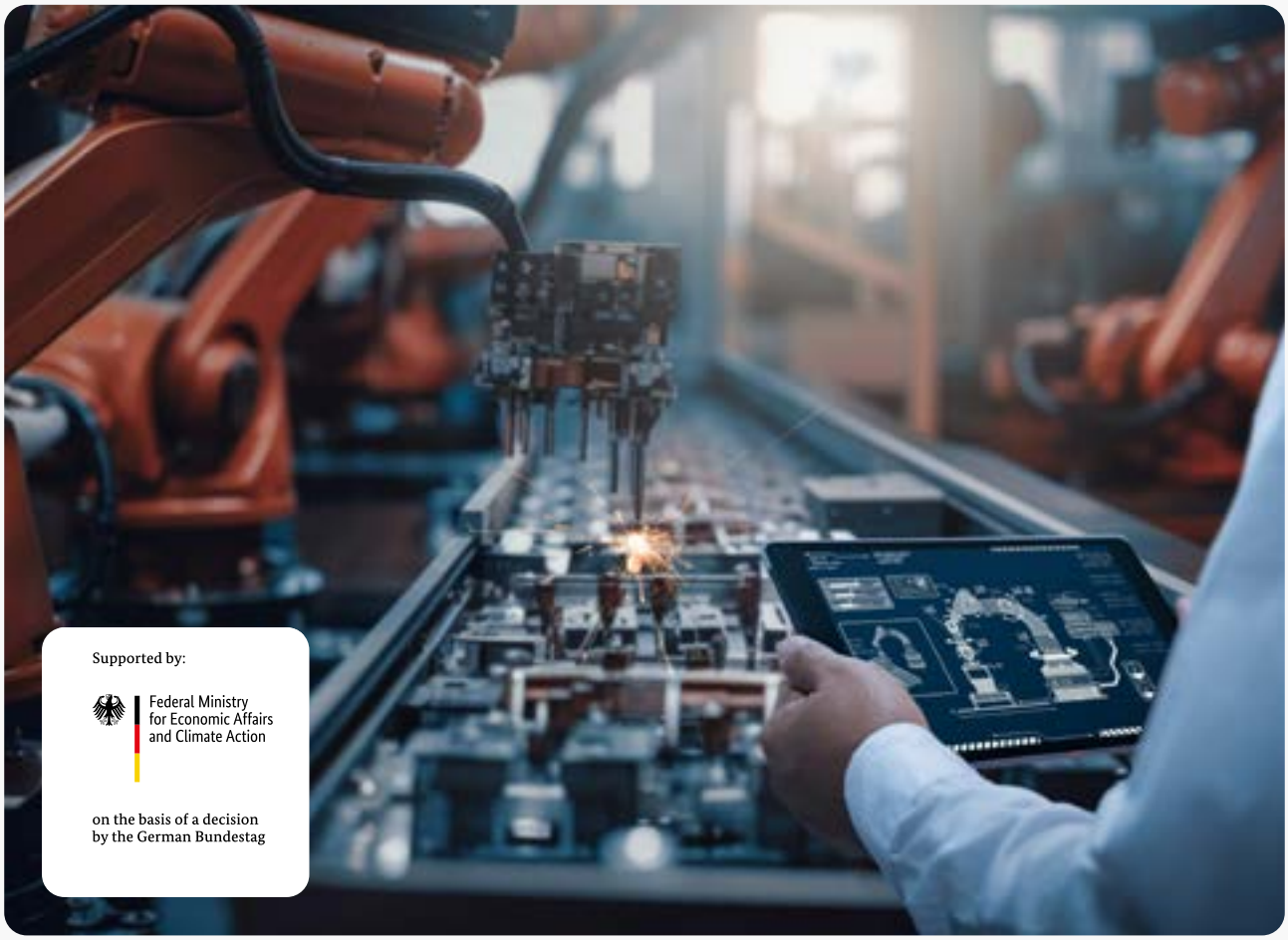
ebs | kumkeo

ELMAR

REAL-TIME FRAMEWORK

Engineered for control. Built for extremes. Ready for tomorrow.



