Max Ritter

Senior Freelance Software Engineer - AI | Data | Cloud | DevOps

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German citizen · German · English · www.maxritter.net

Remote only · Clients worldwide · Available by arrangement · Rate on request

Journey

08/2021 - Present	**Senior IT freelancer** · *maxritter.net* - AI, LLMs, data, cloud and DevOps
08/2020 - 07/2021	**Senior consultant** · *Netlight* - Swedish consultancy, several clients
07/2019 - 07/2020	**CTO and co-founder** · *Wemolo* - today 250 employees in five countries
03/2018 - 06/2019	**Lead engineer and team lead** · *ParkHere* - IoT startup for smart parking
09/2017 - 02/2018	**First employee** · *Bleenco* - machine learning and computer vision startup
2015 - 2017	**Master of Science** · HS Pforzheim - Computer Engineering
2011 - 2015	**Bachelor of Science** · HS Ravensburg-Weingarten - Applied Informatics

Profile

Senior freelance software engineer and technical advisor with industry experience since 2017 in AI, cloud, data and DevOps. I build text and voice agents with large language models (LLMs), retrieval-augmented generation (RAG) and the Model Context Protocol (MCP). I help engineering teams use Claude Code and Codex effectively, including through my product QualityLayer. My experience spans Amazon Web Services (AWS), Microsoft Azure, machine learning, computer vision and embedded systems. I take technical decisions through implementation, testing and operation.

Professional Experience (Projects)

02/2026 - 10/2026
dialpad.com

Senior AI Engineer and Technical Advisor (Freelancer)
Dialpad (US, Agentic Platform)

Developed a modular Python voice/text agent-runtime prototype with LiveKit, SIP/WebRTC, STT/LLM/TTS, transfers, DTMF and interruption handling. Built latency, behavior, task-completion and cost evaluations. Developed the MCP Agent Builder for authoring, integrations, existing-agent adoption, OAuth, tenant isolation, API contracts and durable state; deployed and tested it as an internal staging beta.

Advised Telephony Engineering and supported QualityLayer, Claude Code and Codex adoption through codebase context management, plan-implement-test-review workflows, CI/CD, PR automation, playbooks, workshops, hands-on labs and pair programming.

Technologies:

- **Voice AI** (LiveKit Agents, SIP, WebRTC, STT, LLMs, TTS, DTMF)
- **Python Backend** (asyncio, Pydantic, Starlette, REST, gRPC, SQLite)
- **Agent Builder** (MCP, OAuth 2.0, JWT, Multi-Tenancy, Durable State)
- **Quality & Observability** (Evals, Regression, OpenTelemetry, Prometheus)
- **Cloud & Delivery** (Google Cloud, Kubernetes, Docker/OCI, Bazel, CI/CD)
- **Agentic Engineering** (Claude Code, Codex, QualityLayer, Hooks, Prompts)
- **Context Engineering** (RAG, Vector Stores, Codebase Embeddings)

07/2025 – 01/2026
oew-breitband.de

Senior AI, Data and Cloud Engineer (Freelancer)
OEW Breitband GmbH (DE, Telecommunications)
Architected and implemented a data integration and intelligent document search platform for Germany's government-subsidized fiber optic expansion program in Baden-Württemberg. Built ETL pipelines aggregating multi-source data from CRM and ERP systems into a centralized data lake with medallion architecture. Implemented address validation using event-driven serverless architecture on AWS. Designed an AI-powered search engine using Amazon Bedrock Knowledge Bases with vector embeddings, OpenSearch Serverless and Reranking.

Technologies:
- **Agentic AI** (AWS Bedrock, Vector Embeddings, OpenSearch Serverless)
- **Event-Driven Architecture** (Python, EventBridge, Step Functions)
- **Data Engineering** (AWS Glue, RDS PostgreSQL, S3 Data Lake, Parquet)
- **Infrastructure-as-Code** (AWS CDK, TypeScript, Terraform, CI/CD, ECS)

11/2024 – 06/2025
boehringer-ingelheim.com

Senior AI, Data and Cloud Engineer (Freelancer)
Boehringer Ingelheim (DE / US, Pharmaceutical)
Architected and implemented an AI agent platform using Retrieval Augmented Generation (RAG) to enhance clinical data insights. Established CI/CD pipelines for LLM applications using CDK and Jenkins, reducing deployment times. Implemented comprehensive observability solutions that increased agent reliability across pharmaceutical environments. Designed scalable AI workflows with advanced orchestration that optimized context handling for enterprise data sources.

