NETGEAR®

ProSAFE® 10 Gigabit Aggregation Managed Switches

Unmatched 10 Gigabit performance and 10GBase-T RJ45 backward compatibility for virtualized servers, top-of-rack and high density distribution

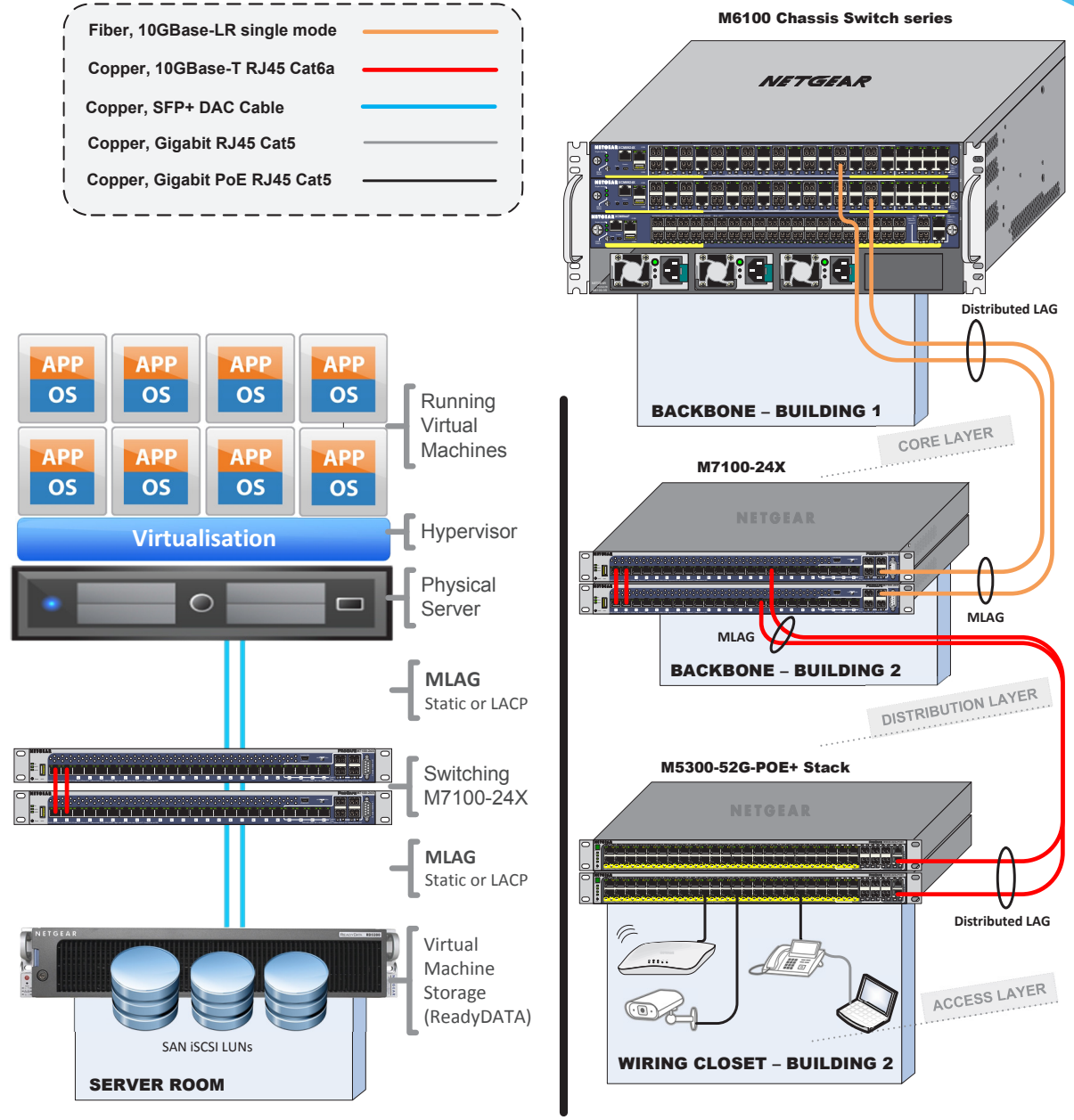**Auto-iSCSI**
DETECTION
OPTIMIZATION

M7100 series

The 10 Gigabit Aggregation M7100 series switches are NETGEAR® affordable fully managed switches for 1G/10G server access layer in campus and enterprise networks, and for high-density, high-performance 10GbE backbone architectures. The M7100 series delivers pure line-rate performance for top-of-rack virtualization or convergence, without having to pay the exorbitant acquisition and maintenance costs associated by other networking vendors. NETGEAR 10 Gigabit Aggregation solutions combine latest advances in hardware and software engineering for higher availability, lower latency and stronger security, at a high-value price point. Like all NETGEAR products, the M7100 series delivers more functionality with less difficulty: Auto-iSCSI optimization, Private VLANs and Local Proxy ARP take the complexity out of delivering network services for virtualized servers and 10 Gigabit infrastructures.

LIFETIME WARRANTY
Hardware Warranty

LIFETIME WARRANTY
Next Business Day

LIFETIME
Tech Support

Why 10 Gigabit Ethernet for edge distribution of mid-sized networks?

- The IEEE standard for 10 Gigabit Ethernet (10GbE), IEEE Standard 802 3ae - 2002, was ratified ten years ago. Almost immediately, large enterprises started confidently deploying 10GbE in their corporate backbones, data centers, and server farms to support high-bandwidth, mission- critical applications.

- Over the years, improvements in 10GbE technology, price, and performance have extended its reach beyond enterprise data centers to mid-sized networks. Increasing bandwidth requirements and the growth of enterprise applications are also driving broader deployments of 10 Gigabit Ethernet. the edge of today's networks.

Fiber, 10GBase-LR single mode

Copper, 10GBase-T RJ45 Cat6a

Copper, SFP+ DAC Cable

Copper, Gigabit RJ45 Cat5

Copper, Gigabit PoE RJ45 Cat5

M6100 Chassis Switch series

Distributed LAG

BACKBONE – BUILDING 1

CORE LAYER

M7100-24X

MLAG

MLAG

