NETGEAR

ProSAFE®全三层多千兆 PoE+交换机 Datasheet

M4200 系列

NETGEAR® M4200 交换机系列为 802.11ac Wave 2 部署带来独一无二的高效解决方案。M4200 是首款 8x2.5G 多千兆交换机并于所有端口均支持 PoE+供电的交换机，其中 2x10G 线速聚合至配线柜。超高品质，纤细设计，即使是非典型网络环境，其安装套件都能优化了 AP 与线缆的部署。3 层特性集包括静态路由和 RIP 动态路由。NETGEAR M4200 已经为未来做好准备，为你网络带来 SDN（软件定义网络）及 OpenFlow 1.3。

NETGEAR 智能接入交换机解决方案结合了软硬件工程技术的最新进步，带来更大的灵活度、更低的复杂性，高性价比，提供强大的投资保护。

## 亮点

**多千兆以太网**

- ProSAFE® M4200-10MG-PoE+ 符合 NBASE-T 标准，1/2.5G/5G 端口和 8x2.5G/2x10G 线速聚合
- 意味着，完全线速接入层匹配 802.11ac 无线 AP 的需求，并具备 PoE+完整供电，并为 Wave2 3x3 和 4x4 部署做好准备

**更大的灵活性**

- 高品质设计，易安装套件使交换机无论是直接挂于墙上、柱子上，或者安装在标准 19 寸机架都毫不费力
- 安全的放置在天花板上，空气通道等其他交换机无法部署的地方，无论是垂直、水平，平放还是竖放

**更低复杂度**

- 整个特性集保护 2 层交换（多级访问控制，Auto-VoIP，Auto-iSCSI）以及 3 层路由（静态或者 RIP），可用而无需许可证
- DHCP/BootP 创新自动安装，包括固件和配置文件上传自动化

**投资保护**

- 多千兆 NBASE-T 可以在传统 Cat5e/Cat6 线缆以 2.5 倍至 5 倍的速度提供同样 100 米的传输，同时还提供对百兆和千兆的兼容
- 即使组织还未部署 SDN，OpenFlow 的支持也为未来需求做好准备，提供最大的投资保护

**安全服务**

- 通过连续分级认证，认证管理器可以为每个端口基于超时时间配置分级认证方式
- 对于 BYOD，分级 Dot1x->MAB->Captive Portal 可以轻松、强大的实现严格的策略

**行业标准的管理**

- 行业标准命令行界面（CLI），全功能网页界面（GUI），SNMP, sFlow 和 RSPAN
- NMS300 管理平台，集中化固件升级、大规模配置支持

## 硬件概览

| | | | 前 | | | | 后 | 管理 | |
|---|---|---|---|---|---|---|---|---|---|
| 型号 | 机箱 | 交换矩阵 | 100/1000/2.5GBASE-T RJ45 端口 | 100/1000/2.5G/5G BASE-T RJ45 端口 | 1000/10GBASE-X SFP+ 端口 | PSU | 风扇 | 带外 console | 型号 |
| M4200-10MG-PoE+ | 完整宽度<br>1-单元 1U机架安装 | 90Gbps | 6 端口 PoE+<br>100M;1G;2.5G | 2 端口 PoE+<br>100M;1G;2.5G;5G | 2 端口<br>1G;10G | 内部 | 固定<br>边到边<br>28.9dB<br>低噪声 | 以太网：带外 1G 端口（前）<br>Console：RJ45 RS232(前)<br>Console：Mini-USB（前）<br>存储：USB(前) | GSM4210P |
| | | | 240W PoE 预算<br>8 端口 PoE+完整供应 | | | | | | |

## 软件概览

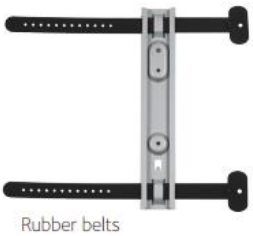
| | 3 层功能 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 型号 | 管理 | 可用性增强 | IPv4/IPv6 ACL 和 QoS, DiffServ | IPv4/IPv6 组播过滤 | IPv4/IPv6 流量监管和汇流 | 生成树<br>绿色以太网 | VLAN | 聚合端口 | IPv4/IPv6 认证安全 | IPv4/IPv6 静态路由 | IPv4/IPv6 动态路由 | 型号 |
| M4200-10MG-PoE+ | 带外;网页 GUI;<br>HTTPS;CLI;Telnet;SSH;SNMP,<br>MIB,RSPAN,Radius Users,<br>TACACS+ | 链路依赖(根据一个或者多个端口的链路状态启用或关闭一个或者多个端口)Syslog 和抓包可以发送到 USB 存储 | 进向<br>1Kbps<br>shaping,<br>基于时间,<br>单一速率流量监管 | IGMPv3 MLDv2 Snooping<br>IGMPv1, v2 和 MLDv1 Snooping Querier<br>控制数据包泛洪 | Auto-VoIP<br>Auto-iSCSI<br>LLDP-MED | STP,MTP,RSTP,PV(R)STP*,BPDU/STRG Root Guard<br>EEE(802.3az) | 静态,动态,语音,MAC<br>GVRP/GMRP<br>QinQ,<br>Private VLANs | 静态和动态 LACP<br>7 种<br>L2/L3/L4<br>哈希算法 | Successive Tiering<br>(DOT1X; MAB; Captive Portal)<br>DHCP Snooping<br>IPv4;动态 ARP 检测 | IPv4/IPv6<br>端口，子网,<br>VLAN<br>路由<br>DHCPv4<br>中继;<br>DHCPv4<br>服务器 | IPv4:RIP<br>6-to-4 隧道 | GSM4210P |

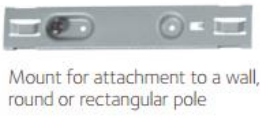
*仅 CLI

## 性能概览

| | 表格大小 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 型号 | MAC<br>ARP/NDP | 路由/交换能力 | 吞吐量 | 路由 | 数据包缓存 | 延时 | ACL | 组播<br>IGMP 组成员 | CPU | VLAN | DHCP | Sflow | 型号 |
| M4200-10MG-PoE+ | 16K MAC 1K ARP/NDP | 90Gbps<br>线速 | 66.9M<br>pps | 静态:<br>32v4/32v6<br>RIP:32 | 16Mb | 64-byte frames:<br><2.8µs 1G RJ45<br><7.2µs 2.5G RJ45<br><5.7µs 5G RJ45<br><0.9µs 10G SFP+ | 50 ACLs,512 rules per list,16K ACL rules (ingress) | 1K IPv4<br>1K IPv6 | CPU 800 Mhz<br>1GB RAM<br>256MB Flash | 1K<br>VLANs | DHCP Server:<br>2K leases<br>IPv4:256 pools | 10 samplers<br>10 pollers<br>8 receivers | GSM4210P |









## 产品概览

M4200 交换机系列由多千兆接入、万兆上联的全网管交换机组成。M4200 交换机系列提供给园区网和中型组织高质量的解决方案，无论其应用类型是 1G、2.5G 还是 5G，包括无线接入、IP 视频和统一通信。全新设计的易安装机箱既可以满足标准的机箱安装，也可以在非典型网络环境进行网络扩展时进行安装，无论是直接挂在墙上，还是连接到矩形/圆形的管状物。最后，软件和系统管理功能为 802.11ac AP 带来安全的 L2/L3/L4 服务和其他 PoE+部署，而简化了其复杂度。

## NETGEAR M4200 系列的关键特性：

- 1G, 2.5G 和 5G NBASE-T 兼容的接入层应用于园区网和中型组织网络中
- 线速 8x2.5G 接入和 2x10G 汇聚，适用 802.11ac 无线 AP 以及 PoE+供电
- 高级 L2,L3,L4 特性集，包括静态路由和 RIP 动态路由
- 多千兆 NBASE-T 使传统的 Cat5e/Cat6 线缆在 100 米距离内可以加速 2.5-5 倍——同时还提供对 100M 和 1G 的兼容性
- 25℃工作环境时 28.9dB 声响，远低于正常办公室的背景环境噪声
- 可以安全的放置在天花板上、风道等其他交换机无法安放的位置，无论是垂直还是水平的
- 易安装特性使其可以直接接到墙上、柱子上，或者挂载在一个标准的 19 寸机架上
- 所有(8 个)多千兆端口具备 PoE+(每端口 30W)功能，总共 240W 的预算
- 低延时，可扩展的表格尺寸，16K MAC、1K ARP/NDP、1K VLAN、32 条 IPv4 路由和 32 条 IPv6 路由
- SDN-Ready OpenFlow 1.3 支持以实现最大投资保护

## NETGEAR M4200 系列软件功能：

- 基于分类器、时间等硬件实施方式的 L2(MAC)，L3(IP)和 L4(UDP/TCP 传输端口)安全和优先级
- 可选 Port-Channel/LAG(802.3ad-802.1AX)L2/L3/L4 哈希实现容错和负载分担，无论是基于何种类型的以太网聚合方式
- Voice VLAN(语音 VLAN)具备 SIP、H323 和 SCCP 协议探测和 LLDP-MED IP 电话自动 QoS 和 VLAN 配置
- 高效认证，搭配 DOT1X,、MAB、Captive Portal，优化 BYOD 体验
- 完整的 IPv4/IPv6 静态路由、IPv4 动态路由（含 RIP 和自动 6-to-4 隧道）
- 2 层组播转发，具备 IGMPv3/MLDv2 Snooping 和 IGMPv2/MLDv1 Snooping Querier
- 高级安全，包括恶意代码检测，DHCP Snooping，DAI（动态 ARP 检测）和 DoS 攻击缓解
- 创新的多厂商 Auto-iSCSI 能力，实现更轻松的虚拟化优化

## NETGEAR M4200 系列弹性和可用特性：

- Link Dependancy（链路依赖）新特性启用或者关闭端口，基于不同端口的链路状态
- PVST(每 VLAN 生成树)和 PVRST(每 VLAN 快速生成树)提供和 PVST+架构的互操作性

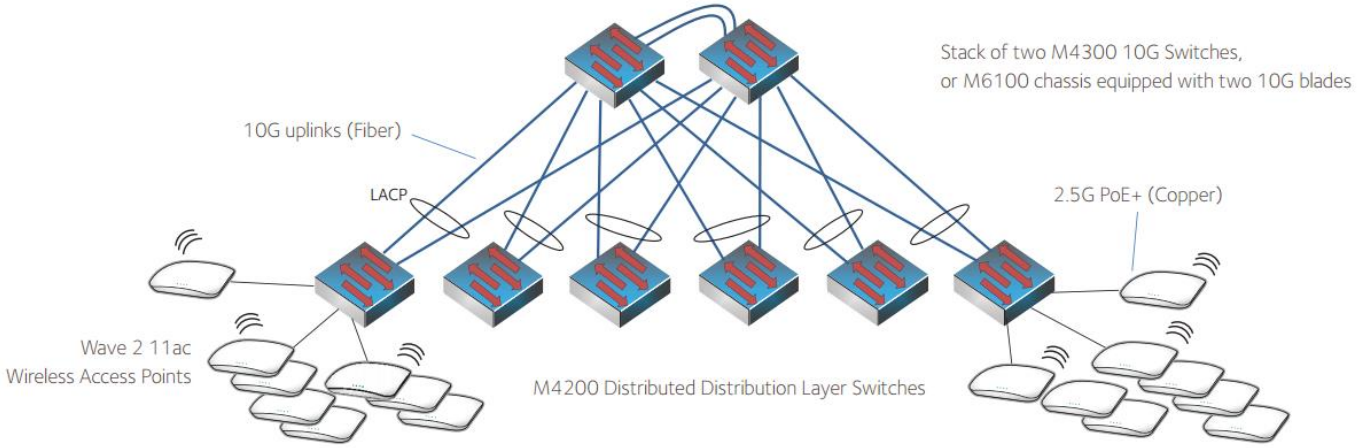
## NETGEAR M4200 系列管理特性：

- DHCP/BootP 创新的自动安装，含固件和配置文件上传自动化
- 行业标准的 SNMP, RMON, MIB, LLDP, AAA, sFlow 和 RSPAN 远程镜像实现
- 服务端口，用于带外管理（OOB）
- 标准 RS232 直通串行 RJ45 和 Mini-USB 端口用于本地管理终端
- 标准 USB 端口用于本地存储、日志、配置或者镜像文件
- 双固件镜像和配置文件，用于更新和最小的服务中断
- 行业标准命令行界面（CLI），IT 管理员可以用习惯的命令进行操作
- 全功能网页界面（GUI），IT 管理员也可以选择更加易用的图形界面
- NMS300 网管平台提供多数配置支持

