

**ALL PROGRAMMABLE**

ANY MEDIA

5G

4K/8K

ANY STANDARD

ANY MACHINE

ANY NETWORK

5G Wireless • SDN/NFV • Video/Vision • ADAS • Industrial IoT • Cloud Computing



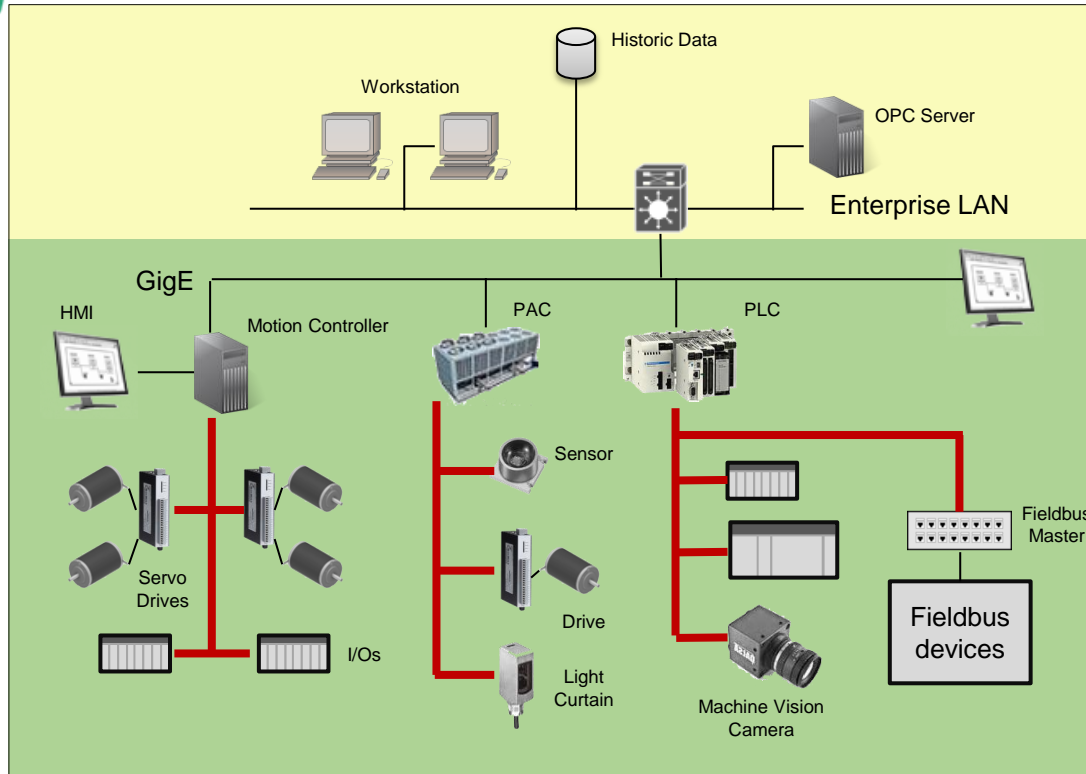
## HMS Anybus IP - Multiprotocol Industrial Communication on Xilinx Webinar

3 November 2015



**Michael Zapke**, Product Marketing Manager Industrial, Xilinx  
**Christian Bergdahl**, Product Marketing Manager, HMS

# Many Industrial Ethernet Standards...

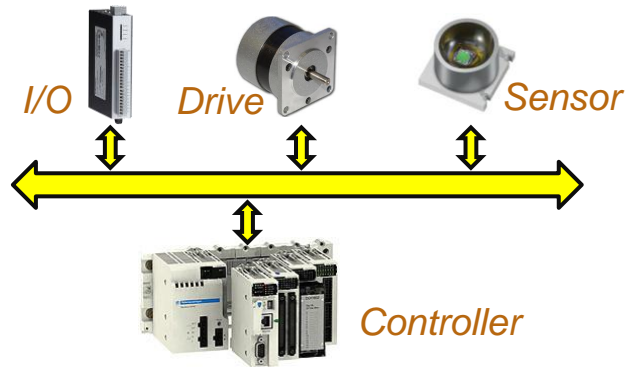


# ... and Your Products Shall Support ALL!

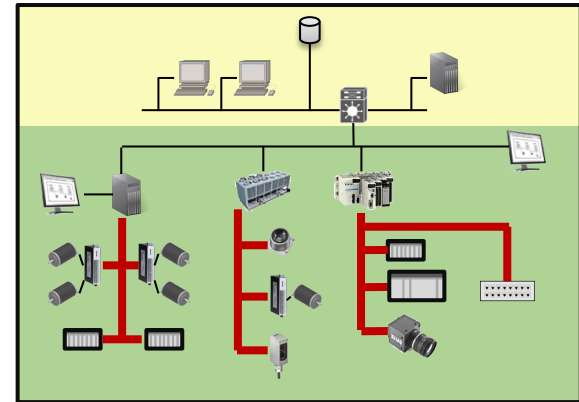
## Different Applications



use **equivalent** equipment



Communicating over **different** standards



Your Product

needs

Many Protocols

# Industrial Ethernet Landscape Impacts Your Profit

## ➤ **High Cost of Development/Ownership**

- Technically complex protocols
- Huge effort to develop, test and certify for each protocol
- Many independent sources to manage



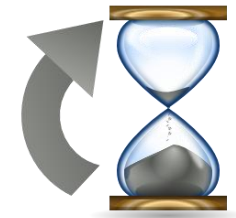
## ➤ **Prevents Platform Architectures**

- Different sources deliver different APIs
- Difficult to re-use application software across protocols



## ➤ **How to stay up-to-date?**

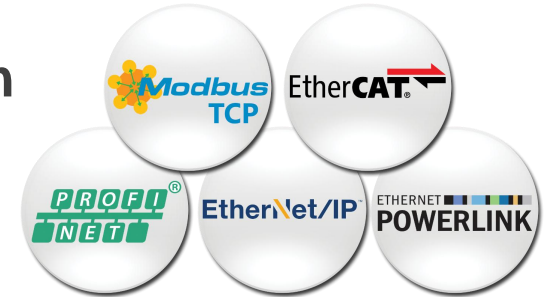
- Changing standards and requirements
- Design changes inflict hardware changes