BACKBONE – BUILDING 2

DISTRIBUTION LAYER

M5300-52G-POE+ Stack

Distributed LAG

ACCESS LAYER

WIRING CLOSET – BUILDING 2

APP OS

APP OS

APP OS

APP OS

APP OS

APP OS

APP OS

APP OS

Running Virtual Machines

Virtualisation

Hypervisor

Physical Server

MLAG
Static or LACP

Switching M7100-24X

MLAG
Static or LACP

Virtual Machine Storage (ReadyDATA)

SAN iSCSI LUNs

SERVER ROOM

Three reasons to get started today with NETGEAR M7100 series

10 Gigabit Ethernet and the server edge: better efficiency

Mid-sized organizations are optimizing their data centers and server rooms by consolidating servers to free up space, power, and management overhead. The first step usually involves consolidating applications onto fewer servers than the old single-application-per-server paradigm. Often, the next step is server virtualization.

Server virtualization supports several applications and operating systems on a single sever by defining multiple virtual machines (VMs) on the server. Each virtual machine operates like a stand-alone, physical machine, yet shares the physical server processing power, ensuring no processing power is wasted. IT departments can reduce server inventory, better utilize servers, and manage resources more efficiently.

Server virtualization relies heavily on networking and storage. Virtual machines grow and require larger amounts of storage than one physical server can provide. Network attached storage (NAS) or storage area networks (SANs) provide additional, dedicated storage for virtual machines. Connectivity between servers and storage must be fast to avoid bottlenecks. 10GbE provides the fastest interconnectivity for virtualized environments.

10 Gigabit Ethernet SAN versus Fibre Channel: simpler and more cost-effective

There are three types of storage in a network: Direct-attached storage (DAS), NAS, and SAN. Each has its advantages, but SAN is emerging as the most flexible and scalable solution for data centers and high-density computing applications. The main drawback to SAN has been the expense and specially trained staff necessary for installing and maintaining the Fibre Channel (FC) interconnect fabric. Nonetheless, SANs with Fibre Channel have become well established in large enterprises.