Technologies:
- **AI Agents** (Python, LangGraph, Bedrock, Smolagents, Streamlit)
- **LLM Operations** (Tracing, Testing, Evaluation, LangSmith, LangFuse)
- **Infrastructure-as-Code** (AWS CDK, Terraform, TypeScript, Jenkins)
- **Vectors, Embeddings, RAG** (OpenSearch, pgvector, PDF Extraction)

07/2024 – 10/2024
company.marc-o-polo.com

Senior Cloud, Data and DevOps Engineer (Freelancer)
Marc O'Polo (DE, E-Commerce / Retail)
Optimized the company's Data Lakehouse architecture built on Airflow, Spark and Dremio, improving query performance and reducing operational costs. Transformed infrastructure management with Terraform-based automation, minimizing deployment errors. Enhanced Kubernetes cluster stability through advanced monitoring and autoscaling, decreasing system downtime. Redesigned ETL pipelines for increased reliability, ensuring consistent completion of the core data flows supporting retail analytics.

Technologies:
- **Kubernetes** (AWS EKS, Helm, Grafana, Prometheus, Autoscaling)
- **Infrastructure-as-Code** (Terraform, AWS CDK, GitOps, CI/CD)
- **ETL Pipelines** (Airflow, EMR, Spark, PySpark, Python, Delta Lake)
- **Observability** (CloudWatch, Elastic Stack, Grafana, AlertManager)

04/2023 – 06/2024
boehringer-ingelheim.com

Senior AI, Cloud, Data and DevOps Engineer (Freelancer)
Boehringer Ingelheim (DE, Pharmaceutical)
Developed an analytics platform for clinical trials that reduced operational decision time and improved trial efficiency. Engineered scalable Python microservices that processed complex trial data with high reliability. Implemented AWS CDK infrastructure that automated deployment tasks and optimized cloud resources. Created efficient ETL pipelines that transformed raw clinical data into insights for trial teams. Trained and

04/2023 – 06/2024
continued · Boehringer Ingelheim

deployed specialized LLMs that answered complex clinical queries, supporting critical decision-making processes.

Technologies:

- **Large Language Models** (Fine-Tuning, LangChain, Azure OpenAI)
- **Python Backend** (FastAPI, OpenAPI, Pydantic, Open-/ElasticSearch)
- **Infrastructure-as-Code** (AWS CDK, TypeScript, CloudFormation)
- **ETL Pipelines** (AWS Glue, Step Functions, Pandas, PySpark, Airflow)

03/2022 – 03/2023
burda.com

Senior Cloud, Data and DevOps Engineer (Freelancer)
Hubert Burda Media (DE, Publishing / Media)

Engineered and deployed the company-wide identity and data management platform that unified access across multiple business units and millions of users. Architected event-driven microservices with Go that processed high-volume transactions with low latency. Revamped data architecture using Databricks and Delta Lake, improving analytics performance. Implemented streaming data pipelines that reduced data processing time, enabling near real-time decision making for digital publishing operations.

Technologies:

- **Event-Driven Architecture** (Node.js, Async, Kafka, SQS, GraphQL)
- **Cloud Infrastructure** (EKS, ArgoCD, Lambda, Jenkins, CloudFront)
- **Data Storage** (S3, DynamoDB, RDS, ElastiCache, MongoDB, PostgreSQL)
- **ETL & Data Engineering** (Databricks, PySpark, Python, Airflow)
- **Security & Compliance** (IAM, Cognito, GDPR, KMS, Secrets Manager)

08/2021 – 02/2022
porsche.com

Senior AI, Data and Cloud Engineer (Freelancer)
Porsche (DE, Automotive)

Designed and implemented cloud-native infrastructure that scaled to support connected vehicles with high availability. Built real-time data processing services that reduced analytics latency, enabling timely customer insights. Developed machine learning pipelines that improved customer preference prediction, driving personalized experiences. Implemented infrastructure-as-code practices that accelerated deployment cycles, supporting rapid innovation for digital services under the SAFe ART framework.

