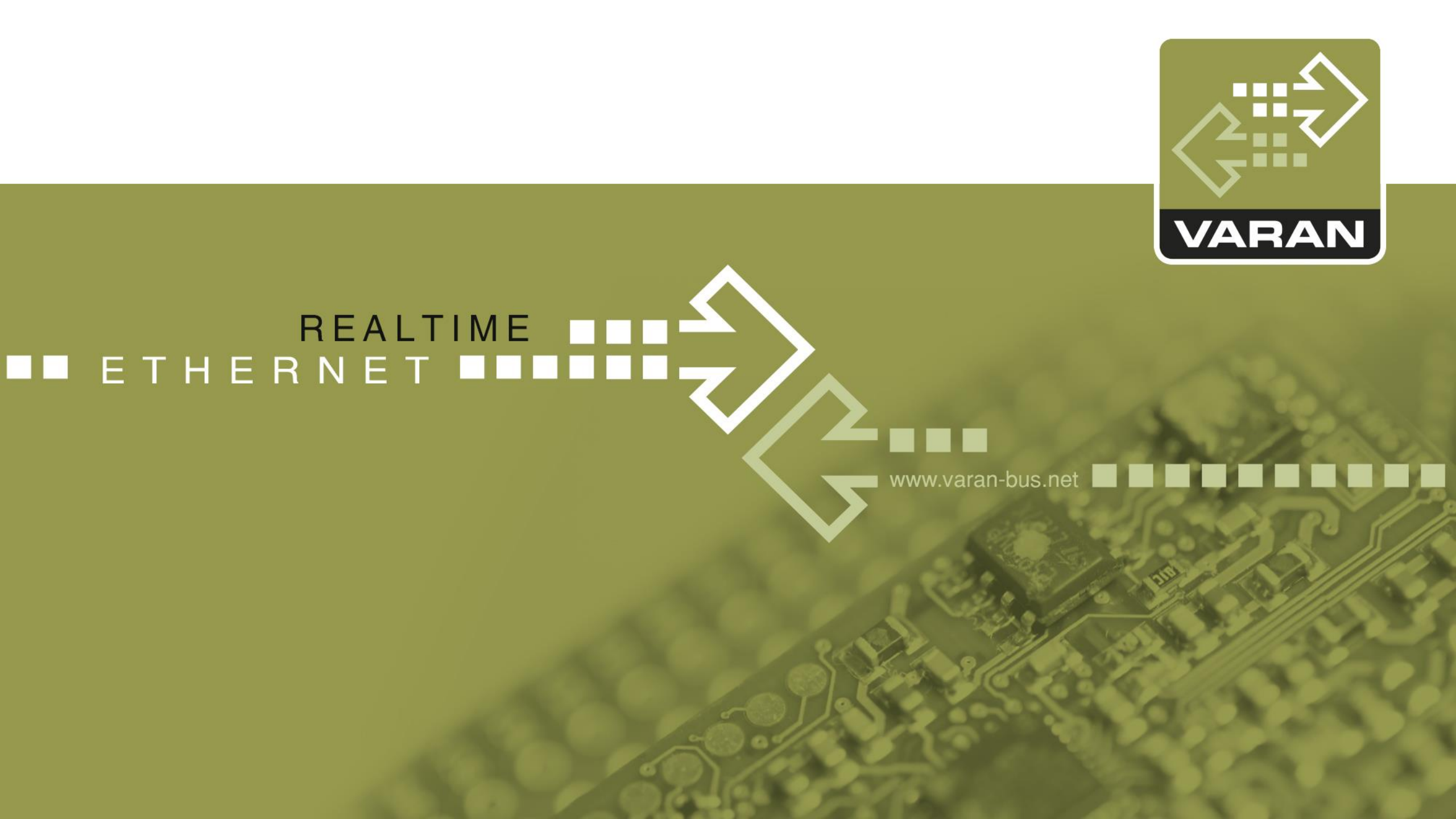

VARAN
REALTIME
ETHERNET
www.varan-bus.net

CONTENTS

HIGHLIGHTS AT A GLANCE

- Hard real-time

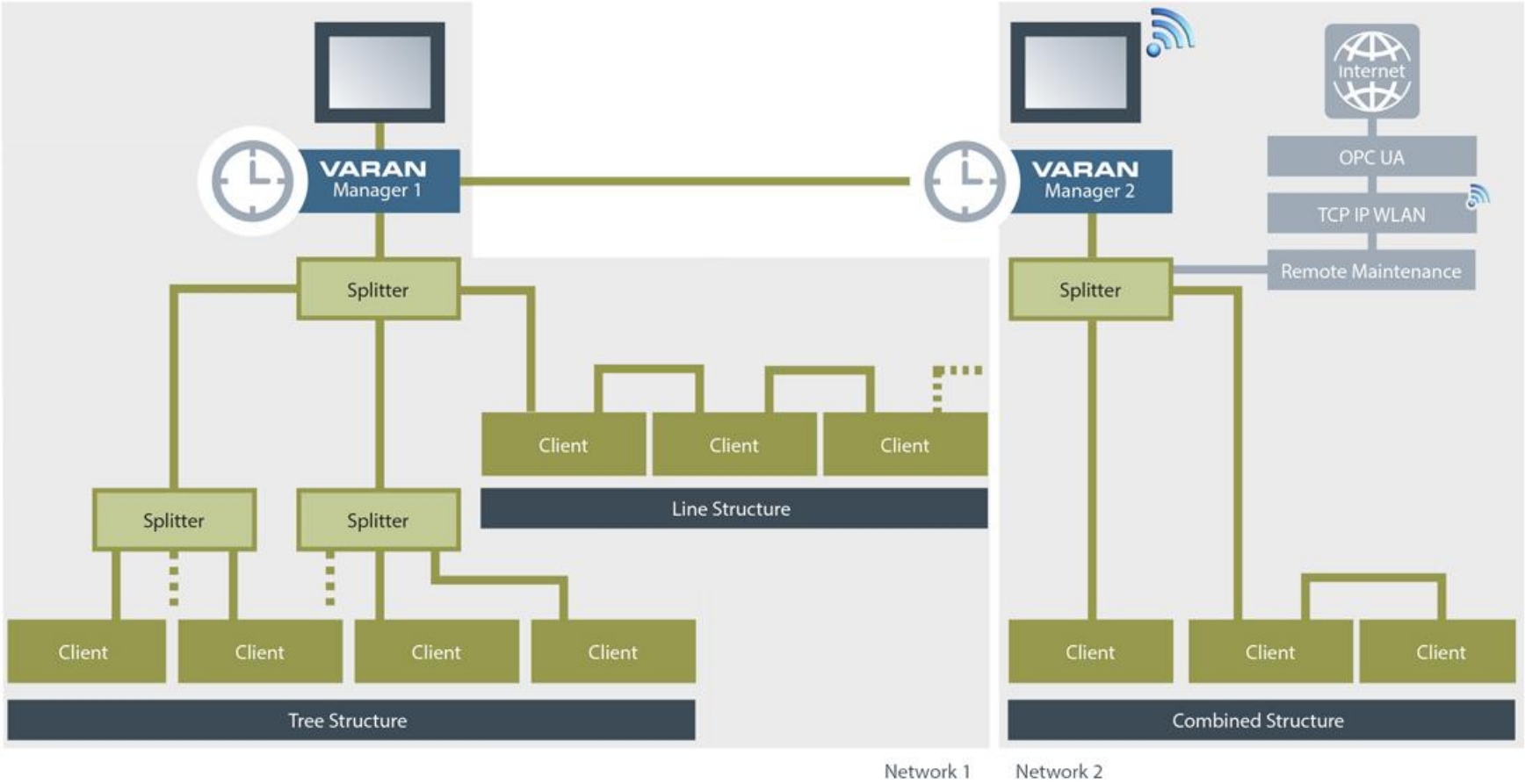
  Cycle times < 100 µs and jitter < 100 ns
- High data reliability
  - Unacknowledged messages are repeated within the same bus cycle
  - Short packet lengths up to a maximum of 128 bytes
- Flexible network topology
  - Star, line and tree topologies can be combined as desired
  - Modular machine structures via "Plug & Play" function
- Low system costs

