

Teo Mrnjavac

Staff Software Engineer — Distributed Systems & AI/ML Infrastructure

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Distributed Systems · HPC · AI/ML Infrastructure · Go · C++ · Kubernetes
CERN LHC Run 3: 3.5 TB/s data taking across 100k+ processes

Professional Experience

CERN

Geneva, Switzerland

Staff Software Engineer - Distributed Systems & Infrastructure

2017–2025

Primary architect, lead developer, and long-term owner of AliECS, the ALICE Experiment Control System: the operator-facing control and orchestration layer for LHC Run 3 data taking. AliECS provides state machine control, resource management, topology customization, task configuration management, and workflow orchestration across a computing environment spanning 100k+ processes on 570 heterogeneous nodes and up to 3.5 TB/s of raw detector data.

- Designed and built Go/C++ services, gRPC/protobuf APIs, control plane components, orchestration logic, operator tooling, and reliability mechanisms for production scientific infrastructure.
- Built orchestration, resource management, service discovery, configuration, and messaging layers for large-scale distributed data taking workflows, including custom control-plane services, gRPC/protobuf APIs, Consul, Kafka, and production Linux infrastructure.
- Owned core systems from architecture and implementation through deployment, debugging, operations support, and long-term maintenance.
- Orchestrated detector control, trigger control, detector readout, and stateful online processing workflows involving custom PCIe readout hardware, radiation-hardened electronics, InfiniBand-connected infrastructure, and GPU-enabled compute.
- Designed, deployed, and operated bare metal provisioning infrastructure for ALICE O2/FLP systems using Foreman, Kickstart, Ansible, and Linux/RHEL, from lab validation through production farm deployment.
- Built and owned a greenfield Go/Ansible installer and deployment system for the ALICE O2 data taking software suite, supporting single node simulated readout, custom hardware readout setups, detector commissioning, vertical slice deployments, and production O2/FLP farm rollout.
- Maintained CI/CD and deployment workflows using Jenkins, GitLab CI, Docker, in-house build tooling, conditional inventories, and release/deployment automation.
- Collaborated directly with physicists, DAQ experts, detector teams, infrastructure teams, and operations shifters under high availability production constraints.

Blue Systems GmbH

Remote

Software Engineer

2013–2017

Original author and maintainer of Calamares, a distribution-independent Linux system installer with a modular C++/Qt and Python plugin architecture.

- Designed APIs and plugin interfaces for C++, Python, and Qt-based systems.
- Maintained release processes, issue tracking, CI/developer tooling, and contributor workflows for open source projects.
- Worked across Linux system integration, storage/partitioning tooling, installer workflows, packaging, deployment, and debugging.
- Operated supporting development infrastructure for issue tracking, CI, crash reporting, static analysis, and release workflows.
- Delivered a robust, extensible, cross-distribution installer solution adopted by Debian, Kubuntu, Manjaro, and others, working with a global community of developers and system integrators.

ITS Alessandro Volta · IAL Friuli-Venezia Giulia · University of Trieste

Multiple locations, Italy

Technical Lecturer and Instructor

2007–2016

Delivered professional courses on Java, C++, object-oriented programming, software engineering, statistical analysis, network services, interoperability, operating systems, and UNIX and Linux system administration.

KDE

Remote

Google Summer of Code Student Developer

2009–2011

Selected for three consecutive paid Google Summer of Code projects with KDE; implemented AmaroK music player features spanning playlist management, on-the-fly transcoding, and tablet/handset support.

Certifications

Google Cloud Certified Professional Machine Learning Engineer

Google · Credential ID: d5c35ca49e7d465c95c61a85114abbcb

2026

Certified Kubernetes Administrator (CKA)

Cloud Native Computing Foundation (CNCF) · Credential ID: LF-nsl1m5qxro

2025

Skills

Core	Distributed systems · Infrastructure engineering · ML/AI platform infrastructure · System design · Cluster architecture · High-performance computing (HPC) · Scientific computing · Real-time data acquisition · Control systems · Bare-metal infrastructure automation · Data pipelines · Production operations
Programming	Go, C++, Python, SQL, Bash / shell
Platforms	Linux · Red Hat Enterprise Linux (RHEL) · Kubernetes · Talos Linux · Proxmox · Docker / OCI · Google Cloud Platform (GCP) · Oracle Cloud Infrastructure (OCI) · Gemini Enterprise Agent Platform / Vertex AI
Infrastructure	GitOps · Helm · Crossplane · Infrastructure as Code (IaC) · Ansible · Foreman · Kickstart · Jenkins · GitLab CI · CI/CD · Mesos · Consul
Observability	Prometheus · Grafana
Networking & compute	InfiniBand · Linux networking · GPU workloads
Messaging & RPC	Kafka · gRPC · Protocol Buffers / protobuf
Human languages	English (C2) · French (B2) · Italian (native) · Croatian (native)

Open Source and Independent Technical Work

Independent infrastructure lab

Remote

Infrastructure platform engineering and operations

2015–present

Long-running production-style infrastructure platform spanning self-hosted Supermicro hardware and Oracle Cloud Infrastructure, with Proxmox virtualization, Talos/Kubernetes, Prometheus/Grafana observability, GitOps-managed workloads, ZFS/NVMe-oF storage, GPU/LLM workloads, Intel X710 10GbE networking, VFIO passthrough, virtualized OpenWrt routing, and Tailscale remote access.

Free/Open Source software contributions

Remote

KDE e.V. member, core contributor to KDE, Qt, Amarok, and Tomahawk

2008–2017

KDE · CERN

Remote

Google Summer of Code and Google Code-in organization administrator and mentor

2012–2016, 2020

RiWireless

Rijeka, Croatia

Linux/network administration and long-range 802.11 wireless access-node setup and operation

2002–2005

Education

University of Trieste

Trieste, Italy

M.Sc. Computer Science

2009–2012

110/110 cum laude

University of Trieste

Trieste, Italy

B.Sc. Computer Science

2006–2009

110/110 cum laude

Publications and talks

- “AliECS: A New Experiment Control System for the ALICE Experiment,” CHEP 2023, EPJ Web of Conferences 295, 02027, 2024.
- “The new ALICE data acquisition system (O2/FLP) for LHC Run 3,” CHEP 2023, EPJ Web of Conferences 295, 02029, 2024.
- “AliECS: A New Experiment Control System for the ALICE Experiment,” ICALEPCS 2019, JACoW, 2020.
- “Towards the ALICE Online-Offline (O2) Control System,” CHEP 2019, EPJ Web of Conferences 214, 01033, 2019.