MAXIMUM PERFORMANCE

Be three years ahead of your competitors

ELMAR
REAL-TIME FRAMEWORK

ELMAR is more than just a platform for real-time applications - it is the result of **50,000 hours of specialised software development.** That maximum of performace This sophisticated **real-time architecture** for AMD® Zynq® UltraScale+™ MPSoCs enables low-latency control algorithms (optionally based on Simulink®) to run in parallel with an embedded Linux distribution. A lightweight hypervisor ensures a clear separation between management and real-time control.
The inter-core communication (ICC) developed in-house optimises data exchange between the ARM® cores.
With ELMAR, you benefit from **three years of development expertise** - and are a decisive step ahead of your competitors.

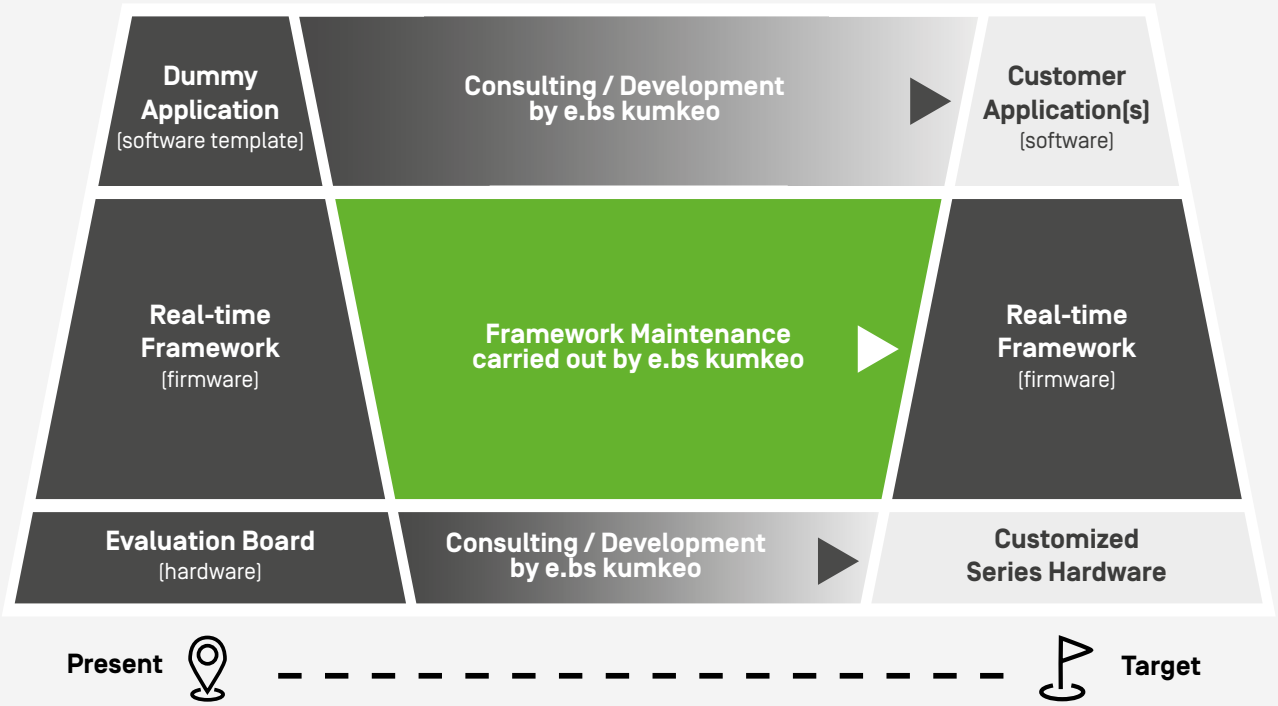
TOP FEATURES

- Powerful, embedded control platform
- Designed for lowest latencies and hard real-time conditions
- Flexible framework for control applications

