Implementation of DHCP network architecture as part of my SBI topology, featuring two routers (R1 & R2) configured for redundancy and three PCs receiving dynamic IP assignments.  
  
 🔹 R1 – Configured as the primary DHCP server  
 🔹 R2 – Configured as the redundant (secondary) DHCP server  
 🔹 PC1& PC2– Automatically received IP addresses via DHCP  
• DHCP Pool: SBI NETWORK  
• Network Address assigned  
• Default Gateway: Used to route packets destined for external networks. When a device (like a PC) receives an IP address from DHCP, the default gateway tells it where to send traffic outside the local subnet.  
• DNS Servers: Primary and Secondary address are taken  
  
What is DHCP?  
DHCP stands for Dynamic Host Configuration Protocol.  
It is a network protocol used to automatically assign IP addresses and other network configuration parameters to devices (like PCs, laptops, phones) so they can communicate on a network.  
Without DHCP, you would have to manually assign IP addresses to every device — which is error-prone and inefficient, especially in large networks.  
✅ Key Points:  
DHCP automates IP address assignment.  
It also provides other details like:  
Subnet mask   
Default gateway   
DNS server addresses   
Makes network management easier and scalable.  
  
⚙️ How DHCP Works (Step by Step)  
When a device (like a PC) connects to the network and needs an IP address, DHCP works using a four-step process called DORA:  
1️. DHCP Discover  
The client (PC) sends a broadcast message to find a DHCP server.  
This message is called DHCP DISCOVER.  
2️. DHCP Offer  
The DHCP server receives the discover message and responds with a DHCP OFFER.  
This offer contains:  
IP address the client can use  
Subnet mask  
Gateway  
Lease time (how long the IP is valid)  
3️. DHCP Request  
The client receives one or more offers and chooses one.  
It then sends a DHCP REQUEST to the chosen server, saying:  
 “Yes, I want this IP address.”  
4️. DHCP Acknowledgment  
The DHCP server sends a DHCP ACK (acknowledgment) confirming the lease.  
Now the client can use the IP address and communicate on the network.  
  
**Configuration on Router R1**

#Configure terminal

#hostname DHCP

#ip dhcp-pool SBI

#network 192.168.1.0 255.255.255.0

#default-router 192.168.1.100

#dns-server 192.168.1.101 192.168.1.102

#End

**To check the configuration**

#sh running-config | s dhcp

#sh ip dhcp binding

To auto assign Ip configuration on Pc  
#ip dhcp  
A computer screen shot of a computer

Description automatically generated

Verification of automatic assignment of Ip to pc  
  
A screenshot of a computer

Description automatically generated