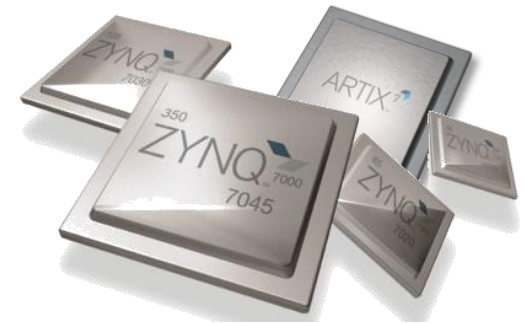
# Xilinx Provides A Unique Solution for the Industrial Ethernet Challenge

## ➤ Lowest cost of ownership - complete solution

- Integrates all major Industrial Ethernet Slave Standards
- Common API based on industry leading technology




## ➤ Enable platform architectures through integration into programmable SoC FPGA




## ➤ Programmability allows for scaling & field updates

# HMS + Xilinx – Deliver Innovative Solutions ...



-  **Anybus**® - Award winning universal communication interface
- Leading provider of Industrial Connectivity Solutions



-  **ZYNQ** - World's leading All Programmable SoC
- Leading provider of Programmable Logic & SoC Solutions

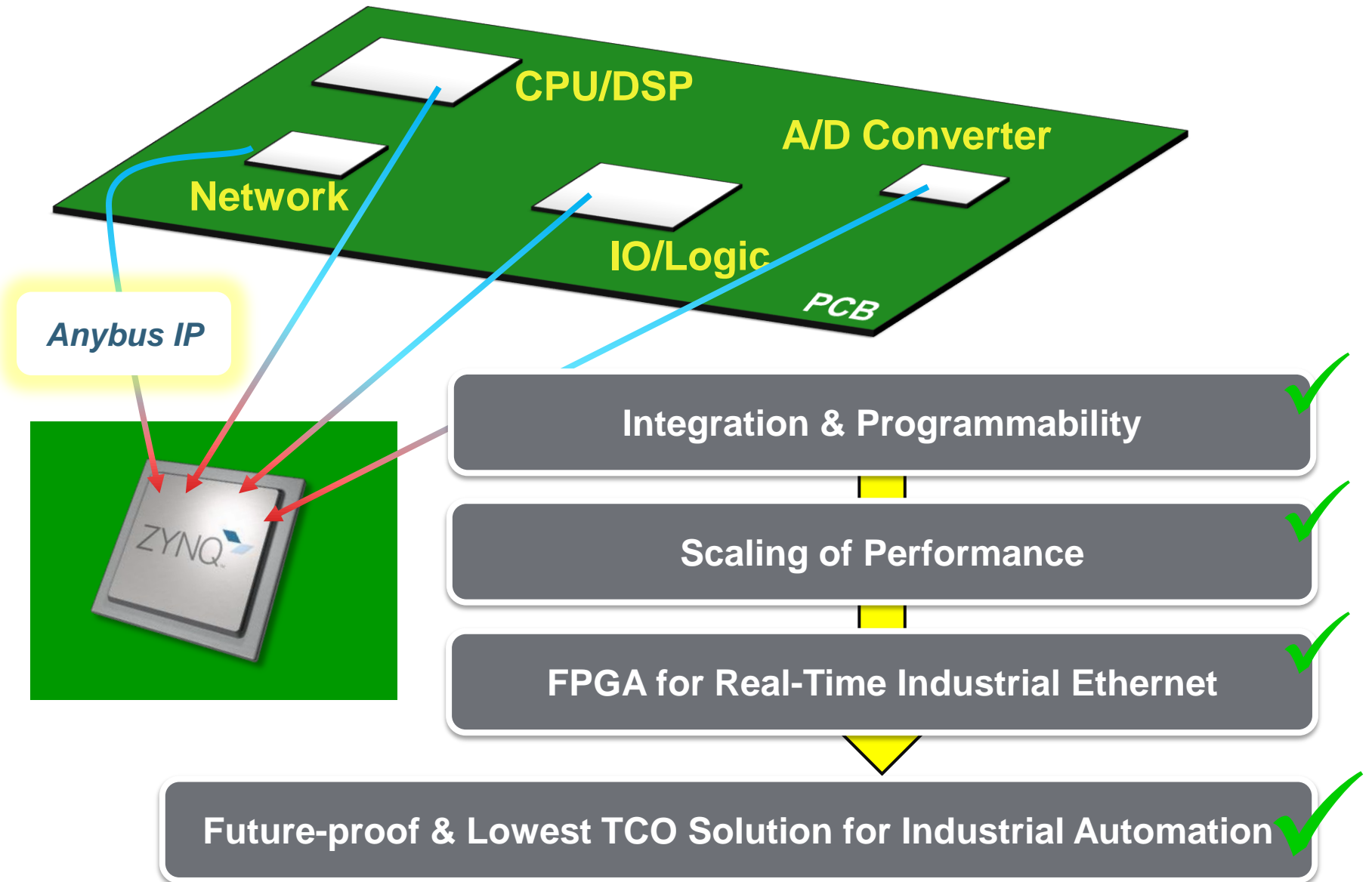
**> 3M Installations**



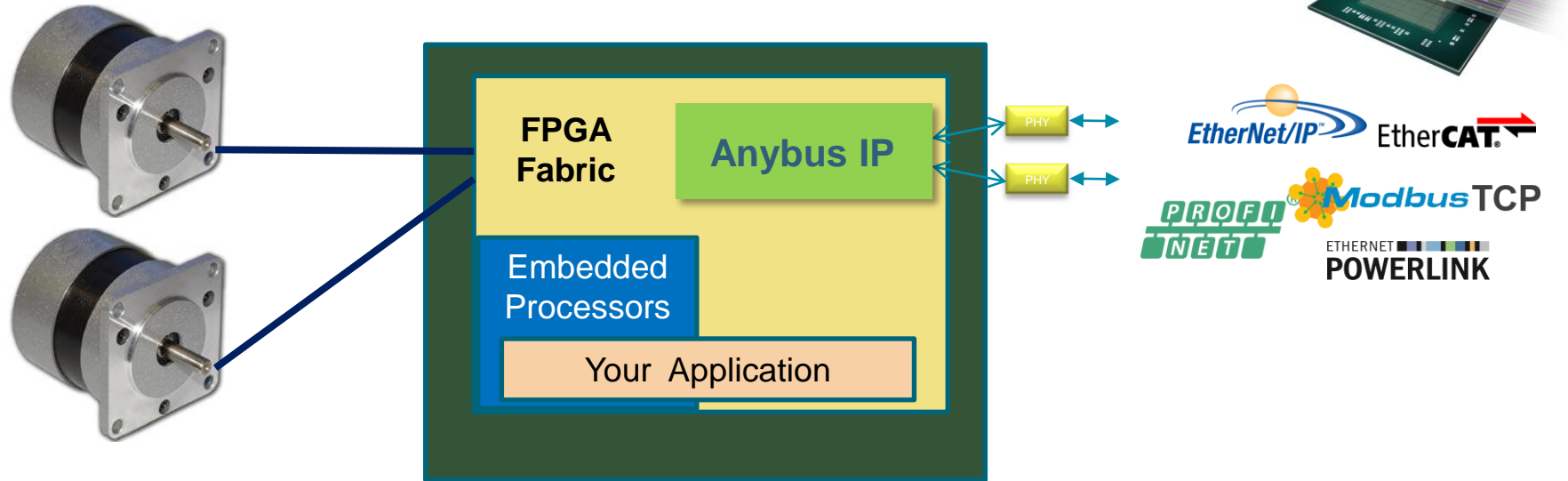
**> 3 decades of FPGA Leadership**

... with Versatile Network Architecture for Industrial Applications

# Xilinx Enables Lowest Cost Industrial Platforms



# Derive Multiple Benefits with Xilinx Devices & Anybus IP



**Design Your Application Once,  
Common API for All Supported Protocols**

**Reduce Total Cost of  
Development/Ownership**