A new standard, the Internet Small Computer System Interface (iSCSI), is making 10 Gigabit Ethernet an attractive, alternative interconnect fabric for SAN applications. iSCSI is an extension of the SCSI protocol used for block transfers in most storage devices and Fibre Channel. The Internet extension defines protocols for extending block transfers over IP, allowing standard Ethernet infrastructure to be used as a SAN fabric. Basic iSCSI is supported in most operating systems today. The latest iSCSI capabilities allow 10 Gigabit Ethernet to compare very favorably to Fibre Channel as a SAN interconnect fabric:

- Reduced equipment and management costs: 10GbE networking components are less expensive than highly specialized Fibre Channel components and do not require a specialized skill set for installation and management

- Enhanced server management: iSCSI remote boot eliminates booting each server from its own direct-attached disk. Instead, servers can boot from an operating system image on the SAN. This is particularly advantageous for using diskless servers in rack-mount or blade server applications

- Improved disaster recovery: all information on a local SAN — including boot information, operating system images, applications, and data — can be duplicated on a remote SAN for quick and complete disaster recovery

- Excellent performance: even transactional virtual machines, such as databases, can run over 10 Gigabit Ethernet and iSCSI SAN, without compromising performance

10 Gigabit Ethernet and the aggregation layer: reduce bottlenecks

Until recently, network design best practices recommended equipping the edge with Fast Ethernet (100Base-T), and using Gigabit uplinks to either the core (for two-tiered network architectures) or aggregation layer (for three-tiered networks). Today, traffic at the edge of the network has increased dramatically. Bandwidth-intensive applications have multiplied, and Gigabit Ethernet to the desktop has become more popular as its price has decreased. Broader adoption of Gigabit Ethernet to the desktop has increased the oversubscription ratios of the rest of the network. The result: a bottleneck between large amounts of Gigabit traffic at the edge of the network, and the aggregation layer or core.

10 Gigabit Ethernet allows the aggregation layer to scale to meet the increasing demands of users and applications. It can help bring oversubscription ratios back in line with network-design best practices, and provides some important advantages over aggregating multiple Gigabit Ethernet links:

- Less fiber usage: a 10 Gigabit Ethernet link uses fewer strands compared with Gigabit Ethernet aggregation, which uses one strand per Gigabit Ethernet link. Using 10 Gigabit Ethernet reduces cabling complexity and uses existing cabling efficiently

- Greater support for large streams: traffic over aggregated 1Gigabit Ethernet links can be limited to 1 Gbps streams because of packet sequencing requirements on end devices. 10 Gigabit Ethernet can more effectively support applications that generate multi Gigabit streams due to the greater capacity in a single 10 Gigabit Ethernet link

- Longer deployment lifetimes: 10 Gigabit Ethernet provides greater scalability than multiple Gigabit Ethernet links, resulting in a more future- proof network. Up to eight 10 Gigabit Ethernet links can be aggregated into a virtual 80-Gbps connection

Conclusion

For network connectivity, 10GBase-T, like other base-t technologies, uses the standard RJ45 Ethernet jack. This connection form factor is not only common on switches, but is also normally integrated onto servers, workstations and other PCs. Base-T usually runs up to a 100 meters, on the widely deployed, twisted pair copper cabling, such as Cat 6A type, and now more recently Cat 7 type. It is also backward compatible, auto-negotiating between higher and lower speeds – thereby not forcing an all at once network equipment upgrade. The NETGEAR M7100 series is the world-first realistic, cost-effective 10GBase-T departmental solution!