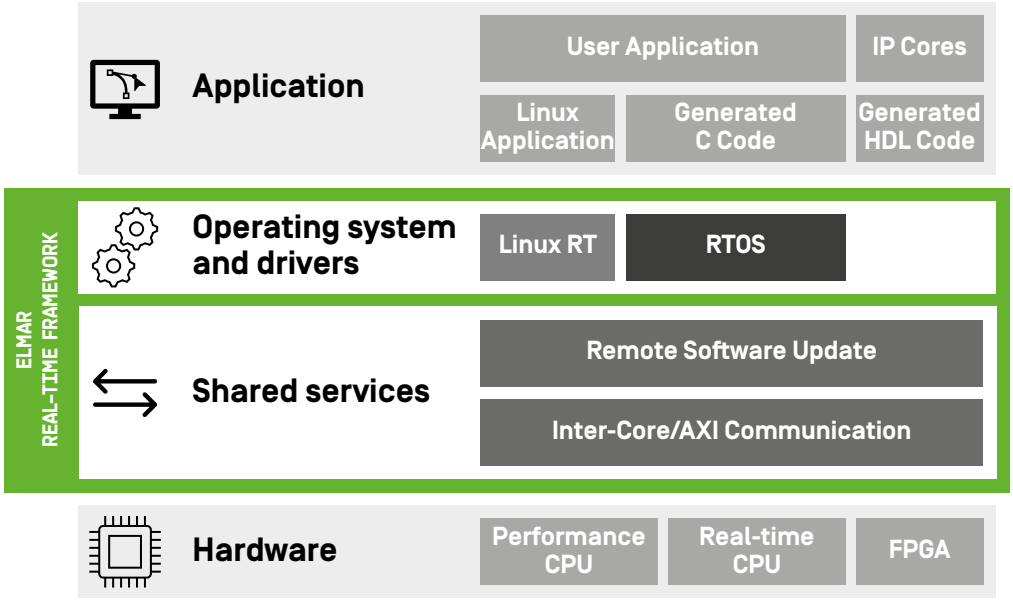
ELMAR PLATFORM ARCHITECTURE

The ELMAR platform for real-time applications comprises:
→ **Prequalified evaluation board**
→ **Real-time framework**
→ **Dummy application**

Configuration for your new application is already provided in the form of an example. This is ideal for using as a template.