Technologies:

- **AWS Services** (Glue, Athena, Step Functions, Lambda, SageMaker)
- **Infrastructure-as-Code** (CDK, Terraform, CloudFormation, Python)
- **Microservices** (Python, Java Spring Boot, REST, API Gateway)
- **Containerization** (Kubernetes, EKS, ECS, Fargate, Docker, ECR)
- **Data Engineering** (PySpark, EMR, Glue, Athena)

03/2021 – 07/2021
climeworks.com

Senior Cloud, Data and DevOps Engineer (Consultant)
Climeworks (CH, Energy/Climate)

Architected a full-stack IoT data platform that processed environmental metrics from numerous sensors with high reliability. Implemented real-time analytics of time-series data using Azure Databricks that improved carbon capture optimization processes. Developed a low-code annotation interface that enhanced data labeling efficiency, accelerating machine learning model development. Created automated data pipelines that enabled precise measurement of carbon capture performance, supporting the company's climate impact goals.

Technologies:

- **Microsoft Azure** (Functions, Data Lake, Event Hub, Key Vault, Entra)
- **Data Storage** (PostgreSQL, Time-Series, Blob Storage, Data Lake)
- **Data Processing** (Databricks, PySpark, Python, Delta Lake)
- **IoT** (Azure IoT Hub, IoT Edge, Device Provisioning Service)

08/2020 – 02/2021
company.marc-o-polo.com

Senior Cloud, Data and DevOps Engineer (Consultant)
Marc O'Polo (DE, E-Commerce / Retail)

Created a blueprint infrastructure-as-code architecture that accelerated the company's cloud migration from on-premise to AWS. Designed and implemented secure network architecture with multi-account strategy that improved security posture. Automated serverless deployments with CI/CD pipelines, shortening release cycles. Established DevOps best practices that enhanced developer productivity and optimized infrastructure costs, supporting the company's digital transformation.

Technologies:

- **AWS Foundation** (VPC, Transit Gateway, Direct Connect, VPN, Route53)
- **Security & Compliance** (IAM, GuardDuty, Security Hub, CloudTrail)
- **Serverless** (API Gateway, SQS, SNS, EventBridge, Python, DynamoDB)
- **Infrastructure-as-Code** (Terraform, Terragrunt, AWS CDK, YAML, HCL)

07/2019 – 07/2020
wemolo.com

Chief Technology Officer (CTO and Co-Founder)
Wemolo (DE, Mobility)

Co-founded and led technical development of an IoT mobility platform that processed real-time, time-series data from numerous devices with low latency. Architected a serverless AWS backend that scaled automatically to handle traffic spikes while maintaining cost efficiency. Implemented machine learning algorithms that improved vehicle detection accuracy, creating competitive advantage in the mobility market. Designed an edge computing solution that reduced cloud data transfer, enabling real-time analytics in bandwidth-constrained environments.

Technologies:

- **Cloud Architecture** (AWS Lambda, API Gateway, ECS, Fargate, SQS)
- **Infrastructure-as-Code** (Terraform, AWS CDK, Serverless Framework)
- **Machine Learning** (TensorFlow, PyTorch, Computer Vision, Python)
- **Edge Computing** (Nvidia Jetson, ARM, C++, OpenCV, Embedded Linux)

03/2018 – 06/2019
park-here.eu

Head of Embedded Systems and IoT Engineer (Employee)
ParkHere (DE, Mobility)

Led development of an AI-powered authentication system for parking facilities that increased security while reducing operational costs. Architected an IoT radar system for real-time parking space detection with high accuracy, surpassing market alternatives. Designed cloud connectivity solutions that maintained uptime even in challenging network environments. As team lead, implemented agile processes that increased development velocity and improved product quality, directly contributing to new enterprise contracts.

