Marc Jakobi

Curriculum Vitae

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Insanity is running the same Nix build over and over again and expecting different results.

Professional career

2022–current — **Backend developer**, *tiko Energy Solutions AG*
Microservices mostly written in Haskell, built with Nix.
(80 % since 2023)

Virtual power plant and IOT devices
- Redis, Kafka, CBOR, MQTT, PostgreSQL, Hazelcast, GraphQL
- Microservices written in Haskell
- Legacy monolith written in Java 21 + Scala 2.13

Data pipelines
- MQTT, Kafka, Thrift, Protobuf, Avro, rocksDB-cloud, TimescaleDB
- Microservices written in Haskell

Web services
- Haskell (servant, wai/warp)

CI, Deployment
- Hydra, Morph, GitLab, Kubernetes, ArgoCD, Kustomize, Terraform, AWS, SOPS, Dhall
- Release management

Quality
- Propagated behaviour driven development practices.
- Introduced and developed KVM-based integration tests using the `nixosTest` framework.

Monitoring, Alerting
- Prometheus, Zabbix, Elasticsearch, OpenTelemetry, Kibana
- Oncall, Incident response

2023–current — **Open source volunteer**, *20 %*
I spend 20 % of my work week maintaining and contributing to various open source projects, e.g.:

NixOS
- Maintainer of various packages and NixOS modules
- Co-maintainer of the Lua and Vim/Neovim ecosystems

Nvim-neorocks
- Innovating the Neovim plugin ecosystem
- Co-maintainer of the `rocks` package manager for Lua

Neovim
- Core contributions
- Maintainer of various plugins for Haskell, Nix and Rust development

2017–2022 **Software engineer**, *Vela Solaris AG*
Java 17, Kotlin, Docker Swarm, Gradle

Polysun Simulation Software *(desktop app written in `Java`)*
- Simulation models: Batteries, PV/PVT, controllers, thermal components
  (heat pumps, storage tanks, co-generators, etc.), eMobility.
  Examples: Implementation of a new battery model;
  control algorithms for PV, batteries and heat pumps.
  Improvement of existing models.
- Plugins (e.g. for co-simulations with `Python`/`Matlab`/`Simulink`/PLC).
- Charting, reporting.
- UI.
- Code reviews (Bitbucket).
- Publications/Presentations/Advanced workshops (e.g. at conferences).

Polysun BIM *Description: Automation of engineering workflows in the building sector;*
data exchange with other applications.

- Customer interviews / requirement analysis.
- Rapid prototyping (interactive mock-ups) + concept validation with pilot customers.
- Roadmap planning.
- Software engineering/development:
  - *Desktop app with a modular bundle architecture*
    (`Java`, `Kotlin`, Hibernate (H2), Vavr, ReactiveX, Protobuf, ArchUnit).
  - *Cloud platform (backend), microservice architecture*
    (Spring Boot 2, Kafka Streams, MongoDB, Graphwalker).

Infrastructure
- CI/CD: Jenkins, Docker Swarm on AWS, e2e testing, release automation
- Internal cloud infrastructure (e.g., license migration, sales automation, ...)
  Apache Camel.
- Development of internal CLI applications (`Haskell`, `Python`)

2014–2017 **Research assistant**, *Projects: PVstore, TwinPower* , HTW Berlin
Optimisation of PV systems with batteries and heat pumps.
Implementation of simulation models in `Matlab`.

2013–2014 **Research assistant & intern**, *Project: PVprog*, HTW Berlin
Development of forecast-based operational strategies for PV storage systems.

Education

2016–2017	**Master of Science - Renewable Energy Systems**, *Hochschule für Technik und Wirtschaft*, HTW Berlin Completion of Master's Thesis in the research group "solar storage systems" (Thesis and oral examination: 1.0 / studies: 1.2 [with honours]), HTW Berlin.
2012–2016	**Bachelor of Science - Renewable Energy Systems**, *Hochschule für Technik und Wirtschaft*, HTW Berlin Completion of Bachelor's Thesis in the research group "solar storage systems" (Thesis and oral examination: 1.0 / studies: 1.3 [with honours]), HTW Berlin.
2006–2009	**A levels**, *Freie Waldorfschule Saar-Hunsrück*, Walhausen, Grade: 2.1

Master's Thesis

Title	*Development of model-based control applications compliant with IEC 61499 for building energy systems with a focus on photovoltaics*
Supervision	Prof. Dr.-Ing. Volker Quaschning, M. Sc. Tjarko Tjaden
Grade	Thesis and oral examination: 1.0 / studies: 1.2
Short summary	Development of intelligent control applications for PV, battery and heat pump systems in compliance with IEC 61499. Development of communication interfaces for simulation tools such as Polysun and Matlab. Validation via co-simulations. Extension of the runtime environment (4diac-RTE) with a REST communication interface and set-up of a field test.