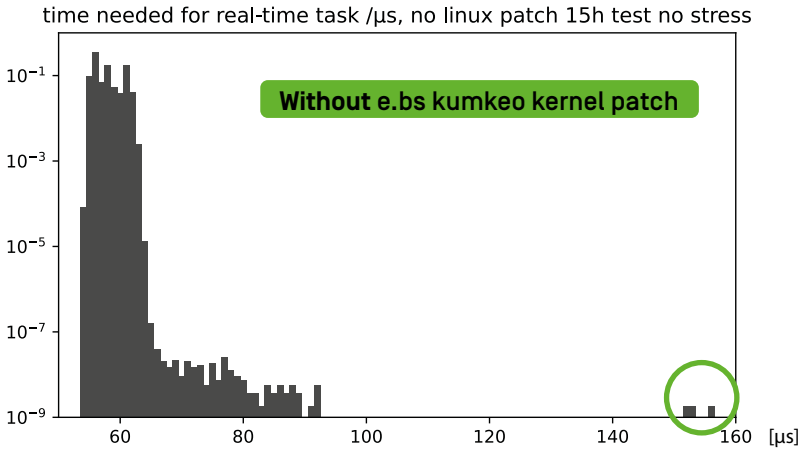


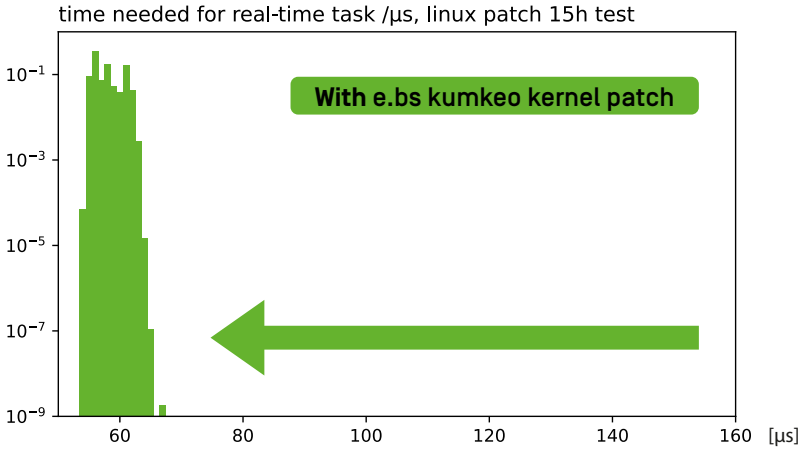
BLOCK DIAGRAM ARCHITECTURE



REAL-TIME FRAMWORK PERFORMANCE

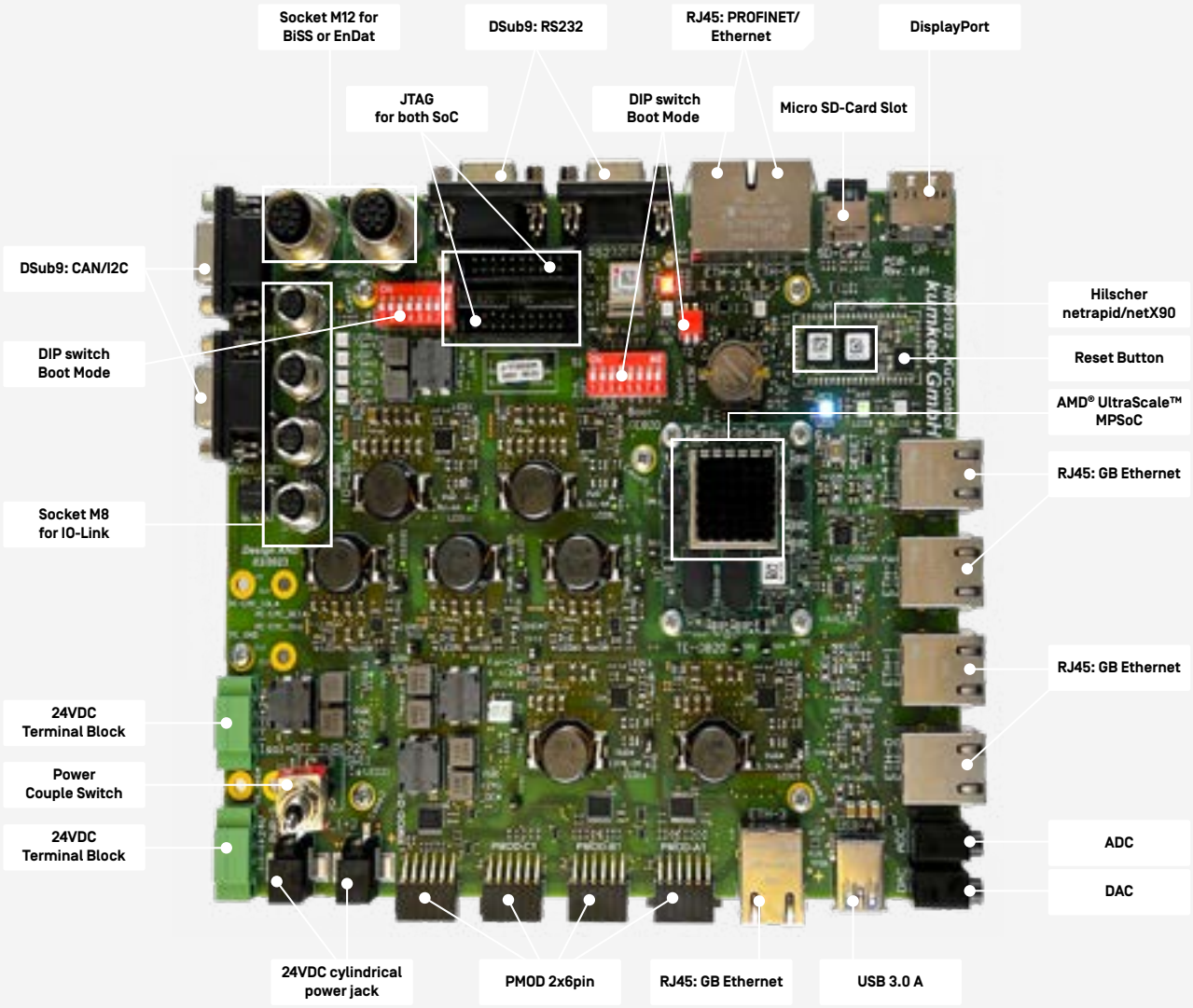
With our **kernel patch** specially designed for the AMD® Zynq® UltraScale+™, we guarantee stable **10kHz inter-core communication** between the real-time cores. This is verified using a complex industrial Simulink® control algorithm.