  Use of inexpensive standard components
- Open standard

  The rights for the technology are held by the VARAN BUS USER ORGANIZATION


VARAN REAL-TIME ETHERNET
UNIVERSAL
APPLICABLITY

UNIVERSALLY APPLICABLE



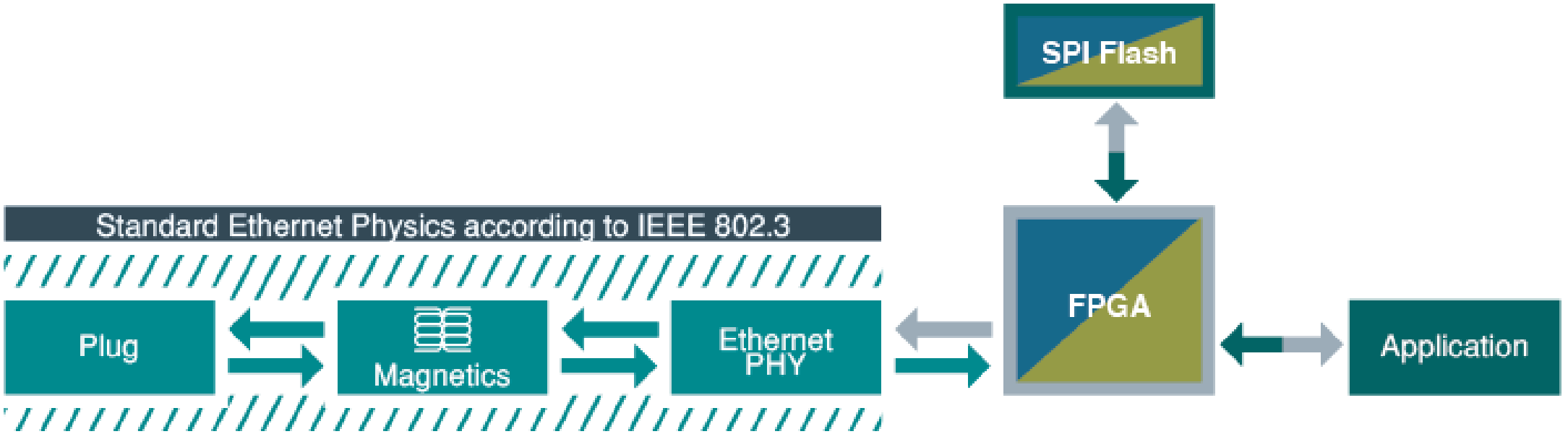
- Rubber/plastic technology
- Metal processing
- Robotics/handling
- Packaging
- Food processing
- Logistics/material flow
- Printing/paper
- Analysis/testing
- Textiles
- Machine tools

VARAN REAL-TIME ETHERNET

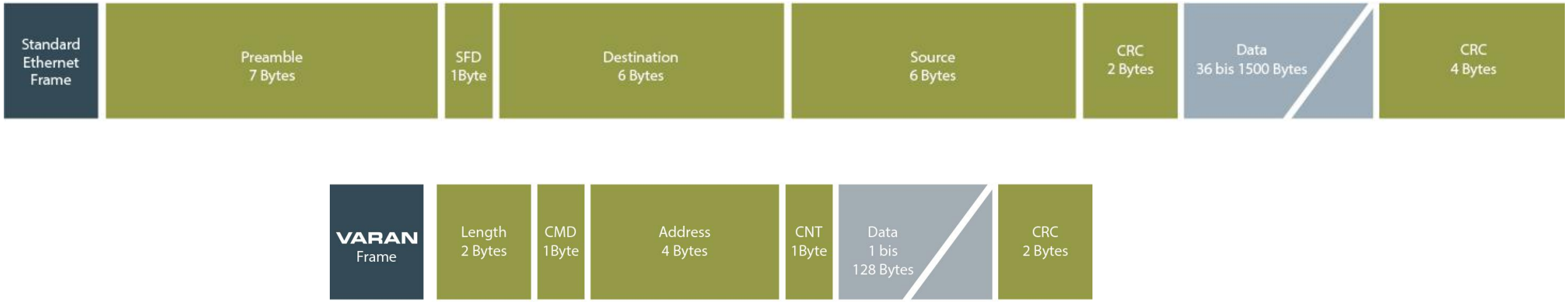
FUNCTION PRINCIPLE

COMPONENTS OF A VARAN CONNECTION

- VARAN protocol is run completely in the hardware
- Inexpensive standard components are used



