

Slide 1 — INTRODUCTION TO LIBRENMS

LibreNMS Network Monitoring System

LibreNMS কী?

- LibreNMS হলো একটি **fully-featured network monitoring tool** ।
- প্রধানত **SNMP-based** মনিটরিং করে ।
- রিয়েল-টাইম গ্রাফ, অ্যালার্ট এবং ড্যাশবোর্ড সাপোর্ট করে ।
- Auto-discovery সিস্টেম আছে — নতুন ডিভাইস নিজে থেকে খুঁজে পায় ।
- 100% ওপেন-সোর্স ।

কেন LibreNMS ব্যবহার করবেন?

- সম্পূর্ণ ফ্রি ও ওপেন-সোর্স
- Auto-Discovery (ARP, CDP, LLDP, OSPF, SNMP)
- Advanced Alerting Engine (Email, Slack, Telegram, Discord, SMS)
- Beautiful RRD Graphs
- Mobile App Support
- API Support — automation এর জন্য খুব সুবিধাজনক
- Daily Updates via git

LibreNMS Architecture

- **Web Frontend:** গ্রাফ, ড্যাশবোর্ড, ডিভাইস ভিউ
- **Poller:** প্রতি 5 মিনিটে SNMP থেকে ডেটা নিয়ে আসে
- **Database (MySQL/MariaDB):** inventory + monitoring data
- **RRD Files:** graph data store
- **Discovery Engine:** নেটওয়ার্ক স্ক্যান করে

Basic Concepts (Beginner Friendly)

- **Device:** মনিটর করা router/switch/server
- **Interface:** network ports (Ethernet/VLAN)
- **Poller:** নিয়মিত ডেটা update করে
- **Alert Rule:** শর্ত অনুযায়ী alarm
- **Dashboard:** গ্রাফ ও status panel

System Requirements

Hardware Requirements:

- CPU: 2 Core বা বেশি
- RAM: 2–4GB (large deployment এ 8GB)
- Storage: 20–50GB (RRD ফাইলের জন্য)

Software Requirements:

- OS: Ubuntu/Debian (recommended)
- Web server: Apache/Nginx
- PHP 7.4+
- Database: MariaDB/MySQL
- SNMP Tools
- Git (daily update system)

Installation Overview (High-Level Steps)

1. Ubuntu server প্রস্তুত করুন
2. Apache + PHP + MariaDB install
3. Git দিয়ে LibreNMS clone করুন

4. Database setup এবং config.php তৈরি
5. Cron jobs setup (poller + discovery)
6. Web installer চালান (GUI setup)

SNMP Configuration (Target Device)

MikroTik / Cisco / Switch / Linux server:

1. SNMP enable
2. Community set করুন
3. Firewall এ UDP 161 allow
4. LibreNMS server থেকে SNMPwalk test
5. Auto-discovery run

Adding Devices (Step-by-Step)

1. LibreNMS Web UI তে লগইন করুন
2. **Devices** → **Add Device**
3. IP address দিন
4. SNMP Community দিন
5. Version: v2c নির্বাচন
6. Add দিলে device discover হবে
7. Graphs populate হতে 2-5 মিনিট সময় লাগে

Alerts & Notifications

LibreNMS supports multiple alert channels:

- Email
- Slack
- Telegram
- Discord
- PagerDuty
- Webhook
- SMS

Alert process:

Triggers → Rules → Transport → Notification

LibreNMS Installation Guide on Ubuntu 22.04

Install Guideline LibreNMS:

1. Update Ubuntu Repository

```
sudo apt update
sudo apt upgrade -y
```

2. Install Required Packages

```
sudo apt install -y acl curl composer fping git graphviz imagemagick mariadb-client
mariadb-server mtr-tiny nginx-full nmap php-cli php-curl php-fpm php-gd php-gmp php-
json php-mbstring php-mysql php-snmp php-xml php-zip rrdtool snmp snmpd whois
unzip python3-pymysql python3-dotenv python3-redis python3-setuptools python3-
systemd python3-pip
```

3. Add LibreNMS User

```
sudo useradd librenms -d /opt/librenms -M -r -s "$(which bash)"
```

4. Download LibreNMS Source

```
cd /opt
sudo git clone https://github.com/librenms/librenms.git
sudo chown -R librenms:librenms /opt/librenms
sudo chmod 771 /opt/librenms
sudo setfacl -d -m g::rwx /opt/librenms/rrd /opt/librenms/logs
/opt/librenms/bootstrap/cache/ /opt/librenms/storage/
sudo setfacl -R -m g::rwx /opt/librenms/rrd /opt/librenms/logs
/opt/librenms/bootstrap/cache/ /opt/librenms/storage/
```

5. Install PHP Dependencies

```
su - librenms
```

```
cd /opt/librenms
```

```
./scripts/composer_wrapper.php install --no-dev
```

```
sudo apt update
```

```
sudo apt install -y python3-venv python3-pip python3-dev python3-setuptools python3-requests python3-pymysql python3-cryptography python3-netaddr
```

```
sudo chown -R librenms:librenms /opt/librenms
```

```
sudo chmod -R 775 /opt/librenms
```

```
su - librenms
```

```
cd /opt/librenms
```

```
python3 -m venv venv
```

```
source venv/bin/activate
```

```
pip install --upgrade pip
```

```
pip install -r requirements.txt
```