## 特性亮点

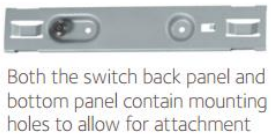
| 8 端口多千兆交换机 所有端口具备完整的 PoE+供应 | |
|---|---|
| NBASE-T（即将到来的 IEEE 802.3bz 标准的基础），于传统 Cat5e/Cat6 线缆在 100 米距离提供 2.5 至 5 倍的速度 | · 8 端口 PoE+多千兆以太网 1G/2.5G BASE-T，并且 8x30W=240W 全功率<br>· 这些端口之中有 2 个支持 5G BASE-T 功能<br>· 无需重新投资布线<br>· 完全向后兼容 1000BASE-T<br>· 2 端口 10G SFP+上联，8x2.5G 可连接 Wave2 11ac AP，其中 2x10G 线速聚合到配线柜<br>· 无阻塞 90Gbps 矩阵（6x2.5G）+（2x5G）+（2x10G），全双工运作 |
| 2 层、3 层、4 层交换特性（ACL，分类，过滤，IPv4/IPv6 静态路由，IPv4 动态路由）通过硬件以线速执行，满足语音、视频和数据聚合 | |

示例：冗余、线速 8x2.5G 2x10G 无线接入层拓扑




| 无以伦比的灵活性 |
|---|
| 易安装既可以作为标准的机架安装，也可以安装于矩形、圆管、墙面 |
| 安全的放置在天花板上，空气通道等其他交换机无法部署的地方，无论是垂直、水平，平放还是竖放 |
| 附带 4 个自黏橡胶脚垫，方便安装在平面上（缓冲撞击和振动；也可以作为堆叠交换机之间的通风空间） |
| 对于墙和杆来说，交换机随机附带一个安装套件，可以用在交换机的背部或者底部（平放或者竖放） |
| 安装套件提供一个锁扣，同时交换机带有一个电源线锁定器，方便在非传统的网络环境中部署 |
| 25℃时 28.9dB 的噪声，远低于正常办公室的背景噪声 |

| 标准机架安装 | 装在墙上 | 装在圆柱上 | 装在矩形柱上 |
|---|---|---|---|

| 电源线锁扣 | 安装于机架之外 | 10 厘米软管夹用于柱子 | 塑料带用于矩形柱子 |
|---|---|---|---|
|  |  |  |  |

| | |
|---|---|
| 最具价值的交换性能 | |
| 16K MAC 地址表，1K VLAN 和 32(IPv4) 32(IPv6) 3 层路由表 | |
| 每台交换机提供线速本地交换路由能力 | |
| 80 PLUS 认证电源实现能源高效 | |
| 16Mb 数据包缓存由密集应用动态共享 | |
| 所有网络速率，包括 2.5G，5G 铜缆，10G 光纤皆是低延时 | |
| 巨型帧支持多达 9Kb，加速存储性能，用于备份和云应用 | |
| iSCS 流量加速以及针对虚拟化和服务器网络中的 iSCSI 发起端和目标实现自动保护/QoS | · 通过窥探 iSCSI 协议使用的数据包来检测 iSCSI 线程的建立和终止<br>· 维护当前活动 iSCSI 进程和连接的数据库以存储数据，包括分类规则以用于特定的 QoS 处理<br>· 根据 iSCSI 线程流量按需安装和移除分类器规则集<br>· 监控 iSCSI 线程的活动，当没有收到终止线程数据包的时候允许进程条目老化<br>避免在拥塞的时候线程中断，以避免其导致 iSCSI 数据包丢弃 |
| SDN-ready，M4200 OpenFlow 特性使其可以被集中的 OpenFlow 控制器通过 OpenFlow 协议进行管理 | · 支持单一表格 OpenFlow 1.3 数据转发路径<br>· OpenFlow 特性可以在任意时间进行开启和关闭<br>· 管理员可以允许交换机自动分配一个 IP 地址给予 OpenFlow 特性或者选择指定使用某个地址<br>· 管理员也可以指定 OpenFlow 特性永远使用服务端口（带外管理端口）<br>· 控制器 IP 地址通过交换机界面手动指定<br>· OpenFlow 控制器列表以及控制器连接选项存放在控制器表格中<br>· M4200 软件中的 OpenFlow 组件使用此信息来建立和维持与 OpenFlow 控制器的 SSL 连接<br>· M4200 实现了 OpenFlow 1.0.0 的子集以及 OpenFlow 1.3 的子集<br>· 它同时实现了 OpenFlow 协议的增强，以使其为数据中心环境优化，并使其兼容 Open vSwitch |
| 接入层可用性 | |
| 链路聚合，也称之为端口聚合，提供强大的网络冗余和负载均衡以聚合到双重网络核心 | |
| 快速生成树（RSTP）和多生成树（MSTP）允许端口快速转变到转发状态，并且实现对拓扑改变通知（TCN）的抑制 | |

| | |
|---|---|
| NETGEAR 的 PVSTP 实施（仅 CLI）遵循其他厂商 Per VLAN STP 的相同规则，以实现严格的互操作性 | • 包含行业标准的 PVST+兼容<br>• PVSTP 类似于 IEEE 802.1s 定义的 MSTP 协议，其主要区别是 PVSTP 每一个 VLAN 运行一个进程<br>• 换句话说，配置的每一个 VLAN 将会运行一个独立的 PVSTP 进程<br>• 当根端口状态变成 down 的时候，FastUplink 特性将会把最低开销的 alternate 端口转变为转发模式，以降低恢复时间<br>• FastBackbone 特性将会在间接（indirect）端口故障时选择新的间接端口 |
| NETGEAR 的 PVRSTP 实施（仅 CLI）遵循其他厂商 Per VLAN RSTP 的相同规则，以实现严格的互操作性 | • 包含行业标准的 RPVST+兼容<br>• PVRSTP 类似于 IEEE 802.1w 定义的 RSTP 协议，其主要区别是 PVRSTP 每一个 VLAN 运行一个进程<br>• 换句话说，配置的每一个 VLAN 将会运行一个独立的 PVRSTP 进程<br>• 每一个 PVRSTP 进程选择一个独立于其他进程的根桥<br>• 所以配置了多少 VLAN，就会有多少根桥<br>• Per VLAN RSTP 内置支持 FastUplink 和 FastBackbone |
| 内置的 DHCP 服务器将会执行 IP 地址冲突检测，预防意外的 IP 地址重复影响网络稳定性 | |
| 轻松部署 | |
| 通过 DHCP 和 BootP 自动安装实现自动配置，通过可扩展的配置文件管理能力简化大规模部署的难度，将 IP 地址及其主机名称进行映射，当交换机在网络中初始化完毕之后马上为其提供配置文件 | |
| 交换机的序列号和交换机的主 MAC 地址通过 CLI 的一条简单“show”命令即可查询——便于发现和远程配置操作 | |
| M4300 DHCP L2 Relay 代理免除了在每一个物理网络或者子网中都需要一个 DHCP 服务器的需求 | • DHCP Relay 代理处理 DHCP 信息并产生新的 DHCP 信息<br>• 支持 DHCP Relay 针对 VLAN 的 Option 82 circuit-id 和 remote-id<br>• DHCP Relay agent 一般是典型的 IP 路由感知型设备，因此可以被援引为 3 层 relay 代理 |
| 通过 Auto-VoIP 特性实现自动 IP 语音优先级优化，简化了最复杂的多厂商 IP 电话部署环境，无论是基于协议（SIP, H323 和 SCCP）还是基于话机源 MAC 地址中的 OUI 字节（默认数据库和基于用户的 OUI）；通过流量分类、开启正确的出站队列配置为 VoIP 流（数据和信令）提供最佳的服务质量，优先于其他常规流量。 | |
| 多样连接 | |
| 8 个 PoE+完整供应、符合 NBASE-T 标准、1G/2.5G 的端口，其中 2 个具备 5G 能力 | |
| 所有 8 个 NBASE-T 端口向后兼容标准的千兆以太网和百兆以太网 | |
| IEEE 802.3at PoE+为每个端口提供最高 30W 供电，使用 2 对线缆，同时也向后兼容 802.3af | • IEEE 802.3at 2 层 LLDP method 和 802.3at PoE+ 2-事件分类方法完整支持，以兼容多数 PoE+ PD 设备 |
| 2 个 10G SFP+上联，为 8x2.5G Wave 2 11ac AP 实现 2x10G 线速聚合至配线柜 | |
| 所有端口支持自动 MDIX 和自动协商，选择正确的传输模式（全双工或半双工），以及使用交叉线或者直通线的时候正确的数据传输模式 | |
| 链路依赖（Link Dependency）特性基于一个或者多个不同端口的状态启用或者关闭一个或者多个端口 | |
| IPv6 支持组播（MLD IPv6 过滤），静态 IPv6 路由（单播），ACL 和 QoS | |

| 轻松管理以及颗粒化控制 | |
|---|---|
| 双重固件镜像和双重配置文件实现透明固件升级/配置修改，最小化服务中断 | |
| 灵活的端口聚合/LAG（802.3ad-802.1AX）实施以实现最佳兼容性、错误容忍以及负载分担，与其他厂商交换机、服务器或者存储设备的任意种类以太网链路聚合技术，只要其符合 IEEE 802.3ad 标准——包括静态（可选哈希算法）——或者 IEEE 802.1AX 动态 LAG 或者 port-channel（高度可调节 LACP-链路聚合控制协议） | |
| 单向链路检测协议（UDLD）和积极 UDLD 自动检测和避免单向链路，以避免在 2 层通信链路中某一双向链路的其中一个方向停止传输流量，避免转发异常 | |
| 端口名称特性允许为所有的端口增加一个描述名称，以便管理员在日常管理中更好的识别相应端口 | |
| SDM(系统数据管理，或交换机数据库)模板允许基于 IPv4 或者 IPv6 应用进行颗粒化系统资源分发 | · ARP 条目（IPv4 路由接口 ARP 缓存条目的最大数量）<br>· IPv4 单播路由（IPv4 单播转发表格条目的最大数量）<br>· IPv6 NDP 条目（IPv6 邻居发现协议 NDP 缓存条目的最大数量）<br>· IPv6 单播路由（IPv6 单播转发表格条目的最大数量）<br>· ECMP 下一跳(IPv4 和 IPv6 单播转发表中可以存储的下一跳的最大数量） |
| 私有 VLAN 和本地代理 ARP 帮助减少广播并增加安全 | |
| 管理 VLAN ID 用户可以自行配置以方便使用 | |
| 可以在 CLI 中实现行业标准的 VLAN 管理，所有的常见操作，如 VLAN 创建；VLAN 名称；通过 GVRP 注册动态创建的 VLAN“静态化”；VLAN trunking；VLAN 加入以及 VLAN ID(PVID)和 VLAN 标记，一次性应用于一个端口、一组端口或者所有端口。 | |
| 使用行业标准的 Access Port 应用在非 802.1Q 感知的终端上，以及在在交换机与交换机之间链路使用 Trunk 端口实现 Native VLAN，以简化 VLAN 配置 | |
| 系统默认自动设置每个端口的广播、组播和单播风暴控制，以典型、可靠的保护应对 DoS 攻击和故障客户端，由于 BYOD 风潮，很容易造成网络和性能问题 | |
| IP 电话管理通过行业标准一致以及相应的自动化功能的语音 VLAN 能力实现简化 | |
| 完整的“系统工具”和“clear”命令集帮助排查连接问题，并恢复多种配置到出厂设置以实现最高的管理效率：traceroute(发现数据包实际经过的路径，基于每一跳，同时如果从 CLI 发起该命令，还好同步响应)，清楚动态学习到的 MAC 地址，计数，组播转发数据库的 IGMP 监听表格列表等等 | |
| Syslog 和 Packet Capture(抓包)可以发送到 USB 存储设备以加速网络故障排错 | |
| 可替换的默认设置文件可以应用在分支办公室，可以在预期需要网络重置的时候使用，无需 IT 人员参与 | |
| 支持所有主要的集中化软件分发平台进行软件升级和配置文件管理（HTTP,TFTP），包括其高度安全版本（HTTPS，SFTP，SCP） | |
| 简单网络时间协议（SNTP）可以用于同步网络资源以及 NTP 的采用，可以提供同步的网络时间戳，无论是以广播还是单播模式（SNTP 客户端通过 UDP 实施——端口 123） | |
| 内置 RMON(4 组)合 sFlow 代理允许外部网络流量分析 | |
| 为聚合而打造 | |
| 音频（VoIP）和视频（组播）完整交换、过滤、路由和优先级划分 | |
| Auto-VoIP，语音 VLAN 和 LLDP-MED 支持，进行 IP 电话的 QoS 和 VLAN 配置 | |
| IGMP Snooping 和代理（IPv4），MLD Snooping 和代理（IPv6），以及查询模式利用快速接受者加入和离开组播流，确保组播流量在 2 层和 3 层网络中仅仅到达感兴趣的接受者，包括特定源（source-specific/SSM）和所有来源（ASM）组播 | |
| 组播 VLAN 注册（MVR）使用一个特定的组播 VLAN 来转发组播流并避免不同 VLAN 里面的重复客户端 | |
| PoE 电源管理和日程安排开启 | |

