

ARNO DUVENHAGE

Senior Software Engineer

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Software engineer with a keen eye for detail and a passion for quality.

Expert C++ software developer (10+ years of experience).

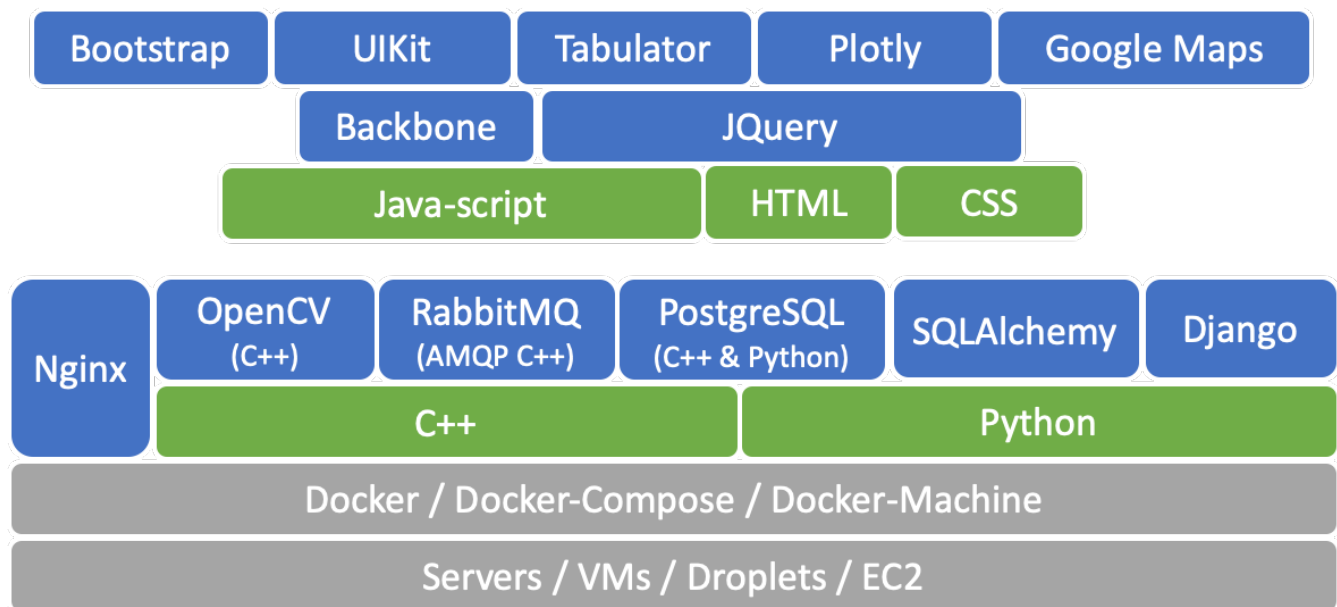
Full stack developer, currently focusing on web backend development.

Skills Summary

- Current Focus:
 - Full stack developer
 - Web backend development
 - Networked and distributed systems
 - High performance multi-threaded applications
 - Tech Lead on complex projects
- Dev Skill Set:
 - Expert C++ software developer (10+ years of experience)
 - Web development
 - High performance application development
 - Networked and distributed system development
 - Mathematical modelling of missiles, aircraft and ballistics for realtime/3D simulations
 - Modelling and simulation of complex control systems
 - 3D visualisation
- Experienced with:
 - Docker, docker-compose and docker-machine
 - GIT, SVN
 - Qt, wxWidgets and MFC application development
 - C++, Java, Python, Java-script, C#
 - XCode, QtCreator, Visual Studio, Visual Studio Code, CMake
 - Gitlab CI
 - Django, NGINX, Apache HTTP server, Apache Tomcat
 - Bootstrap.js, plotly.js, uikit.js and backbone.js
 - Digital ocean (hosting services in the cloud)
 - AWS (hosting services in the cloud)
 - Google Maps API, Cesium.js 3D Maps API, Open-Scene Graph
 - RabbitMQ (AMQP)
 - OpenCV
 - Embedded development (XBee, LoRa, Arduino, ESP8266/32, Raspberry Pi)
 - Protocols (NMEA, AIS, ADS-B / Mode-S, various RADAR system interfaces)
 - RTL-SDR software defined radio (ADS-B & AIS decoding)
 - Small solar (PV) system setup and builds

** Would like to know more about machine learning and image processing: Had some post-graduate courses in AI, but would like some ML projects

Technical Stack (where I work currently)



Education

Degree(s)

- Software Engineering Masters, MEng (with distinction), University of Pretoria, 2011
A Software Framework to Support Distributed Command and Control Applications
- Software Engineering Honours, BEng (Hons), 2007
Specialising in Distributed Systems and Artificial Intelligence
- Computer Engineering, BEng (1st class), University of Pretoria, 2004