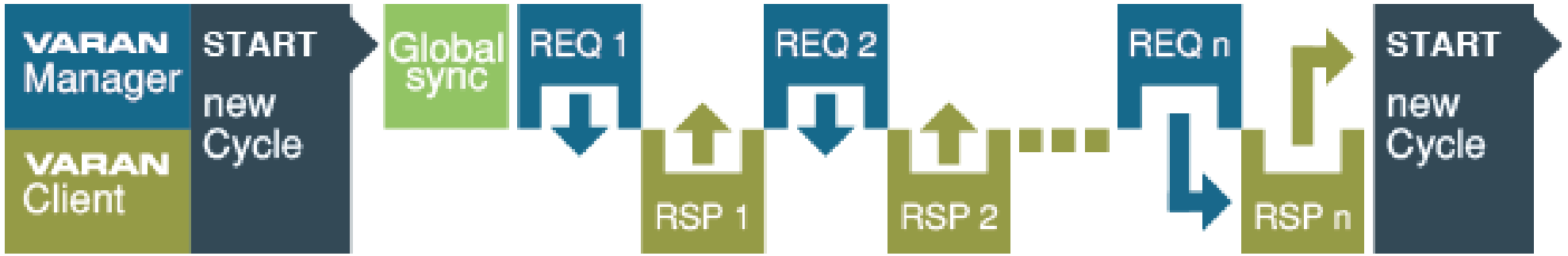
OPTIMIZED VARAN DATA PACKETS



- Small frames: 128-byte payloads and low overhead

MANAGER/CLIENT PRINCIPLE

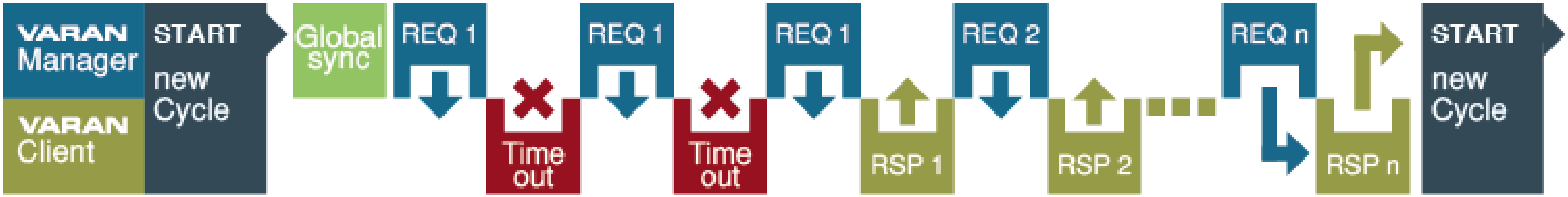
- Guaranteed data consistency with reconfirmation of each message
- Distributed clocks are not required: synchronization with a PLL mechanism



Cycle time < 100 µs

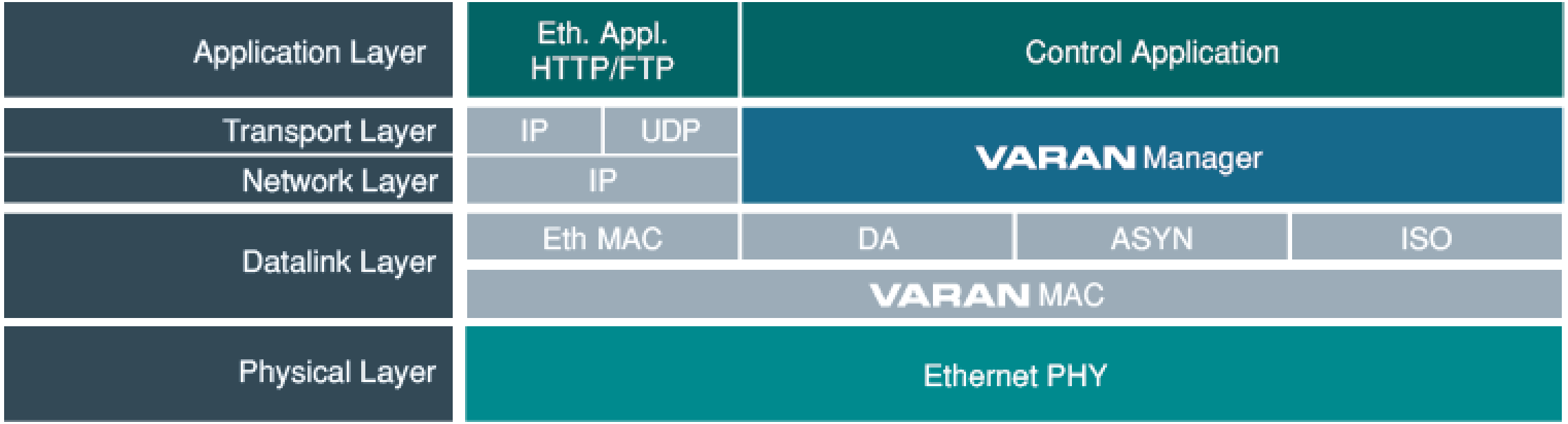
HIGH DATA RELIABILITY

- Industrial environment affected by disruptions
- If no confirmation is received, the message is repeated in the same bus cycle



Communication in the event of an error

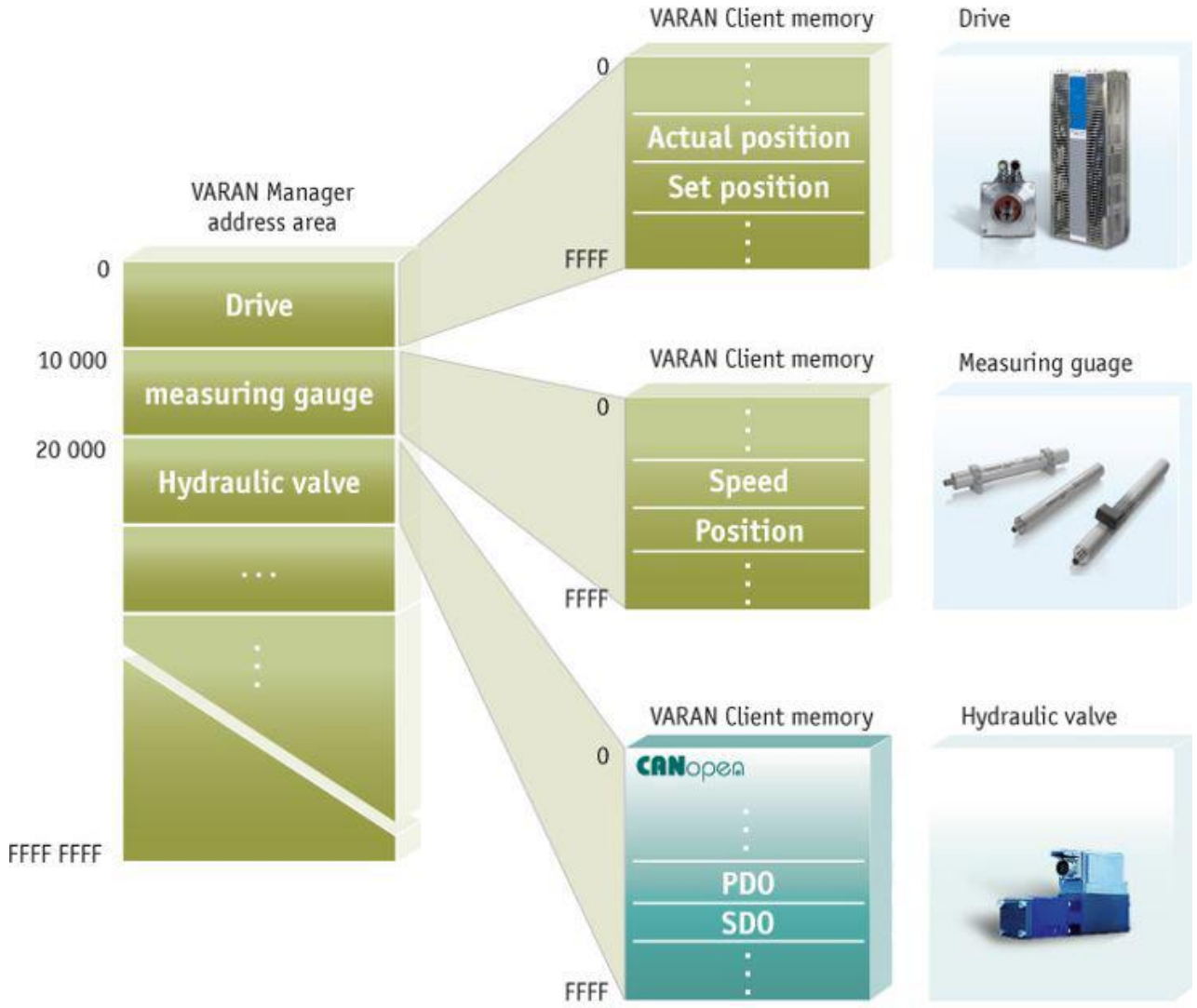
THE VARAN BUS IN THE OSI MODEL



The VARAN datalink layer, which provides the data packets with checksum and guarantees consistent transmission, is based on Ethernet physics.

