***📝 Web Server Setup Notes (Apache2, Nginx, PHP)***

***1. Apache2 Installation & Configuration***

***🔹 Install Apache2***

*sudo apt update*

*sudo apt install apache2 -y*

***🔹 Check Apache2 Service***

*sudo systemctl status apache2*

*sudo systemctl enable apache2*

*sudo systemctl start apache2*

***🔹 Verify Installation***

* *Open browser → http://<server-ip>*
* *You should see* ***“Apache2 Ubuntu Default Page”****.*

***🔹 Configuration Files***

* *Main config: /etc/apache2/apache2.conf*
* *Virtual Hosts: /etc/apache2/sites-available/*
* *Enabled Sites: /etc/apache2/sites-enabled/*
* *Logs:*
  + *Access log → /var/log/apache2/access.log*
  + *Error log → /var/log/apache2/error.log*

***🔹 Manage Virtual Host***

*sudo nano /etc/apache2/sites-available/devops.conf*

*Add:*

*<VirtualHost \*:80>*

*ServerName devops.local*

*DocumentRoot /var/www/devops*

*ErrorLog ${APACHE\_LOG\_DIR}/devops-error.log*

*CustomLog ${APACHE\_LOG\_DIR}/devops-access.log combined*

*</VirtualHost>*

*Enable site & reload:*

*sudo mkdir /var/www/devops*

*echo "Hello from Apache DevOps Site" | sudo tee /var/www/devops/index.html*

*sudo a2ensite devops.conf*

*sudo systemctl reload apache2*

***🔹 Test***

* *Add entry in /etc/hosts:  
  127.0.0.1 devops.local*
* *Open → http://devops.local*

***2. Nginx Installation & Configuration***

***🔹 Install Nginx***

*sudo apt update*

*sudo apt install nginx -y*

***🔹 Check Service***

*sudo systemctl status nginx*

*sudo systemctl enable nginx*

*sudo systemctl start nginx*

***🔹 Verify Installation***

* *Open → http://<server-ip>*
* *You should see* ***“Welcome to Nginx”*** *page.*

***🔹 Configuration Files***

* *Main config: /etc/nginx/nginx.conf*
* *Sites Available: /etc/nginx/sites-available/*
* *Sites Enabled: /etc/nginx/sites-enabled/*
* *Logs:*
  + *Access → /var/log/nginx/access.log*
  + *Error → /var/log/nginx/error.log*

***🔹 Manage Virtual Host***

*sudo nano /etc/nginx/sites-available/devops*

*Add:*

*server {*

*listen 80;*

*server\_name devops.local;*

*root /var/www/devops;*

*index index.html index.htm index.php;*

*location / {*

*try\_files $uri $uri/ =404;*

*}*

*}*

*Enable & reload:*

*sudo mkdir /var/www/devops*

*echo "Hello from Nginx DevOps Site" | sudo tee /var/www/devops/index.html*

*sudo ln -s /etc/nginx/sites-available/devops /etc/nginx/sites-enabled/*

*sudo nginx -t*

*sudo systemctl reload nginx*

***🔹 Test***

* *Add in /etc/hosts:  
  127.0.0.1 devops.local*
* *Open browser → http://devops.local*

***3. PHP Installation & Integration***

***🔹 Install PHP + Extensions***

*sudo apt update*

*sudo apt install php libapache2-mod-php php-mysql php-cli php-curl php-xml php-mbstring -y*

*For Nginx (needs PHP-FPM):*

*sudo apt install php-fpm php-mysql -y*

***🔹 Verify PHP***

*php -v*

***🔹 Test PHP with Apache***

*Create PHP file:*

*echo "<?php phpinfo(); ?>" | sudo tee /var/www/devops/info.php*

*Open browser → http://devops.local/info.php  
You should see PHP info page.*

***🔹 Test PHP with Nginx***

*Update Nginx config /etc/nginx/sites-available/devops:*

*location ~ \.php$ {*

*include snippets/fastcgi-php.conf;*

*fastcgi\_pass unix:/var/run/php/php7.4-fpm.sock; # update version if needed*

*fastcgi\_param SCRIPT\_FILENAME $document\_root$fastcgi\_script\_name;*

*include fastcgi\_params;*

*}*

*Reload:*

*sudo nginx -t*

*sudo systemctl reload nginx*

*Test:*

*echo "<?php phpinfo(); ?>" | sudo tee /var/www/devops/info.php*

*Open → http://devops.local/info.php*

***4. Useful Commands***

* *Restart service:*
* *sudo systemctl restart apache2*
* *sudo systemctl restart nginx*
* *sudo systemctl restart php7.4-fpm*
* *Check open ports:*
* *sudo ss -tulnp | grep :80*
* *Enable firewall rules:*
* *sudo ufw allow 'Apache Full'*
* *sudo ufw allow 'Nginx Full'*