Technologies:

- **Machine Learning** (TensorFlow, OpenCV, OpenVINO, ANPR, YOLO)
- **Internet of Things** (MQTT, Bluetooth, LoRaWAN, LTE-M, NB-IoT, OTA)
- **Embedded Systems** (C/C++, ARM Cortex, RTOS, Embedded Linux)
- **Cloud Backend** (AWS, Lambda, Python, IoT Core, DynamoDB)

09/2017 – 02/2018
bleenco.com

Machine Learning, Computer Vision and IoT Engineer (Employee)
Bleenco (DE, Artificial Intelligence)

Developed a computer vision framework for industrial safety that reduced workplace accidents in pilot deployments. Engineered AI models that detected human emotional states and behaviors with high accuracy in real-world environments. Optimized deep learning inference for edge devices, achieving smooth performance on low-power hardware. Created modular architecture that enabled rapid customization for

09/2017 – 02/2018
continued · Bleenco

diverse industrial applications, accelerating product market fit and customer adoption.

Technologies:
- **Machine Learning** (TensorFlow, Keras, PyTorch, CNN, RNN, LSTM)
- **Computer Vision** (OpenCV, Pose Estimation, Face Recognition)
- **Edge AI** (Nvidia Jetson, TensorRT, Coral TPU, Model Optimization)
- **Cloud Integration** (AWS, Model Training, Data Storage, OTA Updates)
- **Development Tools** (Python, C++, CUDA, Git, Docker, PyTest)

Projects (Own Products)

Commercial product
qualitylayer.dev
GitHub repository

QualityLayer
Software factory for coding agents
Planning-first workflow on top of Claude Code and Codex. The developer approves one plan before any code is written. The agent builds it test first and records every check, and agents that did not write the code verify the result against the request. It ships as a command line and a desktop and browser review app for macOS, Windows and Linux, with team workflows.

Technologies:
- **Agentic Engineering** (Claude Code, Codex, Skills, Plans, Verification)
- **Application** (TypeScript, Bun, React, Rust, CLI, Desktop App)

Originally released as Pilot Shell.

Live product
bahnsparer.de

Bahnsparer
Rail fares, price alerts and journey companion
Rail-travel app for Android, iOS and desktop. It compares fares, travel time and historical reliability, watches prices, follows a booked journey live and prepares the facts for a possible passenger-rights claim. Every request runs on the traveller's device; there is no backend for rail data and no account.

Technologies:
- **Cross-Platform App** (React, TypeScript, Vite, Capacitor, Electron)
- **Quality** (Vitest, Playwright, Visual Tests), Website (TanStack Start)

Open source
diy-thermocam.net
GitHub repository

DIY-Thermocam
Open-source thermal imager
Do-it-yourself thermal imaging camera around the FLIR Lepton sensor: firmware, PCB, enclosure and desktop suite, all public and buildable at home with standard tools. It began as a bachelor thesis and is now used by makers, schools and companies, with more than 1.2k GitHub stars.

Technologies:
- **Embedded Systems** (C/C++, Firmware, FLIR Lepton 2.5 / 3.1R / 3.5, PCB)
- **Desktop Suite** (Analysis, Live View, Converter, USB Streaming)

Employment History

08/2021 – Present
Remote, worldwide
maxritter.net

Senior Freelance Software Engineer (Self-Employed)
As an independent Senior IT Freelancer, Max combines hands-on product engineering with technical advice and team enablement. He builds AI-powered text and voice products, cloud infrastructure and data platforms, and helps engineering teams adopt coding agents effectively. His experience spans AI and machine learning, cloud, data, DevOps and embedded systems, from technical decisions through implementation, testing and deployment.

08/2020 – 07/2021
Munich, Germany
netlight.com

Senior IT Consultant (Netlight GmbH)
At Netlight, Max served as a Senior IT Consultant specializing in cloud architecture design and implementation. He delivered strategic DevOps transformations and built IoT platforms for enterprise clients across many different sectors. His consultative approach balanced technical excellence with business-driven outcomes.

