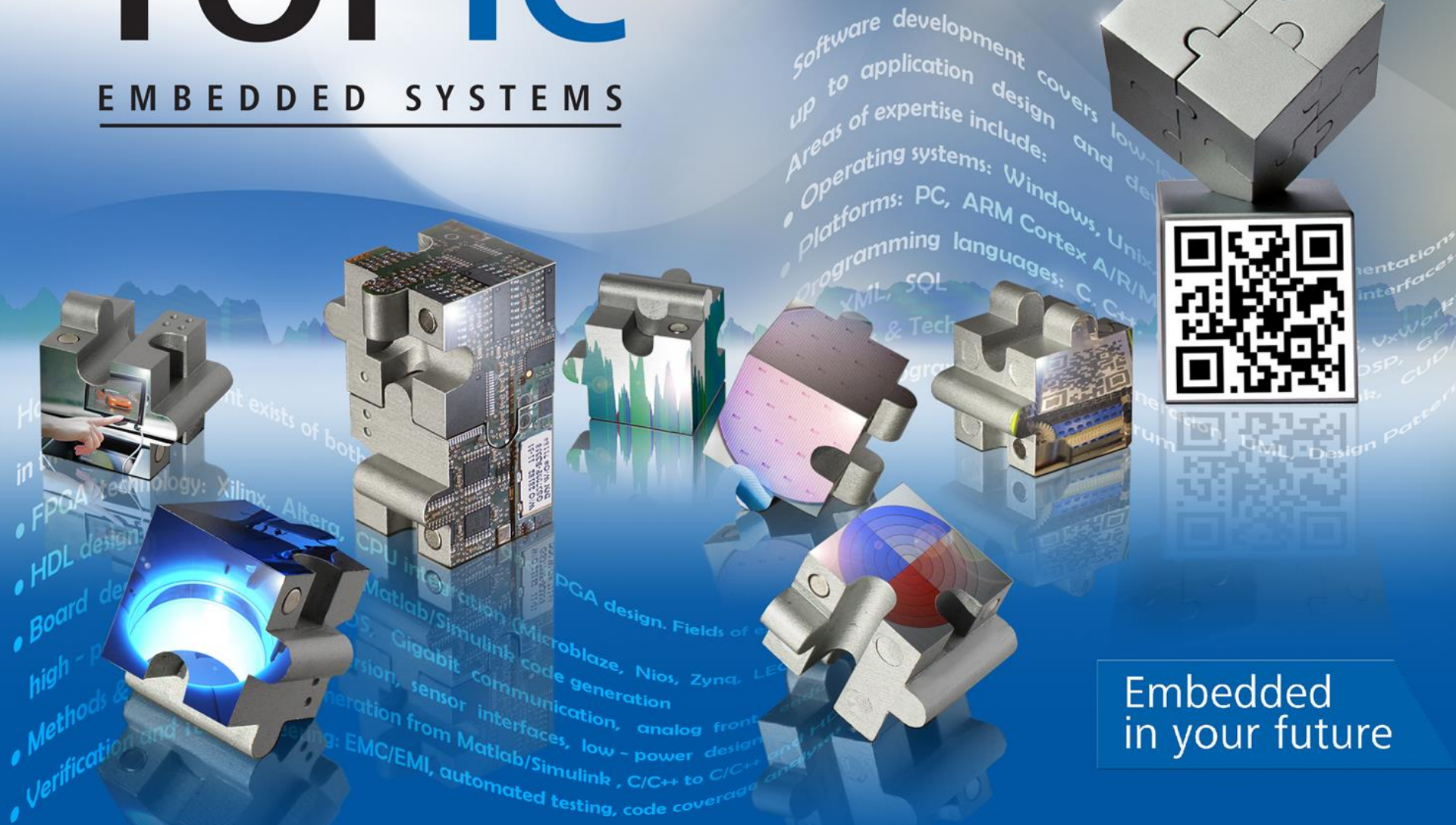
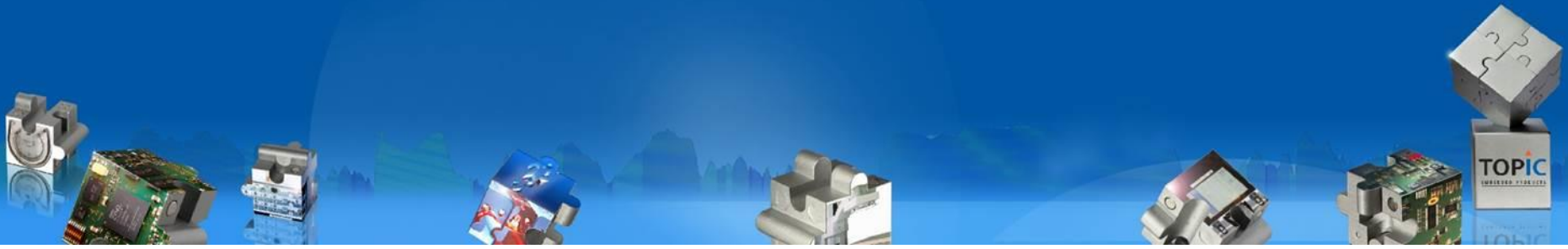