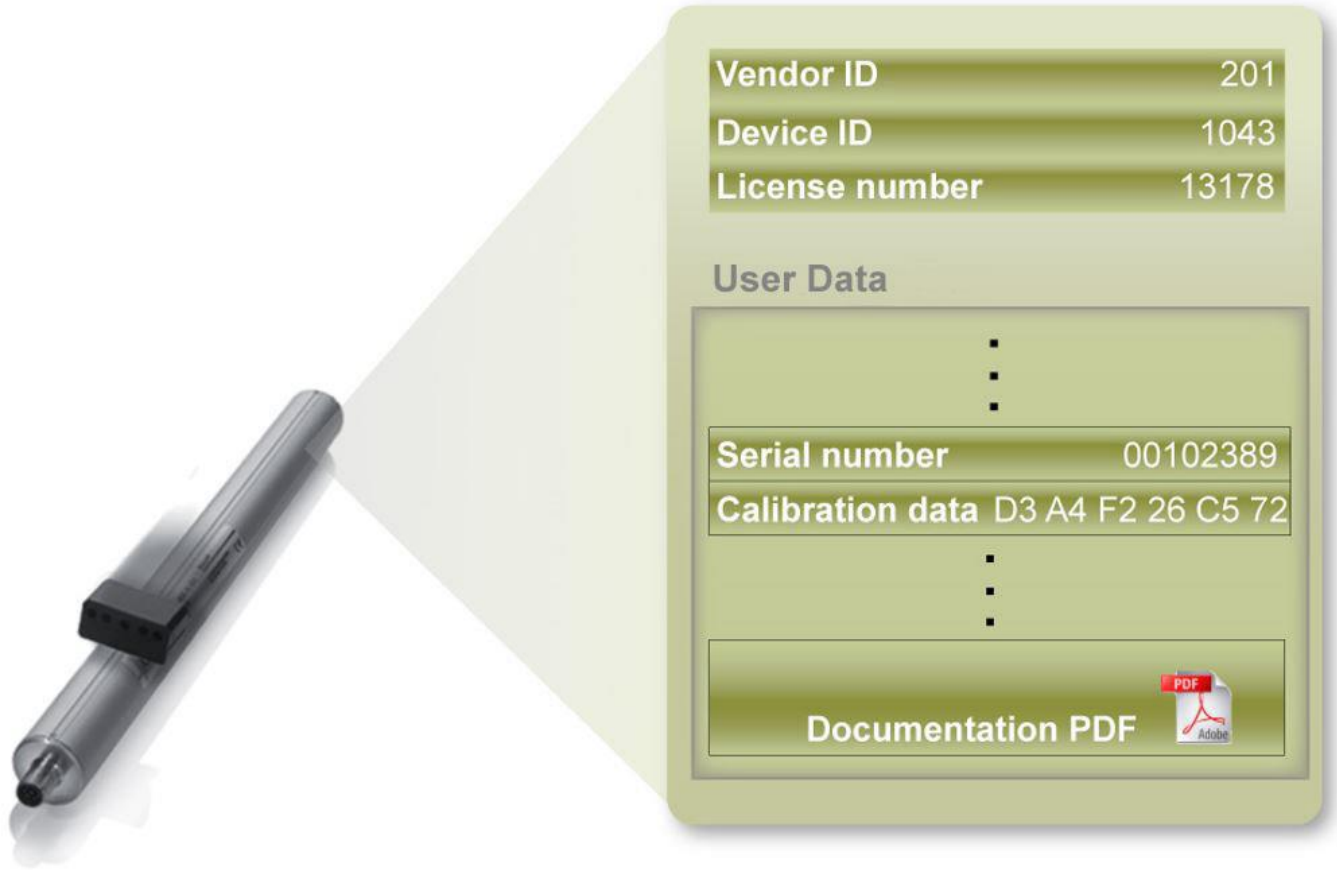
THE VARAN BUS IS SIMPLE

- Automatic addressing
- Simple operating principle
- Simple instruction sets
- Data exchange over the entire address range