07/2019 – 07/2020
Munich, Germany
wemolo.com

CTO & Co-Founder (Wemolo GmbH)
As Co-Founder and CTO of Wemolo, Max led all technical aspects from ideation to market. He architected a serverless AWS platform for IoT device management, developed the edge computing stack for ML inference, and established the technical roadmap. His leadership spanned engineering team building and technology selection.

03/2018 – 06/2019
Munich, Germany
park-here.eu

Software Engineer & Team Lead (ParkHere GmbH)
At ParkHere, Max led the IoT engineering team while developing smart parking solutions. He architected cloud-connected sensor networks, designed ML-based vehicle detection systems, and created embedded firmware for harsh outdoor environments. His technical leadership improved product reliability while scaling the solution across multiple enterprise deployments.

09/2017 – 02/2018
Munich, Germany
bleenco.com

Software Engineer (Bleenco GmbH)
At Bleenco, Max engineered a modular computer vision framework for industrial safety applications. He developed AI models for human behavior analysis, emotion recognition, and anomaly detection optimized for edge deployment. His work established the foundation for the company's core technology platform, enabling rapid deployment across diverse industrial environments.

{} Skills

AI (LLMs & Agents)
Large Language Models (LLMs), AI Agents, Text & Voice Agents, LiveKit, SIP, WebRTC, Speech-to-Text (STT), Text-to-Speech (TTS), Model Context Protocol (MCP), Claude Code, Codex, Amazon Bedrock, LangChain, LangGraph, Retrieval-Augmented Generation (RAG), Embeddings, Vector Databases, Context Optimization, Evaluation, Deployment, Prompt Engineering, Testing

Cloud (AWS, Azure & GCP)
Amazon Web Services (AWS), Microsoft Azure, Google Cloud (GCP), Multi-Account Strategy, Event-Driven, Microservices, Serverless, Integration & APIs, Security & Governance, MLOps & AI Infrastructure

Data & DevOps
ETL, SQL, Databases, Data Pipelines, Data Lakehouse, Apache Spark, Databricks, Airflow, Iceberg, Delta Lake, Athena, Glue, AWS CDK, Terraform, CI/CD, Docker, Kubernetes

ML & Embedded
Machine Learning, Computer Vision, TensorFlow, PyTorch, Edge AI, Nvidia Jetson, C/C++, ARM Cortex, RTOS, Embedded Linux, IoT

Programming
Python (FastAPI, asyncio, Pydantic), TypeScript, SQL, Go, C/C++, Bash, PySpark

Certifications

- AWS DevOps Engineer – Professional
- AWS Data Analytics – Specialty
- AWS Developer – Associate
- AWS re/Start Accredited Instructor
- CNCF Kubernetes and Cloud Native Associate
- Microsoft Azure Data Fundamentals
- AWS Solutions Architect – Professional
- AWS Solutions Architect – Associate
- AWS SysOps Administrator – Associate
- HashiCorp Terraform Associate
- Microsoft Azure Fundamentals
- Claude Code Partner Badge (Anthropic)

Education

2015 – 2017 **M. Sc. Computer Engineering**
HS Pforzheim
Design and Implementation of Complex Embedded Systems. Grade: 1.3

2011 – 2015 **B. Sc. Applied Informatics**
HS Ravensburg-Weingarten
Focus on Automation Engineering and Information Networks. Grade: 1.5

Languages

German – *native* | **English** – *fluent (C1)*

Interests

Reading | Travelling | Mindfulness

References

Shezan Kazi
Vice President of AI (US, Dialpad)
LinkedIn profile

I had the pleasure of working with Max at Dialpad, and he was outstanding.

Max is one of those rare engineers who sits right at the frontier of AI-native development and actually ships. He has deep expertise in agentic systems and AI coding workflows, and he moves from idea to working prototype faster than almost anyone I have worked with. What sets him apart is that he does not stop at the prototype. He brings the engineering discipline to make things reviewable, well documented and ready for others to build on.

He is just as strong as a teacher. Max has a real gift for making cutting-edge ideas practical and for helping engineers and product people alike adopt new ways of building with AI. He is generous with his knowledge, open to feedback and always focused on what actually works in practice.

