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NETGEAR M4250 Series Automatic and Dynamic Configuration

Technical White Paper

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Network switch configuration is becoming much more complicated and time consuming in both the IT and AV over IP environments. AV integrators and network administrators are looking for a quick and simple automated way to configure multiple switches at the same time. Configuring Ethernet trunks, LAG, and IGMP have become tedious and complicated for some non-IT experienced engineers. This whitepaper provides a brief overview of NETGEAR's automatic and dynamic configuration features (Auto-Trunk, Auto-LAG, and NETGEAR IGMP Plus™) on our M4250 series switches.

Key Definitions

Ethernet Trunk Port

A trunk port is a specific port on a network switch that allows multiple data streams to flow through a single Ethernet port. Basically, a trunk port is a bundle of VLANs that are configured to a single port.

Link Aggregation Group (LAG)

Link aggregation allows the switch to treat multiple physical links between two end-points as a single logical link. All the physical links in a given LAG must operate in full-duplex mode at the same speed. LAGs can be used to directly connect two switches when the traffic between them requires high bandwidth and reliability, or to provide a higher-bandwidth connection to a public network. Management functions treat a LAG as if it were a single physical port.

Internet Group Management Protocol (IGMP)

IGMP is a widely used multicast protocol that is supported at the network layer of the OSI stack. IGMP is used by hosts to inform adjacent routers of the desire to receive, continue receiving, or stop receiving a multicast stream.

NETGEAR IGMP Plus™

NETGEAR IGMP Plus™ helps the ProAV network engineers and integrators with an effortless configuration implementation of a layer 2 multicast network. On switches from other vendors, the process of configuring the ProAV multicast VLAN would incur many CLI commands and introduce the possibility of user errors due to CLI complexity.

NETGEAR's Automatic and Dynamic Configuration Solution

With software release 13.0.x, the M4250 series switches provides the following automatic and dynamic configuration features:

• Auto-Trunk

• Auto-LAG

• IGMP Plus™

Auto-Trunk

Auto-Trunk provides an effortless ability to configure multiple VLANs onto an uplink Ethernet port or any unused Ethernet port. By simply setting up the pre-configured network profile or VLANs on a specified port, the M4250 automatically configures the enabled, unused Ethernet port (preferably used for interconnect) to support all the VLANs configured on the switch.

Here are the quick and easy steps to verify if Auto-Trunk is enabled globally and is configured to a specific interconnect port:

1.   Auto-Trunk is enabled by default on all M4250 series switches. Using the AV User Interface, click on 'Network Profiles'. The global Auto-trunk switch should be enabled as shown below.
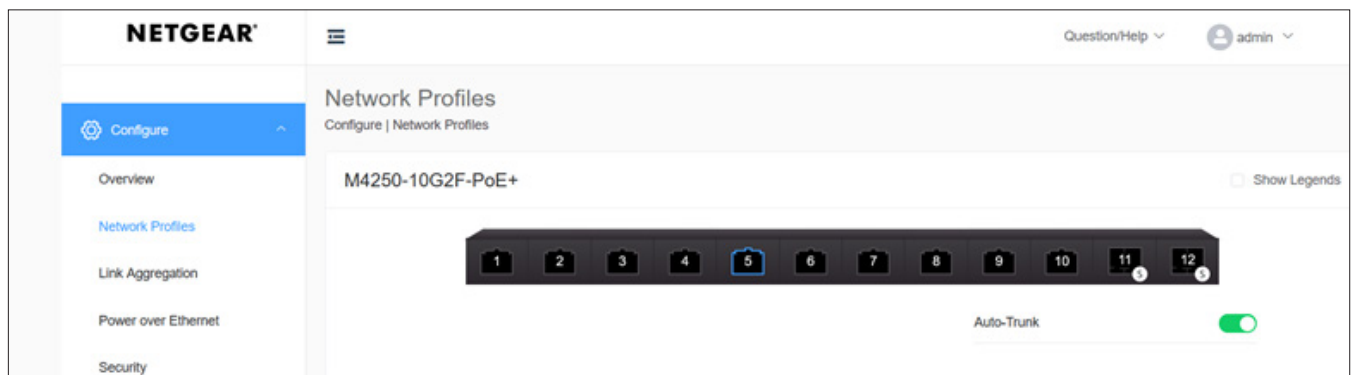
2. After the network profiles and specific ports are configured, the enabled interconnect port will display an "A" in the lower corner of the port. In the example below, we used VLAN 1, 3, and 4 for the configured VLANs and Ethernet port 0/9 as the interconnect port.