Bachelor's Thesis

Title	*Optimierung der Netzeinspeisung von deutschlandweit verteilten PV-Speichersystemen mit prognosebasierten Betriebsstrategien*
Supervision	Prof. Dr.-Ing. Volker Quaschning, M. Sc. Johannes Weniger
Grade	Thesis and oral examination: 1.0 / studies: 1.3
Short summary	Modelling and CUDA-simulation of 46126 Germany-wide distributed PV storage systems. Examination of the cumulated influence of various operational strategies and optimisation of forecasting- and control algorithms regarding self-sufficiency and grid integration.

Other

2016	**Intern**/**project work**, Vela Solaris AG, Winterthur Implementation and validation of the "PVprog" forcast-based control algorithm in Polysun.
2011	**Temp**, Brose Fahrzeugteile GmbH; Leuwico GmbH, Coburg Assembly, manufacture
2011	**Intern**, Lasco Umformtechnik GmbH, Coburg Montage, inspection, mechanical workshop
2009–2010	**Social service**, REHA GmbH, Neunkirchen

Languages

English	Mother tongue	
German	Mother tongue	
French	Good knowledge	*School, grades 7-13; regular. visits to France and Morocco*

Professional skills

Programming languages	`Haskell, Nix, Rust, C, Scala, Kotlin, Java, Lua, Python, C++`
Development environment	`Neovim, NixOS, tmux, Nushell, coreutils` *I prefer to work in the terminal*
Simulation	Polysun, Simulink, TRNSYS
Scientific documentation	LaTeX, pandoc

Leisure-time activities

Sports	Running, cycling, HIIT, hiking
Cooking	
Gardening	

Professional interests

Renewable energiy	Photovoltaics, batteries, thermal systems, eMobility, sector coupling
Software development	FOSS/Linux development, Trade literature, Hackathons, SoCraTes, Functional software architecture

Publications

Conference paper	Jakobi, M.; Kunath, L.; Witzig, A. *BIM use-case: Model-based performance optimization.* EuroSun international conference on solar energy for buildings and industry, Rapperswil, 2018.
Conference paper	Jakobi, M.; Stöckli, U.; Tjaden, T.; Quaschning, Q. *From simulation to reality: IEC 61499 compliant control applications for solar energy systems.* EuroSun international conference on solar energy for buildings and industry, Rapperswil, 2018.
Conference paper	Jakobi, M.; Stöckli, U.; Tjaden, T.; Quaschning, Q. *Von der Simulation zur Realität: IEC 61499 konforme Regelanwendungen für Solare Energiesysteme.* Symposium photovoltaische Solarenergie, Bad Staffelstein, 2018.
Thesis	Jakobi, M.: *Development of model-based control applications compliant with IEC 61499 for building energy systems with a focus on photovoltaics.* Master's thesis, Hochschule für Technik und Wirtschaft, Berlin, 2017.
Thesis	Jakobi, M.: *Optimierung des Netzeinspeiseverhaltens von deutschlandweit verteilten PV-Speichersystemen mit prognosebasierten Betriebsstrategien.* Bachelor's thesis, Hochschule für Technik und Wirtschaft, Berlin, 2016.
Data & code	Jakobi, M.; Schmidt, M.; Anyangbe, F. *Cell resolved Matlab OOP model of a lithium iron phosphate battery pack*, TU Berlin, 2017.
Co-author	Weniger, J.; Bergner, J.; Beier, D.; Jakobi, M.; Tjaden, T.; Quaschning, Q.: *Grid Feed-in Behavior of Distributed PV Battery Systems.* 30th European Photovoltaic Solar Energy Conference and Exhibition, Hamburg, 2015.