10 Gigabit transition with Base-T

- 10GBase-T, like other Base-T technologies, uses the standard RJ45 Ethernet jack
- It is backward compatible, auto-negotiating between higher and lower speeds – thereby not forcing an all at once network equipment upgrade
- Cat5/Cat5E are supported for Gigabit speeds; when Cat6 twisted pair copper cabling is a minimum requirement for 10 Gigabit up to 30 meters
- Cat6A or newer Cat7 cabling allow for up to 100 meter 10GBase-T connections

NETGEAR 10 Gigabit M7100 series key features:

- Line-rate 10G Copper "Base-T" switch solution with low latency
- 24 ports 10GBase-T (RJ45) supporting Fast Ethernet, Gigabit Ethernet and 10 Gigabit speeds for server and network progressive upgrade
- 4 ports SFP+ for 1G/10G fiber uplinks and other DAC connections
- IPv4 routing in Layer 2+ package (static routing) with IPv4/IPv6 ACLs and QoS
- Enterprise-class L2/L3 tables with 32K MAC, 6K ARP/NDP, 1K VLANs, 128 static L3 routes
- Two redundant, hot-swap power supplies (one PSU comes with the switch; second optional PSU is ordered separately)
- Two removable fan trays and front-to-back cooling airflow for best compatibility with data center hot aisle/cold aisle airflow patterns
- Auto-EEE Energy Efficient Ethernet associated with Power Back Off for 15% to 20% less consumption when short copper cables

NETGEAR 10 Gigabit M7100 series software features:

- Innovative multi-vendor Auto-iSCSI capabilities for easier virtualization optimization, iSCSI flow acceleration and automatic protection/QoS
- Automatic multi-vendor Voice over IP prioritization based on SIP, H323 and SCCP protocol detection
- Voice VLAN and LLDP-MED for automatic IP phones QoS and VLAN configuration
- IPv4/IPv6 Multicast filtering with IGMP and MLD snooping, Querier mode and MVR for simplified video deployments
- Advanced classifier-based hardware implementation for L2 (MAC), L3 (IP) and L4 (UDP/TCP transport ports) security and prioritization
- Unidirectional Link Detection Protocol (UDLD) prevents forwarding anomalies

NETGEAR 10 Gigabit M7100 series link aggregation and channeling features:

- Flexible Port-Channel/LAG (802.3ad) implementation for maximum compatibility, fault tolerance and load sharing with any type of Ethernet channeling
- Including static (selectable hashing algorithms) or dynamic LAGs (LACP)
- Multi Chassis Link Aggregation (MLAG) between two M7100 switches overcomes limitations of Spanning Tree, increasing bandwidth while preserving redundancy

NETGEAR 10 Gigabit M7100 series management features:

- DHCP/BootP innovative auto-installation including firmware and configuration file upload automation
- Industry standard SNMP, RMON, MIB, LLDP, AAA, sFlow and RSPAN implementation
- Selectable serial RS232 DB9 and Mini-USB port for management console
- Standard USB port for local storage, logs, configuration or image files
- Dual firmware image and configuration file for updates with minimum service interruption
- Industry standard command line interface (CLI) for IT admins used to other vendors commands
- Fully functional Web console (GUI) for IT admins who prefer an easy to use graphical interface

NETGEAR 10 Gigabit M7100 series warranty and support:

- NETGEAR ProSAFE Lifetime Hardware Warranty*
- Included Lifetime Online Chat Technical Support
- Included Lifetime Next Business Day Hardware Replacement

Hardware at a Glance

Model name	FRONT				REAR		Model number
	100/1000/10GBase-T RJ45 ports	1000/10GBase-X Fiber SFP+ ports	Management console	Storage (image, config)	Modular PSUs (redundant, hot-swap)	Modular Fan Trays (front-to-back cooling, hot-swap)	
M7100-24X	24	4 (shared)	1 x RS232 DB9, 1 x Mini-USB (selectable)	1 x USB	2 (Part-number: APS300W) (1 power supply already installed)	2 (Part-number: AFT200) (2 fan trays already installed)	XSM7224 v1h1

M7100-24X is a 24 x 10Gbase-T version, Layer 2+
4 shared SFP+

M7100 series rear view
2 modular, redundant PSUs
- Each M7100 series ships with one installed modular PSU
- Additional PSU unit is available for hot swap HA (APS300W)

2 modular fan trays
- Each M7100 series ships with two installed fan trays
- Spare units are available for hot swap HA (AFT200)