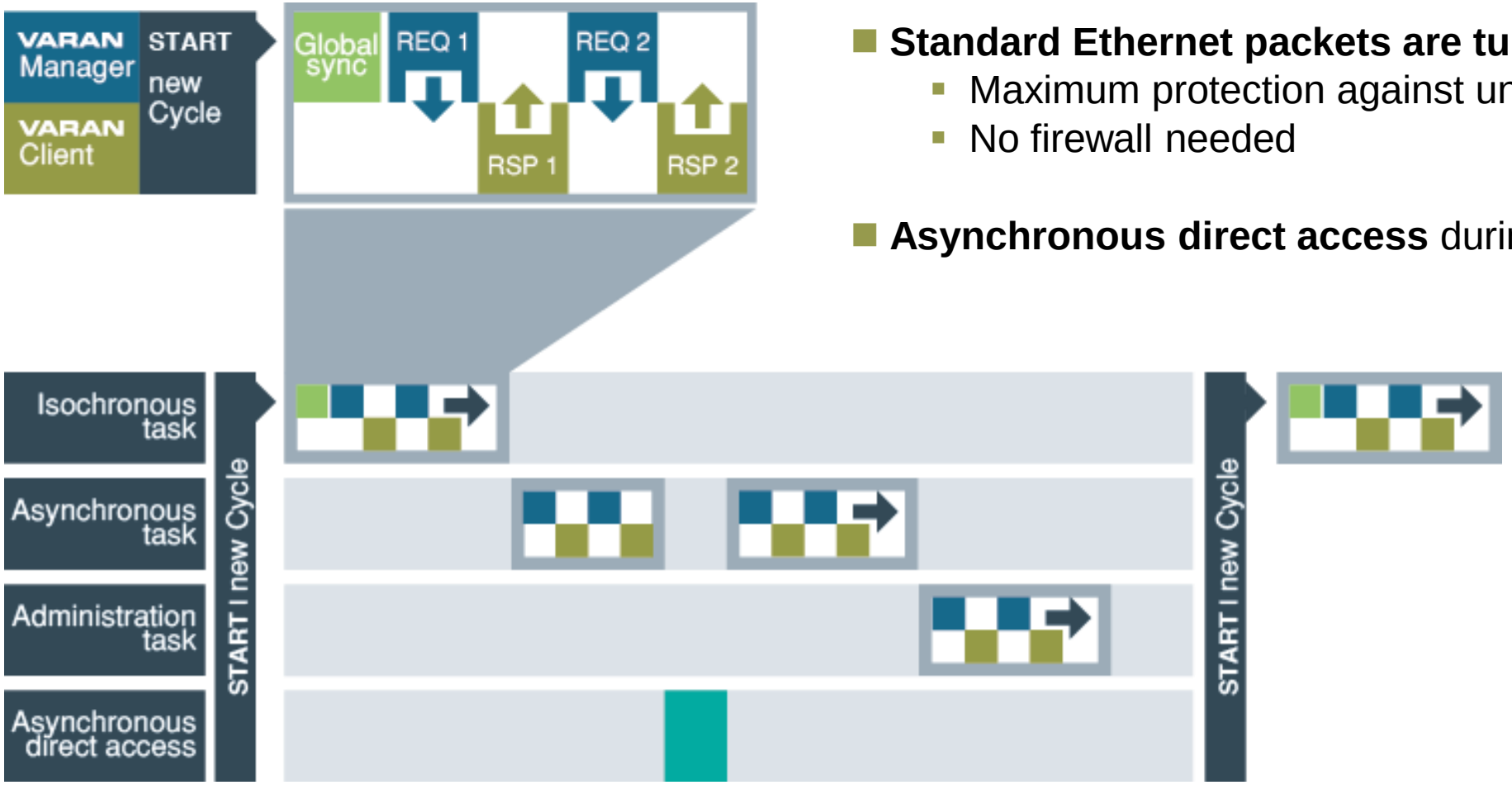


ELECTRONIC IDENTIFICATION LABEL

- Unique identification for each participant



DATA HANDLING: ALL IN GOOD TIME

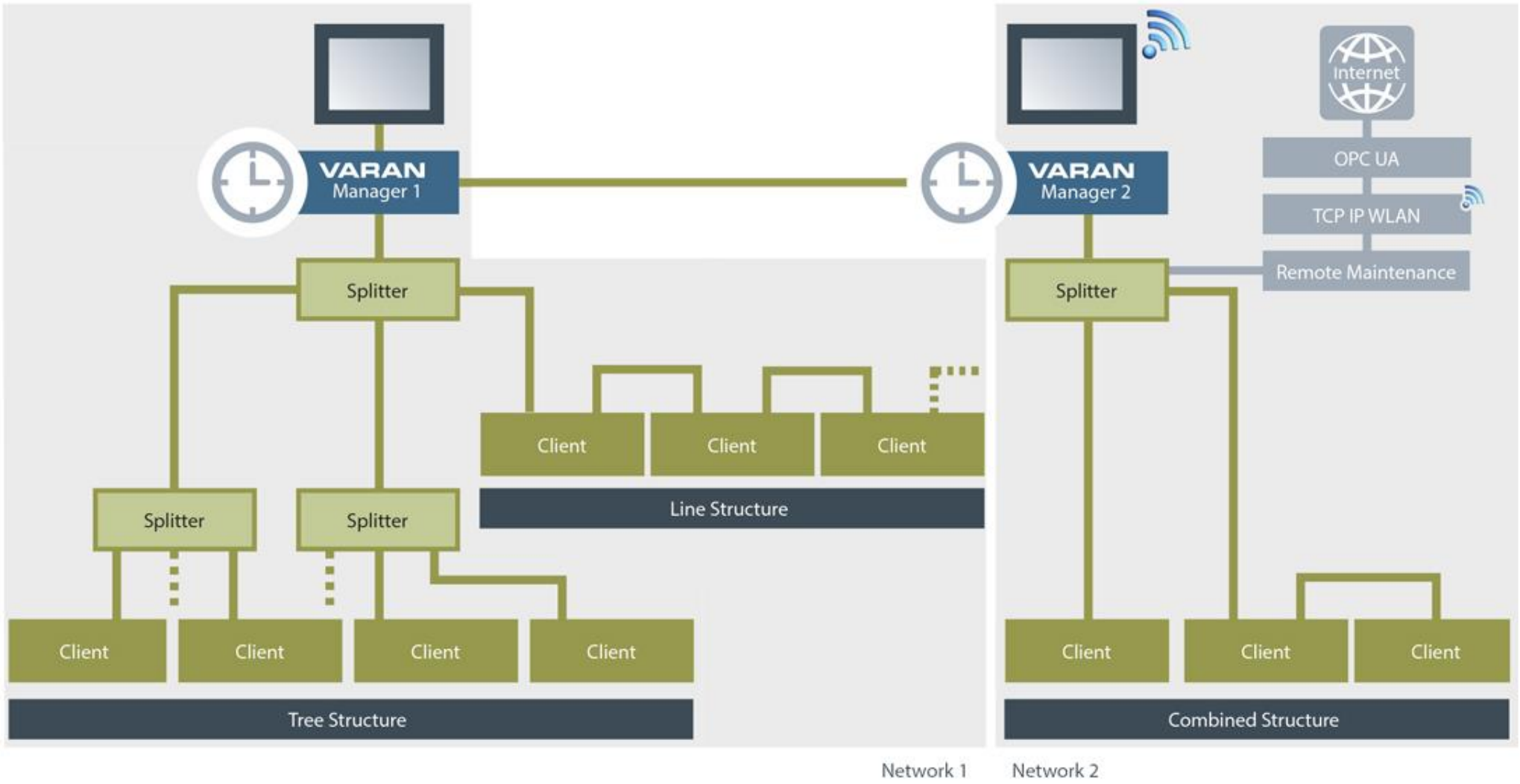


- **Standard Ethernet packets are tunneled**
  - Maximum protection against unauthorized access
  - No firewall needed
- **Asynchronous direct access** during the bus cycle

HIGH PERFORMANCE

Bus cycle time	< 100 µs	
Isochronous access time	2.18 µs	8 I/Os = 1 byte
	5.05 µs	1 Drive 16-byte r/w
Asynchronous direct access	< 25 µs	128 bytes
Synchronicity-inaccuracy	< 100 ns jitter	
	Portable to Gigabit Ethernet without protocol changes	