| 3 层路由包 | |
|---|---|
| 静态路由/ECMP 静态路由用于 IPv4 和 IPv6 | • 静态和默认路由是可以配置的，通过下一跳 IP 地址配置到达任意目标<br>• 允许添加附加的路由，为网络管理员增加多种选择<br>• 管理员可以为一个特定的目标配置多个下一跳，使路由器可以在下一跳实现负载分担<br>• 管理员通过指定路由优先级的数值来区分静态路由：一个更小的优先级数值代表一条更优先的静态路由<br>• 低优先的静态路由仅会在高优先静态路由不可用时使用（链路故障，或者下一跳无法解析为 MAC 地址）<br>• 优先选项允许管理员控制每一条静态路由相比较从其他来源学习到的路由（如 OSPF）的优先级，源于静态路由与从其他不同来源学习到的路由在拥有相同的优先级时具备更高的优先 |
| 高级静态路由功能实现流量控制 | • 可以为去往特定网络的流量配置静态拒绝路由，以此使其不通过路由器转发<br>• 此类流量将会被丢弃，然后 ICMP 目标不可达信息将会发送给源端<br>• 静态拒接路由的典型用法是用于防止路由环路<br>• 默认路由作为优先级选项可以进行配置 |
| 如需通过网页配置界面进行 VLAN 创建和 VLAN 路由的配置，那么 VLAN 路由向导提供如下自动化功能： | • 创建一个 VLAN 并为 VLAN 生成一个唯一的名称<br>• 添加选定端口到新创建的 VLAN，删除默认 VLAN 里面的选定端口<br>• 创建一个 LAG，添加选定端口到 LAG，然后将此 LAG 添加到新创建的 VLAN<br>• 启用标记，如果选定的端口在另外一个 VLAN 中<br>• 禁用标记，如果选定的端口不在另外一个 VLAN 中<br>• 排除那些不是从 VLAN 中选择的端口<br>• 开启 VLAN 路由，使用输入的 IP 地址和子网掩码应用于逻辑路由接口上 |
| DHCP Relay 代理从任意路由端口中继 DHCP 请求，包括 VLAN，当 DHCP 服务器不在相同的 IP 网络或者子网中的时候 | • 代理从没有 DHCP 服务器的子网中继请求至另一子网的服务器或者下一跳代理<br>• 不像路由器可以透明交换 IP 数据包，DHCP 中继代理将会处理 DHCP 信息并产生新的 DHCP 信息<br>• 支持 DHCP relay Option 82 circuit-id 和 remote-id for VLAN<br>• Multiple Helper IP 特性允许为 DHCP 中继代理的每一个路由接口配置多个 DHCP 服务器地址，以便来自不同接口的客户端数据包使用不同的服务器地址 |
| 支持 RIPv2（路由信息协议），作为距离矢量协议，于 RFC 2453 for IPv4 中指定 | • 每一条路由以其到达目标所需经过的网关或者跳数为特征<br>• 类属内部网管协议（IGP），RIP 在自治系统（AS）内部工作 |
| IP Multinetting 允许为一个网络接口配置多个 IP 地址（其他厂商称之为 IP 别名或者辅助地址） | |
| ICMP 阀值特性增加了配置选项，可以设置多种不同类型 ICMP 信息的传输 | • ICMP 重定向可以被恶意发送者利用来执行中间人攻击，或者转移数据包进行恶意监控，或者通过将数据包”丢入黑洞”实施 DoS 攻击<br>• ICMP 响应请求以及其他信息可以用于探测易受攻击的主机或者路由器<br>• 速率限制 ICMP 错误信息保护本地路由器和网络，以免发送大量信息占用 CPU 和带宽 |
| 企业级安全 | |
| 流量控制 MAC 过滤和端口安全帮助限制进出特定端口的流量，以增加整体安全并阻止 MAC 地址洪范问题 | |
| DHCP Snooping 监控 DHCP 客户端和 DHCP 服务器之间的 DHCP 流量，以过滤有害的 DHCP 信息，并建立一个视为被授权过的绑定数据库（MAC 地址、IP 地址、VLAN ID、端口）组合，来避免 DHCP 服务器欺骗攻击 | |
| 动态 ARP 检测(DAI)使用 DHCP snooping 绑定数据库(每端口/VLAN)来丢弃不属于任何绑定的数据包，并绑定 IP/MAC 地址，免受恶意用户流量的影响 | |

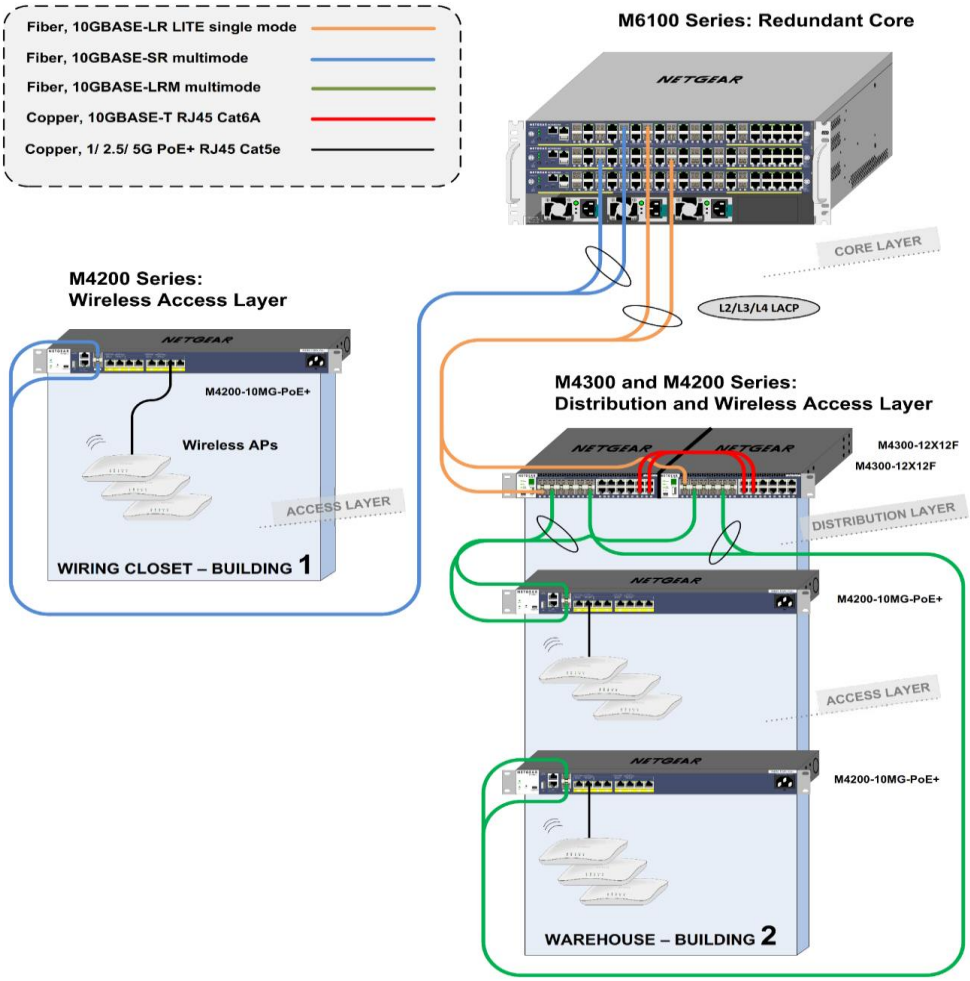
| | |
|---|---|
| 基于时间的 2 层/3 层-v4/3 层-v6/4 层 ACL 可以绑定到端口、2 层接口、VLAN 和 LAG(链路聚合组)，实现快速的预防非授权数据和正确的颗粒度管理 | |
| 对于带内交换机管理，CPU 接口（控制平台 ACL）的管理 ACL 被用于定义 IP/MAC 或者通过何种协议进行管理，以增强 HTTP/HTTPS 或者 Telnet/SSH 管理的安全 | |
| 带外管理可以通过特定的服务端口（1G RJ45 OOB）进行，同时带内管理可以通过管理 ACL 进行禁止 | |
| BPDU Guard（网桥协议数据单元防护）允许网络管理员强化生成树（STP）区域边界并保持活动拓扑的持续和可预测——edge 端口之后并开启了 BPDU 的非授权设备或者交换机将无法通过产生环路来影响到整体的 STP | |
| Spanning Tree Root Guard(生成树根防护：STRG)通过预防根桥欺骗来强化 2 层网络拓扑，例如非授权或者意料外的新设备意外的成为一个特定 VLAN 的根桥 | |
| 支持动态 802.1x VLAN 指派模式，包括动态 VLAN 创建模式和客人 VLAN/非认证 VLAN，为用户和设备强制实行严格的 RADIUS 策略 | • 每个端口最多可以支持 48 个客户端（802.1x），包括用户域的认证，以利用融合部署。例如，当 IP 电话连接 PC 至其网桥，IP 话机和 PC 可以通过相同的交换机端口进行认证，不过是处于不同的 VLAN 分配策略（语音 VLAN，其他生产 VLAN） |
| 802.1x MAC 地址认证绕开（MAB）是一个补充认证机制，使非 802.1x 设备可以绕开传统的 802.1x 认证流程，让它们使用客户端 MAC 地址作为标识符来进行网络认证 | • RADIUS 服务器将会维护一个经过授权的客户网卡 MAC 地址列表以用于 MAB 目的<br>• MAB 可以在交换机以端口为基础进行配置<br>• MAB 将会在不成功的 802.1x 认证过程之后发起（可以设置超时时间），当客户端不响应任何 EAPOL 数据包的时候<br>• 当无法感知 802.1x 的客户端尝试连接的时候，交换机将会发送每一个客户端的 MAC 地址到认证服务器<br>• RADIUS 服务器对比客户端网卡的 MAC 地址与授权的地址<br>• RADIUS 服务器为每一个客户端返回相应的访问策略和 VLAN 指派信息 |
| 通过连续分级认证，认证管理器可以基于配置的超时时间为每一个端口执行分级的认证方法 | • 默认情况下，配置的认证方法以如下顺序执行：802.1x，MAB，Captive Portal(网页认证)<br>• BYOD 环境下，分级认证可以简单而又强大的实施严格策略<br>- 例如，当一个客户端连接的时候，M4300 试着按上述方法进行用户/客户端的认证，一个接着一个<br>• 管理员可以进行限制，例如在 Captive Portal 之后，将没有其他认证方法 |
| 双重 VLAN（DVLAN – Qin Q），与多租户环境通过核心网络（metro core）将流量从一个客户领域传递到另外一个：客户 VLAN ID 被保留，接着服务提供商的 VLAN ID 将会被添加到流量中，以便流量可以简单安全的通过核心网络 | |
| Private VLAN(私有 VLAN)(Primary VLAN, Isolated VLAN, Community VLAN, Promiscuous Port, Host Port, Trunks)提供相同广播域里面的 2 层端口隔离，允许一个 VLAN 广播域被划分成更小的点到多点子域（可跨交换机，只要在相同的 2 层网络） | • Private VLAN 于 DMZ 中是非常有用的，在此区域服务器一般是互相之间不进行通信，但是需要跟路由器通信<br>• 免于使用更加复杂的端口 VLAN 并相应的 IP 地址/子网和相关联的 3 层路由<br>• Private VLAN 的另外一个典型应用就是运营商级别的部署，因其用户不该看见、嗅探或者攻击其他用户的流量 |
| SSH 和 SNMPv3（无论是否使用 MD5/SHA 进行验证）确保 SNMP 和 Telnet 线程是安全的 | |
| TACACS+和 RADIUS 提供严格的 Login 和 Enable 认证，增强了管理员进行交换机管理的安全性，基于最新的行业标准：exec 授权使用 TACACS+或者 RADIUS；命令授权使用 TACACS+和 RADIUS 服务器；HTTP 和 HTTPS 的 user exec accounting 使用 TACACS+或者 RADIUS；其认证在用户 ID 和密码之上还将基于用户域 | |
| 优秀的服务质量（QoS） | |
| 基于硬件实施的高级分类器：划分 2 层（MAC）、3 层（IP）和 4 层（UDP/TCP 传输端口）优先级 | |
| 8 个队列（堆叠组为 7）用于优先级，并且多种基于 802.1p（CoS）和 DiffServ 的 QoS 策略可以应用到接口和 VLAN | |
| 高级速率控制可以控制至 1Kbps 颗粒度，并且最小保障带宽可以与 ACL 关联来实现最佳颗粒度管理 | |

| | |
|---|---|
| Single Rate Policing(单一速率监管)特性支持进行单一速率监管，如 RFC2697 所定义 | • Committed Information Rate（该类别平均可允许的速率）<br>• Committed Burst Size（该类别最大连续数据包的总量）<br>• Excessive Burst Size（该类别附加的突发大小，这部分相比 Committed Burst Size 以更低的速率运行）<br>• DiffServ 特性应用到 class map |
| 自动 IP 语音优先级划分，可基于协议（SIP, H323 和 SCCP）或者 OUI Auto-VoIP，多达 144 个同时语音通话 | |
| iSCSI 数据流加速和自动保护/Auto-iSCSI 进行 QoS | |
| Flow Control 流量控制 | |
| 802.3x 流控基于 IEEE 802.3 Annex 31B 参数实施，分别有对称流控、非对称流控和无流控 | • 非对称流控允许交换机响应接收到的 PAUSE 帧，但是端口本身无法产生 PAUSE 帧<br>• 对称流控允许交换机响应、产生 MAC 控制 PAUSE 帧 |
| 允许设备在特定的时间被设置一个阀值：设备如果想抑制另外一台设备的数据帧传输，将发送一个 PAUSE 帧给对方 | • 设备如果想抑制另外一台设备的数据帧传输，将发送一个 PAUSE 帧给对方 |
| UDLD 支持 | |
| UDLD 实施检测单向链路物理端口（UDLD 必须在链路两端都启用以检测单向链路） | • UDLD 协议的运作是交换包含邻居设备信息的数据包<br>• 其目的是检测和避免 2 层通信通道的单向链路转发的异常 |
| “normal-mode”和“aggressive-mode”皆被支持，以完美兼容其他厂商的实现，包括两种模式的端口“D-Disable”的触发 | |

