

### Modelagem de redes

#### Objetivo: Aplicações e configurações de uma rede DHCP

**Part 1:** Conceitos de DHCP

**Part 2:** Monte e configuração de uma rede

### PART 1 – CONCEITOS DE DHCP - *Dynamic Host Configuration Protocol*

#### 1.1 Problema

Você precisa configurar 100 computadores com a configuração IP, mas sem DHCP. Não lhe resta alternativa além de configurar manualmente cada um dos computadores individualmente.

Além disso, também é preciso documentar a configuração IP de cada cliente e realizar uma modificação na configuração IP dos clientes e ainda reconfigurar manualmente cada um deles.

Principais parâmetros que devem ser configurados para que o protocolo TCP/IP funcione em uma máquina:

- Número IP;
- Máscara de sub-rede;
- Gateway Padrão
- Número IP de um ou mais servidores DNS

Em uma rede com centenas e até mesmo milhares de estações de trabalho, configurar o TCP/IP em cada estação se torna uma tarefa bastante trabalhosa.

Sempre que houver mudanças, a reconfiguração terá que ser feita manualmente em todas as estações de trabalho.

Possibilidade de erros de configuração:

- Digitação do endereço IP
- Digitação da máscara de sub-rede

DHCP: criado para facilitar a configuração e administração do protocolo TCP/IP em uma rede com um grande número de máquinas

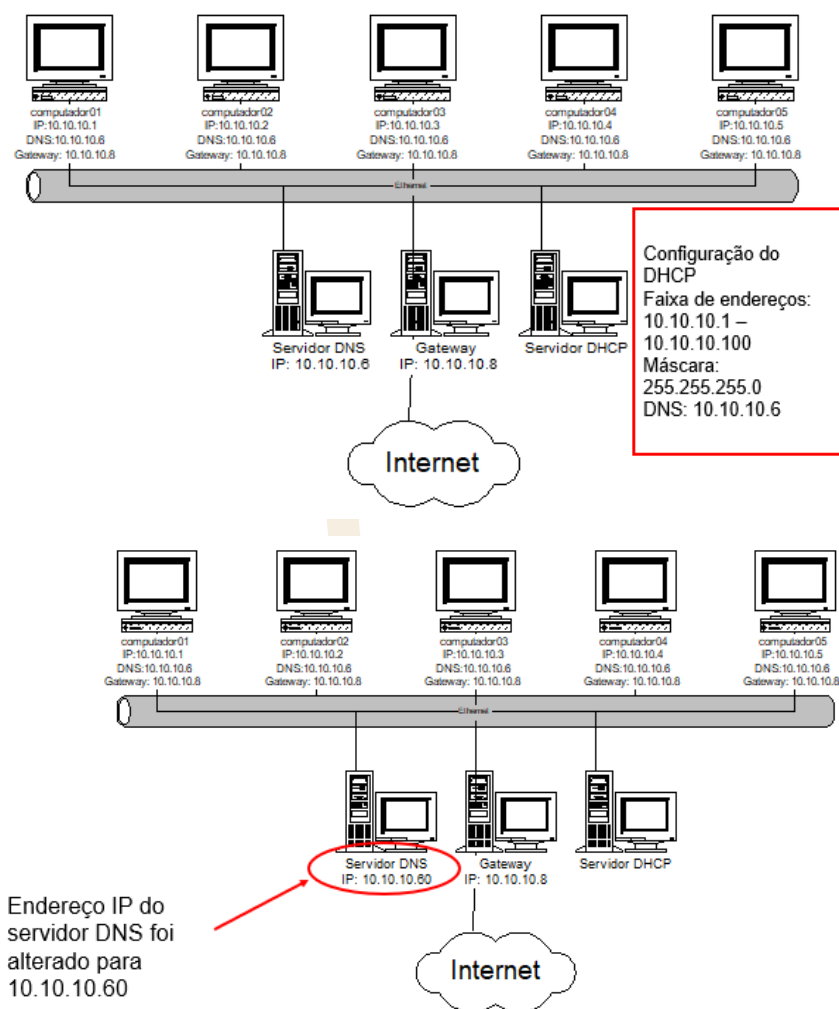
Com a instalação de um servidor DHCP é possível fazer com que os computadores e demais dispositivos de uma rede obtenham automaticamente configurações de TCP/IP.