**Dedicated Resources Guarantee  
Performance**

**Deterministic & Reliable**

**Update/Customize As Needed**

**No Hardware Changes**

# Xilinx Complete Industrial Offering

## Reduce Risk, Development & Certification Time

### ISO 61508 Certified

Functional Safety for Devices & Tools



### Longest Life



Devices Exceeding  
Industrial Products Life

12 to 15 years+  
Device Availability

### Absolute Quality



No Errata on Xilinx  
Design and IP on  
28nm Family

# Differentiated Total Solution from Xilinx®



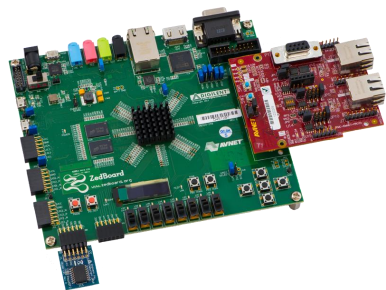
## ALL PROGRAMMABLE Devices and Design Software

- **Zynq®-7000** – SoC for smart industrial applications
- **Artix®-7** – FPGA for I/Os, drives, sensors
- **Vivado Design Suite** with SDK - For embedded Designs



## Award Winning Industrial Network Solution

- **Anybus IP** - Industrial Ethernet Slaves as FPGA IP for Xilinx
- Profinet - EtherNet/IP - EtherCAT - Powerlink - Modbus-TCP
- IP, SW Stack, OS, SDK - get all from one



## Reference System

- **Zedboard**: Anybus IP Reference System with Zynq
- **FMC-ISMNET**: Two ports for Industrial
- Linux supplied
- Kit on Zynq SoM (System on Module) in Feb 2016