# TOPIC

EMBEDDED SYSTEMS



Embedded  
in your future

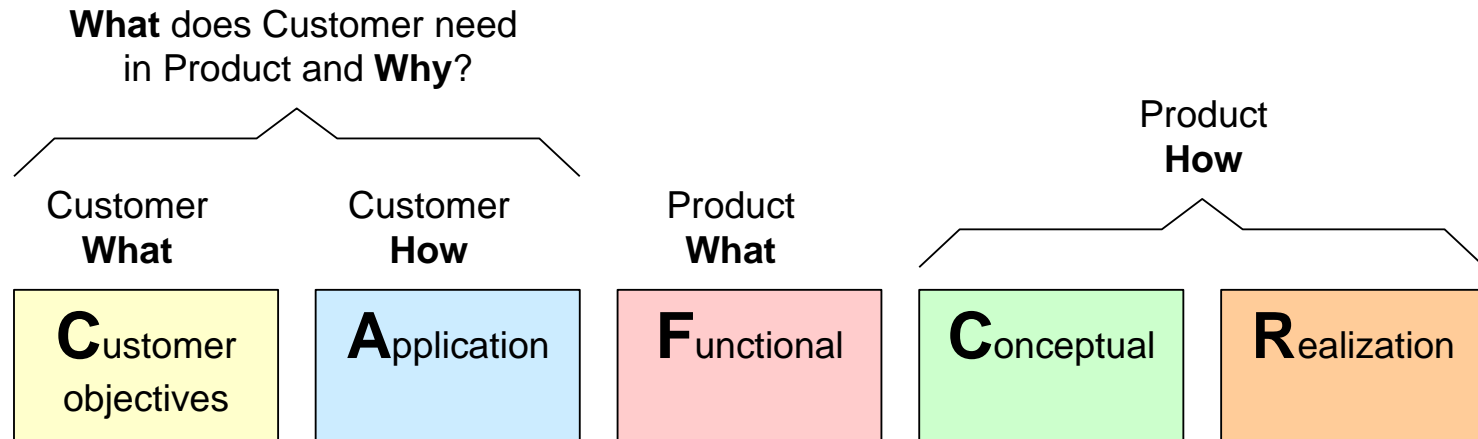
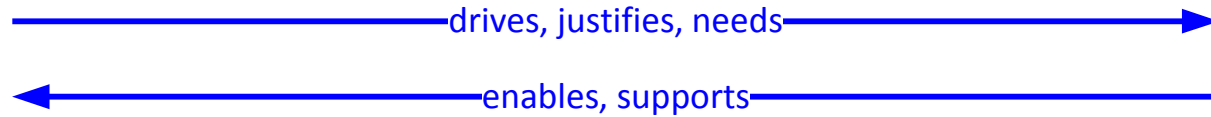


Hardware platform for

# ULTRASOUND INSPECTION

Herman Kuster, Topic Embedded Systems

# CAFCR



▲ More details on [www.gaudisite.nl](http://www.gaudisite.nl)

# Customer objectives

- ▲ Strong in Ultrasound inspection of steel
- ▲ Using third party hardware and software for years
- ▲ Wish to supply whole system including own hardware and software

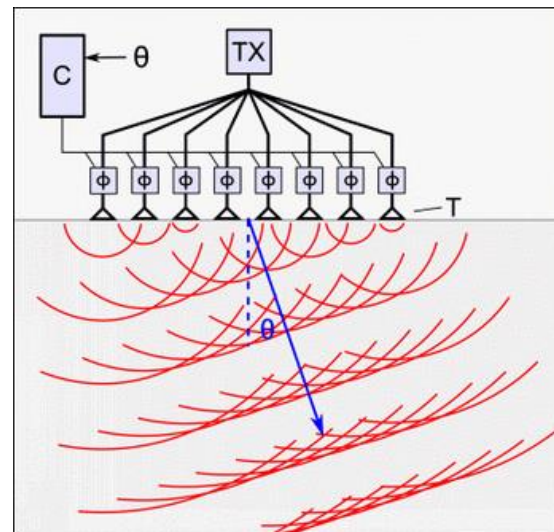
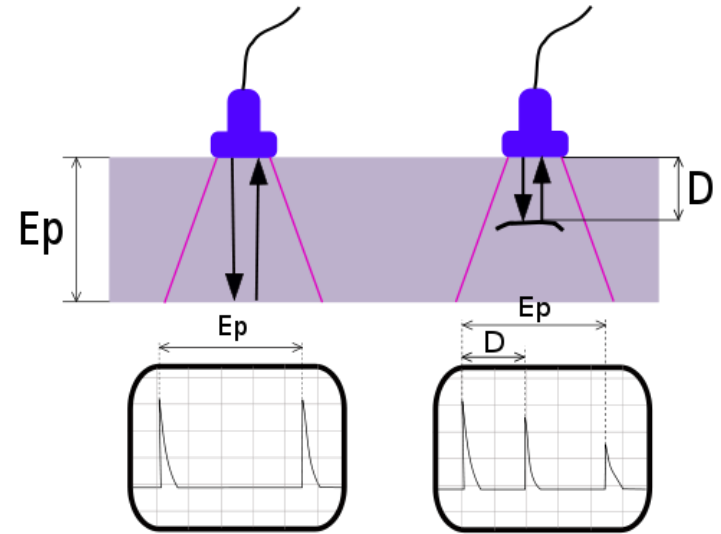