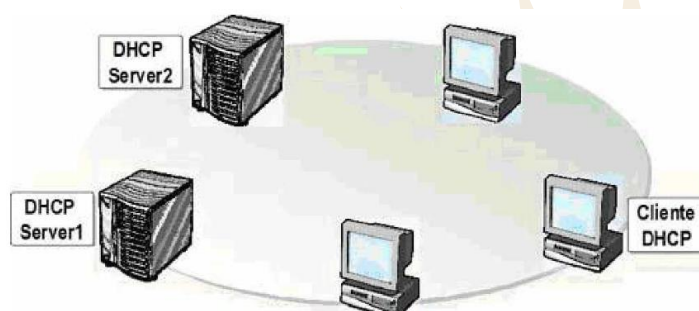
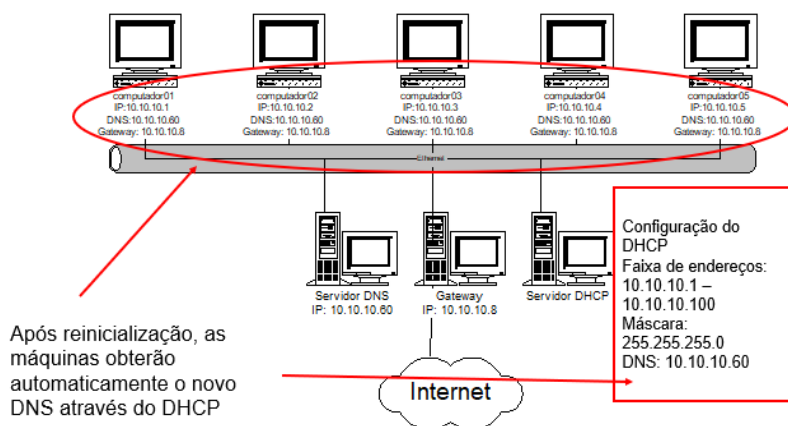
Com o uso do DHCP a distribuição de endereços IP e demais configurações do TCP/IP é automatizada e centralizada gerenciada.

Escopo: faixas de endereços IP criadas pelo administrador, e que serão distribuídas pelo servidor DHCP.

Para cada escopo também podem ser configurados outros parâmetros (IP do gateway, máscara de sub-rede e servidor DNS).

### 1.2 Exemplo: Alteração do IP do servidor DNS

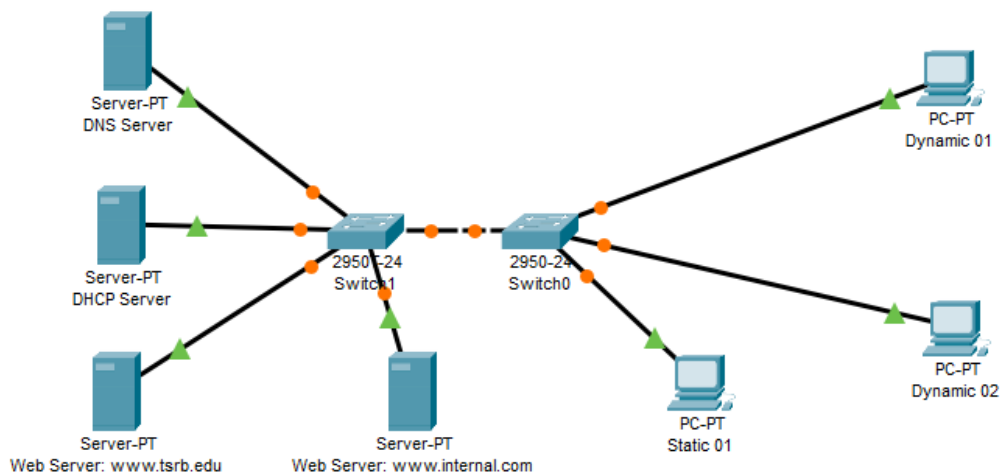




- 1 O cliente DHCP envia um broadcast, pacote DHCPDISCOVER
- 2 O servidor DHCP envia um broadcast, pacote DHCPOFFER
- 3 O cliente DHCP envia um broadcast, pacote DHCPREQUEST
- 4 O servidor DHCP envia um broadcast, pacote DHCPACK