Key Question when using Auto-Trunk

**What is auto trunked when an interconnect port between two M4250's becomes trunked?**

The Auto-Trunk feature on the M4250 will trunk all the configured network profile VLANs and all other configured VLANs including VLAN1.
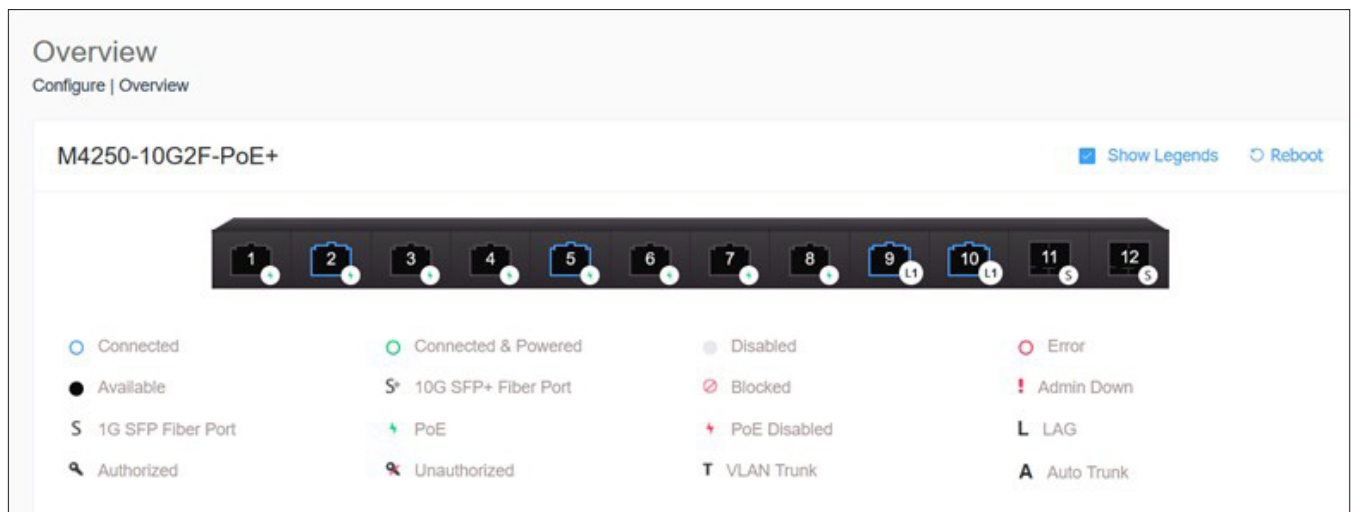
Auto-LAG

The Auto-LAG feature automatically creates Dynamic LAG between two or more M4250 series switches and have more than one link connected between them. In the M4250 series switches, the Auto-LAG feature piggybacks onto the Auto-Trunk feature. Hence, when there are 2 or more Auto-Trunk ports, the ports will automatically enable Dynamic Link Aggregation Protocol or LACP between the Auto-Trunk ports.

Quick easy steps to verify if Auto-LAG is globally enabled and Auto-LAG is configured onto two or more Auto-Trunk ports:

1. Auto-LAG is enabled by Default on all M4250 series switches. Using the AV User Interface, click on 'Link Aggregation'. The global Auto-LAG switch should be enabled and showing green.
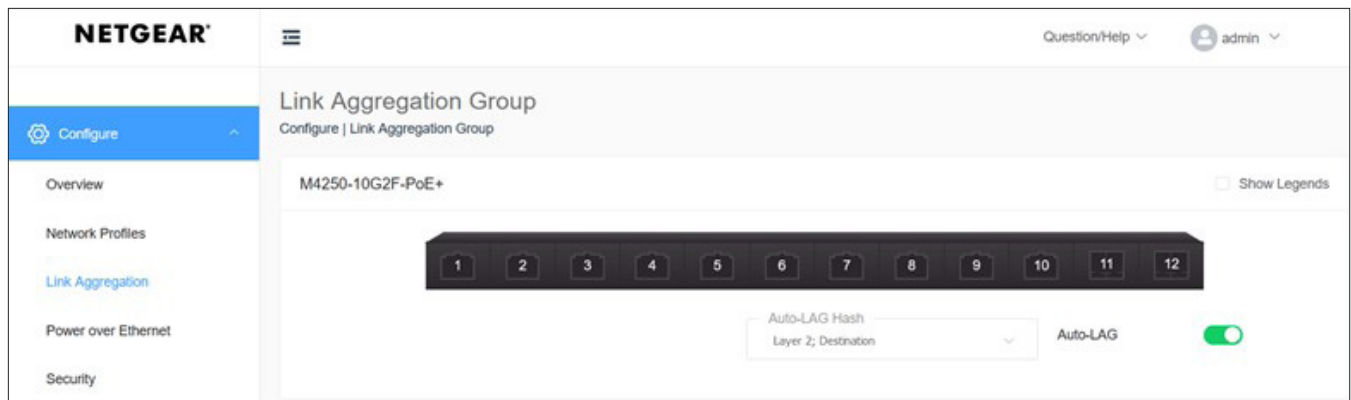
2. After the Auto-Trunks are created, the specific enabled interconnect port will show an "L1" on the corner on each of the pairs of Ethernet ports showing that they are in Link Aggregation Group mode. In the example below, we used Ethernet ports 0/9 and 0/10. Each port is already configured with Auto-Trunk with VLAN 1, 3, and 4, therefore, we are grouping 2Gbps between 2 M4250 switches.

Key Question when using Auto-LAG

What happens with Spanning-Tree Protocol (STP) with Auto-LAG enabled on interconnected ports?

STP runs on bridged networks to help eliminate loops. If a bridge loop occurs, the network can become flooded with traffic. IEEE 802.1s, Multiple Spanning Tree Protocol (MSTP), supports multiple instances of Spanning Tree to efficiently channel VLAN traffic over different interfaces. Each instance of the Spanning Tree behaves in the manner specified in IEEE 802.1w, Rapid Spanning Tree, with slight modifications in the working but not the end effect (chief among the effects is the rapid transitioning of the port to the forwarding state).

With Auto-LAG on the M4250, this spanning-tree and link aggregation process happens rather quickly. To slow down the process, the M4250 switch first identifies which port to shut down for spanning-tree loop protection and shortly after, the M4250 identifies that link aggregation protocol is required for both ports. Then it re-enables the previously shutdown port and shuts down spanning-tree protocol on both interconnect ports.

NETGEAR IGMP Plus™

IGMP Plus automatically configures IGMP snooping for VLANs, which is used to build forwarding lists for multicast traffic. On the M4250 series switches, each of the pre-configured network profiles enable IGMP Plus by default. Therefore, when a network profile is configured for Video or Audio, IGMP Plus is enabled. The following IGMP snooping features are automatically enabled for the VLAN:

• Admin mode

• Fast-Leave

• Proxy Querier

• Report Flood Mode

• Exclude Mrouter Interface Mode

• Installs reserved Multicast MAC addresses into the system.

Key Question when using IGMP Plus

What if I do not need IGMP in the pre-configured network profiles?

For advanced configurations, the user may create their own network profiles using the AV user interface and decide whether multicast or IGMP Plus is required in their particular VLAN configuration. Other advanced methods of the configuration would require the user to log on to the IT user interface to configure other switching options and features.

Conclusion

As the AV industry enters into a more complex IT environment, having features like Auto-Trunk, Auto-LAG, and IGMP Plus greatly decrease the complexity and time involved in entering in countless lines of CLI code and configuring multiple locations through an IT user interface. The M4250 switch series comes with many pre-configured AV configurations and features that aid the non-IT experienced professional to build a complexAV-over-IP network. The simple and automated nature of these new features create an effortless configuration of a complex Ethernet switch. At NETGEAR, we offer a turn-key solution to meet the ProAV infrastructure needs.

For more information on the AV Line of M4250 switches,
please visit www.netgear.com/avline.

For more information on NETGEAR and their ProAV products and services,
please visit www.netgear.com/proav.

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