# Application

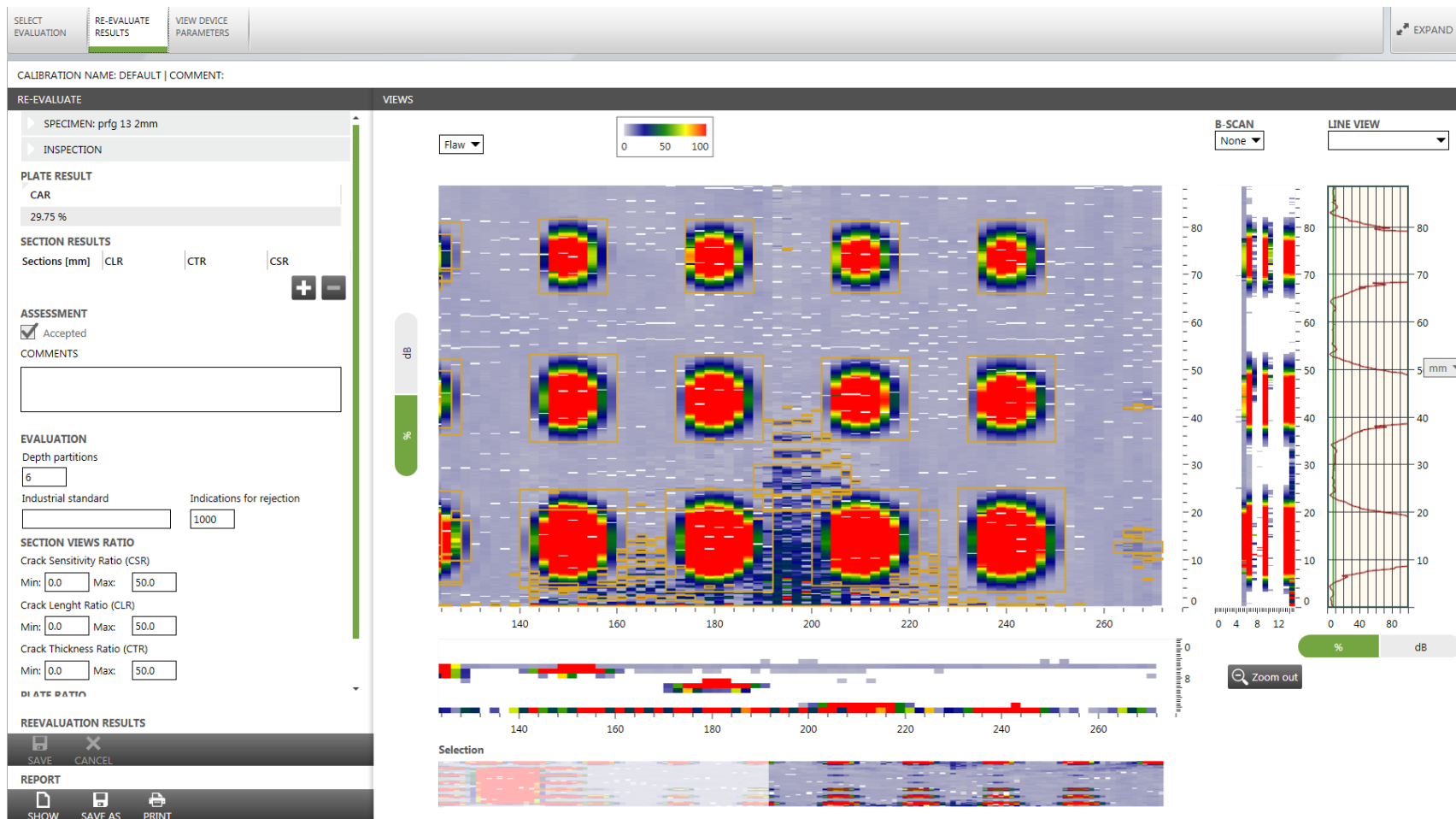


# Application

- ▲ Ultrasound inspection
- ▲ Detection of cracks and bubbles
- ▲ Sensor consists of piezo actuator and piezo sensor
- ▲ Different types of sensors:
  - ▲ Phased-array
  - ▲ Multiple single-probes