### PART 2: MONTE E CONFIGURAÇÃO DE UMA REDE COM SERVIDORES

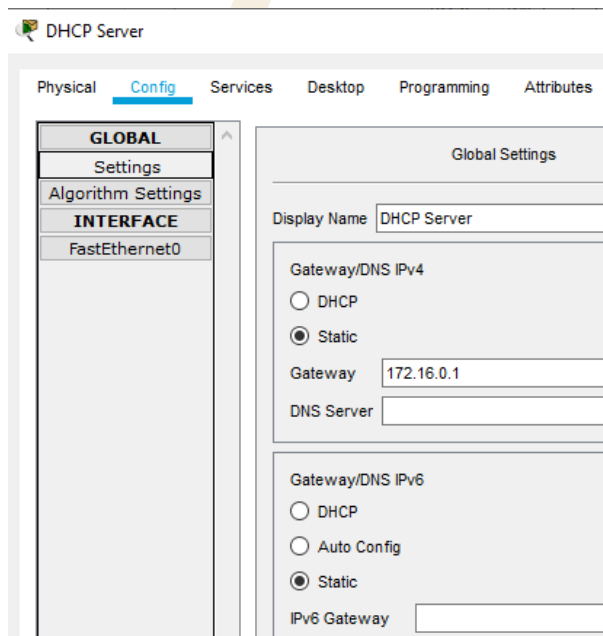
#### 2.1 Topologia



#### 2.2 Configuração do servidor de DHCP

##### Global Settings:

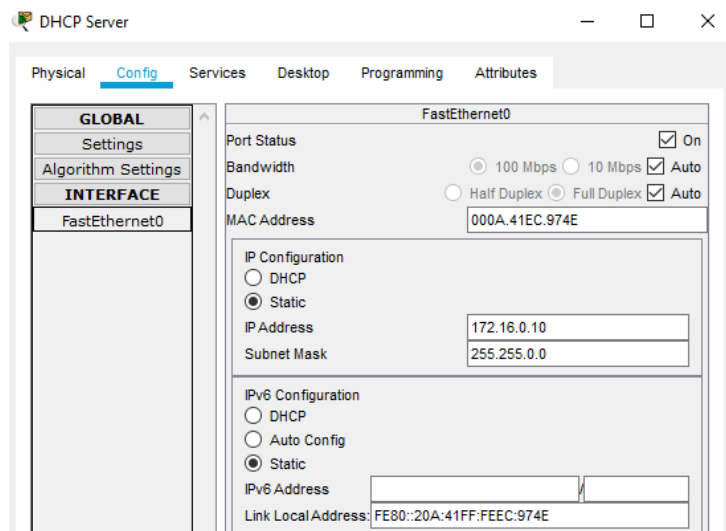
- Change the Display Name to “DHCP Server”
- Set the Gateway to 172.16.0.1