# Anybus IP with HMS

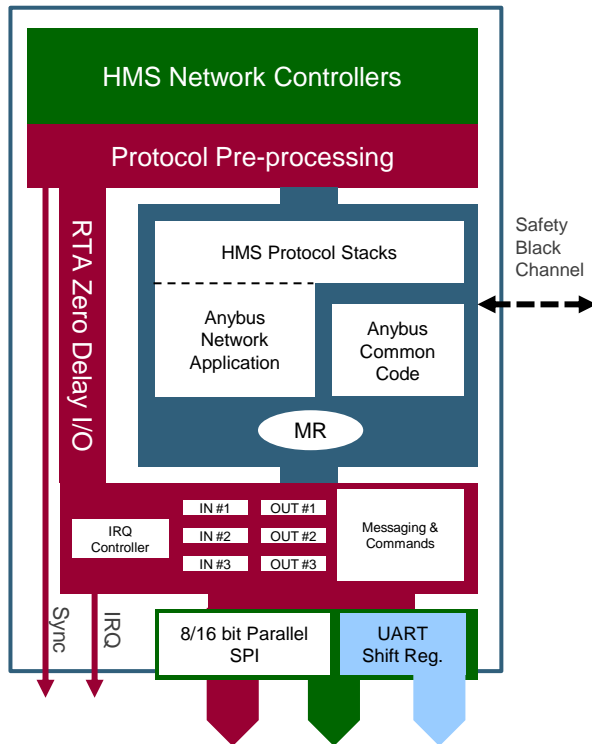
# Anybus CompactCom 40 from HMS



Best in class



**Anybus**  
*Award winning communication solution  
Proven in millions of installed modules from HMS*



**Anybus CompactCom  
Chip, Brick, Module**

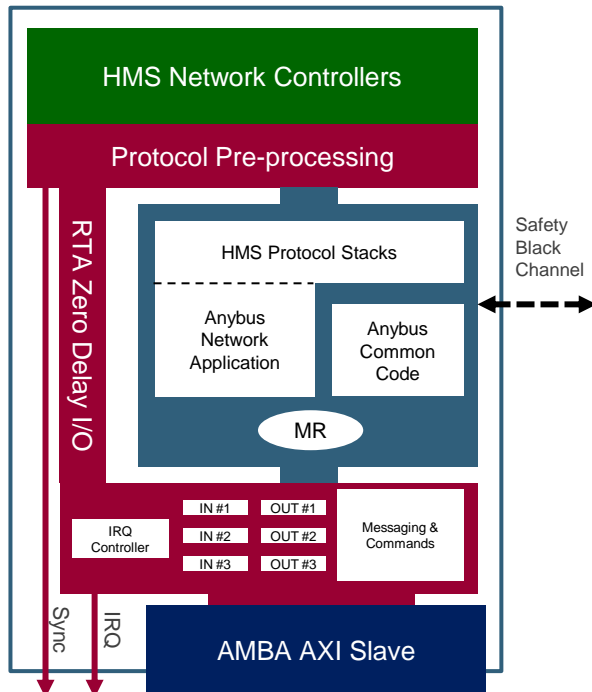
# Anybus from HMS - as IP on Xilinx Devices



Best in class



**Anybus**  
*Award winning communication solution  
Proven in millions of installed modules from HMS*

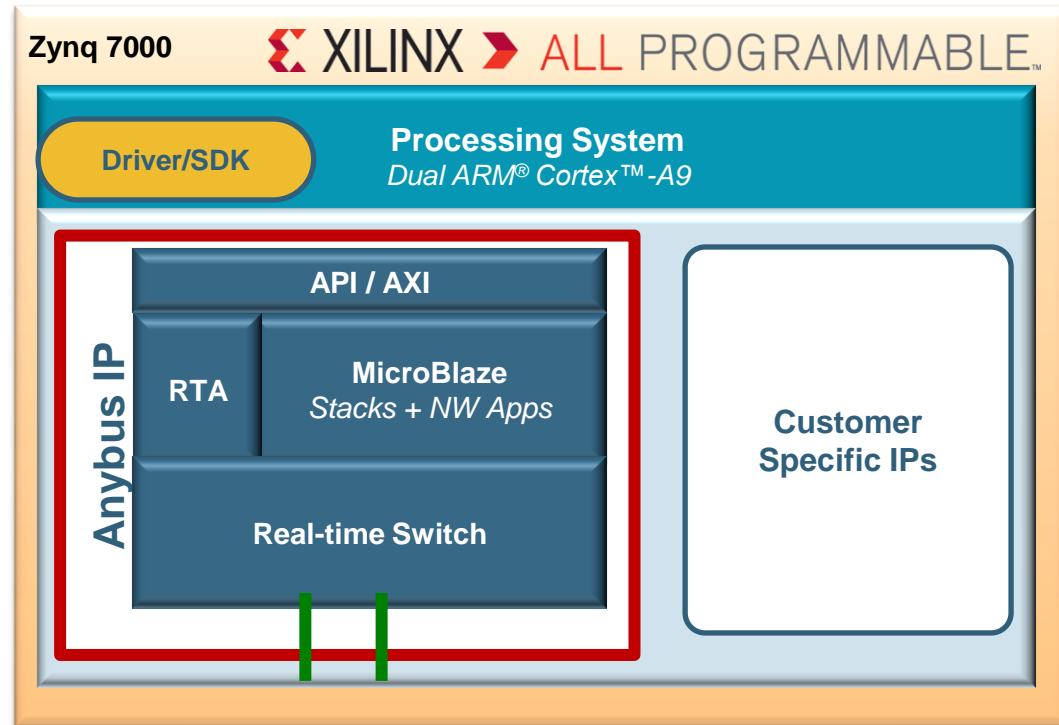


**Anybus IP**  
**Based on CompactCom 40 technology**

# Anybus IP Implements All Protocols with a Uniform Architecture

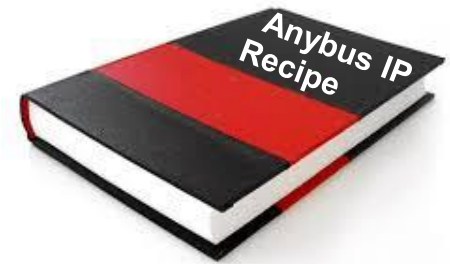
## Architecture essentials

- Anybus CompactCom Information Model and Application Interface
- Anybus application providing generic network functionality independent of protocol
- AXI support
- Real-time in Hardware
- Consequent isolation of communication from application for best determinism
- Cores in Zynq's PS stay free for user application
- FPGA IP with embedded  $\mu$ C
- 3 port switch