# Application





# Functional (requirements)

## ▲ Interfaces:

- ▲ Max 64 Probe connections
- ▲ Piezo UT, EMAT Probe connections
- ▲ External clock and trigger input/output
- ▲ 1G and 10G ethernet
- ▲ Several low-speed interfaces like:
  - ▲ Encoders (RS-485)
  - ▲ Fieldbus to machine control
  - ▲ LVDS and HDMI display output
  - ▲ SPI and I2C interfaces

## ▲ Processing platform:

- ▲ FPGA fabric for high-speed parallel processing
- ▲ CPU cores for feedback loops and management tasks

## ▲ Modular and scalable



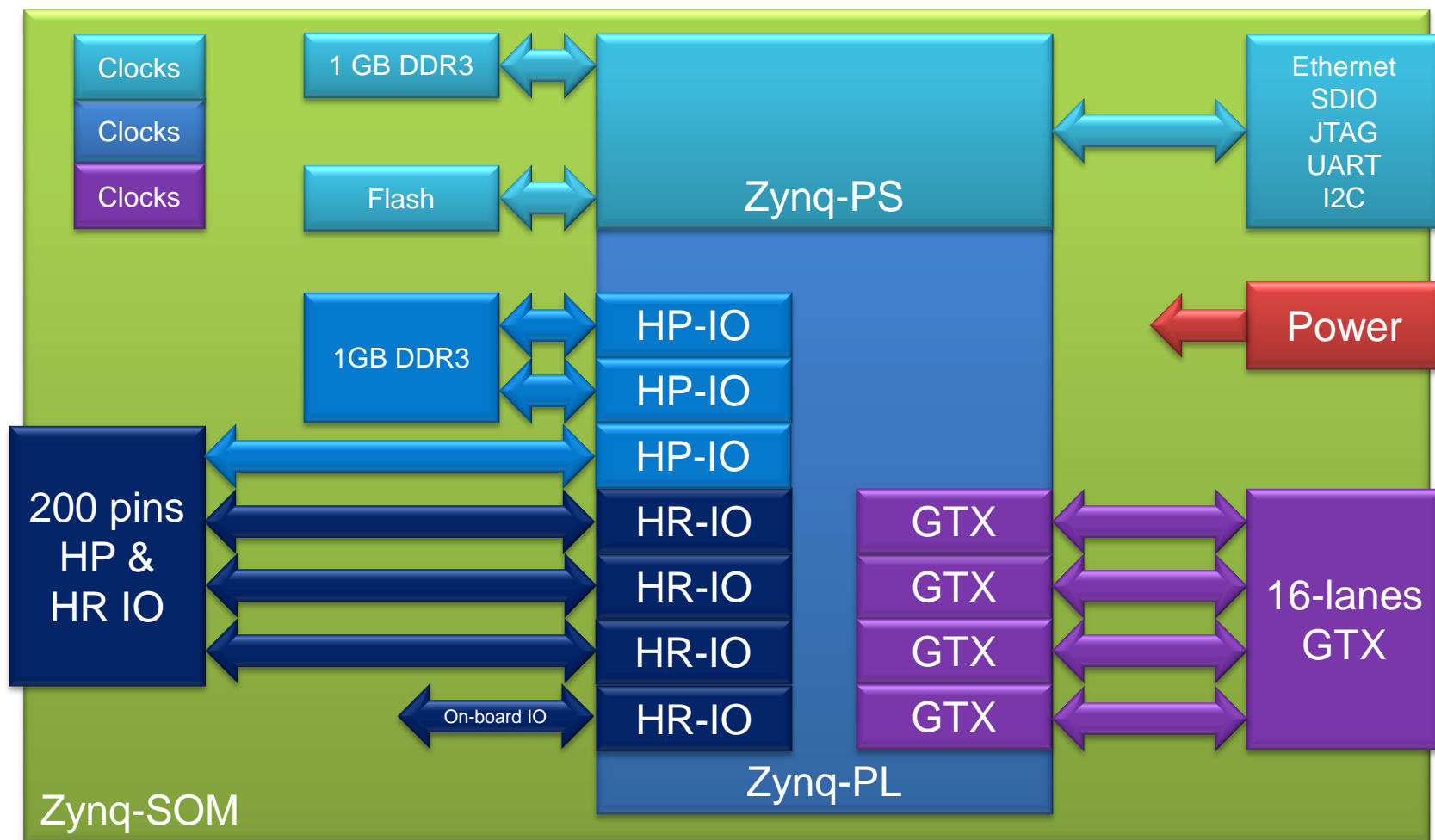
# Conceptual

- ▲ Industrial PC or Single board computer
- ▲ CPU-SOM, FPGA-SOM, Zynq-SOM
- ▲ Full custom built system
- ▲ Miami+, SOM with Xilinx Zynq