Short Courses / Training

- Enterprise Architect Training, 2016, Pretoria
- AnyLogic Advanced Training, 2011, Blue Stallion Technologies, Pretoria
- Multi-Sensor Fusion, 2005, Johns Hopkins University, Washington DC, USA
- CCNA & CCNP (done as part of BEng course work)

Experience

- Council for Scientific and Industrial Research (CSIR), Meraka (2017 – present)
 - Principle Software Engineer
- Council for Scientific and Industrial Research (CSIR), DPSS (2005 – 2017)
(Defence Peace Safety and Security – DPSS)
 - Principle Engineer (2014)
 - Senior Engineer (2011)
 - Senior Engineer (2008)
 - Researcher (2005)
- Roles and Responsibilities at CSIR
 - Web-backend development
 - System Integration of various commercial and proprietary systems:
 - NMEA, ADS-B, AIS, ASTERIX protocols
 - Spire Maritime data
 - GPS Trackers, Icom & Kenwood GPS Radios, Spidertracks
 - PostgreSQL data logging, playback and system integration
 - Military Search Radars and Mission Control Systems
 - Fighter aircraft and their data-links
 - Military command and control systems
 - UAV video and data links
 - AMQP (RabbitMQ) based systems
 - Technical Lead on Technology Demonstrators and Operational Systems
 - Backend for integrating and distributing vessel data for a web-based real-time vessel tracking system
 - In-situ sensor development framework (embedded, video, AIS, ADS-B, GPS, LoRa)
 - Simulation framework used for Ground Based Air Defence system evaluation and doctrine evaluation
 - Simulation framework used for air-to-air and air to ground fighter tactics evaluations and doctrine evaluation (co-developed by multiple DPSS areas)
 - Interoperability gateway used to integrate various sensors and equipment during CSIR and South African National Defence Force (SANDF) experiments and field trials
 - Fighter / mission controller training and evaluation environment for South African Air Force (SAAF)

- SAAF Gripen tactical data-link ground station and reference implementation
- Original proof of concept for Advanced Fire Information Service (AFIS)
- Embedded Development:
 - Raspberry Pi
Completed various camera and sensor projects (C++ & Linux).
 - Arduino, ESP, Xbee and LoRa
Completed monitoring and control applications (C++ mostly).
- C++ coach and training
 - Presents on C++ and new C++11/14 features to co-workers
 - Presents on web backend technologies to co-workers
 - Supervises vacation students
- Technical support and maintenance of software development infrastructure.
- Integration support during experiments, demos and field trials.
- Setup and maintenance of application servers.

Research Outputs

- Conference Papers
 - *A Layered Distributed Simulation Architecture to Support the C2 Enterprise*, SISO Fall SIW 2009.
 - *The Evolution of a C2 Protocol Gateway*, SISO Euro SIW 2008.
 - *A State Estimation Approach for Live Aircraft Engagement*, SISO Fall SIW 2007.
- Co-authored Papers
 - *A Data-Centric C4I Testbed*, C Malan and A Duvenhage, SAJADS, 2011.
 - *Joint Command and Control (JC2) capability development Utilising a Modelling and Simulation Framework*, P Ramadeen, D Uys, A Duvenhage, 2010.
 - *Experiences form Constructing a Command and Control Simulation Using a Data-Link Standard*, DC Uys and A Duvenhage, SISO Fall SIW 2009.
 - *Effectively Using a 3rd Party visualisation Component in a Discrete Event Simulation Environment for Joint Command and Control*, P Ramadeen, B Duvenhage and A Duvenhage, SISO Fall SIW 2009.
 - *An Alternative to Dead-reckoning for Model State Quantisation when Migrating to a Quantised Discrete Event Architecture*, B Duvenhage and A Duvenhage, ECMS 2008.

Awards and Acknowledgements

- CSIR Awards
 - Outstanding Contribution by a Research Team, 2016
Rhino Poaching Prevention Team (CMORE)
- Meraka Awards
 - *Outstanding Contribution by a Team, 2018*
Oceans and Coasts Information Management System (OCIMS)
- DPSS Awards
 - Outstanding Impact Award, 2015
Technology to Combat Poaching Team (CMORE)
 - Outstanding Contribution by a Team, 2011
Mission Simulation Framework Team
- DPSS, CCIW (Competency Area) Awards
 - Established Researcher, 2016
 - Technical Support, 2015
 - RGL Special Award: *Macadamia Border Safeguarding Team, 2014*
 - RGL Special Award, *GBADS Team, 2013*
 - Outstanding Technical Work by a Senior Researcher, 2013
 - Technical Leadership, 2012
 - Outstanding Contribution by a Team, 2011
 - Outstanding Contribution by a Team, 2010
 - Outstanding Contribution by an Individual, 2009
 - Outstanding Contribution by a Team, 2009

References

- Waldo Kleynhans (co-worker), +27 84 807 2419, w.kleynhans@gmail.com
- Herman le Roux (co-worker), +27 72 373 7349, hermanleroux@gmail.com
- Shahen Naidoo (co-worker), +27 76 480 7459
- Cillié Malan (co-worker), +27 83 268 1908