***5. Testing Setup***

*✅ Apache works with http://<ip>  
✅ Nginx works with http://<ip>  
✅ PHP info page loads properly.  
✅ Logs verify requests.*

***Practice Lab Setup Plan***

***🧪 Practice Lab Plan – Apache2, Nginx, PHP***

***Stage 1 – Base Setup***

1. *Create a fresh* ***Ubuntu VM / server****.*
2. *Update system:*
3. *sudo apt update && sudo apt upgrade -y*
4. *Install basic tools:*
5. *sudo apt install curl wget unzip net-tools -y*

***Stage 2 – Apache Web Server***

1. *Install Apache2:*
2. *sudo apt install apache2 -y*
3. *Verify service:*
4. *systemctl status apache2*
5. *Create your* ***first website****:*
6. *sudo mkdir /var/www/site1*
7. *echo "<h1>Welcome to Site1 - Apache</h1>" | sudo tee /var/www/site1/index.html*
8. *Create VirtualHost /etc/apache2/sites-available/site1.conf:*
9. *<VirtualHost \*:80>*
10. *ServerName site1.local*
11. *DocumentRoot /var/www/site1*
12. *</VirtualHost>*
13. *Enable and reload:*
14. *sudo a2ensite site1.conf*
15. *sudo systemctl reload apache2*
16. *Add to /etc/hosts:*
17. *127.0.0.1 site1.local*
18. *Test: Open → http://site1.local*

***Stage 3 – Nginx Web Server***

1. *Install Nginx:*
2. *sudo apt install nginx -y*
3. *Verify service:*
4. *systemctl status nginx*
5. *Create a* ***second website****:*
6. *sudo mkdir /var/www/site2*
7. *echo "<h1>Welcome to Site2 - Nginx</h1>" | sudo tee /var/www/site2/index.html*
8. *Create VirtualHost /etc/nginx/sites-available/site2:*
9. *server {*
10. *listen 80;*
11. *server\_name site2.local;*
12. *root /var/www/site2;*
13. *index index.html;*
14. *}*
15. *Enable & reload:*
16. *sudo ln -s /etc/nginx/sites-available/site2 /etc/nginx/sites-enabled/*
17. *sudo nginx -t*
18. *sudo systemctl reload nginx*
19. *Add to /etc/hosts:*
20. *127.0.0.1 site2.local*
21. *Test: Open → http://site2.local*

***Stage 4 – PHP Integration***

1. *Install PHP + modules:*
2. *sudo apt install php libapache2-mod-php php-mysql -y*
3. *sudo apt install php-fpm php-mysql -y*
4. *Test with Apache:*
5. *echo "<?php phpinfo(); ?>" | sudo tee /var/www/site1/info.php*

*Open → http://site1.local/info.php*

1. *Test with Nginx:  
   Edit /etc/nginx/sites-available/site2:*
2. *location ~ \.php$ {*
3. *include snippets/fastcgi-php.conf;*
4. *fastcgi\_pass unix:/var/run/php/php7.4-fpm.sock; # update PHP version*
5. *}*

*Reload Nginx:*

*sudo systemctl reload nginx*

*Add test file:*

*echo "<?php phpinfo(); ?>" | sudo tee /var/www/site2/info.php*

*Open → http://site2.local/info.php*

***Stage 5 – Advanced Practice***

*🔹 Deploy a* ***simple PHP app*** *(like a login page).  
🔹 Configure* ***Apache Reverse Proxy → Nginx****.  
🔹 Use* ***Apache for static content*** *and* ***Nginx + PHP-FPM for dynamic content****.  
🔹 Enable logs & analyze:*

*tail -f /var/log/apache2/access.log*

*tail -f /var/log/nginx/access.log*

***Stage 6 – Security & Performance***

* *Enable* ***firewall*** *(UFW):*
* *sudo ufw allow 'Apache Full'*
* *sudo ufw allow 'Nginx Full'*
* *Enable* ***HTTPS*** *with Let’s Encrypt (practice only):*
* *sudo apt install certbot python3-certbot-apache -y*
* *sudo apt install certbot python3-certbot-nginx -y*

***✅ Final Goal***

* *You’ll have* ***2 separate websites****:*
  + *site1.local → running on Apache*
  + *site2.local → running on Nginx + PHP-FPM*
* *You’ll know how to:  
  ✅ Install, configure, and test Apache/Nginx  
  ✅ Setup Virtual Hosts / Server Blocks  
  ✅ Integrate PHP with both servers  
  ✅ Check logs, troubleshoot, and secure*