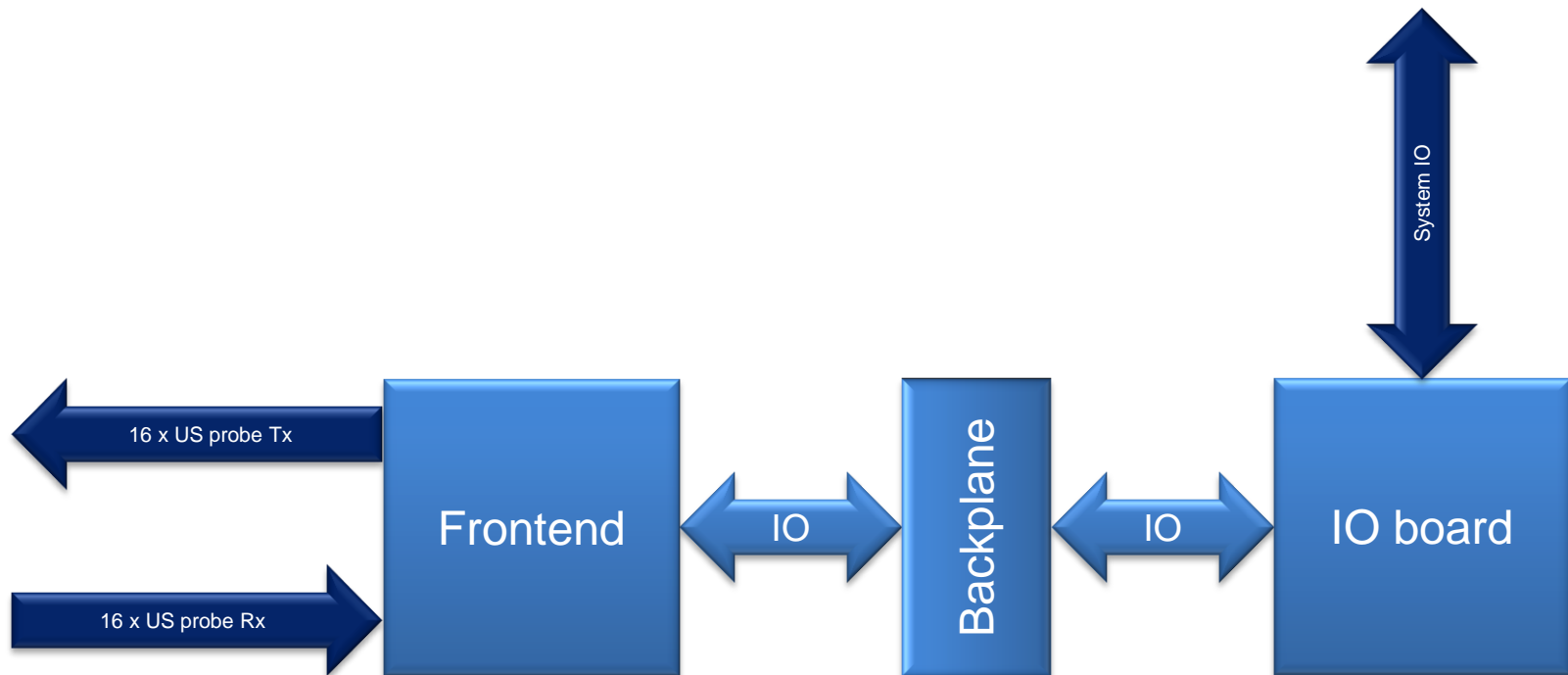
# Realization

- ▲ Miami+ SOM
- ▲ System overview
- ▲ Data processing
- ▲ Backplane board
- ▲ Frontend board
- ▲ Backend board

