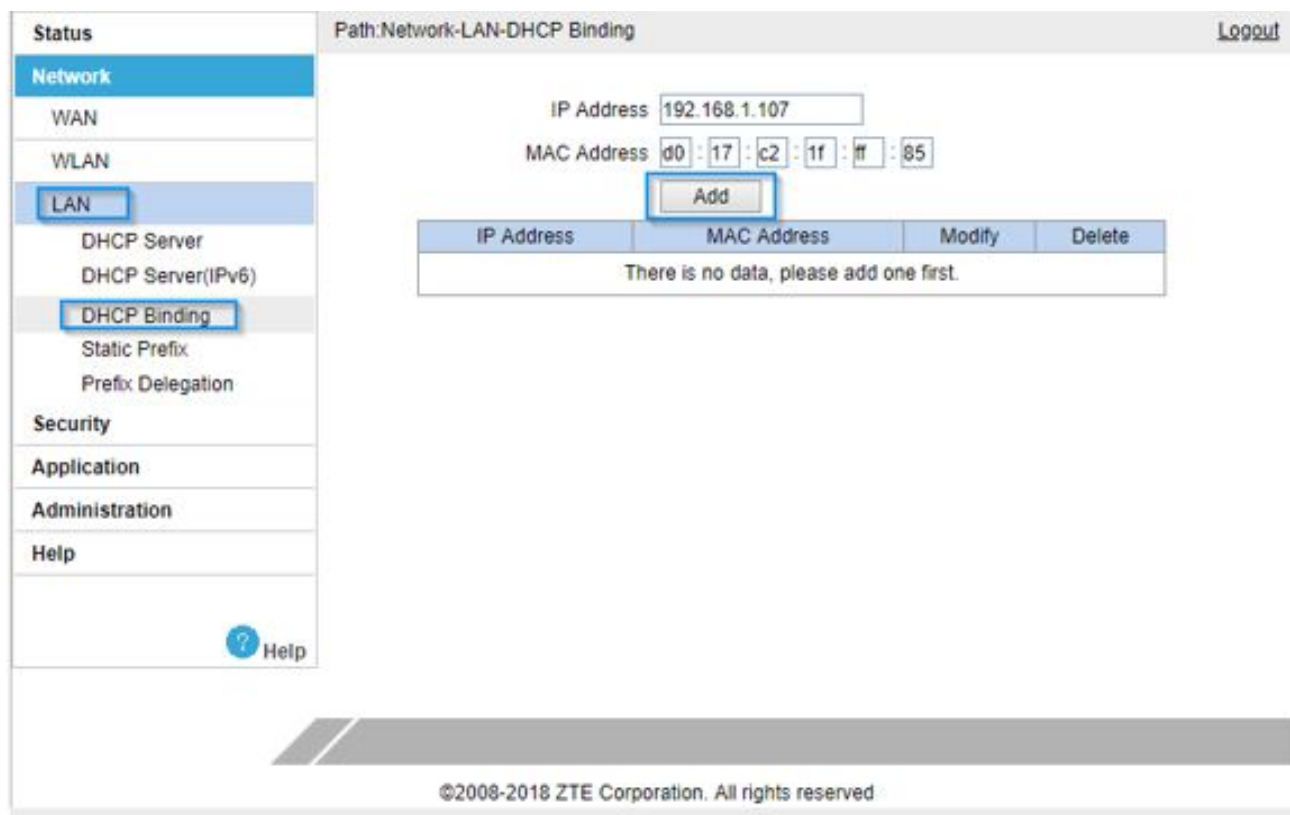


Photo 12. LAN section of router configuration



Click on **LAN** segment and then click on **DHCP Binding**. This is described in photo 13. List IPv4 wanted address and list MAC address of LAN client. After configuring these parameters click on **Add** to save settings.



Path: Network-LAN-DHCP Binding [Logout](#)

IP Address: 192.168.1.107

MAC Address: d0 : 17 : c2 : 1f : ff : 85

[Add](#)

IP Address	MAC Address	Modify	Delete
There is no data, please add one first.			

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Photo 13. Configuring DHCP binding



Confirmation of configuration looks like described in photo 14.

Status

Network

WAN

WLAN

LAN

DHCP Server

DHCP Server(IPv6)

DHCP Binding

Static Prefix

Prefix Delegation

Security

Application

Administration

Help

Help

Path:Network-LAN-DHCP Binding

Logout

IP Address

MAC Address

Add

IP Address	MAC Address	Modify	Delete
192.168.1.107	d0:17:c2:1f:ff:85		

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Photo 14. Confirmation of DHCP binding