### FastEthernet:

Set the IP address to 172.16.0.10

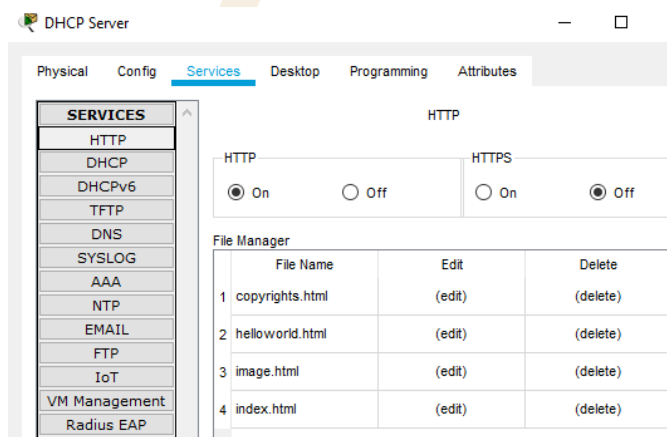
Set the Subnet Mask to 255.255.0.0



### Services

#### HTTP:

Set HTTP Service and HTTPS Service to **Off**

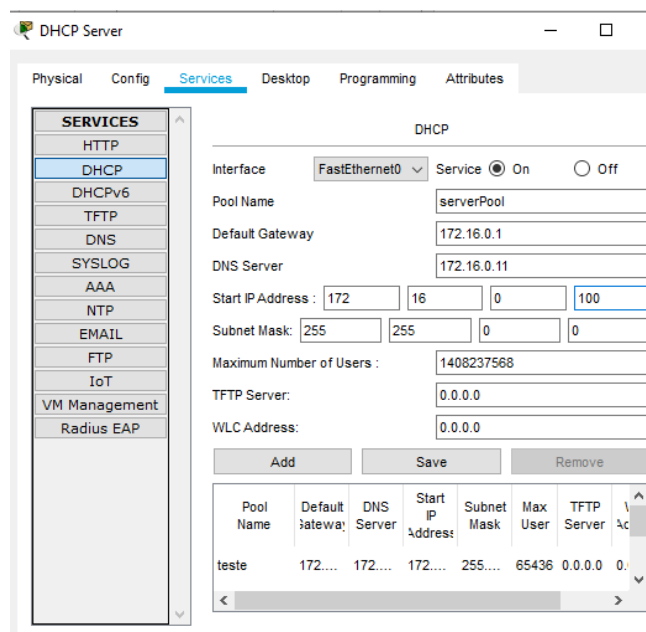


#### DHCP:

Set the Default Gateway to 172.16.0.1

Set the DNS Server to 172.16.0.11

Set the Start IP Address to 172.16.0.100



The screenshot shows the DHCP Server configuration window with the 'Services' tab selected. The 'DHCP' service is highlighted in the left sidebar. The main configuration area shows the following settings:

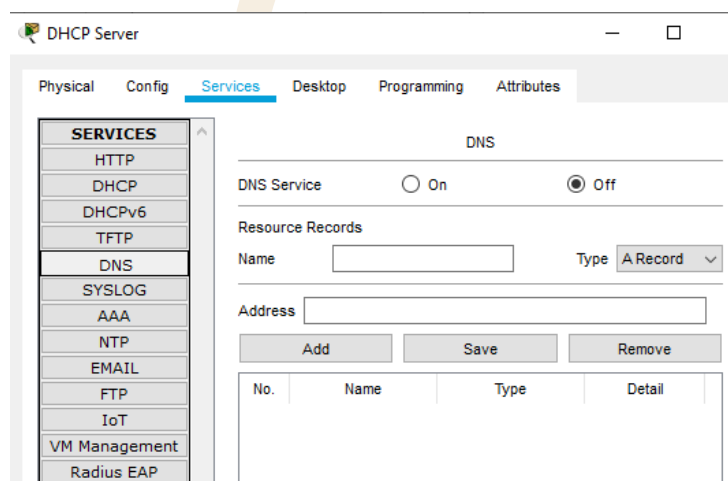
- Interface: FastEthernet0
- Service: ☒ On
- Pool Name: serverPool
- Default Gateway: 172.16.0.1
- DNS Server: 172.16.0.11
- Start IP Address: 172.16.0.100
- Subnet Mask: 255.255.0.0
- Maximum Number of Users: 1408237568
- TFTP Server: 0.0.0.0
- WLC Address: 0.0.0.0

At the bottom, there is a table with columns: Pool Name, Default Gateway, DNS Server, Start IP Address, Subnet Mask, Max User, TFTP Server, and Action. The table contains one entry:

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	Action
teste	172.16.0.1	172.16.0.11	172.16.0.100	255.255.0.0	65436	0.0.0.0	

**DNS:**

Set the Service to **Off**



The screenshot shows the DHCP Server configuration window with the 'DNS' tab selected. The 'DNS Service' is set to ☒ Off. The 'Resource Records' section is visible with the following settings:

- Name:
- Type: A Record
- Address:

At the bottom, there is a table with columns: No., Name, Type, and Detail. The table is currently empty.

Configure Two Client Computers using DHCP

Add two client computers.

Global Settings:

Change the Display Names to “Dynamic 1” and to “Dynamic 2” respectively

Set the Gateway/DNS to DHCP

Add two client computers.