PREQUALIFIED EVALUATION BOARD

The prequalified evaluation board offers you a **flexible hardware platform** on which to initiate development of the application. Taking center stage is an AMD® Zynq® UltraScale+™ MPSoC, which is available in various versions, depending on the requirements, and is pluggable via a carrier board. Available as a co-processor is the **Hilscher netX 90 SoM**, which supplements the board with field bus functions and sensor interfaces. Prequalification and the expanded temperature range allow the evaluation board to be used for **test benches and prototypes**. Time gained up to completion of the specific hardware can be used for development and testing purposes. The evaluation board can also be used as a basis for specific hardware.



SELECTED EVALUATION BOARD FEATURES

- → Compatible with Trenz Electronic TE-0820/0821 SoM Series*
  - → Dual/Quad Core ARM® Cortex® A53
  - → Dual Core ARM® Cortex® R5
  - → Up to 4GB DDR4-RAM
  - → FPGA up to 256K logic cells
- → 5x Gigabit Ethernet
- → PROFINET/TSN-ready
- → Hilscher netX 90 co-processor
- → Compliant with EMV standards*
- → 10-layer PCB design
- → Size: 200 x 170 x 20 mm

* See datasheet for evaluation board details

ELMAR
EVALUATION BOARD
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Block diagram

OVERVIEW OF SPECIFIC FEATURES

INTER-CORE COMMUNICATION MECHANISM
Synchronized communication of the process image between the ARM® cores on the basis of configurable and prioritization-capable channels.

VIRTUAL NETWORK AND PRIORITIZATION
Option to use a single IP interface outwardly for all ARM® cores. Prioritization according to EtherType via priority queues.

PARAMETER MANAGER
Centralized parameter management in Linux. Editable via web interface or primary controller. Persistent storage on SD card.

HW AND SW WATCHDOG
Configurable watchdog for real-time cores and Linux. Logging of reset reason.

CENTRALIZED LOGGING AND EVENT LOGGING
Central logging of all ARM® cores through syslog in Linux. Expandable to include configurable event messages.

REMOTE SOFTWARE UPDATE
Remote controllable A/B update mechanism; signing and encryption support. Automatic rollback in case of error.

SECURE BOOT
Optimal protection against compromised software through the use of Secure Boot.

WEBSERVER AND IOT SUPPORT
Provision of a web server and REST-API. Touch-optimized web interface for system information and configuration. Ready to connect to cloud/IoT platform.

SIMULINK® TARGET
Use of in-house Simulink® blockset to support the real-time cores. Complete integration into Simulink®; no need to use VITIS®. Supports external mode.

SCALABLE
Our framework runs on all versions of the AMD® Zynq® UltraScale+™ MPSoC series, e.g. AMD® KRIA boards.

YOUR BENEFITS

TIME-TO-MARKET
Take advantage of the market lead - we have already invested 50,000 engineering hours in ELMAR. Instead of starting from scratch, you can rely on a mature, ready-to-use solution and accelerate your sales cycles.

REDUCE COSTS – INCREASE SALES
ELMAR saves you expensive HiL hardware and licence costs. The platform covers product development, rapid prototyping and in-the-loop tests in a single system. This means less investment and faster project launches.

COMBINES THE BENEFITS OF BOTH ENVIRONMENTS
Isolation of Linux from the real-time cores through the use of a hypervisor means that the advantages of both operating systems can be exploited in parallel. Hypervisor latency is <3µs.

PREQUALIFIED EVALUATION BOARD
Our evaluation board is immediately available and can be used as a development platform or within test benches, prototypes and batch production.

FRAMEWORK MAINTENANCE CARRIED OUT
We continually enhance ELMAR and make updates available in regular cycles. In the case of security patches, we provide a rapid response.