6. Configure Timezone

```
sudo nano /etc/php/8.3/fpm/php.ini
```

```
sudo nano /etc/php/8.3/cli/php.ini
```

```
# Uncomment and set:
```

```
date.timezone = Asia/Dhaka
```

```
sudo timedatectl set-timezone Asia/Dhaka
```

```
sudo systemctl restart php8.3-fpm.service
```

7. Configure MariaDB

```
-----  
  
sudo nano /etc/mysql/mariadb.conf.d/50-server.cnf  
# Add under [mysqld]:  
innodb_file_per_table=1  
lower_case_table_names=0  
sudo systemctl enable mariadb  
sudo systemctl restart mariadb  
  
# Create Database and User  
sudo mysql -u root -p  
CREATE DATABASE librenms CHARACTER SET utf8mb4 COLLATE utf8mb4_unicode_ci;  
CREATE USER 'librenms'@'localhost' IDENTIFIED BY 'root@1234';  
GRANT ALL PRIVILEGES ON librenms.* TO 'librenms'@'localhost';  
FLUSH PRIVILEGES;  
EXIT;
```

8. Configure PHP-FPM Pool

```
-----  
  
sudo cp /etc/php/8.3/fpm/pool.d/www.conf /etc/php/8.3/fpm/pool.d/librenms.conf  
sudo nano /etc/php/8.3/fpm/pool.d/librenms.conf  
# Change:  
[www] → [librenms]  
user = librenms  
group = librenms  
listen = /run/php-fpm-librenms.sock  
sudo systemctl restart php8.3-fpm.service  
  
ss -p/n
```

9. Configure Nginx Server Block

```
sudo nano /etc/nginx/sites-available/librenms.conf
```

```
# Paste configuration (change domain)
```

```
server {
```

```
    listen    80;
```

```
    server_name librenms.howtoforge.local;
```

```
    root      /opt/librenms/html;
```

```
    index     index.php;
```

```
    charset utf-8;
```

```
    gzip on;
```

```
    gzip_types text/css application/javascript text/javascript application/x-javascript  
image/svg+xml text/plain text/xsd text/xsl text/xml image/x-icon;
```

```
    location / {
```

```
        try_files $uri $uri/ /index.php?$query_string;
```

```
    }
```

```
    location ~ [^/]\.php(/|$) {
```

```
        fastcgi_pass unix:/run/php-fpm-librenms.sock;
```

```
        fastcgi_split_path_info ^(.+\.php)(/.+)$;
```

```
        include fastcgi.conf;
```

```
    }
```

```
    location ~ /\.(!well-known).* {
```

```
        deny all;
```

```
    }
```

```
}
```

```
sudo ln -s /etc/nginx/sites-available/librenms.conf /etc/nginx/sites-enabled/
```

```
sudo nginx -t
```



```
sudo rm /etc/nginx/sites-enabled/default
```

```
sudo systemctl restart nginx
```

10. Additional Configuration

```
sudo ln -s /opt/librenms/lnms /usr/bin/lnms
```

```
sudo cp /opt/librenms/misc/lnms-completion.bash /etc/bash_completion.d/
```

```
# Configure SNMP
```

```
sudo cp /opt/librenms/snmpd.conf.example /etc/snmp/snmpd.conf
```

```
sudo nano /etc/snmp/snmpd.conf
```

```
# Set:
```

```
com2sec readonly default root@1234
```

```
curl -o /usr/bin/distro https://raw.githubusercontent.com/librenms/librenms-agent/master/snmp/distro chmod +x /usr/bin/distro
```

```
sudo systemctl enable snmpd
```

```
sudo systemctl restart snmpd
```

```
cp /opt/librenms/librenms.nonroot.cron /etc/cron.d/librenms
```

```
cp /opt/librenms/misc/librenms.logrotate /etc/logrotate.d/librenms
```

```
# Cron and Logrotate
```

```
sudo crontab -u librenms -e
```

```
GNU nano 7.2
```

```
/tmp/crontab.dM0ouv/crontab *
```

```
# LibreNMS Poller (runs every 5 minutes)
```

```
*/5 * * * * /opt/librenms/poller.php -h all -d >> /opt/librenms/logs/poller.log 2>&1
```

```
# LibreNMS Discovery (runs every 5 minutes)
*/5 * * * * /opt/librenms/discovery.php -h all -d >> /opt/librenms/logs/discovery.log
2>&1
```

```
# LibreNMS Daily Maintenance (runs at midnight)
0 0 * * * /opt/librenms/daily.sh >> /opt/librenms/logs/daily.log 2>&1
```

```
sudo chown -R librenms:librenms /opt/librenms/logs
sudo chmod -R 775 /opt/librenms/logs
```

```
sudo cp /opt/librenms/librenms.nonroot.cron /etc/cron.d/librenms
sudo cp /opt/librenms/misc/librenms.logrotate /etc/logrotate.d/librenms
```

11. Start Web Installer

Open browser: <http://librenms.example.com>

Steps:

- Check pre-install requirements (all green)
- Enter database credentials
- Build database
- Create admin user
- Validate installation
- Login with admin credentials