# Miami+ Zynq-SOM

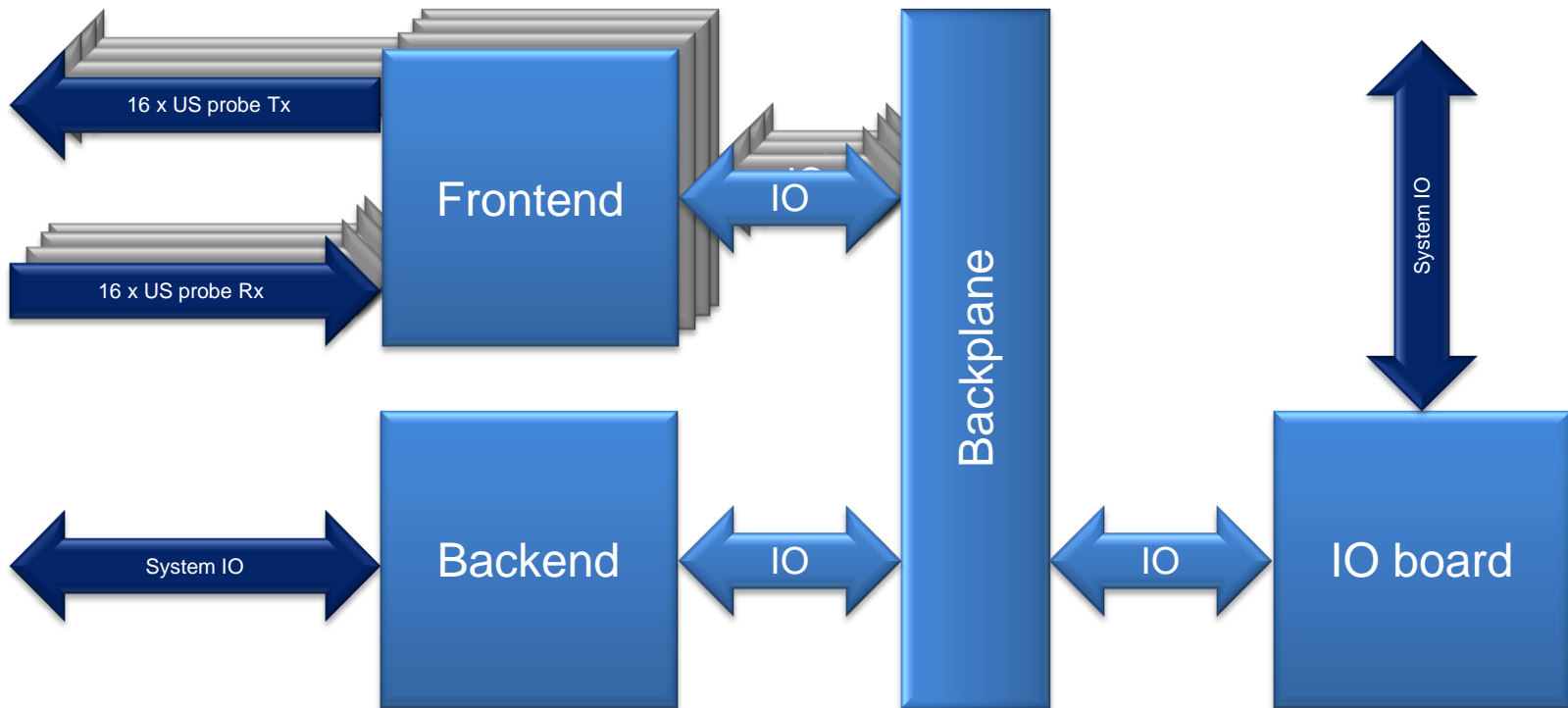


# Standalone system overview

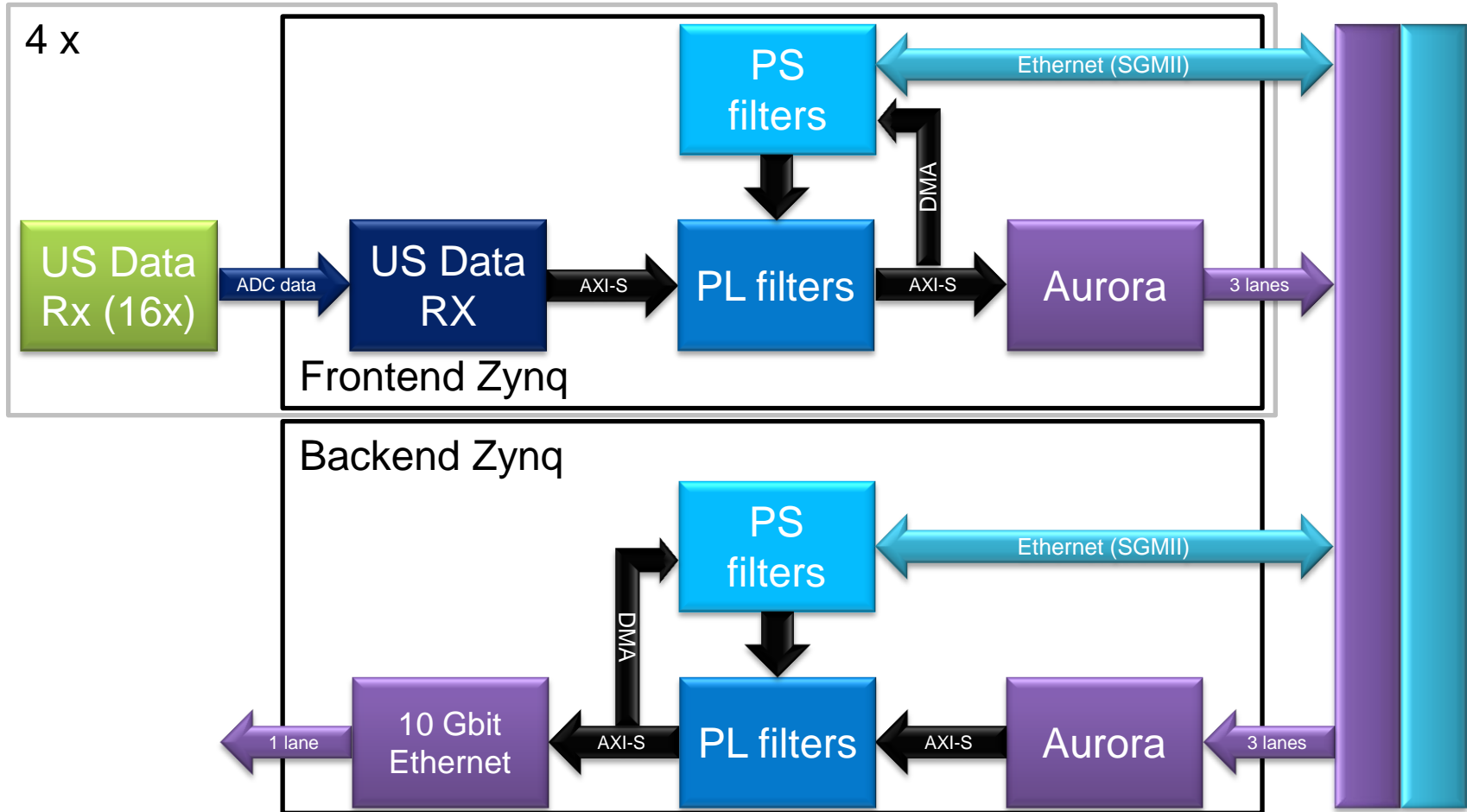