**Interworks with applications through a protocol-independent interface**

# Rapid Development with Anybus IP



## Include Anybus Driver

- Source code supplied

1



## Develop Application

- Example supplied

2



## Implement with Vivado

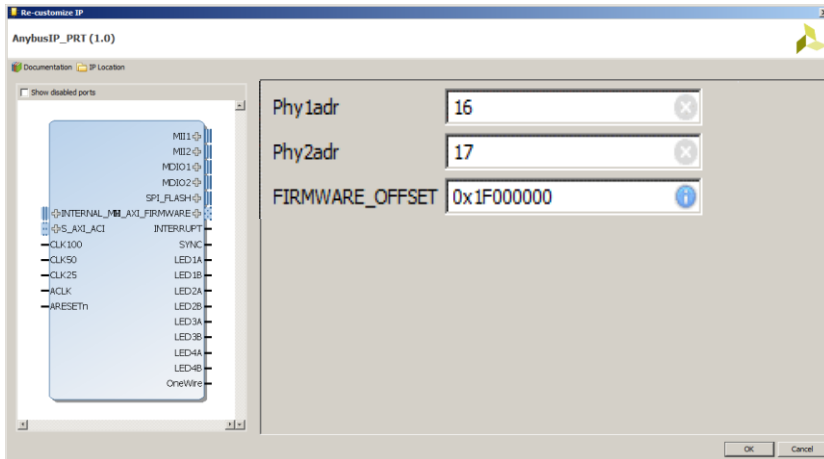
- Fit Anybus IP to your target device

3

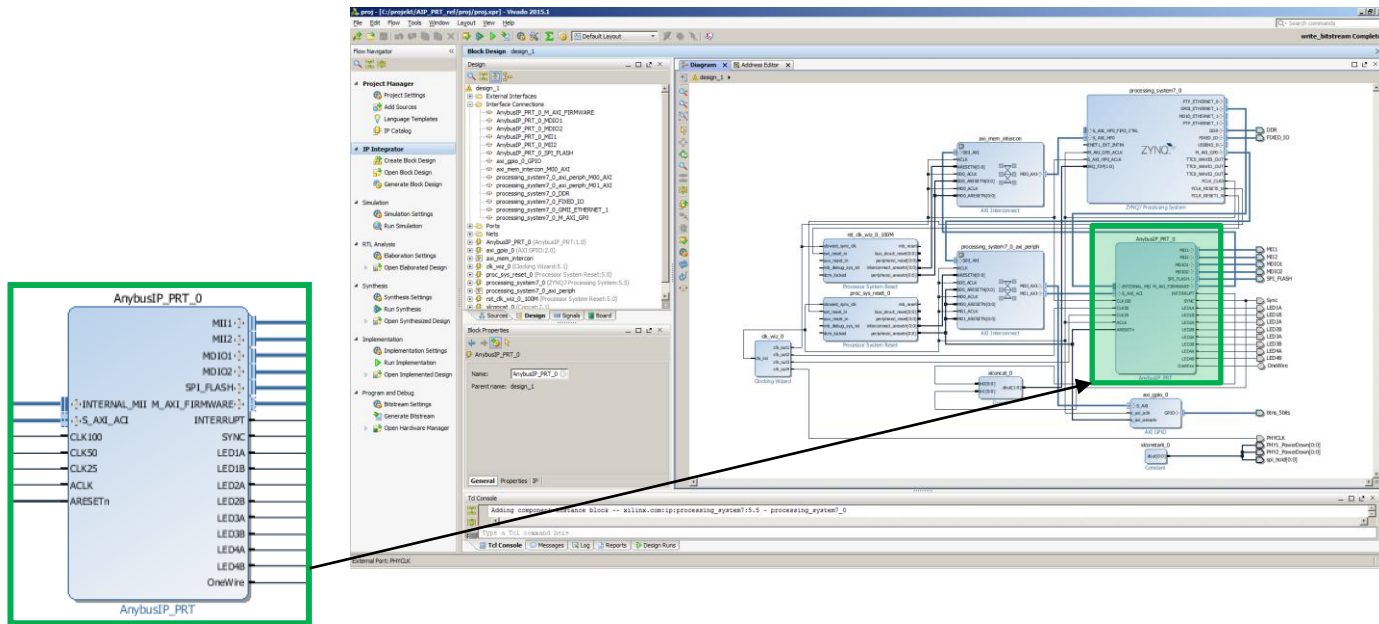


**Anybus IP  
is in your  
design**

# Anybus IP in Xilinx Vivado® Design Suite



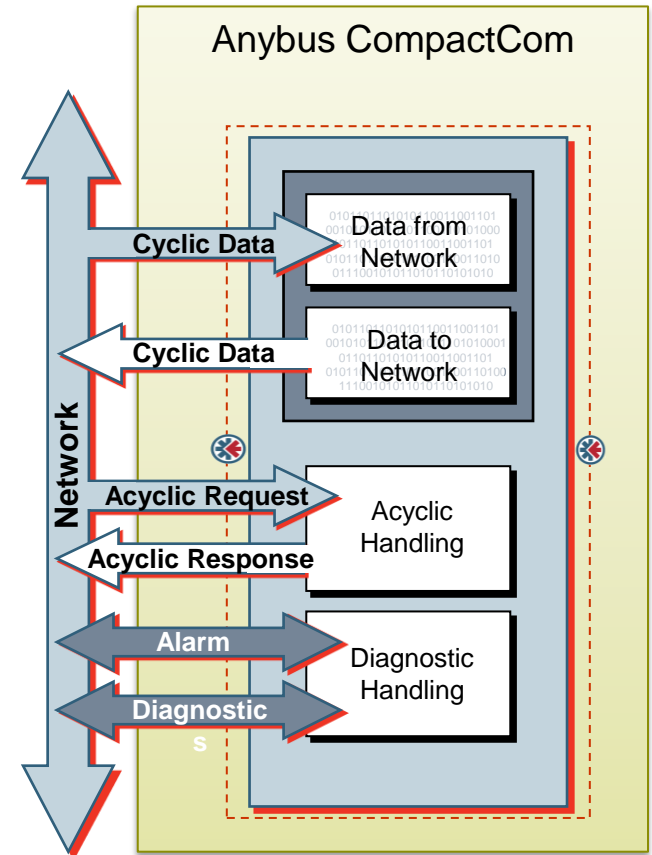
- Simple Configuration
- Full function in a single block
- Same interfacing for all protocols



# Software Application Interface (API) for Anybus IP

## Anybus CompactCom – Proven Technology

- Network independent Application SW Interface
- Same software driver for all networks at no loss of functionality or performance.
- Object oriented API
- Well documented and managed
- Standard API functions include:
  - cyclic process data exchange (I/O)
  - acyclic parameter data interface
  - device diagnostic interface
  - network status and events indication