FLEXIBLE NETWORK TOPOLOGIES

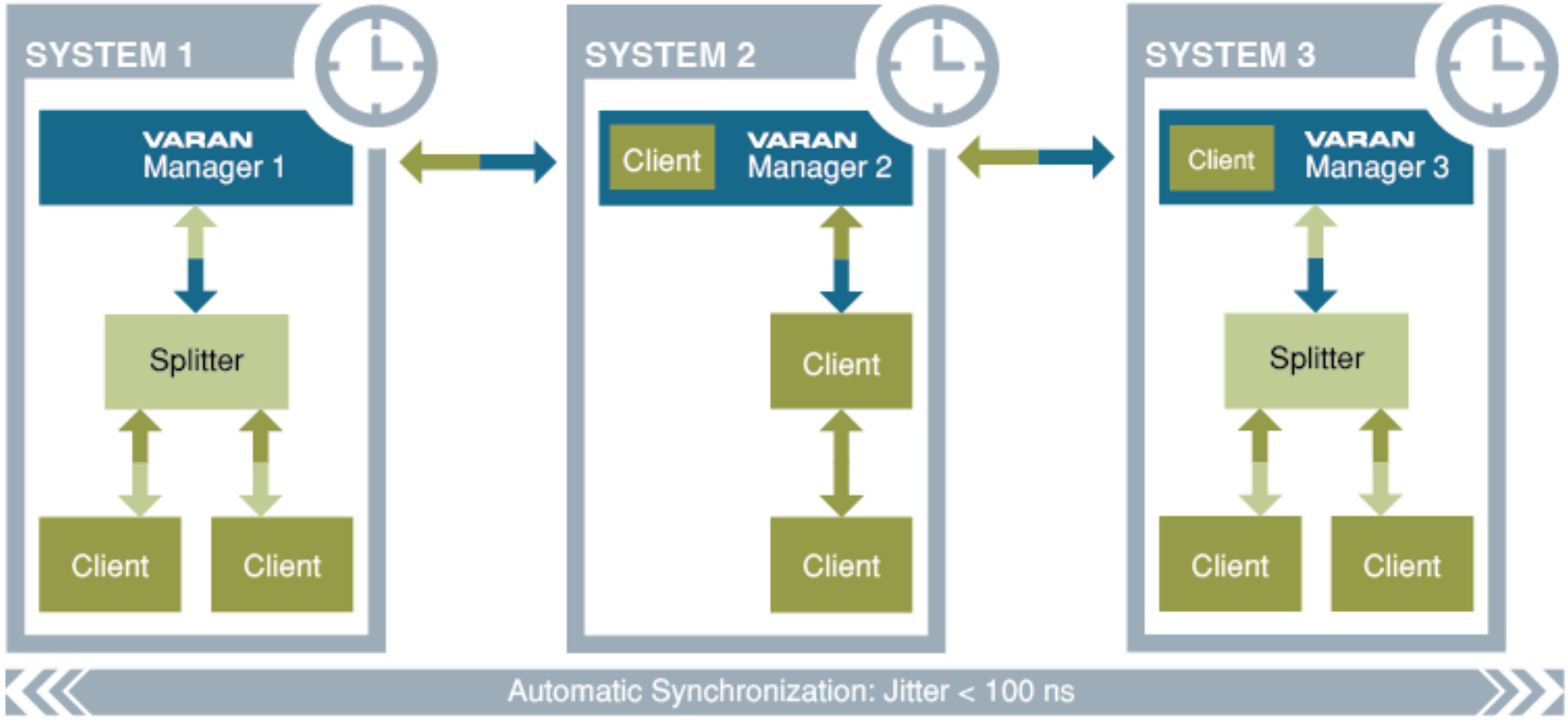


VARAN IS FLEXIBLE

- **Hot Plug Capability**
  Individual VARAN Clients can be removed from the network and reconnected or exchanged during active operation

- **CANopen Integration**
  Simple connection of existing CANopen® devices in the VARAN network

SYNCHRONOUS MULTI-MANAGER SYSTEMS

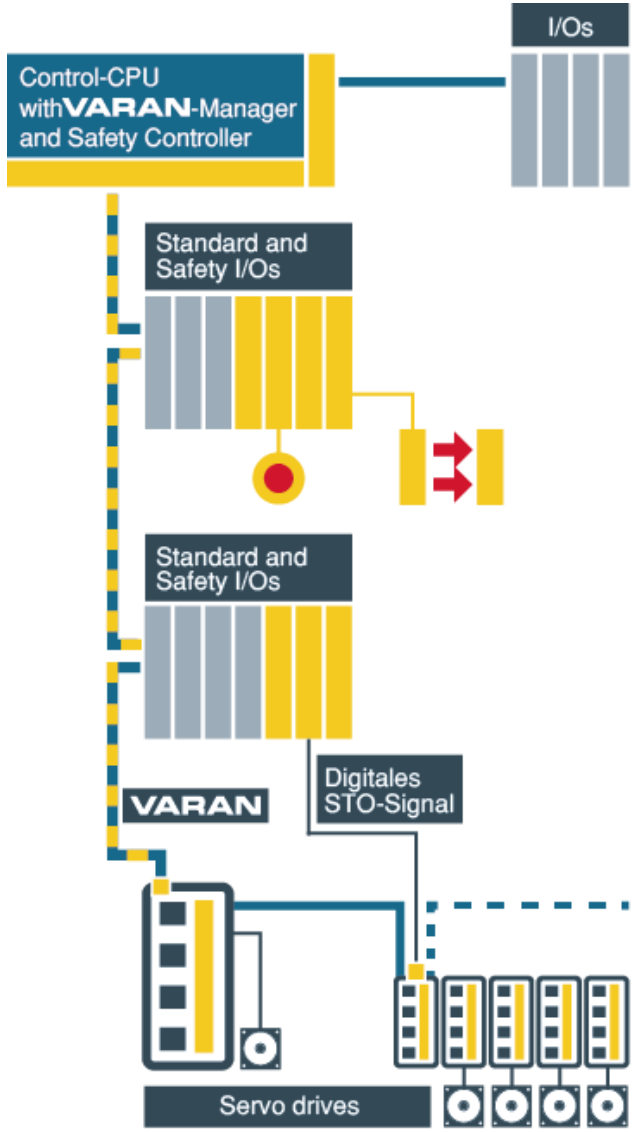


Data exchange and synchronization between machines


VARAN REAL-TIME ETHERNET
SAFETY INTEGRATION

SAFETY OVER VARAN

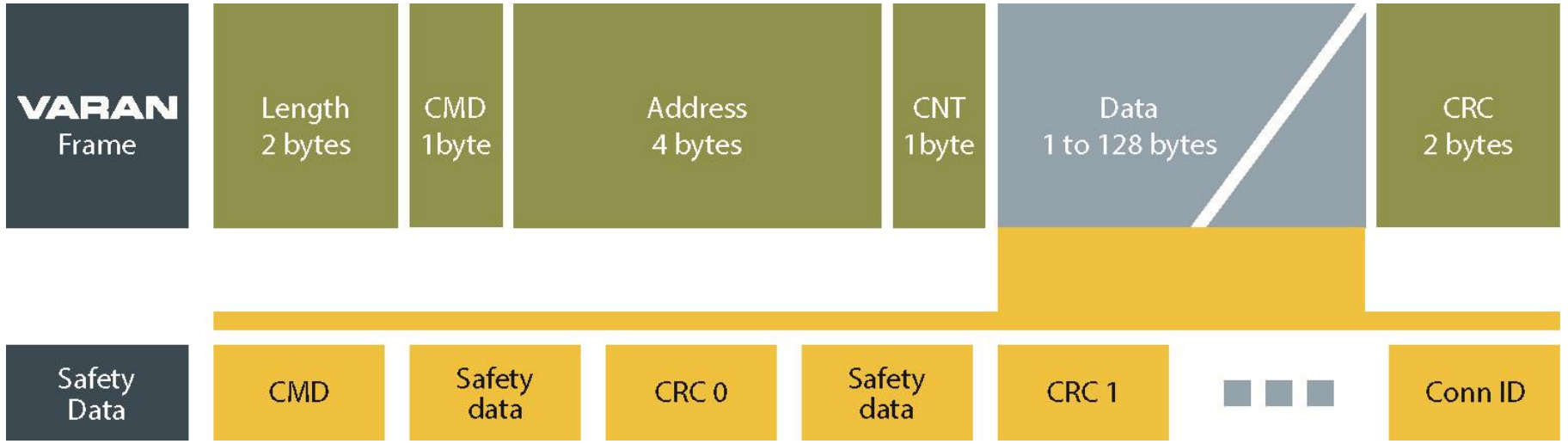
- Data transfer via Black Channel
- Decentralized Safety solutions
- Multi-Manager capable
- SIL 3 according to IEC 62061