FOCUS ON CORE COMPETENCIES
While you concentrate on developing your application, we undertake the development of and any necessary adjustment to the real-time framework and also support you throughout the entire process.

EXPERIENCE GAINED THROUGH WORK IN THE FIELD
Our real-time framework is already in productive use in a sector industrial application and is already used in series.

TECHNICAL REQUIREMENTS FOR USING ELMAR

Depending on the respective scenario and application area, the requirements for using ELMAR are as follows:

- → 24V DC power supply
- → JTAG debugger (e.g. Olimex)
- → RS-232 to USB adapter
- → SD card with a capacity of at least 4GB
- → Host computer with
  - → administrator access to the SD card
  - → configurable network interface for SSH access
  - → Python 3.11 or later
  - → 500GB free disk space
  - → at least 16GB RAM
- → AMD® VIVADO* (at least 2021.2)
- → AMD® VITIS (at least 2021.2)
- → Mathworks® MATLAB® Simulink® (at least 2021b with the following toolboxes:
  - → Simulink® Coder
  - → Simulink® Embedded Coder
  - → Simulink® HDL Coder
- → Recommended: NTP server

*Note: Depending on the Zynq® UltraScale+™ MPSoC used, the free VIVADO Standard Edition may also be used.

ELKE - EFFICIENCY BOOST FOR YOUR ELMAR SYSTEMS

ELKE (ELMAR Live Configuration Editor) is the central configuration tool for ELMAR - developed to reduce complexity and shorten project runtimes.
Until now, the configuration of ELMAR systems has required several extensive and consistent files. Manual maintenance is time-consuming, error-prone and slows down the development process. With ELKE, you can automate this step: The tool generates all required configurations consistently, reliably and significantly faster. This ensures quality, reduces costs and increases planning reliability in your projects.

Why ELKE?

- → **Automation instead of manual labour:** Saves time and reduces sources of error.
- → **Standardised configurations:** Increases reproducibility and maintainability.
- → **Faster project start:** Shorter setup times, immediate operational readiness.
- → **Cross-platform usability:** Compatible with Windows and Linux.
- → **Proven in practice:** Developed in close consultation with users.

Conclusion

ELKE brings structure, speed and security to the configuration of your ELMAR systems - a clear added value for your company.

TRIGLOG – PROFESSIONAL DATA ACQUISITION WITH ELMAR

We put you in a position to trasnform your ELMAR platform into a powerful, event-driven data collection system. Triglog brings professional-grade data acquisition to your industrial applications with:

→ **High-Speed Sampling:** Capture data at up to 10kHz with zero data loss
→ **Intelligent Triggering:** Event-driven data collection that captures exactly what matters
→ **COMTRADE Export:** Direct output to IEEE standard format for power system analysis
→ **Multiple Export Formats:** Flexible output options beyond COMTRADE for any workflow
→ **Continuous Operation:** Real-time data collection without interrupting your applications

Whether you're analyzing power systems, monitoring industrial processes, or conducting research, Triglog delivers the precision and reliability you need with industry-standard output formats.
Ready to elevate your data collection capabilities? Triglog is now available on the ELMAR platform.

ELMAR ORDERING INFORMATION

ELMAR consequently tailores to your specific requirements.
Basically, the platform is available in the following versions:

VERSION	ITEM NO.	SCOPE
ELMAR complete	4260629980152	Evaluation board Real-time framework Dummy application
ELMAR starter-kit	4260629980169	ELMAR complete, additionally with: → 24VDC power supply incl. cable → JTAG debugger → RS-232 to USB adapter → SD card 8GB → CAT6 Ethernet cabel
ELMAR smart	4260629980176	Real-time framework Dummy application
ELMAR pure	4260629980183	Evaluation board

ELMAR DEEP DIVE

„ELMAR DEEP DIVE“ is our format that provides brief insights into the top features and areas of application of our ELMAR Real-Time Framework.
Take a look at the first episodes on our YouTube Channel.

ELMAR
>>>
DEEP DIVE

STILL HAVE ANY QUESTIONS?

We would be delighted to provide you with further information. Please visit kumkeo.de/elmar or send an email to our ELMAR team at service@kumkeo.de.

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