# 目标应用

**Wave 2 11ac AP 部署**

M4200 是世界上首款拥有 8 个完全 PoE+供电，整合 1G/2.5G 以及 2 个 10G 端口上联的多千兆交换机，满足任意厂商 8 台 Wave 2 11ac AP 的无阻塞部署




**建筑 1：无线接入层**

- 为了满足 Wave 2 802.11ac 的需求，有线网络必须扩展他们的性能和范围来支持超过 1G 的速率
- 此外，不方便部署电源的环境也可以从完全 PoE+电源供应中获益
- M4200-10MG-PoE+是为满足 Wave2 11ac AP 的部署而全新设计的
- 拥有 8x2.5G 连接至 AP，2x10G 线速聚合，M4200 冗余连接至 M6100 核心机箱式交换机
- 2 条 SFP+上联链路分别连接到 2 个不同的 10G 刀片，使用链路聚合（L2/L3/L4 LACP），实现负载均衡与失效切换
- M6100 管理单元不间断失效切换与转发确保没有单点故障
- 使用 LACP 聚合到冗余核心，M4200 实现线速无线接入层，并具备 PoE+完整供电
-

**建筑 2：M4300 和 M4200 汇聚与无线接入层**

- 在此仓库中，两台半宽 M4300 10GbE 型号在一个机架空间配对作为冗余汇聚层
- 相对单台聚合交换机，如此 2 台横向堆叠对于 HA 来说高性价比的同时也更高效
- M4200 接入交换机的管理单元不间断失效切换与转发确保没有单点故障
- 每一台 M4200 皆可连接到两台冗余的汇聚交换机，使用链路聚合（L2/L3/L4 LACP）实现负载均衡与失效切换
- 当离配线柜太远的时候，M4200 远端交换机可以在仓库里面安全的安装在柱子上
- 此冗余拓扑可以实现线速 8x2.5G 无线接入层，并具备完全 PoE+供电

# 组件和模块

**M4200-10MG-PoE+**
**多千兆全网管交换机**

**订购信息**

- ✓ *Americas, Europe: GSM4210P-100NES*
- ✓ *Asia Pacific: GSM4210P-100AJS*

Both the switch **back** panel and **bottom** panel contain mounting holes to allow for attachment

- ✓ 8-port PoE+ 1G / 2.5G (RJ45) including 2-port with 5Gbps
- ✓ NBASE-T compliant
- ✓ 2-port 10GBASE-X (SFP+)
- ✓ Non blocking 90Gbps fabric for (6 x 2.5G) + (2 x 5G) + (2 x 10G) full duplex operation
- ✓ 240W PoE budget (30W per port across 8 ports)
- ✓ Out-of-band 1G Ethernet management port
- ✓ Mini-USB and RJ45 RS232 console ports and USB storage port
- ✓ L3 feature set with static routing and RIP v1/v2 dynamic routing
- ✓ Easy Mount for standard rack mounting as well as plenum mounting on poles or walls
- ✓ Whisper quiet acoustics (28.9dB @25°C / 77°F)


19 寸机架套件

机架外安装的套件

10 厘米安装套件用于圆柱

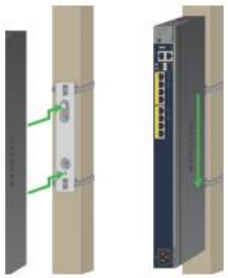
塑胶套件用于矩形柱子

标准机架安装

将交换机接至墙上

将交换机接到圆柱上

将交换机接到矩形柱子上



# 组件

## GBIC SFP and SFP+ Optics for M4200 series

| 订购信息<br>*Worldwide: see table below*<br>*Warranty: 5 years* | Multimode Fiber (MMF) | | Single mode Fiber (SMF) |
|---|---|---|---|
| | OM1 or OM2<br>62.5/12 5µm | OM3 or OM4<br>50/125µm | 9/125µm |
| **10 Gigabit SFP+**<br>  <br>• Fits into M4200 models SFP+ interfaces | AXM763<br>10GBase-LRM long reach multimode<br>802.3aq - LC duplex connector<br>up to 220m (722 ft)<br>AXM763-10000S (1 unit) | AXM763<br>10GBase-LRM long reach multimode<br>802.3aq - LC duplex connector<br>up to 260m (853 ft)<br>AXM763-10000S (1 unit) | AXM762<br>10GBase-LR long reach single mode<br>LC duplex connector<br>up to 10km (6.2 miles)<br>AXM762-10000S (1 unit)<br>AXM762P10-10000S (pack of 10 units) |
| | | AXM761<br>10GBase-SR short reach multimode<br>LC duplex connector<br>OM3: up to 300m (984 ft)<br>OM4: up to 550m (1,804 ft)<br>AXM761-10000S (1 unit)<br>AXM761P10-10000S (pack of 10 units) | AXM764<br>10GBase-LR LITE single mode<br>LC duplex connector<br>up to 2km (1.2 mile)<br>AXM764-10000S (1 unit) |
| **Gigabit SFP**<br>  <br>• Fits into M4200 models SFP+ interfaces | AGM731F<br>1000Base-SX short range multimode<br>LC duplex connector<br>up to 275m (902 ft)<br>AGM731F (1 unit) | AGM731F<br>1000Base-SX short range multimode<br>LC duplex connector<br>OM3: up to 550m (1,804 ft)<br>OM4: up to 1,000m (3,280 ft)<br>AGM731F (1 unit) | AGM732F<br>1000Base-LX long range single mode<br>LC duplex connector<br>up to 10km (6.2 miles)<br>AGM732F (1 unit) |

| | | |
|---|---|---|
| **AGM734**<br>**1000Base-T Gigabit RJ45 SFP**<br>**订购信息**<br>✓ *Worldwide: AGM734-10000S* |  | • Fits into M4200 models SFP+ interfaces<br>• 1 port Gigabit RJ45<br>• Supports only 1000Mbps full-duplex mode<br>• Up to 100m (328 ft) with Cat5 RJ45 or better<br>• Conveniently adds copper connectivity to M4200 fiber interfaces |
| M4200 系列的直连线缆 | SFP+至 SFP+ | |
| | 1 米 | 3 米 |
| **10 Gigabit DAC**<br>  <br>• Fits into M4200 models SFP+ interfaces | AXC761<br>10GSFP+ Cu (passive)<br>SFP+ connectors on both end<br>AXC761-10000S (1 unit) | AXC763<br>10GSFP+ Cu (passive)<br>SFP+ connectors on both end<br>AXC763-10000S (1 unit) |

NETGEAR

# 技术参数

- Requirements based on 12.0 software release

| *Model Name* | *Description* | *Model number* |
|---|---|---|
| **M4200-10MG-PoE+** | Full Power PoE+ 8x2.5G and 2x10G Aggregation Switch | **GSM4210P** |

| **Physical interfaces** | | | |
|---|---|---|---|
| **Gigabit and 10 Gigabit Ethernet Ports** | **Auto-sensing RJ45 100/1000/2.5G BASE-T** | **Auto-sensing RJ45 100/1000/2.5G/5G BASE-T** | **Auto-sensing SFP+ ports 1000/10GBASE-X** |
| M4200-10MG-PoE+ | 6 | 2 | 2 |
| **Management Ports** | **Console ports** | **Service port (Out-of-band Ethernet)** | **Storage port** |
| M4200-10MG-PoE+ | Serial RS232 RJ45 (front) ; Mini-USB (front) | 1 x RJ45 10/100/1000BASE-T (front) | 1 x USB (front) |
| **Power Supply** | **Built-in PSU** | | |
| M4200-10MG-PoE+ | 1 (front, power cord strap and lock) | | |
| **Fans** | **Fixed fans** | | |
| M4200-10MG-PoE+ | side-to-side airflow | | |
| **Power over Ethernet** | | | |
| **PSE Capacity** | **PoE+ ports** | | |
| M4200-10MG-PoE+ | 8 | | |
| **PoE Budget** | **PoE Budget @ 110V-220V AC in** | | |
| M4200-10MG-PoE+ | 240 Watts (8 x 30W full power) | | |
| **Features Support** | | | |
| IEEE 802.3af (up to 15.4W per port) | Yes | | |
| IEEE 802.3at (up to 30W per port) | Yes | | |
| IEEE 802.3at Layer 2 (LLDP) method | Yes | | |
| IEEE 802.3at 2-event classification | Yes | | |
| PoE timer / schedule (week, days, hours) | Yes | | |
| **Processor / Memory** | | | |
| Processor (CPU) | Integrated 800Mhz CPU in switching silicon | | |
| System memory (RAM) | 1 GB | | |
| Code storage (flash) | 256 MB | *Dual firmware image, dual configuration file* | |
| Packet Buffer Memory | 16 Mb | *Dynamically shared across only used ports* | |
| **Performance Summary** | | | |
| **Switching fabric** | | | |
| M4200-10MG-PoE+ | 90 Gbps | | *Line-rate (non blocking fabric)* |

| | | | | | |
|---|---|---|---|---|---|
| **Throughput** | | | | | |
| M4200-10MG-PoE+ | 66.9 Mpps | | | | |
| **Latency - 10G Fiber** | **64-byte frames** | **512-byte frames** | **1024-byte frames** | **1518-byte frames** | |
| M4200-10MG-PoE+ | 0.849µs | 0.838µs | 0.838µs | 0.835µs | |
| **Latency - 5G Copper** | **64-byte frames** | **512-byte frames** | **1024-byte frames** | **1518-byte frames** | |
| M4200-10MG-PoE+ | 5.697µs | 6.94µs | 8.578µs | 10.16µs | |
| **Latency - 2.5G Copper** | **64-byte frames** | **512-byte frames** | **1024-byte frames** | **1518-byte frames** | |
| M4200-10MG-PoE+ | 7.174µs | 8.573µs | 10.214µs | 11.78µs | |
| **Latency - 1G Fiber** | **64-byte frames** | **512-byte frames** | **1024-byte frames** | **1518-byte frames** | |
| M4200-10MG-PoE+ | 2.775µs | 2.756µs | 2.741µs | 2.712µs | |
| **Latency - 1G Copper** | **64-byte frames** | **512-byte frames** | **1024-byte frames** | **1518-byte frames** | |
| M4200-10MG-PoE+ | 2.784µs | 2.764µs | 2.748µs | 2.769µs | |
| **Green Ethernet** | | | | | |
| Energy Efficient Ethernet (EEE) | IEEE 802.3az Energy Efficient Ethernet Task Force compliance | | | | *Deactivated by default* |
| **Other Metrics** | | | | | |
| Forwarding mode | Store-and-forward | | | | |
| Addressing | 48-bit MAC address | | | | |
| Address database size | 16K MAC addresses | | | | |
| Number of VLANs | 1,024 VLANs (802.1Q) simultaneously | | | | |
| Number of multicast groups filtered (IGMP) | 2K total (1,024 IPv4 and 1,024 IPv6) | | | | |
| Number of Link Aggregation Groups (LAGs) | 5 LAGs with up to 8 ports per group | | | | *802.3ad / 802.1AX-2008* |
| Number of hardware queues for QoS | 8 queues | | | | |
| Number of routes | | | | | |
| Pv4 | 32 IPv4 Unicast Routes | | | | |
| Pv6 | 32 IPv6 Unicast Routes | | | | |
| Number of static routes | | | | | |
| | 32 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Pv4 | | | | | |
| Pv6 | 32 | | | | |
| RIP application route scaling | | | | | |
| Pv4 | 32 | | | | |
| Number of IP routing interfaces (port or VLAN) | 64 | | | | |
| Jumbo frame support | up to 9KB packet size | | | | |
| **Acoustic noise (ANSI-S10.12)** | **@ 25 °C ambient (77 °F)** | | | | |
| M4200-10MG-PoE+ | 28.9 dB | | | | *Fan speed control* |
| **Heat Dissipation (BTU)** | | | | | |
| M4200-10MG-PoE+ | 1,067.62 BTU/hr | | | | |
| **Mean Time Between Failures (MTBF)** | **@ 25 °C ambient (77 °F)** | | **@ 50 °C ambient (122 °F)** | | |
| M4200-10MG-PoE+ | 753,324 hours (~85.99 years) | | 172,083 hours (~19.6 years) | | |
| **L2 Services - VLANs** | | | | | |
| IEEE 802.1Q VLAN Tagging | Yes | | | | Up to 4,093 VLANs - 802.1Q Tagging |
| Protocol Based VLANs | Yes | | | | |
| IP subnet | Yes | | | | |
| ARP | Yes | | | | |
| IPX | Yes | | | | |
| Subnet based VLANs | Yes | | | | |
| MAC based VLANs | Yes | | | | |
| Voice VLAN | Yes | Based on phones OUI bytes (internal database, or user-maintained) or protocols (SIP, H323 and SCCP) | | | |
| Private Edge VLAN | Yes | | | | |
| Private VLAN | Yes | | | | |
| IEEE 802.1x | Yes | | | | |
| Guest VLAN | Yes | | | | |
| RADIUS based VLAN assignment via .1x | Yes | IP phones and PCs can authenticate on the same port but under different VLAN assignment policies | | | |
| RADIUS based Filter ID assignment via .1x | Yes | | | | |
| MAC-based .1x | Yes | | | | |
| Unauthenticated VLAN | Yes | | | | |
| Double VLAN Tagging (QinQ) | Yes | | | | |
| Enabling | Yes | | | | |