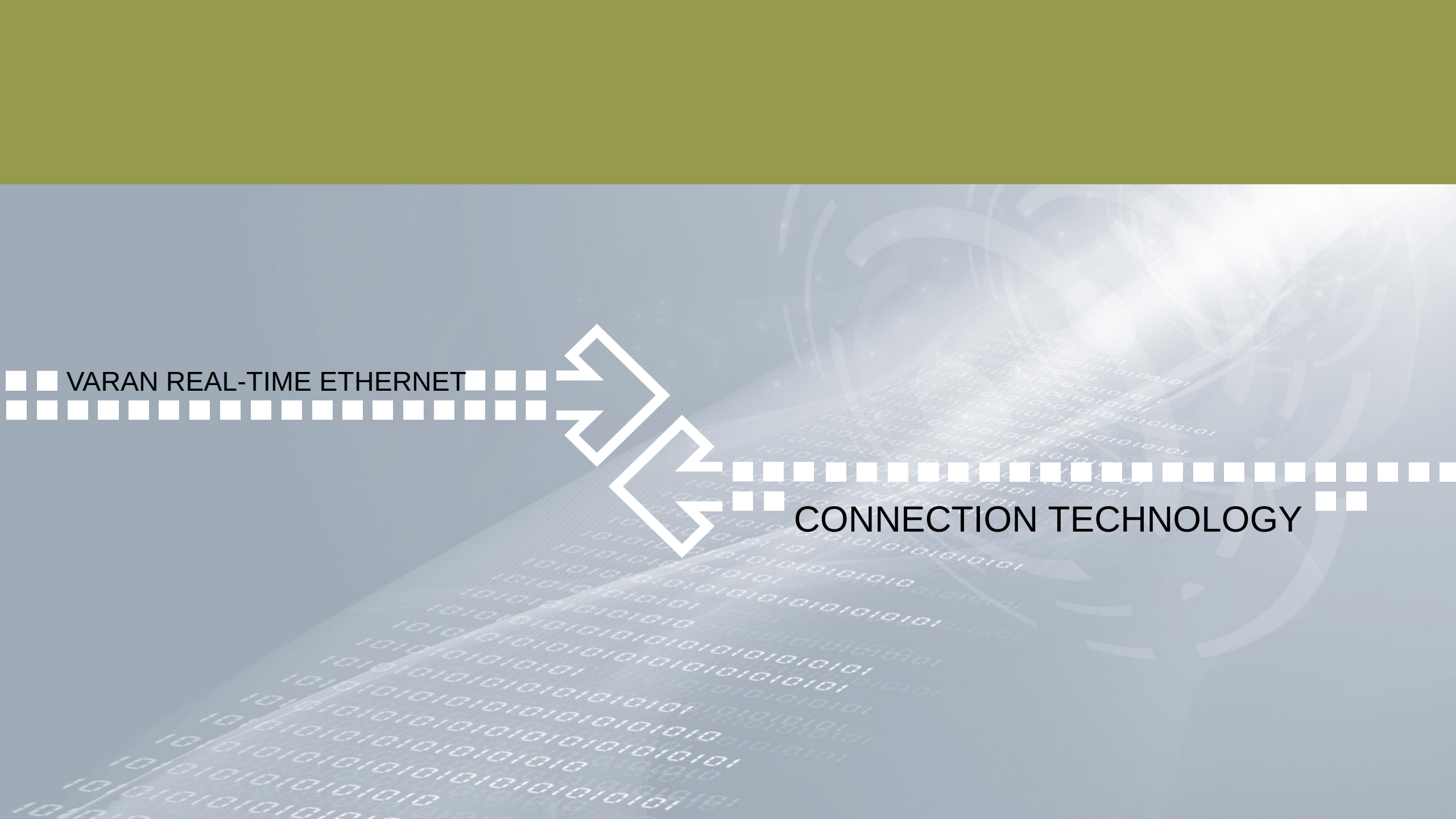


In systems with multi-manager networks, the Safety signals can be transmitted over multiple machines and are then available to the entire production line.

