HP ProLiant Ethernet best practices for NIC auto-negotiation

Introduction

Auto-negotiation refers to the mechanism whereby network devices automatically configure themselves to achieve the optimum speed and duplex on a local area network. HP server competitors have posted numerous best practices papers on this topic, each one stating that auto-negotiation is always the preferred setting for devices that comply with the IEEE 802.3 specification for Ethernet. HP holds a different belief, one based on the knowledge of each network administrator.

Several NIC auto-negotiation best practices must be considered because network administrators are the best judges of the needs of their network infrastructures. This paper focuses on three different types of network infrastructures and provides a best practice for each type.

The three network infrastructures are:

- Compliant Gigabit/Fast Ethernet
- Non-compliant Gigabit/Fast Ethernet
- Mixed Compliant

Compliant Gigabit/Fast Ethernet networks

For customers who have fully compliant IEEE 802.3 Gigabit and/or Fast Ethernet networking devices installed in their network infrastructure, HP recommends that all devices on this network use auto-negotiation. Doing so eliminates many of the known issues that surround the forcing of speeds and duplex in these environments.

Because Gigabit Ethernet standards do not make provisions for the forcing of speed and duplex (disabling of auto-negotiation), many manufacturers, including HP, have included a forced speed and duplex option of 1000Mbps/Full duplex for Gigabit Ethernet devices. This setting does not disable auto-negotiation. The setting forces the device to use 1000Mbps/Full duplex only. In other words, Gigabit Ethernet does not auto-negotiate. Instead of an auto-negotiated port linking at 100Mbps or lower, the device attempting to connect will fail. Forcing speeds and duplex in a Gigabit Ethernet-only network at Gigabit speeds is unsupported.

Non-compliant Gigabit/Fast Ethernet networks

Though today's Gigabit and Fast Ethernet networking devices typically fully comply with the IEEE 802.3 standards, many customer installations have older devices that may not be fully compliant with today's standards. Many of these devices' manufacturers have offered upgrades in order to meet standards compliance; many others may not have provided updates or may not have made updates available for specific devices. If this is the case, a best practice in these networks is to **force** speeds and duplex to ensure proper linking of devices. This issue primarily occurs with Fast Ethernet networks in which the use or mismatch of auto-negotiation and forced speed/duplex options can cause slow or degraded performance and dropped or runt packets.

Mixed compliant Gigabit/Fast Ethernet networks

Many networks consist of a mix of IEEE 802.3 compliant and non-compliant devices. These types of networks present a more difficult administrative effort to avoid the problems that each type of device poses. Network administrators know which devices are compliant or not and should configure these devices accordingly. For each networking device being configured, network administrators must consider the practices described in the previous sections on compliant and non-compliant networks.

HP encourages network administrators to carefully document devices on these types of networks, so future devices can be installed with minimal impact to currently connected devices.

Summary

For a manufacturer to apply a single best practice statement to Ethernet standards is not in the best interest of every customer. Network administrators are the only people who can truly make this call. HP's best practice statement is:

If your network is completely IEEE 802.3 compliant then use the auto-negotiation option for all devices. If your network is not IEEE 802.3 compliant or is a mix of compliant and non-compliant devices, use the options that are most applicable to each device on your network.

For more information

For more information about ProLiant networking see the following URL:

http://h18004.www1.hp.com/products/servers/networking/