| | | | | | |
|---|---|---|---|---|---|
| dvlan-tunnel makes interface | | | | | |
| Global ethertype (TPID) | Yes | | | | |
| Interface ethertype (TPID) | Yes | | | | |
| Customer ID using PVID | Yes | | | | |
| GARP with GVRP/GMRP | Yes | Automatic registration for membership in VLANs throughout the network | | | |
| Multiple Registration Protocol (MRP) | Yes | Can replace GARP functionality | | | |
| Multicast VLAN Registration Protocol (MVRP) | Yes | Can replace GVRP functionality | | | |
| MVR (Multicast VLAN registration) | Yes | | | | |
| **L2 Services - Availability** | | | | | |
| IEEE 802.3ad - LAGs | Yes | Up to 5 LAGs and up to 8 ports per group | | | |
| LACP | Yes | | | | |
| Static LAGs | Yes | | | | |
| Local Preference per LAG | Yes | | | | |
| LAG Hashing | Yes | | | | |
| LAG Member Port Flaps Tracking | Yes | | | | |
| LAG Local Preference | Yes | Known unicast traffic egresses only out of local blade LAG interfarce members | | | |
| Storm Control | Yes | | | | |
| IEEE 802.3x (Full Duplex and flow control) | Yes | | | | |
| Per port Flow Control | Yes | Asymmetric and Symmetric Flow Control | | | |
| UDLD Support (Unidirectional Link Detection) | Yes | | | | |
| Normal-Mode | Yes | | | | |
| Aggressive-Mode | Yes | | | | |
| Link Dependency | Yes | Allow the link status of specified ports to be dependent on the link status of other ports | | | |
| IEEE 802.1D Spanning Tree Protocol | Yes | | | | |

| | | | | | |
|---|---|---|---|---|---|
| IEEE 802.1w Rapid Spanning Tree | Yes | | | | |
| IEEE 802.1s Multiple Spanning Tree | Yes | | | | |
| Per VLAN STP (PVSTP) with FastUplink and FastBackbone | Yes (CLI only) | PVST+ interoperability | | | |
| Per VLAN Rapid STP (PVRSTP) | Yes (CLI only) | RPVST+ interoperability | | | |
| STP Loop Guard | Yes | | | | |
| STP Root Guard | Yes | | | | |
| STP BPDU Guard | Yes | | | | |
| STP BPDU Filtering | Yes | | | | |
| STP BPDU Flooding | Yes | | | | |
| **L2 Services - Multicast Filtering** | | | | | |
| IGMPv2 Snooping Support | Yes | | | | |
| IGMPv3 Snooping Support | Yes | | | | |
| MLDv1 Snooping Support | Yes | | | | |
| MLDv2 Snooping Support | Yes | | | | |
| Expedited Leave function | Yes | | | | |
| Static L2 Multicast Filtering | Yes | | | | |
| Enable IGMP / MLD Snooping per VLAN | Yes | | | | |
| IGMPv1/v2 Snooping Querier | Yes | | | | |
| MLDv1 Snooping Querier | Yes | | | | |
| MGMD Snooping | | | | | |
| Control Packet Flooding | Yes | | | | |
| Flooding to mRouter Ports | Yes | | | | |
| Remove Flood-All-Unregistered Option | Yes | | | | |
| Multicast VLAN registration (MVR) | Yes | | | | |
| **L3 Services - DHCP** | | | | | |
| DHCP IPv4 / DHCP IPv6 Client | Yes | | | | |

| | | | | | |
|---|---|---|---|---|---|
| DHCP IPv4 Server | Yes | | | | |
| DHCP Snooping IPv4 | Yes | | | | |
| BootP Relay IPv4 | Yes | | | | |
| DHCP Relay IPv4 | Yes | | | | |
| DHCP Relay Option 82 circuit-id and remote-id for VLANs | Yes | | | | |
| Multiple Helper IPs | Yes | | | | |
| Auto Install (DHCP options 66, 67, 150 and 55, 125) | Yes | | | | |
| **L3 Services - Routing** | | | | | |
| Static Routing / ECMP Static Routing | IPv4/IPv6 | | | | |
| Multiple next hops to a given destination | Yes | | | | |
| Load sharing, Redundancy | Yes | | | | |
| Default routes | Yes | | | | |
| Static Reject routes | Yes | | | | |
| Port Based Routing | Yes | | | | |
| VLAN Based Routing | Yes | | | | |
| 802.3ad (LAG) for router ports | Yes | | | | |
| RIP | IPv4 | | | | |
| RIPv1 / RIPv2 | Yes | | | | |
| IP Multinetting | Yes | | | | |
| ICMP throttling | Yes | | | | |
| Router Discovery Protocol | Yes | | | | |
| DNS Client | IPv4 / IPv6 | | | | |
| IP Helper | Yes | | | | |
| Max IP Helper entries | 512 | | | | |
| Proxy ARP | IPv4 / IPv6 | | | | |
| ICMP | IPv4/IPv6 | | | | |
| ICMP redirect detection in hardware | Yes | | | | |
| **Network Monitoring and Discovery Services** | | | | | |
| ISDP (Industry Standard Discovery Protocol) | Yes | Can interoperate with devices running CDP | | | |
| 802.1ab LLDP | Yes | | | | |
| 802.1ab LLDP - MED | Yes | | | | |
| SNMP | V1, V2, V3 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| RMON 1,2,3,9 | Yes | | | | |
| sFlow | Yes | | | | |
| **Security** | | | | | |
| **Network Storm Protection, DoS** | | | | | |
| Broadcast, Unicast, Multicast DoS Protection | Yes | | | | |
| Denial of Service Protection (control plane) | Yes | Switch CPU protection | | | |
| Denial of Service Protection (data plane) | Yes | Switch Traffic protection | | | |
| DoS Attacks Protection | SIPDIP | UDPPORT | L4PORT | | SYNACK |
| | SMACDMAC | TCPFLAGSEQ | ICMP | | |
| | FIRSTFRAG | TCPOFFSET | ICMPV4 | | |
| | TCPFRAG | TCPSYN | ICMPV6 | | |
| | TCPFLAG | TCPSYNFIN | ICMPFRAG | | |
| | TCPPORT | TCPFINURGPSH | PINGFLOOD | | |
| CPU Rate Limiting | Yes | Applied to IPv4 and IPv6 multicast packets with unknown L3 addresses when IP routing/multicast enabled | | | |
| ICMP throttling | Yes | Restrict ICMP, PING traffic for ICMP-based DoS attacks | | | |
| **Management** | | | | | |
| Management ACL (MACAL) | Yes | Protects management CPU access through the LAN (in band management) | | | |
| Max Rules | 64 | | | | |
| Out of band Management | Yes | In-band management can be shut down entirely when out-of-band management network | | | |
| Radius accounting | Yes | RFC 2565 and RFC 2866 | | | |
| TACACS+ | Yes | | | | |
| Malicious Code Detection | Yes | Software image files and Configuration files with digital signatures | | | |
| **Network Traffic** | | | | | |
| Access Control Lists (ACLs) | L2 / L3 / L4 | MAC, IPv4, IPv6, TCP, UDP | | | |
| Time-based ACLs | Yes | | | | |
| Protocol-based ACLs | Yes | | | | |
| ACL over VLANs | Yes | | | | |
| Dynamic ACLs | Yes | | | | |
| IEEE 802.1x Radius Port Access Authentication | Yes | Up to 48 clients (802.1x) per port are supported, including the authentication of the users domain | | | |

| | | | | | |
|---|---|---|---|---|---|
| 802.1x MAC Address Authentication Bypass (MAB) | Yes | Supplemental authentication mechanism for non-802.1x devices, based on their MAC address only | | | |
| Network Authentication Successive Tiering | Yes | Dot1x --> MAP --> Captive Portal successive authentication methods based on configured time-outs | | | |
| Port Security | Yes | | | | |
| DHCP Snooping | Yes | IPv4/IPv6 | | | |
| Dynamic ARP Inspection | Yes | IPv4 | | | |
| IPv6 RA Guard Stateless Mode | Yes | | | | |
| MAC Filtering | Yes | | | | |
| Port MAC Locking | Yes | | | | |
| Private Edge VLAN | Yes | A protected port doesn't forward any traffic (unicast, multicast, or broadcast) to any other protected port - same switch | | | |
| Private VLANs | Yes | Scales Private Edge VLANs by providing Layer 2 isolation between ports across switches in same Layer 2 network | | | |
| **Quality of Service (QoS) - Summary** | | | | | |
| Access Lists | Yes | | | | |
| L2 MAC, L3 IP and L4 Port ACLs | Yes | | | | |
| Ingress | Yes | | | | |
| Egress | No | | | | |
| Time-based | Yes | | | | |
| 802.3ad (LAG) for ACL assignment | Yes | | | | |
| Binding ACLs to VLANs | Yes | | | | |
| ACL Logging | Yes | | | | |
| Support for IPv6 fields | Yes | | | | |
| DiffServ QoS | Yes | | | | |
| Edge Node applicability | Yes | | | | |
| Interior Node applicability | Yes | | | | |
| 802.3ad (LAG) for service interface | Yes | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Support for IPv6 fields | Yes | | | | |
| Ingress / Egress | Ingress only | | | | |
| IEEE 802.1p COS | Yes | | | | |
| 802.3ad (LAG) for COS configuration | Yes | | | | |
| WRED (Weighted Deficit Round Robin) | Yes | | | | |
| Strict Priority queue technology | Yes | | | | |
| Single Rate Policing | Yes (CLI only) | | | | |
| Committed Information Rate | Yes | | | | |
| Committed Burst Size | Yes | | | | |
| Excessive Burst Size | Yes | | | | |
| DiffServ feature applied to class maps | Yes | | | | |
| Auto-VoIP | Yes, based on protocols (SIP, H323 and SCCP) or on OUI bytes (default database and user-based OUIs) in the phone source MAC address | | | | |
| iSCSI Flow Acceleration | Yes | | | | |
| Dot1p Marking | Yes | | | | |
| IP DSCP Marking | Yes | | | | |
| **QoS - ACL Feature Support** | | | | | |
| ACL Support (general, includes IP ACLs) | Yes | | | | |
| MAC ACL Support | Yes | | | | |
| IP Rule Match Fields: | | | | | |
| Destination IP | Inbound | | | | |
| Destination IPv6 IP | Inbound | | | | |
| Destination L4 Port | Inbound | | | | |
| Every Packet | Inbound | | | | |
| IP DSCP | Inbound | | | | |
| IP Precedence | Inbound | | | | |
| IP TOS | Inbound | | | | |
| Protocol | Inbound | | | | |
| Source IP (for Mask support see below) | Inbound | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Source IPv6 IP | Inbound | | | | |
| L3 IPv6 Flow Label | Inbound | | | | |
| Source L4 Port | Inbound | | | | |
| TCP Flags (ack, est, fin) | No | | | | |
| Supports Masking | Inbound | | | | |
| MAC Rule Match Fields | | | | | |
| COS | Inbound | | | | |
| Destination MAC | Inbound | | | | |
| Destination MAC Mask | Inbound | | | | |
| Ethertype | Inbound | | | | |
| Source MAC | Inbound | | | | |
| Source MAC Mask | Inbound | | | | |
| VLAN ID | Inbound | | | | |
| Rules attributes | | | | | |
| Assign Queue | Inbound | | | | |
| Logging -- deny rules | Inbound | | | | |
| Mirror (to supported interface types only) | Inbound | | | | |
| Redirect (to supported interface types only) | Inbound | | | | |
| Rate Limiting -- permit rules | Inbound | | | | |
| Interface | | | | | |
| Inbound direction | Yes | | | | |
| Outbound direction | Yes | | | | |
| Supports LAG interfaces | Yes | | | | |
| Supports Control-plane interface | No | | | | |
| Multiple ACLs per interface, dir | Yes | | | | |
| Mixed-type ACLs per interface, dir | Yes | | | | |
| Mixed L2/IPv4 ACLs per interface, inbound | No | | | | |
| Mixed IPv4/IPv6 ACLs per interface, inbound | No | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mixed IPv4/IPv6 ACLs per interface, outbound | No | | | | |
| **QoS - DiffServ Feature Support** | | | | | |
| DiffServ Supported | Yes | | | | |
| Class Type | | | | | |
| All | Yes | | | | |
| Class Match Criteria | | | | | |
| COS | Inbound | | | | |
| COS2 (Secondary COS) | No | | | | |
| Destination IP (for Mask support see below) | Inbound | | | | |
| Destination IPv6 IP | Inbound | | | | |
| Destination L4 Port | Inbound | | | | |
| Destination MAC (for Mask support see below) | Inbound | | | | |
| Ethertype | Inbound | | | | |
| Every Packet | Inbound | | | | |
| IP DSCP | Inbound | | | | |
| IP Precedence | Inbound | | | | |
| IP TOS (for Mask support see below) | Inbound | | | | |
| Protocol | Inbound | | | | |
| Reference Class | Inbound | | | | |
| Source IP (for Mask support see below) | Inbound | | | | |
| Source IPv6 IP | Inbound | | | | |
| L3 IPv6 Flow Label | Inbound | | | | |
| Source L4 Port | Inbound | | | | |
| Source MAC (for Mask support see below) | Inbound | | | | |
| VLAN ID | Inbound | | | | |