FastEthernet: Set the IP Configuration to DHCP

### Adding switches

#### Add two switches.

Connect the servers to one switch using a straight-through cable.

Connect the client computers to the other switch using a straight-through cable.

Interconnect the two switches using a crossover cable.

### Verify connectivity

Ping (ICMP)

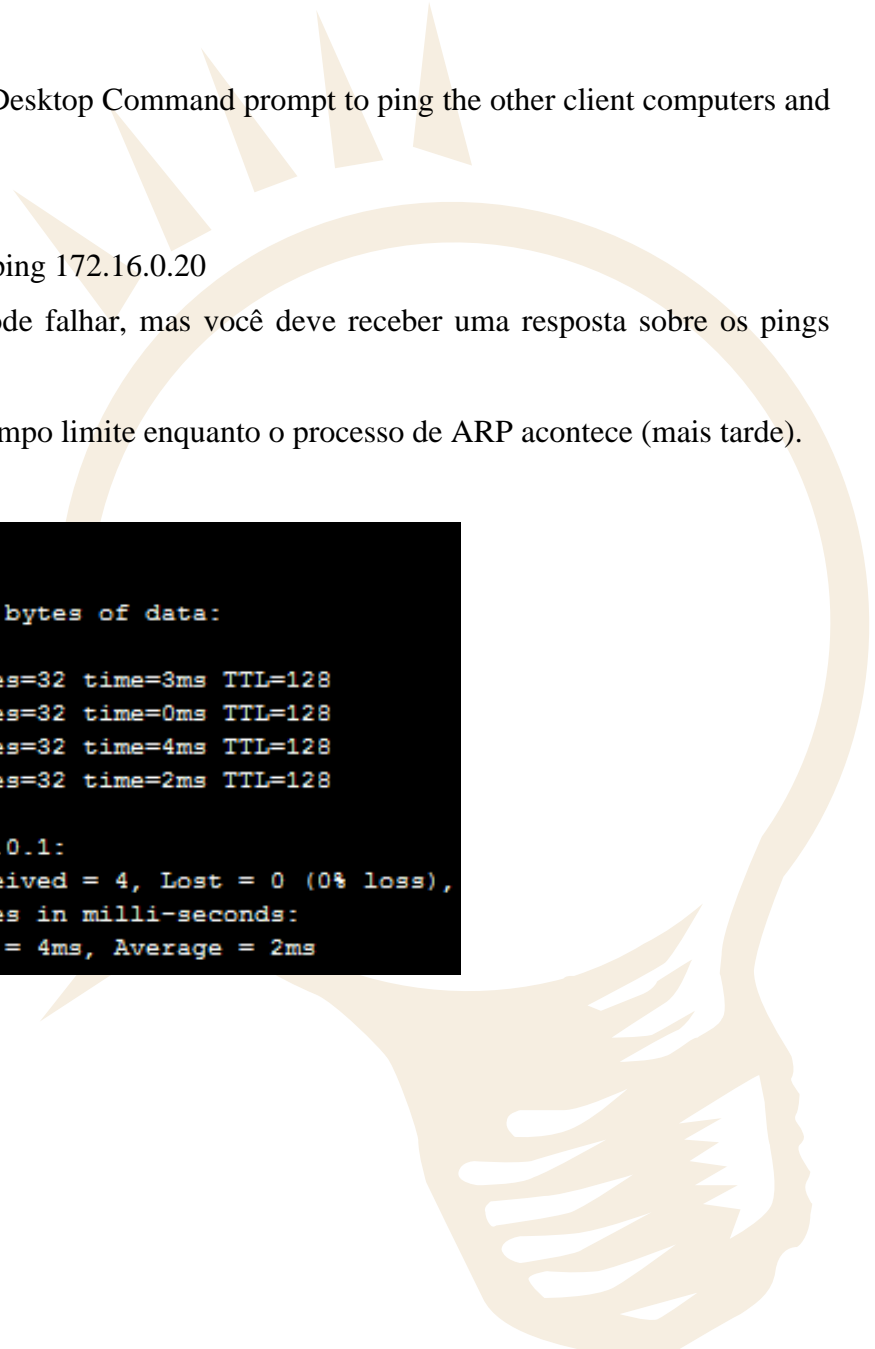
From a client computer use the Desktop Command prompt to ping the other client computers and the servers.

