# Ethernet of Everything
Quick and Easy Networking of "Things"

Summary

Whether called Internet of Things (IoT), Industrial IoT, or Industrial Ethernet—any "thing" can now be connected, controlled or monitored—garage openers, home appliances, HVAC systems, lighting and an endless array of other common products. This places increased importance on creating products that are easily connected and provide intelligent control within a simplified development environment.
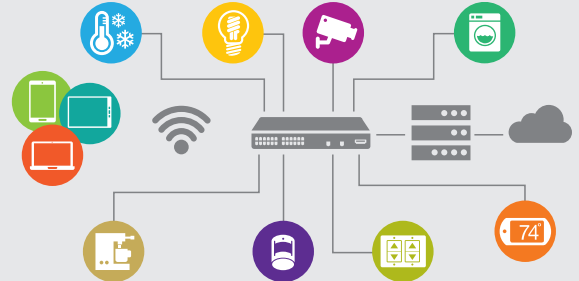
We Enable Things

Networked things range in complexity from the simplest environmental sensor to processing intensive nodes. Microchip's 8-bit and 32-bit microcontrollers enable these applications with lightweight communications stacks and an extensive mix of smart peripherals that operate independently of the core—requiring little to no CPU intervention. Paired with Microchip's industry-leading eXtreme Low Power (XLP) and picoPower® technologies, PIC® and AVR® MCUs enable innovation in the Ethernet of Everything.

Microchip's Ethernet solutions build upon an established networking foundation, providing improved system performance, reduced latency, ease of installation and scaling, as well as the option to incorporate Power over Ethernet (PoE) for single-line power and communications.
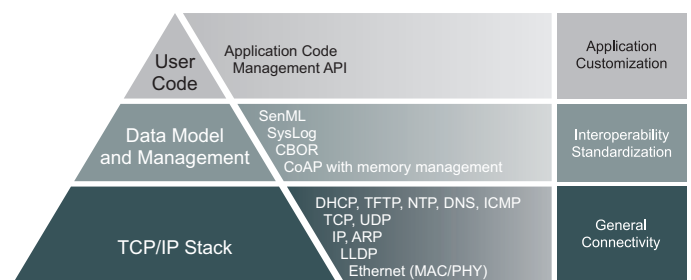
Scaling Solutions

- Extensive 8-/32-bit PIC and AVR MCU product portfolio
- Autonomous analog and digital peripheral operation
- Flexible MAC/PHY options

Communications and Control

- Easy Ethernet enablement (UDP, UDP + CoAP, TCPIP)
- Customizable response and control
- Human and sensor interface

Firmware

Getting started is easy with free lightweight TCPIP stacks to create customized applications that are easily implemented via MPLAB® Code Configurator and Atmel START. To minimize the challenges in creating interoperable products from various vendors, Microchip has collaborated with Cisco to enable the Digital Building Ecosystem—a standards-based Constrained Application Protocol (CoAP) communication layer with application specific data models.

User Code	Application Code Management API	Application Customization
Data Model and Management	SenML SysLog CBOR CoAP with memory management	Interoperability Standardization
TCP/IP Stack	DHCP, TFTP, NTP, DNS, ICMP TCP, UDP IP, ARP LLDP Ethernet (MAC/PHY)	General Connectivity

TCP/IP Stacks

- Optimized TCPIP stacks
- Supports standard and proprietary protocols
- Quick application Integration via MCC, Atmel START and MPLAB Harmony Configurator

Data Model and Management

- CoAP
- Foundation of Cisco's Digital Building Ecosystem
- Path to multi-vendor product interoperability

User Code

- Application customization
- Extensive PIC and AVR MCU options
- Quick start development environment

MICROCHIP

Quick Start Development Environment

Quickly start designing with Microchip's comprehensive array of easy-to-use hardware and software tools. Reduce development time with Microchip's Curiosity, Xplained or PoE development platforms and add functions with click boards™ from MikroElektronika. Rapidly generate peripheral configuration and communications code with MPLAB Code Configurator or Atmel START.

Curiosity and Xplained Development Platforms
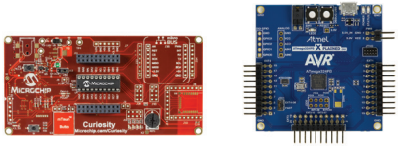
- Curiosity for PIC MCUs
  www.microchip.com/curiosity
- Xplained for AVR MCUs
  www.microchip.com/xplained
- Supports 8- to 40-pin MCUs
- Integrated programmer/debugger
- mikroBUS™ click board header

mikroBUS click boards

- www.microchipdirect.com
- Over 140 click boards and growing
- Vast array of quick plug-in options
  - Variety of sensors
  - Communications
  - Wireless
  - LCD and more…

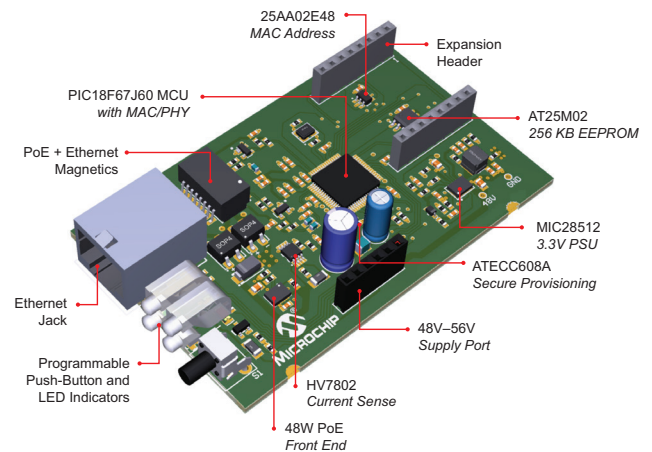## MPLAB Code Configurator and Atmel START

- MCC for PIC MCUs
  www.microchip.com/MCC
- Atmel START for AVR MCUs
  www.microchip.com/START
- Free graphical programming environment
- Simplified configuration of:
  - Peripherals and functions
  - Communication stacks
- Reduces overall design time

Power over Ethernet (PoE) Development Platform

Microchip has developed the next generation development hardware that takes advantage of PoE for single-line communications and power. This ultimately simplifies design, reduces form factors and eases in the installation of "things".

Highlights

- Universal reference design and development platform
- Industry-standard infrastructure for communications and power
- Up to 48W device power delivery
- Base board with expansion header
  - LED driver
  - Gesture controller
  - Sensor interface
  - mikroBUS click boards
  - Custom expansion
- Development support for Cisco Digital Building Ecosystem

25AA02E48
MAC Address

Expansion Header

PIC18F67J60 MCU
with MAC/PHY

AT25M02
256 KB EEPROM

PoE + Ethernet Magnetics

MIC28512
3.3V PSU

ATECC608A
Secure Provisioning

Ethernet Jack

48V–56V
Supply Port

Programmable Push-Button and LED Indicators

HV7802
Current Sense

48W PoE
Front End

Ordering Information

- PoE Base Board (DM160230)
- PoE Development Kit (DV161001)
  - Includes PoE Base Board, PoE programmer and I/O starter click

www.microchip.com/EoE