| | | | | | |
|---|---|---|---|---|---|
| (Source VID) | | | | | |
| VLAN ID2 (Secondary VLAN) (Source VID) | No | | | | |
| Supports Masking | Inbound | | | | |
| Policy | | | | | |
| Out Class Unrestricted | Yes | | | | |
| Policy Attributes -- Inbound | | | | | |
| Assign Queue | Yes | | | | |
| Drop | Yes | | | | |
| Mark COS | Yes | | | | |
| Mark COS-AS-COS2 | No | | | | |
| Mark COS2 (Secondary COS) | No | | | | |
| Mark IP DSCP | Yes | | | | |
| Mark IP Precedence | Yes | | | | |
| Mirror (to supported interface types only) | Yes | | | | |
| Police Simple | Yes | | | | |
| Police Single-Rate | No | | | | |
| Police Two-Rate | Yes | | | | |
| Police Color Aware Mode | Yes | | | | |
| Redirect (to supported interface types only) | Yes | | | | |
| Policy Attributes -- Outbound | No | | | | |
| Drop | No | | | | |
| Mark COS | No | | | | |
| Mark IP DSCP | No | | | | |
| Mark IP Precedence | No | | | | |
| Mirror (to supported interface types only) | No | | | | |
| Police Simple | No | | | | |
| Police Single-Rate | No | | | | |
| Police Two-Rate | No | | | | |
| Police Color | No | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Aware Mode | | | | | |
| Redirect (to supported interface types only) | No | | | | |
| Service Interface | | | | | |
| Inbound Slot.Port configurable | Yes | | | | |
| Inbound 'All' Ports configurable | Yes | | | | |
| Outbound Slot.Port configurable | No | | | | |
| Outbound 'All' Ports configurable | No | | | | |
| Supports LAG interfaces | Yes | | | | |
| Mixed L2/IPv4 match criteria, inbound | No | | | | |
| Mixed IPv4/IPv6 match criteria, inbound | No | | | | |
| Mixed IPv4/IPv6 match criteria, outbound | No | | | | |
| PHB Support | | | | | |
| EF | Yes | | | | |
| AF4x | Yes | | | | |
| AF3x | Yes | | | | |
| AF2x | Yes | | | | |
| AF1x | Yes | | | | |
| CS | Yes | | | | |
| Statistics -- Policy Instance | | | | | |
| Offered | packets | | | | |
| Discarded | packets | | | | |
| **QoS - COS Feature Support** | | | | | |
| COS Support | Yes | | | | |
| Supports LAG interfaces | Yes | | | | |
| COS Mapping Config | | | | | |
| Configurable per-interface | Yes | | | | |
| IP DSCP Mapping | Yes | | | | |
| COS Queue Config | | | | | |
| Queue Parms configurable per-interface | Yes | | | | |
| Drop Parms configurable | Yes | | | | |

| | | | | | |
|---|---|---|---|---|---|
| per-interface | | | | | |
| Interface Traffic Shaping (for whole egress interface) | Yes | | | | |
| Minimum Bandwidth | Yes | | | | |
| Weighted Deficit Round Robin (WDRR) Support | Yes | | | | |
| Maximum Queue Weight | 127 | | | | |
| WRED Support | Yes | | | | |

| **Functional Summary - IETF RFC Standards and IEEE Network Protocols** | |
|---|---|
| **Core Management** | |
| RFC 854 — Telnet | RFC 3414 — User-Based Security Model |
| RFC 855 — Telnet option specifications | RFC 3415 — View-based Access Control Model |
| RFC 1155 — SMI v1 | RFC 3416 — Version 2 of SNMP Protocol Operations |
| RFC 1157 — SNMP | RFC 3417 — Transport Mappings |
| RFC 1212 — Concise MIB definitions | RFC 3418 — Management Information Base (MIB) for the Simple Network Management Protocol (SNMP) |
| RFC 1867 — HTML/2.0 forms with file upload extensions | Configurable Management VLAN |
| RFC 1901 — Community-based SNMP v2 | SSL 3.0 and TLS 1.0 |
| RFC 1908 — Coexistence between SNMP v1 and SNMP v2 | – RFC 2246 — The TLS protocol, version 1.0 |
| RFC 2068 — HTTP/1.1 protocol as updated by draft-ietf-http-v11-spec-rev-03 | – RFC 2346 — AES cipher suites for Transport layer security |
| RFC 2271 — SNMP framework MIB | – RFC 2818 — HTTP over TLS |
| RFC 2295 — Transparent content negotiation | SSH 1.5 and 2.0 |
| RFC 2296 — Remote variant selection; RSVA/1.0 state management cookies — draft-ietf-http-state-mgmt-05 | – RFC 4253 — SSH transport layer protocol |
| RFC 2576 — Coexistence between SNMP v1, v2, and v3 | – RFC 4252 — SSH authentication protocol |
| RFC 2578 — SMI v2 | – RFC 4254 — SSH connection protocol |
| RFC 2579 — Textual conventions for SMI v2 | – RFC 4251 — SSH protocol architecture |
| RFC 2580 — Conformance statements for SMI v2 | – RFC 4716 — SECSH public key file format |
| RFC 3410 — Introduction and Applicability Statements for Internet Standard Management Framework | – RFC 4419 — Diffie-Hellman group exchange for the SSH transport layer protocol |
| RFC 3411 — An Architecture for Describing SNMP Management Frameworks | HTML 4.0 specification, December 1997 |
| RFC 3412 — Message Processing & Dispatching | Java Script™ 1.3 |
| RFC 3413 — SNMP Applications | |

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|---|---|---|---|---|---|
| **Advanced Management** | | | | | |
| Industry-standard CLI with the following features: | | Optional user password encryption | | | |
| – Scripting capability | | Multisession Telnet server | | | |
| – Command completion | | Auto Image Upgrade | | | |
| – Context-sensitive help | | | | | |
| **Core Switching** | | | | | |
| IEEE 802.1AB — Link level discovery protocol | | IEEE 802.3ac — VLAN tagging | | | |
| IEEE 802.1D — Spanning tree | | IEEE 802.3ad — Link aggregation | | | |
| IEEE 802.1p — Ethernet priority with user provisioning and mapping | | IEEE 802.3ae — 10 GbE | | | |
| IEEE 802.1Q — Virtual LANs w/ port-based VLANs | | IEEE 802.3af — Power over Ethernet | | | |
| IEEE 802.1S — Multiple spanning tree compatibility | | IEEE 802.3at — Power over Ethernet Plus | | | |
| IEEE 802.1v — Protocol-based VLANs | | IEEE 802.3x — Flow control | | | |
| IEEE 802.1W — Rapid spanning tree | | ANSI/TIA-1057 — LLDP-MED | | | |
| iEEE 802.1AB — LLDP | | GARP — Generic Attribute Registration Protocol: clause 12, 802.1D-2004 | | | |
| IEEE 802.1X — Port-based authentication | | GMRP — Dynamic L2 multicast registration: clause 10, 802.1D-2004 | | | |
| IEEE 802.3 — 10Base-T | | GVRP — Dynamic VLAN registration: clause 11.2, 802.1Q-2003 | | | |
| IEEE 802.3u — 100Base-T | | RFC 4541 — IGMP snooping and MLD snooping | | | |
| IEEE 802.3ab — 1000Base-T | | RFC 5171 — UniDirectional Link Detection (UDLD) Protocol | | | |
| **Additional Layer 2 Functionality** | | | | | |
| Broadcast storm recovery | | IGMP and MLD snooping querier | | | |
| Double VLAN/VMAN tagging | | Port MAC locking | | | |
| DHCP Snooping | | MAC-based VLANs | | | |
| Dynamic ARP inspection | | IP source guard | | | |
| Independent VLAN Learning (IVL) support | | IP subnet-based VLANs | | | |
| IPv6 classification APIs | | Voice VLANs | | | |
| Jumbo Ethernet frames | | Protected ports | | | |
| Port mirroring | | IGMP snooping | | | |
| Static MAC filtering | | Green Ethernet power savings mode | | | |
| **System Facilities** | | | | | |
| Event and error logging facility | | RFC 2030 — Simple Network Time Protocol (SNTP) V4 for IPv4, IPv6, and OSI | | | |
| Runtime and configuration download capability | | RFC 2131 — DHCP Client/Server | | | |
| PING utility | | RFC 2132 — DHCP options and BOOTP vendor extensions | | | |
| XMODEM | | RFC 2865 — RADIUS client | | | |
| RFC 768 — UDP | | RFC 2866 — RADIUS accounting | | | |
| RFC 783 — TFTP | | RFC 2868 — RADIUS attributes for tunnel protocol support | | | |
| RFC 791 — IP | | RFC 2869 — RADIUS extensions | | | |
| RFC 792 — ICMP | | RFC 28869bis — RADIUS support for Extensible Authentication Protocol (EAP) | | | |
| RFC 793 — TCP | | RFC 5176 — RADIUS Change of Auth | | | |
| RFC 826 — ARP | | RFC 3164 — The BSD syslog protocol with RFC 5424 update | | | |
| RFC 951 — BOOTP | | RFC 3580 — 802.1X RADIUS usage guidelines | | | |