Example:

From the Dynamic 1 client, C> ping 172.16.0.20

O primeiro ou segundo ping pode falhar, mas você deve receber uma resposta sobre os pings posteriores.

Isto é devido ao ping atingir o tempo limite enquanto o processo de ARP acontece (mais tarde).



```
PC>ping 172.16.0.1

Pinging 172.16.0.1 with 32 bytes of data:

Reply from 172.16.0.1: bytes=32 time=3ms TTL=128
Reply from 172.16.0.1: bytes=32 time=0ms TTL=128
Reply from 172.16.0.1: bytes=32 time=4ms TTL=128
Reply from 172.16.0.1: bytes=32 time=2ms TTL=128

Ping statistics for 172.16.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 2ms
```

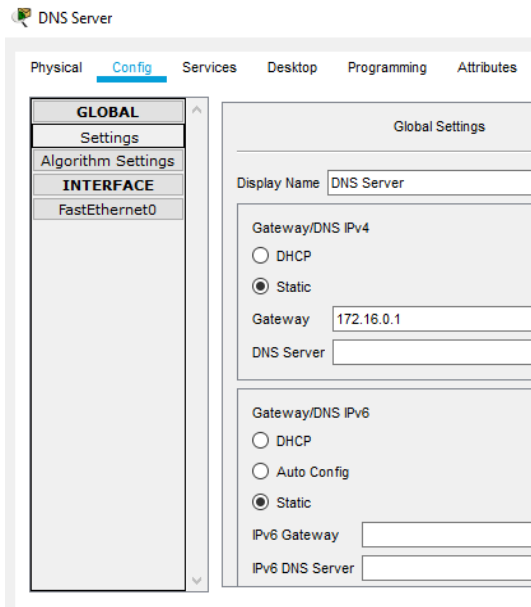
### Configuring the DNS Server

Add a server.

#### Global Settings:

Change the Display Name to “DNS Server”

Set the Gateway to 172.16.0.1



The screenshot shows the 'DNS Server' configuration window with the 'Config' tab selected. The left sidebar shows a tree view with 'GLOBAL' expanded, containing 'Settings' and 'Algorithm Settings', and 'INTERFACE' expanded, containing 'FastEthernet0'. The main area is titled 'Global Settings' and contains the following fields:

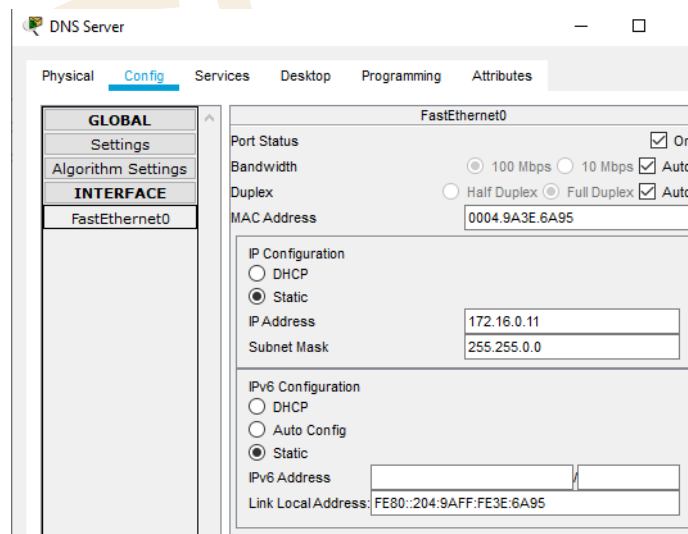
- Display Name: DNS Server
- Gateway/DNS IPv4:
  - ☐ DHCP
  - ☒ Static
  - Gateway: 172.16.0.1
  - DNS Server: (empty)
- Gateway/DNS IPv6:
  - ☐ DHCP
  - ☐ Auto Config
  - ☒ Static
  - IPv6 Gateway: (empty)
  - IPv6 DNS Server: (empty)