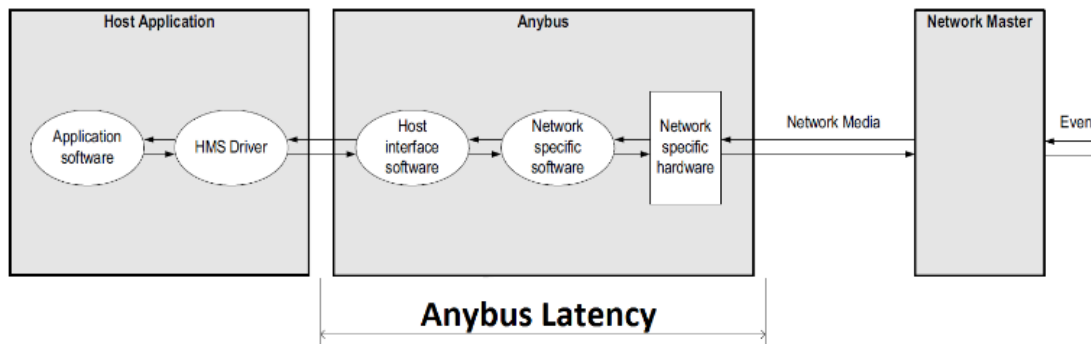
# Anybus CompactCom & Anybus IP Performance and Latency

## ➤ High-speed networks

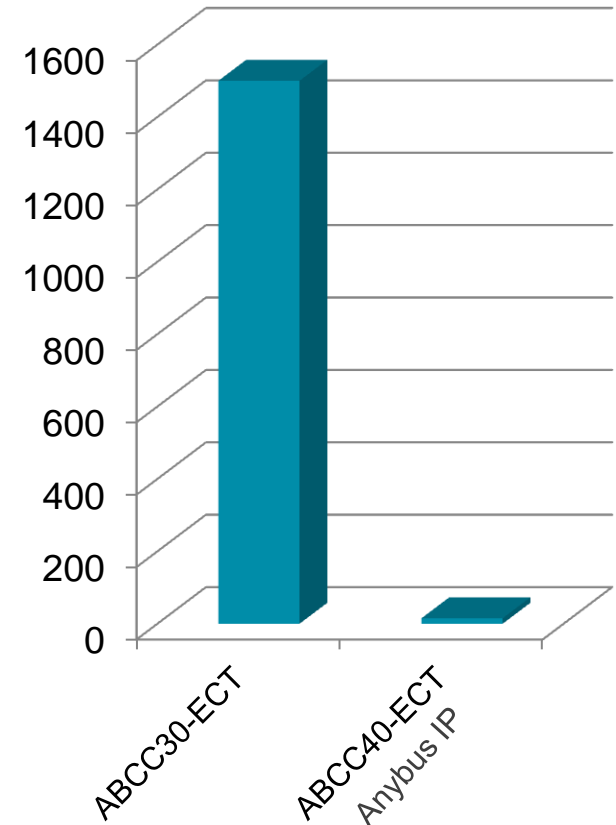
- EtherCAT, Profinet, etc
- Supported network cycle: 50~250 $\mu$ s
- Latency: 5~15 $\mu$ s or less
  - 10000% performance improvement over Anybus CompactCom30
- "Zero delay" when possible
- Anybus Motion Profile Driver – enhanced functionality possible for demanding Real Time applications

## ➤ Low-speed networks

- EtherNet/IP, Modbus, ...
- Latency: Network specific (<500 $\mu$ s)

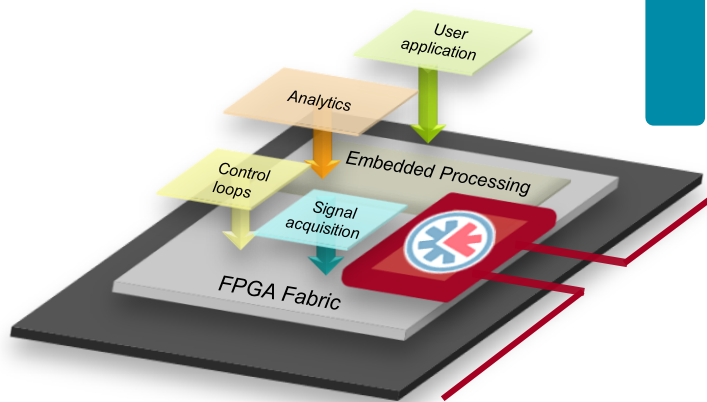


## Latency ( $\mu$ s)



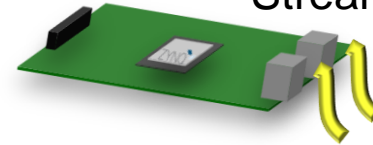
# An Industrial Platform with Anybus IP is Most Versatile

An INDUSTRIAL Platform  
with Zynq® and Anybus IP...

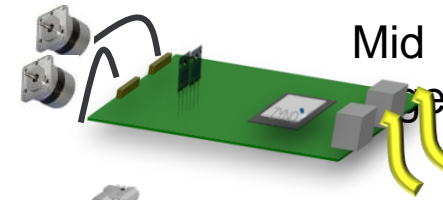


...forms a competitive  
product lineup

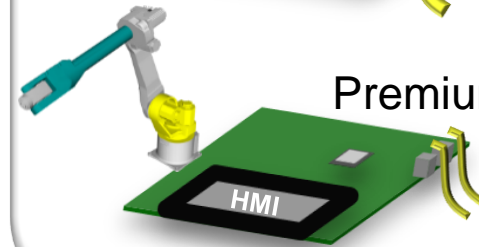
Streamline



Mid



Premium



Scalability and Programmability makes Differentiation easy

# Anybus IP – Available NOW!



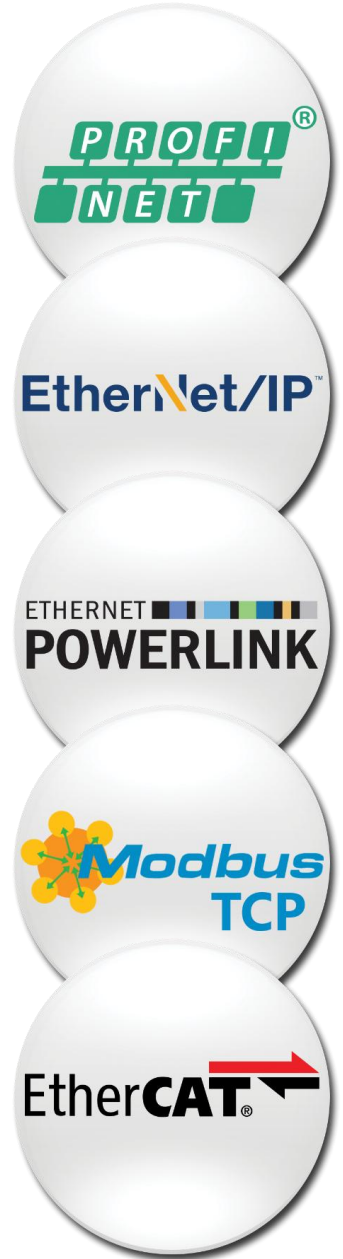
Protocol Software

IP Core

Driver (Source Code)