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|---|---|
| RFC 1321 — Message digest algorithm | Power Source Equipment (PSE) IEEE 802.af Powered Ethernet (DTE Power via MDI) standard |
| RFC 1534 — Interoperability between BOOTP and DHCP | IEEE Draft P802.1AS/D6.7 — IEEE 802.1AS Time Synchronization Protocol |
| **Core Routing** | |
| RFC 826 — Ethernet ARP | RFC 3021 — Using 31-Bit Prefixes on Point-to-Point Links |
| RFC 894 — Transmission of IP datagrams over Ethernet networks | RFC 3046 — DHCP/BOOTP relay |
| RFC 896 — Congestion control in IP/TCP networks | VLAN routing |
| RFC 1027 — Using ARP to implement transparent subnet gateways (Proxy ARP) | |
| RFC 1256 — ICMP router discovery messages | |
| RFC 1321 — Message digest algorithm | |
| RFC 1519 — CIDR | |
| RFC 1812 — Requirements for IPv4 routers | |
| RFC 2082 — RIP-2 MD5 authentication | |
| RFC 2131 — DHCP relay | |
| RFC 2453 — RIP v2 | |
| **Quality of Service - DiffServ** | |
| RFC 2474 — Definition of the differentiated services field (DS Field) in IPv4/IPv6 headers | RFC 3246 — An expedited forwarding PHB (Per-Hop Behavior) |
| RFC 2475 — An architecture for differentiated services | RFC 3260 — New terminology and clarifications for DiffServ |
| RFC 2597 — Assured forwarding PHB group | |
| **Quality of Service - Access Control Lists (ACLs)** | |
| Permit/deny actions for inbound or outbound IP traffic classification based on: | Permit/deny actions for inbound or outbound Layer 2 traffic classification based on: |
| – Type of service (ToS) or differentiated services (DS) DSCP field | – Source MAC address |
| – Source IP address | – Destination MAC address |
| – Destination IP address | – EtherType |
| – TCP/UDP source port | – VLAN identifier value or range (outer and/or inner VLAN tag) |
| – TCP/UDP destination port | – 802.1p user priority (outer and/or inner VLAN tag) |
| – IPv6 flow label | Optional rule attributes: |
| – IP protocol number | – Assign matching traffic flow to a specific queue |
| | – Redirect or mirror (flow-based mirroring) matching traffic flow to a specific port |

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|---|---|
| | – Generate trap log entries containing rule hit counts |
| **Quality of Service - Class of Service (CoS)** | |
| Direct user configuration of the following: | Auto VoIP |
| – IP DSCP to traffic class mapping | |
| – IP precedence to traffic class mapping | |
| – Interface trust mode: 802.1p, IP Precedence, IP DSCP, or untrusted | |
| – Interface traffic shaping rate | |
| – Minimum and maximum bandwidth per queue | |
| – Strict priority versus weighted (WRR/WDRR/WFQ) scheduling per queue | |
| – Tail drop versus Weighted Random Early Detection (WRED) queue depth management | |
| **Core Multicast** | |
| RFC 1112 — Host extensions for IP multicasting | Draft-ietf-idmr-dvmrp-v3-10 — DVMRP |
| RFC 2236 — IGMP v2 | Draft-ietf-magma-igmp-proxy-06.txt — IGMP/MLD-based multicast forwarding (IGMP/MLD proxying) |
| RFC 2710 — MLDv1 | Draft-ietf-magma-igmpv3-and-routing-05.txt — IGMPv3 and multicast routing protocol interaction |
| RFC 2365 — Administratively scoped boundaries | Static RP configuration |
| RFC 3376 — IGMPv3 | |
| RFC3810 — MLDv2 | |
| **Core IPv6 Routing** | |
| RFC 1981 — Path MTU for IPv6 | RFC 3513 — Addressing architecture for IPv6 |
| RFC 2373 — IPv6 addressing | RFC 3542 — Advanced sockets API for IPv6 |
| RFC 2460 — IPv6 protocol specification | RFC 3587 — IPv6 global unicast address format |
| RFC 2461 — Neighbor discovery | RFC 4291 — Addressing architecture for IPv6 |
| RFC 2462 — Stateless autoconfiguration | RFC 4443 — Internet Control Message Protocol (ICMPv6) for the IPv6 Specification |
| RFC 2464 — IPv6 over Ethernet | RFC 6164 — Using 127-Bit IPv6 Prefixes on Inter-Router Links |
| RFC 2711 — IPv6 router alert | RFC 6583 — Operational Neighbor Discovery Problems |
| RFC 3056—Connection of IPv6 Domains via IPv4 Clouds | |
| RFC 3315 —Dynamic Host Configuration Protocol for IPv6 (DHCPv6) | |
| RFC 3484 — Default address selection for IPv6 | |
| RFC 3493 — Basic socket interface for IPv6 | |
| **Supported MIBs** | |
| **Base Package MIBs** | MIBs can be dowloaded here: http://support.netgear.com/for_business/default.aspx |
| ANSI/TIA-1057 — LLDP-EXT-MED-MIB | RFC 2674 — Q-BRIDGE-MIB |

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|---|---|
| DIFFSERV DSCP TC (Draft — no RFC) | RFC 2677 — IANA Address Family Numbers MIB |
| DNS-RESOLVER-MIB (IETF DNS Working Group) | RFC 2819 — RMON MIB |
| DNS-SERVER-MIB (IETF DNS Working Group) | RFC 2925 — DISMAN-PING-MIB and DISMAN-TRACEROUTE-MIB |
| GreenEthernet Private MIB | RFC 3273 — RMON MIB for High Capacity Networks |
| IANA-ADDRESS-FAMILY-NUMBERS-MIB (IANA (3/2002) | RFC 3411 — SNMP Management Frameworks MIB |
| IEEE 802.1AB-2004 — LLDP MIB | RFC 3411 — SNMP-FRAMEWORK-MIB |
| IEEE 802.1AB-2005 — LLDP-EXT-DOT3-MIB | RFC 3412 — SNMP-MPD-MIB |
| POWER ETHERNET MIB (Draft — no RFC) | RFC 3413 — SNMP-NOTIFICATION-MIB |
| RFC 1155 — SMI-MIB | RFC 3413 — SNMP-PROXY-MIB (initial revision published as RFC 2273) |
| RFC 1450 — SNMPV2-MIB | RFC 3413 — SNMP-TARGET-MIB (initial revision published as RFC 2273) |
| RFC 2273 — SNMP Notification MIB, SNMP Target MIB | RFC 3414 — User-based Security Model for SNMPv3 MIB |
| RFC 2392 — IANA RTPROTO-MIB | RFC 3415 — View-based Access Control Model for SNMP MIB |
| RFC 2572 — SNMP Message Processing and Dispatching MIB | RFC 3417 — SNMPV2-TM |
| RFC 2574 — User-based Security Model for SNMPv3 MIB | RFC 3418 — SNMPv2 MIB |
| RFC 2575 — View-based Access Control Model for SNMP MIB | RFC 3434 — RMON MIB Extensions for High Capacity Alarms |
| RFC 2576 — SNMP Community MIB | RFC 3584 — SNMP Community MIB |
| RFC 2578 — SNMPV2-SMI | RFC 3621 — POWER-ETHERNET-MIB |
| RFC 2579 — SNMPV2-TC | SNMP-RESEARCH-MIB— SNMP research MIB definitions |
| RFC 2580— SNMPV2-CONF | SR-AGENT-INFO-MIB— SNMP research MIB definitions |
| RFC 2613 — SMON-MIB | USM-TARGET-TAG-MIB — SNMP research MIB definitions |
| **Switching Package MIBs** | |
| RFC 1213 — MIB-II | RFC 2011 — SNMPv2 Management Information Base |
| ANSI/TIA 1057 — LLDP-MED MIB | RFC 2213 — Integrated Services MIB |
| FASTPATH Enterprise MIBs supporting switching features | RFC 2233 — IF-MIB |
| FASTPATH-MMRP-MIB — MMRP private MIB for IEEE 802.1Q devices | RFC 2233 — The Interfaces Group MIB using SMI v2 |
| FASTPATH-MSRP-MIB — MSRP private MIB for IEEE 802.1Q devices | RFC 2674 — VLAN and Ethernet Priority MIB (P-Bridge MIB) |
| FASTPATH-MVRP-MIB — MVRP private MIB for IEEE 802.1Q devices | RFC 2737 — Entity MIB (Version 2) |
| IANAifType-MIB — IANAifType Textual Convention | RFC 2819 — RMON Groups 1,2,3, & 9 |
| IEEE 802.1AB — LLDP MIB | RFC 2863 — Interfaces Group MIB |
| IEEE 802.3AD MIB (IEEE8021-AD-MIB) | RFC 3291 — INET Address MIB |
| IEEE Draft P802.1AS/D7.0 (IEEE8021-AS-MIB) | RFC 3291 — Textual Conventions for Internet Network Addresses |
| IEEE LAG-MIB — Link Aggregation module | RFC 3621 — Power Ethernet MIB |

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|---|---|---|---|---|---|
| for managing IEEE 802.3ad | | | | | |
| LLDP-EXT-DOT3-MIB (part of IEEE Std 802.1AB) | | RFC 3635 — Etherlike MIB | | | |
| LLDP-MIB (part of IEEE Std 802.1AB) | | RFC 3636 — IEEE 802.3 Medium Attachment Units (MAUs) MIB | | | |
| Private MIB for 802.1Qat, 802.1Qav Configuration | | RFC 4022 — Management Information Base for the Transmission Control Protocol (TCP) | | | |
| RFC 1493 — Bridge MIB | | RFC 4113 — Management Information Base for the User Datagram Protocol (UDP) | | | |
| RFC 1643 — Definitions of managed objects for the Ethernet-like interface types | | RFC 4444 — IS-IS MIB | | | |
| **Routing Package MIBs** | | | | | |
| FASTPATH Enterprise MIBs supporting routing features | | RFC 2096 — IP Forwarding Table MIB | | | |
| IANA-Address-Family-Numbers-MIB | | RFC 2668 — IEEE 802.3 Medium Attachment Units (MAUs) MIB | | | |
| RFC 1724 — RIP v2 MIB Extension | | | | | |
| RFC 2096 — IP Forwarding Table MIB | | | | | |
| **IPv6 Management MIBs** | | | | | |
| RFC 3419 — TRANSPORT-ADDRESS-MIB | | IPv6-MIB (draft) | | | |
| IPv6-ICMP-MIB (draft) | | | | | |
| **IPv6 Routing MIBs** | | | | | |
| RFC 2465 — IPv6 MIB | | RFC 2466 — ICMPv6 MIB | | | |
| **QoS Package MIB** | | | | | |
| RFC 3289 — DIFFSERV-MIB & DIFFSERV-DCSP-TC MIBs | | Private MIBs for full configuration of DiffServ, ACL, and CoS functionality | | | |
| **Security MIB** | | | | | |
| RFC 2618 — RADIUS Authentication Client MIB | | IEEE8021-PAE-MIB — The Port Access Entity module for managing IEEE 802.1X | | | |
| RFC 2620 — RADIUS Accounting MIB | | IEEE 802.1X MIB (IEEE 8021-PAE-MIB 2004 Revision) | | | |
| **Multicast Package MIBs** | | | | | |
| draft-ietf-idmr-dvmrp-mib-11.txt — DVMRP MIB | | | | | |
| draft-ietf-magma-mgmd-mib-05.txt —Multicast Group Membership Discovery MIB (both IGMP and MLD) | | | | | |
| FASTPATH Enterprise MIBs supporting multicast features | | | | | |
| **Management** | | | | | |
| Password management | Yes | | | | |
| Configurable Management VLAN | Yes | | | | |
| Out-of-band Management | Yes | In-band management can be shut down using Management ACLs when separate management network | | | |
| Auto Install (BOOTP and DHCP options 66, 67, 150 and 55, 125) | Yes | Scalable deployment process (firmware, config) | | | |
| Admin access control via Radius and TACACS+ | Yes | Policies, Enable | | | |
| Industry standard CLI (IS-CLI) | Yes | Command Line interface | | | |