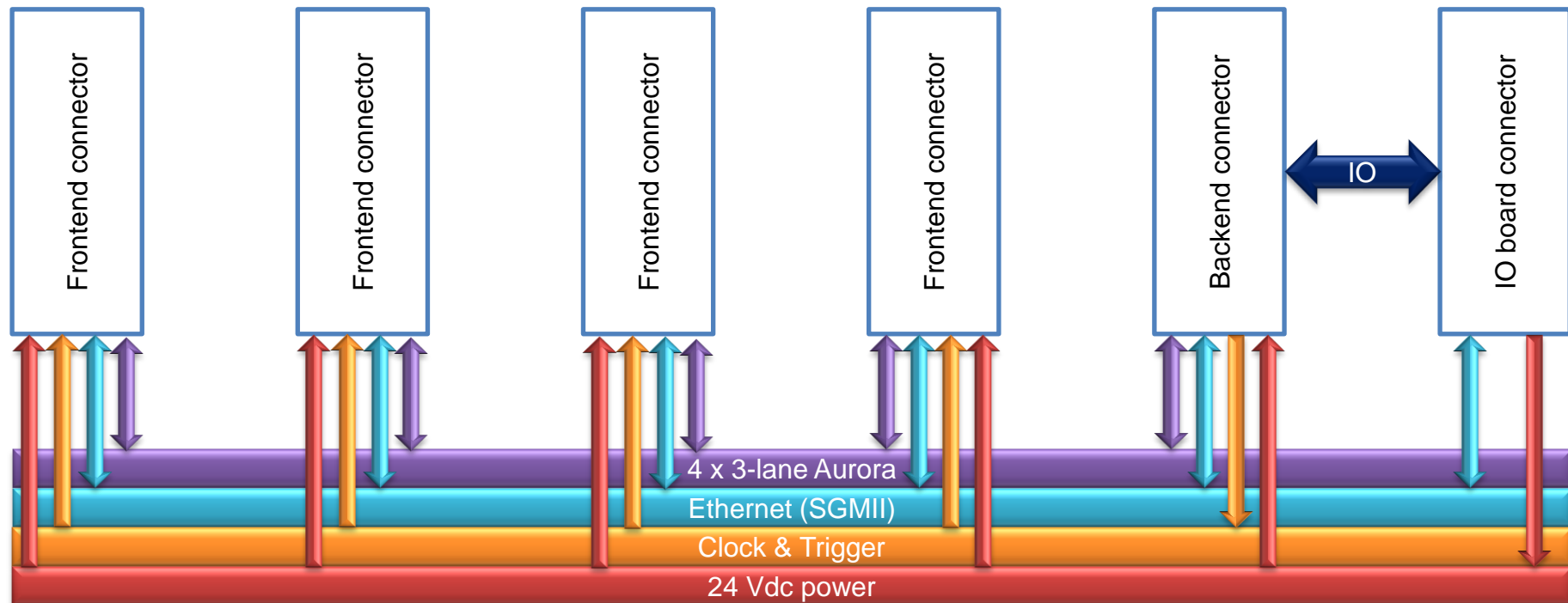
# Full system overview



# Data processing for US Data



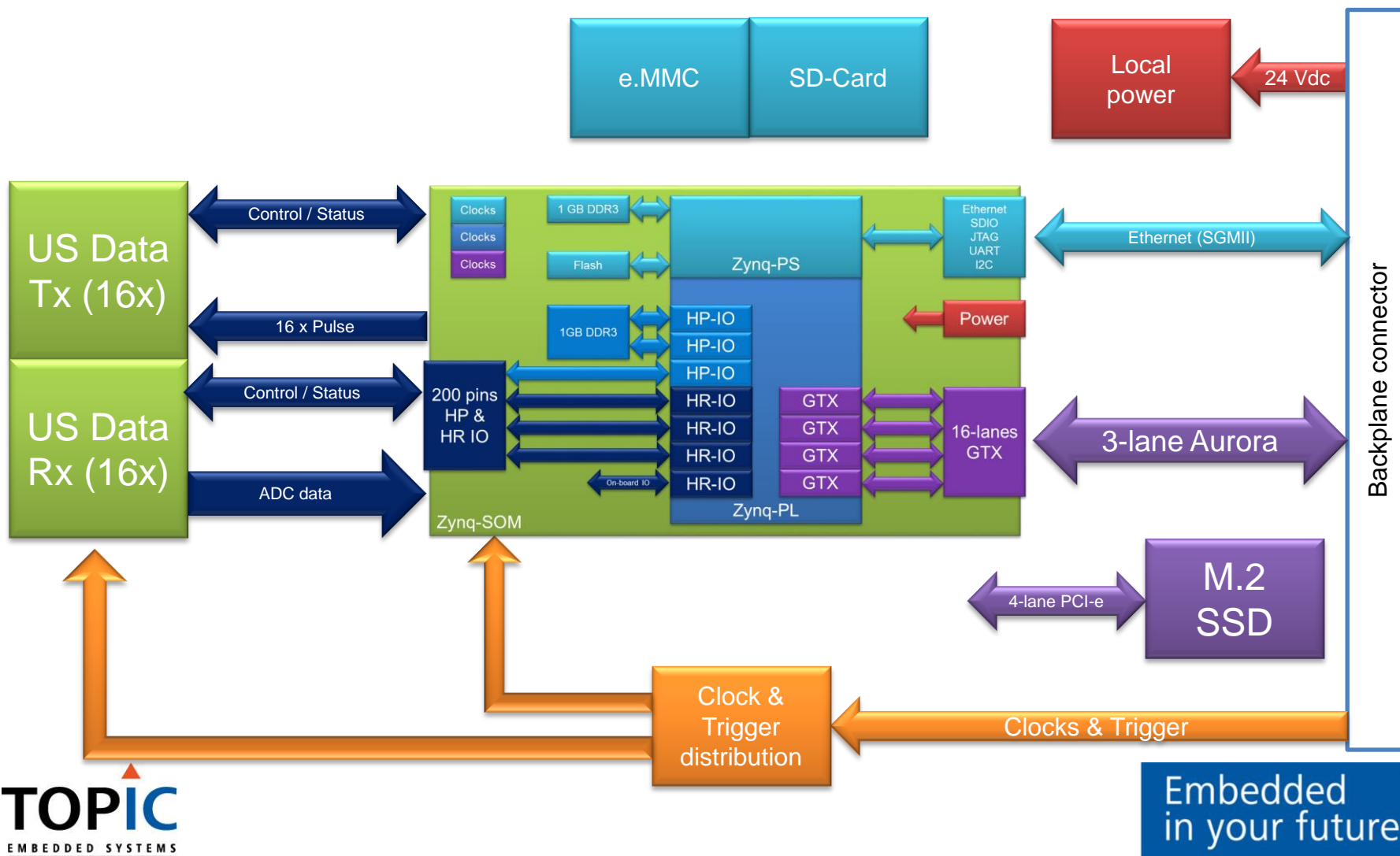
# Backplane board



Gb Ethernet  
switch

Clock &  
Trigger  
distribution

# Frontend board





# Backend board



# Standalone system





# Full system



# Questions