Software at a Glance

Model name	LAYER 2+ PACKAGE							Model number
	IPv4/IPv6 ACL and QoS	IPv4/IPv6 Multicast filtering	Auto-iSCSI Auto-VoIP	EEE (802.3az)Auto-EEE	VLANs	Convergence	IPv4 Unicast Static Routing	
M7100-24X	L2, L3, L4, ingress, egress, 1 Kbps	IGMP and MLD Snooping, Querier mode, MVR	Yes	Yes	Static, Dynamic, Voice, MAC, Subnet, Protocol-based, QinQ, Private VLANs	LLDP-MED, RADIUS, 802.1X, timer	Yes (Port-based, Subnet, VLANs)	XSM7224 v1h1

Performance at a Glance

Model name	TABLE SIZE									Model number
	Packet buffer	CPU	ACLs	MAC address table ARP/NDP table VLANs DHCP server	Fabric	Latency	Static Routes	Multicast IGMP Group membership	sFlow	
M7100-24X	16 Mb	800Mhz 256M RAM 128M Flash	1K ingress 512 egress	32K MAC 6K ARP/NDP VLANs: 1K DHCP: 16 pools 1,024 max leases	480Gbps line-rate	10GBase-T <3.7 µs SFP+ <1.8 µs	128 IPv4	2K	32 samplers 52 pollers 8 receivers	XSM7224 v1h1

Accessories and Modules

Modular PSUs for M7100 series

APS300W
Modular Power Supply

Ordering information
- Worldwide: APS300W-10000S
- Warranty: 5 years

- PSU unit for M7100 series switches
  – M7100-24X
- Provides redundant power and hot swap replacement capability

AFT200
Modular Fan Tray

Ordering information
- Worldwide: AFT200-10000S
- Warranty: 5 years

- Replaceable fan tray for M7100 series switches
  – M7100-24X
- Two fan trays (two fans each) are required for M7100 series

Direct Attach Cables for M7100 series

ORDERING INFORMATION WORLDWIDE: SEE TABLE BELOW WARRANTY: 5 YEARS	SFP+ to SFP+	
	1 meter (3.3 ft)	3 meters (9.8 ft)
10 Gigabit DAC • Fits into M7100 series shared SFP+ interfaces	**AXC761** 10GSFP+ Cu (passive) SFP+ connectors on both end **AXC761-10000S (1 unit)**	**AXC763** 10GSFP+ Cu (passive) SFP+ connectors on both end **AXC763-10000S (1 unit)**

GBIC SFP Optics for M7100 series

ORDERING INFORMATION WORLDWIDE: SEE TABLE BELOW WARRANTY: 5 YEARS	Multimode Fiber (MMF)		Single mode Fiber (SMF)
	OM1 or OM2 62.5/125μm	OM3 or OM4 50/125μm	9/125μm
10 Gigabit SFP+ • Fits into M7100 series shared SFP+ interfaces	**AXM763** 10GBase-LRM long reach multimode 802.3aq - LC duplex connector up to 220m (722 ft) **AXM763-10000S (1 unit)**	**AXM763** 10GBase-LRM long reach multimode 802.3aq - LC duplex connector up to 260m (853 ft) **AXM763-10000S (1 unit)** **AXM761** 10GBase-SR short reach multimode LC duplex connector OM3: up to 300m (984 ft) OM4: up to 550m (1,804 ft) **AXM761-10000S (1 unit)** **AXM761P10-10000S (pack of 10 units)**	**AXM762** 10GBase-LR long reach single mode LC duplex connector up to 10km (6.2 miles) **AXM762-10000S (1 unit)** **AXM762P10-10000S (pack of 10 units)** **AXM764** 10GBase-LR LITE single mode LC duplex connector up to 2km (1.2 mile) **AXM764-10000S (1 unit)**
Gigabit SFP • Fits into M7100 series shared SFP+ interfaces	**AGM731F** 1000Base-SX short range multimode LC duplex connector up to 275m (902 ft) **AGM731F (1 unit)**	**AGM731F** 1000Base-SX short range multimode LC duplex connector OM3: up to 550m (1,804 ft) OM4: up to 1,000m (3,280 ft) **AGM731F (1 unit)**	**AGM732F** 1000Base-LX long range single mode LC duplex connector up to 10km (6.2 miles)) **AGM732F (1 unit)**

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