Simple Example Application

Documentation and Getting Started Design Guides

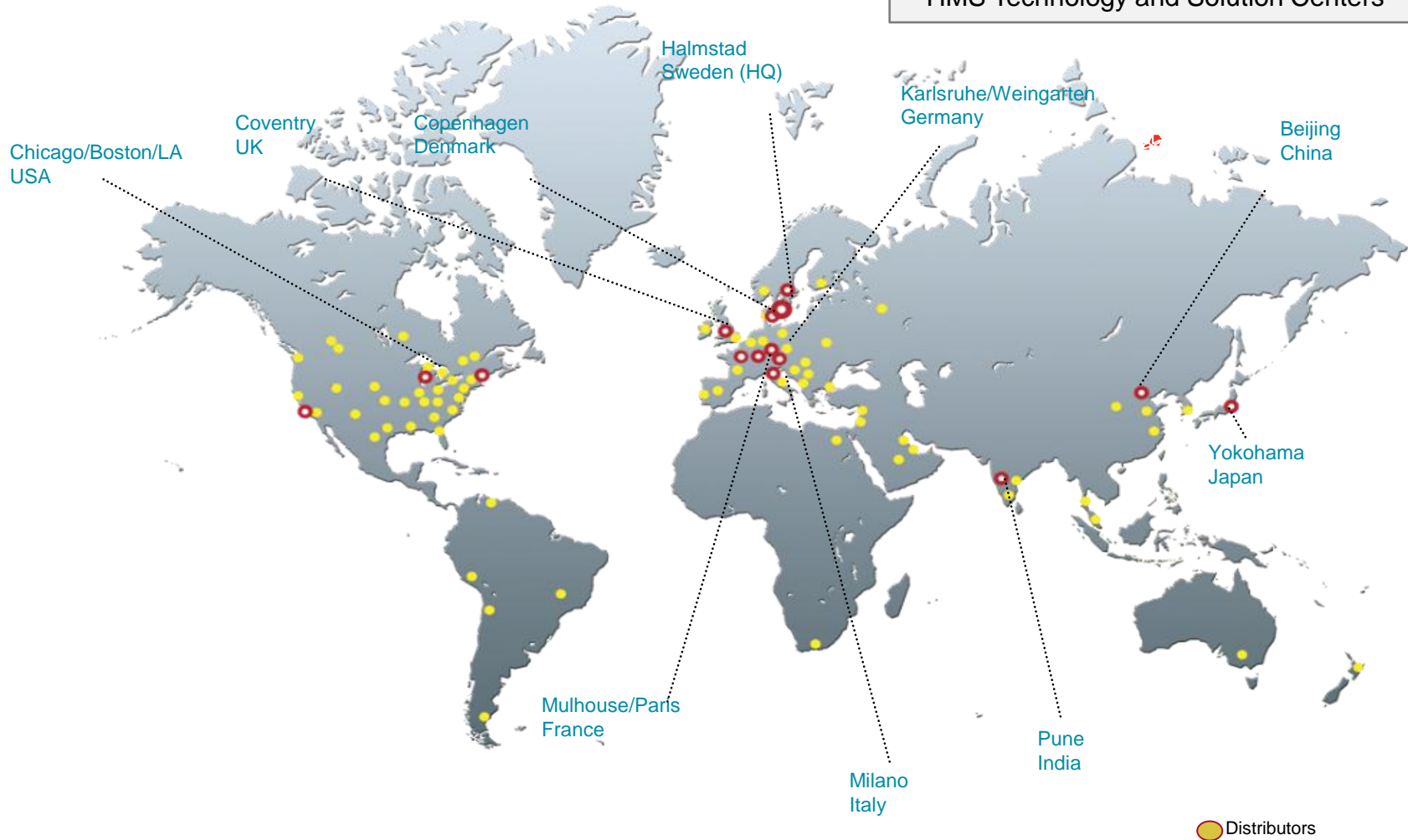


Contact HMS for details, [www.anybus.com](http://www.anybus.com)