| | | | | | |
|---|---|---|---|---|---|
| CLI commands logged to a Syslog server | Yes | | | | |
| Web-based graphical user interface (GUI) | Yes | Fully functional GUI (exceptions are noted below:) | | | |
| Features without Web GUI support | | | | | |
| PV(R)STP | CLI only | | | | |
| Authorization List | CLI only | | | | |
| Control Plane ACL | CLI only | | | | |
| UDLD | CLI only | | | | |
| QoS Policy for Single Rate | CLI only | | | | |
| DHCPv6 Snooping | CLI only | | | | |
| eMail Alerting | CLI only | | | | |
| MMRP | CLI only | | | | |
| Telnet | Yes | | | | |
| IPv6 management | Yes | | | | |
| Dual Software (firmware) image | Yes | Allows non disruptive firmware upgrade process | | | |
| Dual Configuration file | Yes | Text-based (CLI commands) configuration file | | | |
| Non disruptive Config Management | Yes | With new startup configuration file, the switch gracefully resolves any differences with the running config | | | |
| IS-CLI Scripting | Yes | | | | |
| Port descriptions | Yes | | | | |
| SNTP client over UDP port 123 | Yes | Provides synchronized network timestamp either in broadcast or unicast mode | | | |
| XMODEM | Yes | | | | |
| SNMP v1/v2 | Yes | | | | |
| SNMP v3 with multiple IP addresses | Yes | | | | |
| RMON 1,2,3,9 | Yes | | | | |
| Max History entries | 3 * (number of ports in the switch + LAG + 10) | | | | |
| Max buckets per History entry | 10 | | | | |
| Max Alarm entries | 3 * (number of ports in the switch + LAG + 10) | | | | |
| Max Event entries | 3 * (number of ports in the switch + LAG + 10) | | | | |
| Max Log entries per Event entry | 10 | | | | |
| Port Mirroring | Yes | | | | |
| Number of monitor sessions | 1 (multiple sessions are configurable) | | | | |
| Tx/Rx | Yes | | | | |
| Many to One Port | Yes | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mirroring | | | | | |
| LAG supported as source ports | Yes | | | | |
| Max source ports in a session | Total switch port count | | | | |
| Remote Port Mirroring (RSPAN) | Yes | | | | |
| | When a particular session is enabled, any traffic entering or leaving the source ports of that session is copied (mirrored) onto a Remote Switched Port Analyzer (RSPAN) VLAN | | | | |
| Flow based mirroring | Yes | | | | |
| Cable Test utility | Yes | CLI, Web GUI | | | |
| Outbound Telnet | Yes | | | | |
| SSH | v1 / v2 | Secure Shell | | | |
| SSH Session Configuration | Yes | | | | |
| SSL/HTTPS and TLS v1.0 for web-based access | Yes | | | | |
| File transfers (uploads, downloads) | TFTP / HTTP | | | | |
| Secured protocols for file transfers | SCP / SFTP / HTTPS | | | | |
| HTTP Max Sessions | 16 | | | | |
| SSL/HTTPS Max Sessions | 16 | | | | |
| HTTP Download (firmware) | Yes | | | | |
| Email Alerting | Yes (CLI only) | | | | |
| Syslog (RFC 3164) (RFC 5424) | Yes, forwarding messages via UDP using the Syslog protocol to one or more collectors or relays | | | | |
| Persistent log supported | Yes | | | | |
| OpenFlow 1.3 | Supports a single-table OpenFlow 1.3 data forwading path | | | | |
| **User Admin Management** | | | | | |
| User ID configuration | Yes | | | | |
| Max number of configured users | 6 | | | | |
| Support multiple READWRITE Users | Y | | | | |
| Max number of IAS users (internal user database) | 100 | | | | |
| Authentication login lists | Yes | | | | |
| Authentication Enable lists | Yes | | | | |
| Authentication HTTP lists | Yes | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Authentication HTTPS lists | Yes | | | | |
| Authentication Dot1x lists | Yes | | | | |
| Accounting Exec lists | Yes | | | | |
| Accounting Commands lists | Yes | | | | |
| Login History | 50 | | | | |
| **M4200 series - Platform Constants** | | | | | |
| Maximum number of remote Telnet connections | 5 | | | | |
| Maximum number of remote SSH connections | 5 | | | | |
| Number of MAC Addresses | 16K | | | | |
| Number of VLANs | 1K | | | | |
| VLAN ID Range | 1 - 4093 | | | | |
| Number of 802.1p Traffic Classes | 8 classes | | | | |
| IEEE 802.1x | | | | | |
| Number of .1x clients per port | 48 | | | | |
| Number of LAGs | 5 LAGs with up to 8 ports per group | | | | |
| Maximum multiple spanning tree instances (MSTP) | 32 | | | | |
| Maximum per VLAN spanning tree instances (PVST) | 32 | | | | |
| MAC based VLANS | Yes | | | | |
| Number supported | 256 | | | | |
| Number of network buffers | 246 | | | | |
| Number of log messages buffered | 200 | | | | |
| Static filter entries | | | | | |
| Unicast MAC and source port | 20 | | | | |
| Multicast MAC and source port | 20 | | | | |
| Multicast MAC and destination port (only) | 2,048 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Subnet based VLANs | Yes | | | | |
| Number supported | 128 | | | | |
| Protocol Based VLANs | Yes | | | | |
| Max number of groups | 128 | | | | |
| Max protocols | 16 | | | | |
| Maximum Multicast MAC Addresses entries | 1K | | | | |
| Jumbo Frame Support | Yes | | | | |
| Max Size Supported | 9k | | | | |
| Number of DHCP snooping bindings | 8K | | | | |
| Number of DHCPv6 snooping bindings | 8K | | | | |
| Number of DHCP snooping static entries | 1024 | | | | |
| LLDP-MED number of remote nodes | 20 | | | | |
| LLDP Remote Management address buffers | 20 | | | | |
| LLDP Unknown TLV address buffers | 100 | | | | |
| LLDP Organisationally Defined Large TLV buffers | 100 | | | | |
| LLDP Organisationally Defined Small TLV buffers | 120 | | | | |
| Port MAC Locking | Yes | | | | |
| Dynamic addresses per port | 4096 | | | | |
| Static addresses per port | 48 | | | | |
| sFlow | | | | | |
| Number of samplers | 10 | | | | |
| Number of pollers | 10 | | | | |
| Number of receivers | 8 | | | | |
| Radius | | | | | |
| Max Authentication servers | 32 | | | | |
| Max Accounting servers | 32 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Number of Routes (v4/v6) | | | | | |
| IPv4 only SDM build | 64 | | | SDM (System Data Management, or switch database) | |
| IPv4/IPv6 SDM build | | | | | |
| IPv4 routes | 64 | | | | |
| IPv6 routes | 64 | | | | |
| RIP application route scaling | 32 | | | | |
| Number of routing interfaces (including port/vlan) | 64 | | | | |
| Number of static routes (v4/v6) | 32/32 | | | | |
| DHCP Server | | | | | |
| Max number of pools | 256 | | | | |
| Total max leases | 2K | | | | |
| DNS Client | | | | | |
| Concurrent requests | 16 | | | | |
| Name server entries | 8 | | | | |
| Seach list entries | 6 | | | | |
| Static host entries | 64 | | | | |
| Cache entries | 128 | | | | |
| Domain search list entries | 32 | | | | |
| Number of Host Entries (ARP/NDP) | | | | | |
| IPv4 only SDM build | 1,152 | | | SDM (System Data Management, or switch database) | |
| IPv4/IPv6 SDM build (v4/v6) | 768 / 384 | | | | |
| Static v4 ARP Entries | 128 | | | | |
| IGMPv3 / MLDv2 Snooping Limits | | | | | |
| IGMPv3/MLDv2 HW entries when Switching only | 32/16 | | | | |
| IP Multicast | | | | | |
| IGMP Group | 1K IPv4 1K IPv6 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Memberships per system | | | | | |
| ACL Limits | | | | | |
| Maximum Number of ACLs (any type) | 100 | | | | |
| Maximum Number Configurable Rules per List | 512 ingress / 0 egress | | | | |
| Maximum ACL Rules per Interface and Direction | 512 ingress / 0 egress | | | | |
| Maximum ACL Rules per Interface and Direction (IPv6) | 256 ingress / 0 egress | | | | |
| Maximum ACL Rules (system-wide) | 16K | | | | |
| Maximum ACL Logging Rules (system-wide) | 128 | | | | |
| COS Device Characteristics | | | | | |
| Configurable Queues per Port | 8 queues | | | | |
| Configurable Drop Precedence Levels | 3 | | | | |
| DiffServ Device Limits | | | | | |
| Number of Queues | 8 queues | | | | |
| Requires TLV to contain all policy instances combined | Yes | | | | |
| Max Rules per Class | 13 | | | | |
| Max Instances per Policy | 28 | | | | |
| Max Attributes per Instance | 3 | | | | |
| Max Service Interfaces | 116 | | | | |
| Max Table Entries | | | | | |
| Class Table | 32 | | | | |
| Class Rule Table | 416 | | | | |
| Policy Table | 64 | | | | |
| Policy | 1,792 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Instance Table | | | | | |
| Policy Attribute Table | 5,376 | | | | |
| Max Nested Class Chain Rule Count | 26 | | | | |
| AutoVoIP number of voice calls | 20 | | | | |
| iSCSI Flow Acceleration | | | | | |
| Max Monitored TCP Ports/IP Addresses | 16 | | | | |
| Max Sessions | 192 | | | | |
| Max Connections | 192 | | | | |
| OpenFlow 1.3 | | | | | |
| Number of max OpenFlow access rules | 1,024 | | | | |
| Number of max OpenFlow forwarding rules | 1,792 | | | | |
| **LEDs** | | | | | |
| Per port | Speed, Link, Activity | | | | |
| Per Device | Power, Fan | | | | |
| **Physical Specifications** | | | | | |
| Dimensions | | | | | |
| M4200-10MG-PoE+ | Width: 17.32 inches (44 cm); Height: 1U - 1.73 inches (4.4 cm); Depth: 3.94 inches (10 cm) | | | | |
| Weight | | | | | |
| M4200-10MG-PoE+ | 4.52 lb (2.05 kg) | | | | |
| **Power Consumption** | | | | | |
| Worst case, all ports used, full PoE, line-rate traffic | | | | | |
| M4200-10MG-PoE+ | 281.6W max | | | | |
| **Environmental Specifications** | | | | | |
| Operating: | | | | | |
| Temperature | 32° to 122°F (0° to 50°C) | | | | |
| Humidity | 90% maximum relative humidity, non-condensing | | | | |
| Altitude | 10,000 ft (3,000 m) maximum | | | | |
| Storage: | | | | | |
| Temperature | – 4° to 158°F (–20° to 70°C) | | | | |
| Humidity | 95% maximum relative humidity, non-condensing | | | | |
| Altitude | 10,000 ft (3,000 m) maximum | | | | |
| **Electromagnetic Emissions and Immunity** | | | | | |

| | |
|---|---|
| Certifications | CE mark, commercial<br>FCC Part 15 Class A<br>VCCI Class A<br>Class A EN 55022<br>(CISPR 22) Class A<br>Class A C-Tick<br>EN 50082-1<br>EN 55024 |
| **Safety** | |
| Certifications | CE mark, commercial<br>CSA certified (CSA 22.2 #950)<br>UL listed (UL 1950)/cUL IEC 950/EN 60950 |
| **Package Content** | |
| M4200-10MG-PoE+ (GSM4210P) | M4200-10MG-PoE+ Switch<br>Power cord(s)<br>RJ45 straight-through wiring serial console cable to DB9<br>Mini-USB console cable<br>Rubber caps for the SFP+ sockets<br>Rack-mounting kit<br>1 x Mount for attachment to a wall, round pole, or rectangular pole<br>2 x Rubber belts<br>2 x Hose clamps<br>1 x Power cord strap and lock<br>Rubber footpads for tabletop installation<br>Installation guide<br>Resource CD with the following manuals and software:<br>- Software setup manual<br>- CLI manual<br>- Software administration guide<br>- Hardware installation guide<br>- The driver for use with The Mini-USB console cable |

| **Optional Modules** | | |
|---|---|---|
| AGM731F | 1000BASE-SX SFP GBIC (Multimode) | AGM731F |
| AGM732F | 1000BASE-LX SFP GBIC (Single mode) | AGM732F |
| AGM734 | 1000BASE-T RJ45 SFP GBIC | AGM734-10000S |
| AXC761 | 10GSFP+ Cu (passive) SFP+ to SFP+ Direct Attach Cable 1m | AXC761-10000S |
| AXC763 | 10GSFP+ Cu (passive) SFP+ to SFP+ Direct Attach Cable 3m | AXC763 -10000S |
| AXM761 | 10GBASE-SR SFP+ GBIC (OM3/OM4 Multimode) | AXM761-10000S |
| AXM761 (Pack of 10 units) | 10GBASE-SR SFP+ GBIC (OM3/OM4 Multimode) | AXM761P10-10000S |
| AXM762 | 10GBASE-LR SFP+ GBIC (Single mode) | AXM762-10000S |
| AXM762 (Pack of 10 units) | 10GBASE-LR SFP+ GBIC (Single mode) | AXM762P10-10000S |
| AXM763 | 10GBASE-LRM SFP+ GBIC (Long Reach Multimode for OM1/OM2, also compatible with OM3/OM4) | AXM763-10000S |
| AXM764 | 10GBASE-LR LITE SFP+ GBIC (Single mode) | AXM764-10000S |

| **Warranty and Support** | |
|---|---|
| ProSafe Lifetime | Included, lifetime |

| | |
|---|---|
| Hardware Warranty* | |
| 90 days of Technical Support via phone and email* | Included, 90 days after purchase |
| Lifetime Technical Support through online chat* | Included, lifetime |
| Lifetime Next Business Day hardware replacement* | Included, lifetime |
| **ProSupport Service Packs** | |
| **Installation contracts** | |
| PSB0304-10000S | Remote Installation Setup and Configuration Service Contract |
| PSP1104-10000S | Onsite Installation Setup and Configuration Service Contract |
| **Supplemental support contracts** | |
| PMP3132-10000S | OnSite NBD Replacement 3-year CAT 2 |
| PMB0332-10000S | OnCall 24x7 3-year CAT 2 |
| PMB0352-10000S | OnCall 24x7 5-year CAT 2 |
| **订购信息** | |
| **M4200-10MG-PoE+** | |
| Americas,Europe | GSM4210P-100NES |
| Asia Pacific | GSM4210P-100AJS |
| China | GSM4210P-100PRS |