

# AutomaTech™

The logo for AutomaTech features the word "AutomaTech" in a white, sans-serif font. The letter "o" is replaced by a stylized circular arrow graphic. The top half of the arrow is yellow and curves clockwise, while the bottom half is blue and curves counter-clockwise, creating a continuous loop.

AutomaTech Solution Brief

**Networking Basics**

January 2016 – SB-MRR-001A



# AutomaTech Solution Brief

## Networking Basics – Overview

### Solution Brief Topics Summary:

- What is a Network?
- The OSI Model (Open System Interconnect)
- Ethernet
- Network Devices
- IP Protocol
- Network Redundancy Solutions
- VLANs



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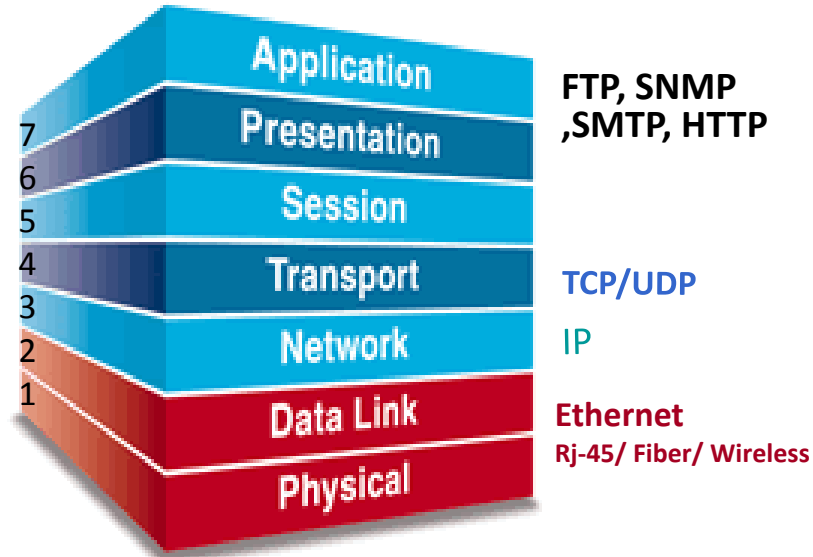
## Networking Basics – What is a Network?

- We all use networks in our daily lives, for example: The Internet, Facebook, Twitter, LinkedIn, AutomaTech.com, and many, many more!
- Networks are used extensively in Industrial Automation to connect controls systems, Automation software, and Enterprise applications together.
- When networks get larger they become harder and more complex to manage. The more protocols required, the more networking knowledge is required to maintain.
- Having a solid foundation on networking basics helps with understanding the more complicated topics.



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## Networking Basics – The OSI Model



The primary purpose is to allow different vendors networks to interoperate.



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## Networking Basics – Ethernet

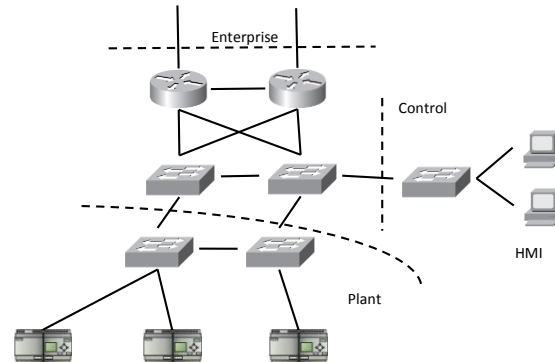
- A family of computer networking technologies for local area networks (LANs). Ethernet was commercially introduced in 1980 and standardized in 1985 as IEEE 802.3.
- Exists at both Data link layer and Physical layer of The OSI Model.
- Utilizes Collision detection CSMA/CD.
  - What it is, How it works.
  - What is the impact to performance.
  - It doesn't prevent collisions, just helps to avoid them and recover from them.



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## Networking Basics – Network Devices

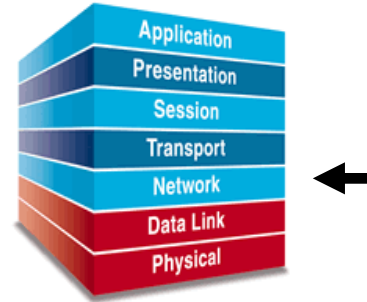
- You will eventually be handed a network diagram at some point and it will be filled with symbols. Common devices include:
  - Hubs
  - Switches
  - Routers



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## Networking Basics – IP Protocol

- Exists at layer 3 of The OSI Model
- Main reason for existence: Routing
- Answers the questions:
  - Which network is a device on?
  - What is its ID on the network?
- IP Header contains IP Addresses
- PDU is the “Packet”



