

# FAQ for Using Unmanaged Switches in an EtherNet/IP System

## 1. When do you know you can use unmanaged switches?

If your EtherNet/IP system meets all of the following criteria, you can consider using unmanaged switches:

### **For EtherNet/IP I/O systems:**

- ✓ When you have an *Isolated* EtherNet/IP architecture. This means your control system is not connected to your business system.

-OR-

When the EtherNet/IP control network is connected to the business network via a ControlLogix Gateway (For example: two 1756-ENBT modules, one connected to business system and one connected to the control system).

- ✓ When the EtherNet/IP control system has only Rockwell Automation products (with the exception of PC's).
- ✓ When the traffic loading through each device (in packets/sec) is within the limitation of the device on the network.

To estimate the maximum amount of traffic that can be potentially seen by a device on the network (*including multicast traffic from other devices*), use the following formula:

$$\text{Potential Max. loading seen by a device} = \frac{1}{2} \times (\text{Device \#1 pack/sec loading} + \text{Device \#2 pack/sec loading} + \dots + \text{Device \#n pack/sec loading})$$

Make sure that the above max loading number is less than the capacity of each of the RA Logix EtherNet/IP scanner on the network (i.e.: 1756-ENBT, 1788-ENBT, 1769-L3xE, etc.)

\*\*\*\* To calculate the individual device packets per second loading, refer to the *EtherNet/IP Performance and Application Guide* (pub# ENET-AP001, chapter 4).

### **For non I/O systems:**

- ✓ When the EtherNet/IP traffic on the network is consisted of messaging only (MSG, HMI, program up/downloading), unmanaged switches can be used regardless of network architecture.

**2. When should I NOT use unmanaged switches in my EtherNet/IP system?**

- When the EtherNet/IP control system is connected to the business system directly via a switch or a router. Proper segregation of the control and business network is always good design practice.
- When the system has non-Rockwell Automation EtherNet/IP devices connected on the network (except for PC's). These devices may not be able to properly handle the multicast traffic generated by the I/O traffic.

**3. What am I giving up when I do not use a managed switch in my system?**

There are two main features that you are giving up when using unmanaged switches:

- IGMP Snooping – filters multicast (I/O) traffic to specific ports. This feature makes sure that traffic only goes to where it needs to, preserving bandwidth on the network and devices.
- Port Mirroring – allows a user to monitor and troubleshoot network traffic on other ports. This is a good tool when troubleshooting a system.

**4. I have set up my system with unmanaged switches. How do I know if the network is operating properly?**

For **any** EtherNet/IP systems, the easiest way to check the health of the network is by looking at the embedded diagnostic web pages provided by the RA devices. For example, the ENBT is a good place to query for information:

Look on this web page	Look for this:
Ethernet statistics page  ■ Error counters: ■ All media counters ■ In Error and Out Error counters (under Interface Counters) ■ Rejected Packets	These numbers should be very low and not incrementing
Diagnostic Overview page	■ Look for connection timeouts. There should not be any! ■ Make sure the <u>packets/sec</u> counts are within each device's limit ■ Under 'I/O Packet Counter Statistics', the MISSED counter should be zero

Another good indication of network health is to monitor system performance. If connections frequently break and/or if HMIs appear to update very "slow", you may need to reduce traffic loading or put in **managed** switches with IGMP Snooping.