SAFETY OVER VARAN

- VARAN Data Frame
- Safety-oriented data is transferred via Black Channel




VARAN REAL-TIME ETHERNET
CONNECTION TECHNOLOGY

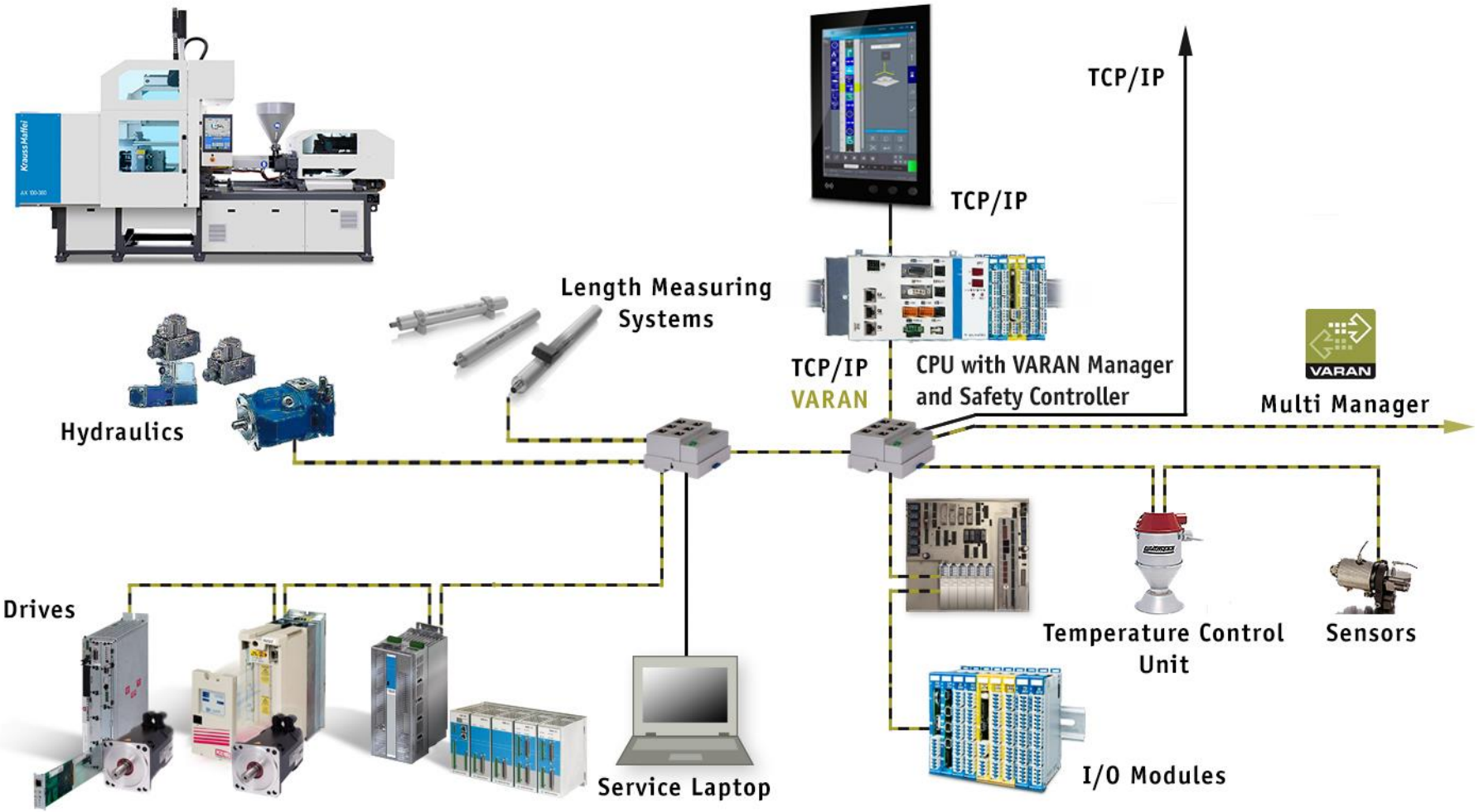
THE OPTIMAL CONNECTION

- Industrial RJ45 (IP 20) connector
- Signal and power supply with hybrid cable
  - M12 connector plug (IP67) up to 2 A
  - 8+4 power/Ethernet connection technology (IP67) up to 10 A
- Industrial Mini I/O (IP20)

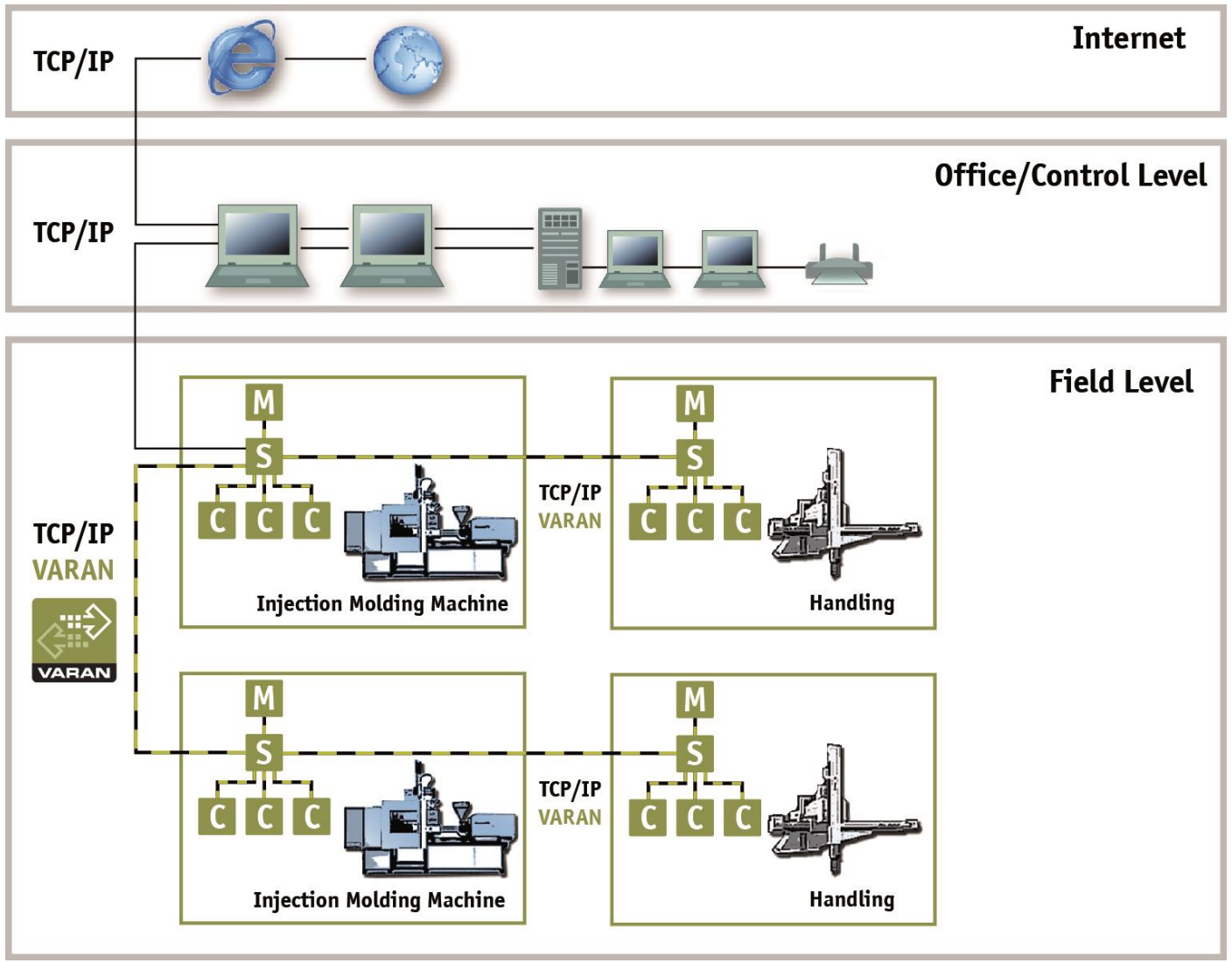
VARAN REAL-TIME ETHERNET

TECHNOLOGY EXAMPLES

VARAN BUS WITHIN THE MACHINE



FROM THE SMALLEST SENSOR TO THE WORLD WIDE WEB



VARAN REAL-TIME ETHERNET

THE VARAN BUS
USER ORGANIZATION

VNO, STRONG TOGETHER

- Founded in 2006, registered organization, independent
- The VNO holds the rights to the open VARAN bus technology
- Control-independent
- Unlimited VARAN technology user rights for members
- Defined connection technology
- Cooperation with organizations such as VDMA, CiA
- CANopen® mapping in VARAN
- Support, maintenance and further development of the standard

STRONG TOGETHER

…with over 50 members

Become a part of the VARAN-BUS-NUTZERORGANISATION!

With **VARAN**, you increase the

PERFORMANCE

and DATA SECURITY

of your application.