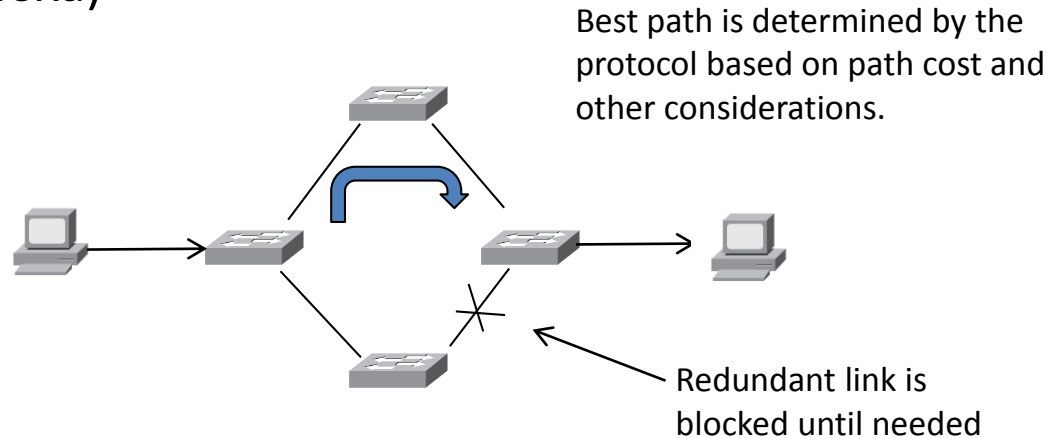
4 Bits	8 Bits	16 Bits	24 Bits
Version	IHL	Type of Service	Total Length
Identification		Flags	Fragment Offset
Time to Live	Protocol	Header Checksum	
Source IP Address			
Destination IP Address			
IP Options			Padding
Data			



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## Networking Basics – Network Redundancy Solutions

- Spanning Tree Protocol STP & RSTP
- Turbo Ring (Moxa)
- Turbo Chain (Moxa)
- Trunking

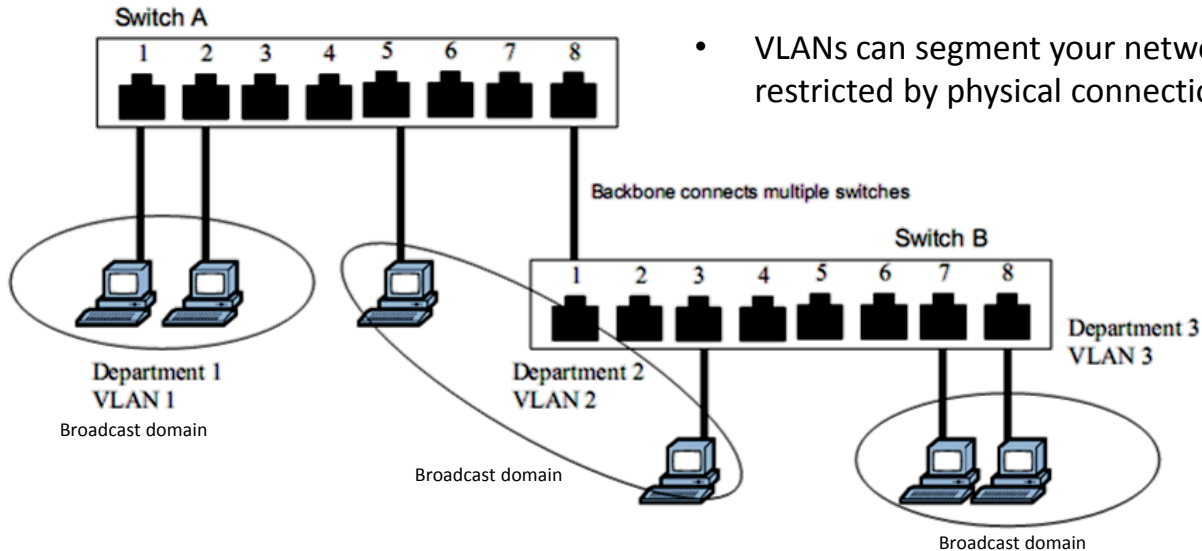




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## Networking Basics – VLANs

- A VLAN is a group of devices that can be located anywhere on a network but which communicate as if they are on the same physical segment.
- VLANs can segment your network without being restricted by physical connections.



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## Networking Basics – Supporting Links

For a more complete description of The OSI Model:

<https://automatech.box.com/s/fh4ptt0vjlh8p4rclkffs4plqlwzfzccd>

For a more information on Ethernet:

<https://automatech.box.com/s/b5pcb6u66vzapd38bd0bij21vo9m1oxc>

For a more information on Network Devices:

<https://automatech.box.com/s/wn1tbcrvs05h1x9yijqo1o3hkg95dta1>

For a more information on IP Protocol:

<https://automatech.box.com/s/uqgc3pd25m9f8m3yrl12i80j5wopfcfa>

For a more information on Network Redundancy and VLANs:

<https://automatech.box.com/s/9cg1o5vn8cgroszb3c4zkhh19ovb7rv6>



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Thank you! Please contact AutomaTech or visit [www2.automatech.com/solution-briefs](http://www2.automatech.com/solution-briefs) for additional information on future Solution Briefs and technology

