

Bernhard David

Senior Embedded Software Engineer
System Architect | Railway & Safety Systems



Professional Profile

Graduate Engineer (University of Applied Sciences) in Technical Physics with more than 45 years of experience in embedded software development, real-time systems, and safety-critical applications.

Extensive experience in the railway industry with a focus on train communication systems, brake control systems, safety layers, fieldbus technologies, and standards-compliant software development according to EN 50128, EN 50129, EN 50159, and IEC 61375.

Strong background in software architecture, system analysis, requirements engineering, communication protocols, integration, testing, and certification support. In-depth expertise in low-level software development for microcontroller, PowerPC, and real-time platforms.

Education

Graduate Engineer (FH) in Technical Physics
Munich University of Applied Sciences
Graduated: 1976

Postgraduate Studies in Industrial Engineering
Munich
Graduated: 1978

Core Competencies

Embedded Software Engineering

- Embedded software development in C/C++
- Low-level hardware-oriented programming
- Real-time and system programming
- Software architecture and system design
- Object-Oriented Analysis and Design (OOA/OOD)
- Re-engineering of existing systems
- Code reviews and documentation reviews

Railway & Safety Systems

- Brake control systems

- Train communication systems
- Safety Layer SDTv2
- SIL2 / SIL3 applications
- Platform and certification testing
- Diagnostic and safety concepts
- Requirements engineering

Communication Systems

- TCN
- MVB
- WTB
- TRDP
- FIP
- CIP
- CAN
- HDLC / LAPD
- DECNET
- X.25 / Datex-P

Testing & Quality Assurance

- Unit and integration testing
 - Conformance testing
 - Certification support
 - Hardware testing
 - Test automation
 - Troubleshooting and root-cause analysis
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Programming Languages

- C
 - C++
 - Assembly
 - Python
 - Perl
 - Pascal
 - PLM
 - Object-Chill
 - REXX
 - XML
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Operating Systems

- Linux (Debian, Ubuntu)

- Windows
 - VxWorks
 - RUBUS
 - RMOS
 - RSX
 - RT-11
 - VMS
 - BS1000 / BS2000
 - XENIX
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Development Tools

- Enterprise Architect
 - IBM Rhapsody
 - ASCET
 - Eclipse
 - Visual Studio
 - CODESYS
 - Jira
 - SVN
 - PVCS
 - CANalyzer
 - Understand C++
 - Lint
 - Wireshark
 - MKS
 - Innovator
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Hardware Platforms

- TRICORE / AURIX
 - PowerPC
 - Siemens C167
 - XC196
 - XMC1000
 - PC/104
 - Raspberry Pi
 - Intel x86
 - DEC PDP-11
 - MicroVAX
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Industry Experience

- Railway Engineering
 - Automotive
 - Industrial Automation
 - Safety-Critical Systems
 - Telecommunications
 - Logistics
 - Medical Technology
 - Defense Systems
 - Test and Measurement Systems
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Selected Projects

2025 – 2026

Web Infrastructure Modernization

- Migration of an existing web presence to IONOS
- Design, deployment, and operation of a self-hosted web server infrastructure
- Implementation of Apache2, Caddy, DynV6, and Linux-based services
- Utilization of modern AI-assisted tools for administration and development

Technologies:

Termux, Apache2, Caddy, Raspberry Pi, Samsung Galaxy S7, FRITZ!Box, Linux

2023

Specifications for Brake Control Units

- Development of specifications for testing systems
 - Support of certification processes
 - Optimization of compliance and verification documentation
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2022

Development of an MVB Component in a TCN Environment

- Development of a communication module
- Definition and implementation of an API library
- Integration into existing TCN architectures

Technologies:

C, UML, FreeRTOS, Understand C

2020 – 2021

Analysis and Optimization of Railway Systems

- Investigation and resolution of complex software defects
- Analysis of Jira issues and change requests
- Bug fixing in production software modules
- Execution of TRDP and SDTv2 tests

Technologies:

CODESYS, Wireshark, IBC Designer, Jira

2017 – 2019

Platform and Certification Testing for Brake Systems

- Specification and execution of platform tests
- Evaluation of test results
- Certification support activities
- Conformance testing for CIP Safety Layer implementations

Technologies:

Python, CODESYS, Test Automation

2010 – 2016

Software Architecture and Safety Concepts for High-Speed Trains

- Definition of software architectures
- Development of secure communication mechanisms
- Design of diagnostic concepts for brake control units
- Development of bootstrap loaders
- Integration of MVB, CAN, and WTB systems
- Compliance documentation according to EN 50128 and EN 50129

Technologies:

ASCET, Enterprise Architect, Eclipse, C++, Python, SVN

1998 – 2009

Development of Communication Systems for Railway Vehicles

- MVB and FIP communication stacks
- Porting to multiple target platforms
- Real-time operating systems
- Integration and testing of distributed systems
- API development
- Fieldbus communication

Technologies:

C, C++, Assembly, VxWorks, RUBUS, CAN, MVB, FIP

1980 – 1998

Development Telecommunications, Industrial Automation, Medical Technology

- EWSD telecommunications systems
- X-ray diagnostic systems
- Access control systems
- Logistics and automated warehouse systems
- Quality assurance and testing systems
- Embedded systems and fieldbus applications

Technologies:

C, Pascal, Fortran, Assembly, RSX, VMS, XENIX

Languages

German: Native Speaker

English: Professional Working Proficiency

Availability

Available for freelance project assignments in the following areas:

- Embedded Software Development
- Railway Systems
- Safety-Critical Systems
- Software Architecture
- Requirements Engineering
- System Integration and Testing
- Certification Support