# HMS - Worldwide Presence

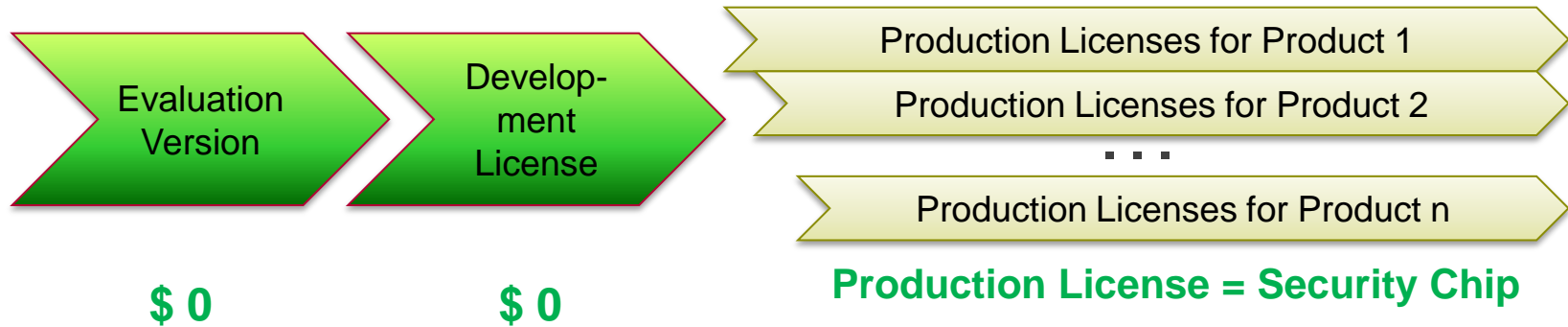
## Anybus IP Support

- Collateral and Documentation
- HMS Technology and Solution Centers



# How to Start with with Anybus IP on Xilinx

# Attractive Licensing Model for Anybus IP



No one time fee

➤ **Get 1-wire Security Chip for production**

Each license is good for each protocol

➤ **No need to specify protocol at order placement**

Extension possible

➤ **Added features, start-up fee applies**

# Enablement Platform

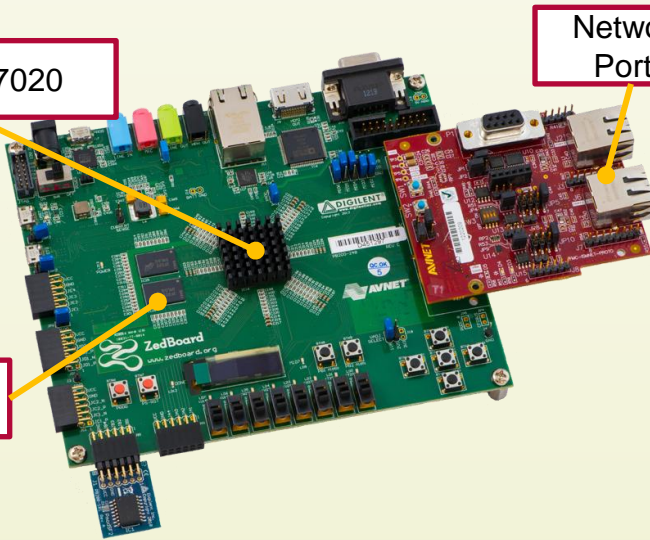
## Reference System

(available today)

Zynq Z-7020

Network Ports

DRAM



### Features

- For Evaluation and Training
- Slave in your Industrial Network
- Integrates with your application on SoC

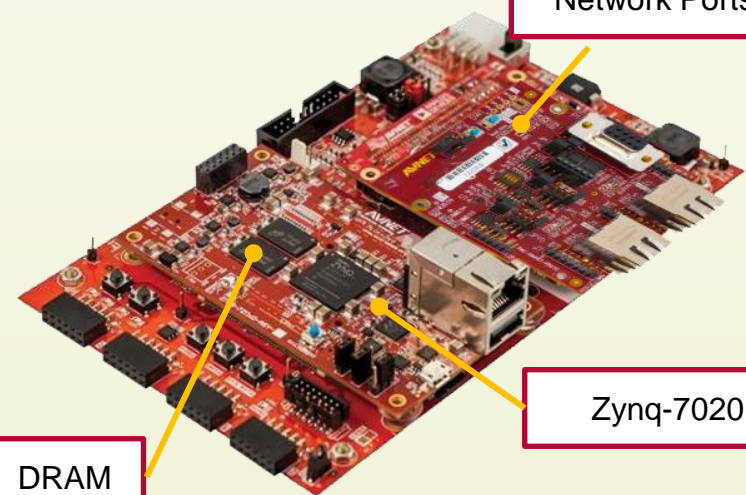
## Avnet Industrial Ethernet Kit

(available February 2016)

Network Ports

DRAM

Zynq-7020



### Features

- For Evaluation, Training, Prototyping and Production
- Avnet MicroZed (System on Module) for direct integration in your product

# Engagement Model



Type	Item	from	
IP Core	FPGA IP and Communication Stack - 5 protocols	HMS	✓
Zynq Development Board	Zedboard	Avnet	✓
Network Extension Card	Network Card (ISMNET) and Flash	HMS	✓
Production License	Security Chip, valid for all supported protocols	HMS	✓
Industrial Ethernet Kit	System on Module for Networking - out of the box	Avnet	Feb 2016

Reference System

**Contact HMS Sales Office for Access**

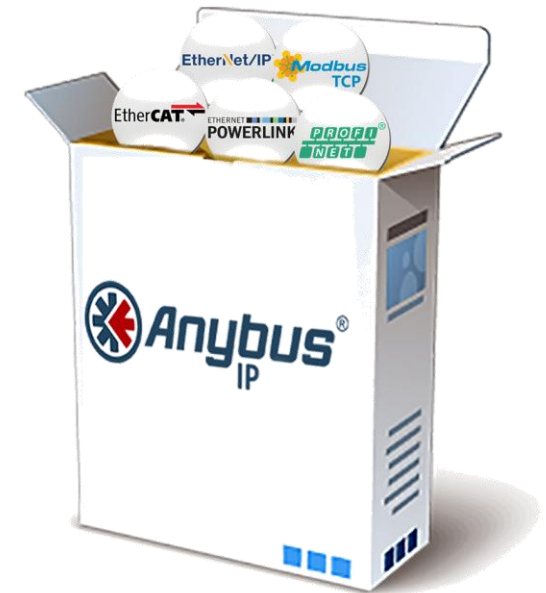
<http://www.anybus.com/contact/contact.asp>

**Get Avnet Development Boards**

<http://www.zedboard.org>

# Anybus IP on Xilinx - Summary

- 5 Major Industrial Ethernet Slave protocols
- Proven HMS Anybus CompactCom 40 technology now on Xilinx
- Lowest Total Cost of Development/Ownership
- Performance guaranteed by design
- Common API and programmability for platform architectures
- Reference System available



# Questions?

Contacts

Available now, contact HMS, Xilinx and Avnet

HMS

**Anybus IP**

➤ <http://www.anybus.com>

Xilinx

**Zynq-7000 and Artix-7**

➤ <http://www.xilinx.com/support.html>

Avnet

**Industrial Ethernet Kit (Feb 2016)**

➤ <http://www.zedboard.org>