Max combines deep technical skill, high ownership and a genuine builder mindset. Any team pushing into agentic AI would be lucky to have him. If you get the opportunity to work with him, I recommend you seize it.

Alexander Kappler
CTO, CISO & Managing Director (DE, DIU – Hamburgs Excellence Center für AWS)
LinkedIn profile

It is my pleasure to wholeheartedly recommend Max Ritter. In our collaboration, Max demonstrated exceptional expertise in AWS architecture, data pipelines, and AI-powered document search. His solutions were technically excellent, well thought-out, and always right on target. I was particularly impressed by his ability to quickly grasp complex requirements and deliver pragmatic, scalable solutions. Max is not only outstanding professionally, but also a true asset as a person – reliable, communicative, and always one step ahead. Anyone looking for a strong partner in the cloud and AI space is in the best hands with Max.

Katharina Stief

Group Manager Data Engineering (DE, Marc O'Polo)

LinkedIn profile

Max was part of our team from July to October and provided outstanding support in optimizing our Open Source Lakehouse Platform. He has a very good understanding of cloud infrastructure in the data domain and truly impressed us with his technical know-how and his ability to quickly find solutions for complex problems. Thanks to his help, we were able to make important progress in our project and significantly improve our platform. I look forward to working with him again.

Tamer Chowdhury

Senior Manager, Global Clinical Development & Operations (US, Boehringer Ingelheim)

LinkedIn profile

I whole heartedly recommend Max from his role as a backend Software Engineer at Boehringer Ingelheim. Max demonstrated a valuable ability to balance high-level strategic thinking with hands-on implementation. His agile approach consistently resulted in effective, solutions that exactly met our project needs. I recommend Max for roles in software engineering, particularly those involving advanced Cloud and Data technologies.

Dr. Axel Berger

Product Owner ML Platform and Services (DE, Porsche)

LinkedIn profile

Max joined my former team as a software engineer and consultant. Despite the complexity of the existing service landscape, Max familiarized himself with the existing infrastructure very quickly and was a big asset to the team - not only from a technical but also from a personal perspective. What really impressed me was his talent for rapid implementation while keeping code quality and raising the technical bar of the team. I consider him as an expert when it comes to AWS services. I can highly recommend Max to any team that wants to push its product roadmap forward. Thanks Max for your contributions!

Dr. Mathew Divine

Head of Digital Lab in Clinical Development & Operations (DE, Boehringer Ingelheim)

LinkedIn profile

Max is an exceptionally skilled backend developer with expertise in cloud development, DevOps, machine learning, and Generative AI. His proficiency in Python, JavaScript, and Bash makes him a versatile asset to our team. His proactive approach, excellent communication skills, and ability to interact well with colleagues are more than commendable. Max's impressive skills were evident from our first meeting during his job interview. Beyond his technical skills, Max's online content on software development practices and self-employment offers valuable insights. Max is truly a unicorn in his field. Thank you, Max, for your exceptional contributions.

Sam Klingner

Head of Data & Analytics (DE, Hubert Burda Media)

LinkedIn profile

Not many people have the ability to go from paper to productive data pipeline code in less than a week and fewer still where they are relative latecomers to a brown-fields project in need of renewal, Max is one of these people. I've worked with Max over the past year as he worked with us on our core data infrastructure as a contractor with little supervision. He has been a remarkable and valued team member and resource throughout the entirety of that time, providing astute research, clever solutions to problems both large and small. In terms of skills, whether it's Kubernetes, AWS or Databricks and Python he has been able to execute efficiently and with great results. I'd be more than happy to work with him again.

Bastian Pieper

Chief Product & Technology Officer (DE, Wemolo)

LinkedIn profile

Max is a real value to your team. During our time as a co-founders I learned a lot from him. He is a very creative person and has great problem solving skills. He is able to move very quickly and come to a solution fast. Especially in a startup environment where you need to act under high pressure his skills were very valuable. Next to his technical skills I can say that Max is honest, humble and good human being. If you have the chance to meet or work with him please do so. I can recommend him whole heartedly.