### Configuring the DNS Server

#### FastEthernet:

Set the IP address to 172.16.0.11

Set the Subnet Mask to 255.255.0.0



The screenshot shows the 'DNS Server' configuration window with the 'Config' tab selected. The left sidebar shows a tree view with 'GLOBAL' expanded, containing 'Settings' and 'Algorithm Settings', and 'INTERFACE' expanded, containing 'FastEthernet0'. The main area is titled 'FastEthernet0' and contains the following fields:

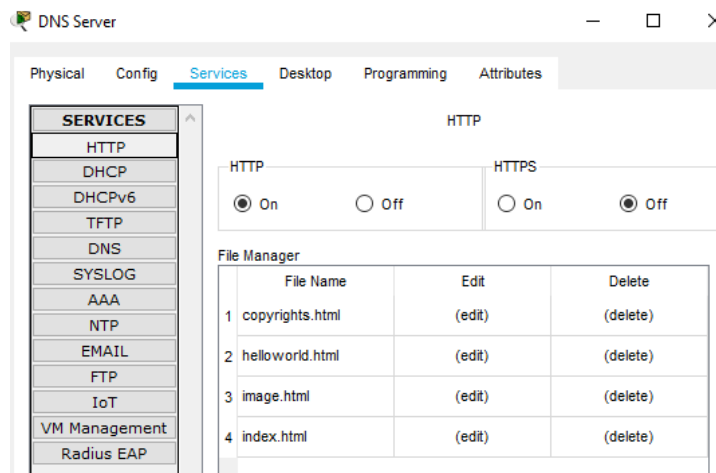
- Port Status: ☒ On
- Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 0004.9A3E.6A95
- IP Configuration:
  - ☐ DHCP
  - ☒ Static
  - IP Address: 172.16.0.11
  - Subnet Mask: 255.255.0.0
- IPv6 Configuration:
  - ☐ DHCP
  - ☐ Auto Config
  - ☒ Static
  - IPv6 Address: (empty)
  - Link Local Address: FE80::204:9AFF:FE3E:6A95



### Services

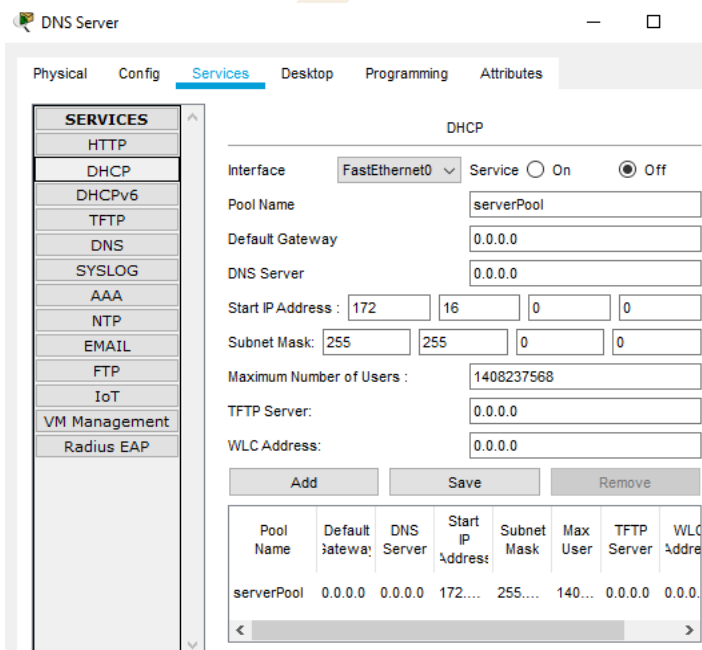
#### HTTP:

Set HTTP Service and HTTPS Service to Off



#### DHCP:

Set the Service to Off



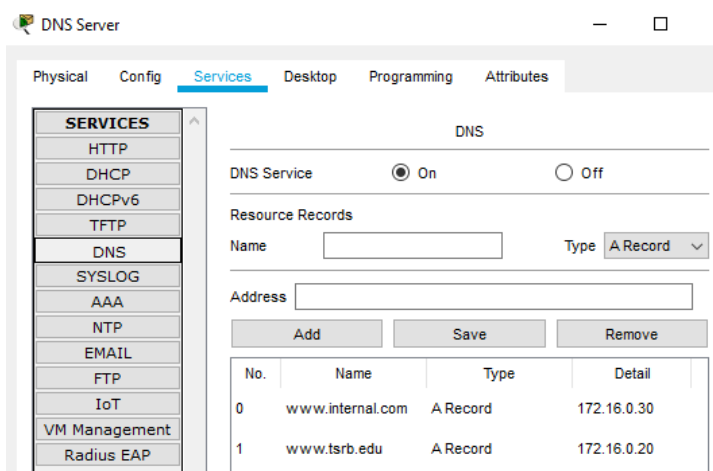
#### DNS:

Entering the www.tsrb.edu Domain Name

Enter for the Domain Name www.tsrb.edu

Enter for IP Address 172.16.0.20

Click Add



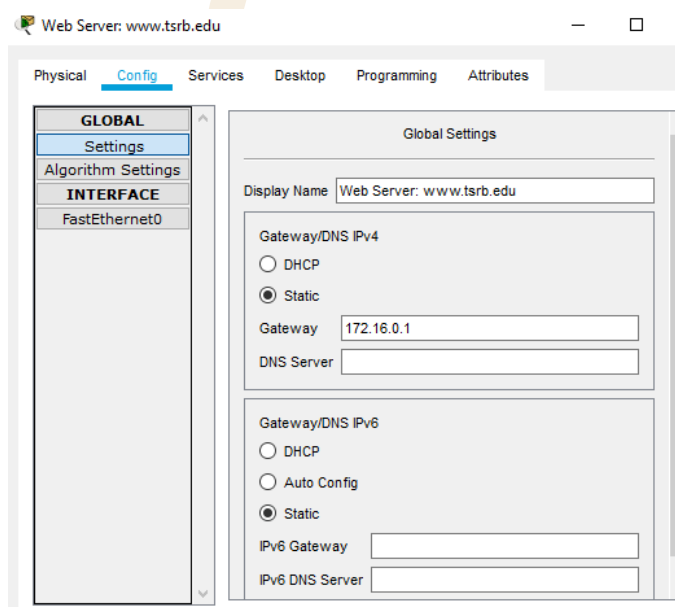
### Configuring the www.tsrb.edu Web Server

Add a server.

#### Global Settings:

Change the Display Name to “Web Server: www.tsrb.edu”

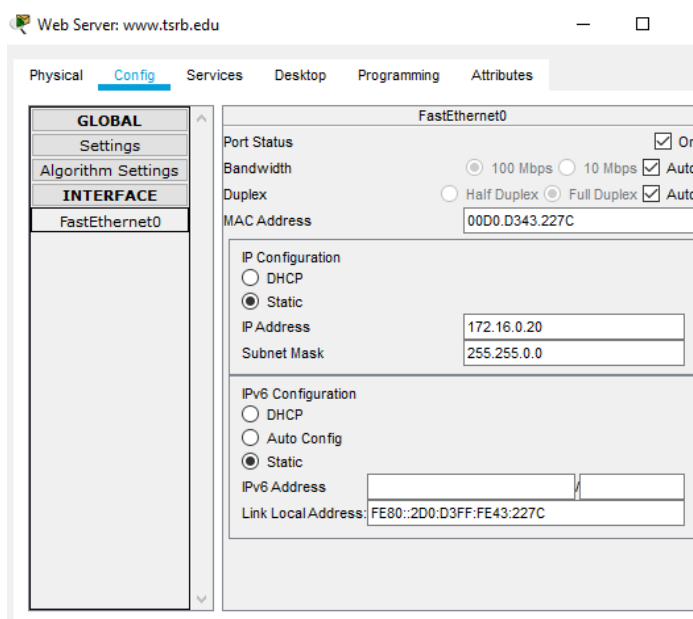
Set the Gateway to 172.16.0.1



#### FastEthernet:

Set the IP address to 172.16.0.20

Set the Subnet Mask to 255.255.0.0



### Services

#### DHCP:

Set the Service to Off

#### DNS:

Set the Service to Off

### Web Browser (HTTP)

On the client computers use the Desktop Web Browser, enter the URLs of the Web Servers [www.tsrb.edu](http://www.tsrb.edu) and [www.internal.com](http://www.internal.com).

You should see the web pages that you created on these servers

