Network management system
(NMS)

Brief description
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FEATURES

- All data is stored in the database. Postgres is used as the database backend.
- NMS is scalable and can support thousands of devices.
- Around zero configuration concept. Just register device in NMS server (fill right NMS URL and access key).
- Two methods to establish communications between device and NMS: secured VPN for cases when device is not in the same L2 domain and PPPoE for single L2 domain.
- Zero configured VPN between server and each devices to secure data exchange and provide remote access. OpenVPN or DM VPN as secure VPN backend.
- Special things to avoid possible address intersection: e.g. using IPv6 or IPv4 link local addresses in management network over IPv4 underlay network.
- Integrated and preconfigured Zabbix server for data gathering, visualization and event notification service as an option.
- Ready to run with minimal additional configuration.
- Capability to integrate with our AAA-server, WAC/WLC and hotspot controllers.
- Device grouping.
- Remote system logging server.
- Capability to access any device (console and web-interface) through single NMS server.
- Firmware management: provisioning, automatic updates by command or by schedule.
- Configuration management: automatic and manual backup, remote configuration reset, upload and settings deployment.
- Settings, interfaces, statistics, addresses, routes and so on visualization and charting (charting is optional).
- Event notification: e.g. device offline, rebooted, important resource is exhausted. Event notification is through email and SMS.

System concept
NMS inherit main system concept which can be generally described as hierarchical relationships:

- System owner/ primary system administrator.
- One or more device groups or served networks

At least one authorized operators must be defined for every network. Rights of operators in the system are adjustable.

There are several web interface levels in the system (see the diagram below):

- Access for system administrator (root).
- Access for network / group administrator
- Restricted access for operator

NMS has built-in and preconfigured OpenVPN server which in a conjunction with OpenVPN client in firmware provides zero configured VPN network between the server and each device. OpenVPN may be replaced by DM VPN implementation in the same role.

VPN is used to secure communications between server and managed devices and to provide remote access for each device to operators.

NMS support deploy of settings to managed devices. NMS provides three levels of settings:

1. Settings from root level are applicable to all devices.
2. Settings from network level are applicable only for devices from one network.
3. Individual settings for concrete device.

NMS supports automatic backup and restoration for configuration files for managed devices, also as automatic firmware upgrade.

NMS supports map view of managed devices. Operator can specify location of device within registration process and (or) within regular management. Openstreet maps is used for map view.

Zabbix is integrated within NMS and used for monitoring and notification purposes. No additional configuration for Zabbix is required.

Configuration process is similar to device registartion in NMS and required minimal data (e.g. credentials).
Web-interface

NMS has powerful web-interface to manage the system. Below are screenshots for some functions of NMS.

Network map view in NMS

Device information in NMS
Basic settings which will be deployed to all devices
Interface settings which are deployed to device in the group

Firmware image which is used to upgrade devices in the group
Wireless interfaces and environment information for selected device
Integrated Zabbix – main page

Graphs from Zabbix
**NMS integration**

NMS is integrated with our firmware, hotspot and wireless access controllers. It can be integrated with other systems by the request.