

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 ভিট
- **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 -pln
```

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