Halvor Teigen

Software Engineer, DevOps

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Halvor Ødegård Teigen works as a backend developer with an additional focus on DevOps. He has a solid academic background with a Master's degree in cybernetics and robotics from NTNU. Through his engagements at Statens Vegvesen and Statnett, he has demonstrated proficiency in Java and Spring Boot, and gained experience as both team lead, scrum master and developer in interdisciplinary autonomous teams with an agile development methodology.

Halvor is committed to continuous growth and has invested time in several certifications and courses. He is ISTQB-certified in several test areas, Kafka-accredited through Confluent, and has completed courses in both Java, Kotlin and AWS.

With two years of experience as a developer he has now taken on the role as team lead and Java backend developer on a test automation project at Statnett. Here, he has developed applications and frameworks that use technologies such as Kafka, Amazon S3, Docker, Spring Boot, REST APIs and SQL databases. He has used GitLab CI/CD pipelines and Ansible for build and deploy to review, test and production environments on the Kubernetes platform OpenShift. Halvor has also had an integral role in the development of a solution for automated integration and value chain tests in CI/CD pipelines using temporary OpenShift environments.

He has previously worked as a developer in the test data team at Statens Vegvesen, where he used Python to generate synthetic test data and Java to develop an application for test data management. The project further revealed demands and potential that led Halvor to take responsibility for the development of central customer services within analysis and generation of synthetic data for testing.

As a person, Halvor is easy going and eager to learn with an "Everything can be learned"-mentality. He has shown the ability to take responsibility and ownership of tasks, and is devoted to delivering work he can be proud of in hindsight. He keeps up to date with the state of the art, both within and outside of his own professional field, and his wide range of experiences has given him the ability to cooperate with different personalities and contribute to holistic solutions from an interdisciplinary perspective.

Key qualifications

- Backend: Java, Python, C++, Spring, Kafka
- DevOps: Git, Docker, Gitlab CI/CD, Ansible, OpenShift
- Database: SQL, JPA, Oracle, MS SQL Server
- Test tools: JUnit, Mockito, PyTest, Postman
- Machine learning, data modeling, GDPR

Relevant courses and certifications

- Kotlin for Java Developers
- Java SE 12 Programming
- GitLab Certified CI/CD Associate
- Confluent Kafka Fundamentals Accreditation
- AWS Certified Solutions Architect - Associate
- ISTQB Certified Tester, Foundation Level

Assignment overview

Statnett	TOD - Test automation and data	Developer, Team lead	08.2022–present
Sopra Steria	Service development - Test Data	Service developer, Researcher, Developer	03.2022–07.2022
Norwegian Public Roads Administration	Syntopia	Developer, Backend developer	09.2021–02.2022
Norwegian University of Science and Technology (NTNU)	Master Thesis	Developer & Author	01.2021–06.2021
Norwegian University of Science and Technology (NTNU)	Specialization Project	Developer & Author	08.2020–12.2020
Kongsberg Maritime	SmartShip	Developer	06.2019–08.2019
Norwegian University of Science and Technology (NTNU)	Project - Real Time Elevators	Developer	01.2019–05.2019

Assignment details

Customer: Statnett
Assignment: TOD - Test automation and data
Role: Developer, Team lead
Duration: 08.2022–present

Project description: The project aimed to increase the testability and quality of software developed by Statnett. This was done through the development of a solution that gave the development teams control over their own test data, traceability through complex message chains and less dependence on external systems in their test environment. One of the products created to achieve this was a framework that teams could use to facilitate automated and data-driven integration testing. User-friendly dashboards and interfaces were also created to visualize data flow in the test environment. The project contributes to less dependence on external systems, thus increased testability and shorter development cycles. It provides increased control, predictability and traceability of test data that flows through event-based systems, as well as greater flexibility in the testing of corner cases. This cuts down the time spent on manual testing considerably, and makes troubleshooting both faster and easier.
Automated integration tests provide increased confidence in the solutions, reduced risk when setting up production, as well as faster, more flexible and more reliable development cycles, while maintaining the quality of the products.

Consultant's role – Developer: In the first phase of the project, Halvor contributed to the design of a new framework for test automation and test data with a focus on event-based systems.
He then worked with development in Java, both with and without the Spring boot framework. This consisted of the development of several applications, as well as the implementation of the Java framework from the first phase.
Technologies that were used included Kafka, REST API, Oracle and MS SQL databases, and Amazon S3.
Halvor also had the main responsibility for the development of GitLab Pipelines and Ansible deploy for automated integration tests in CI/CD pipelines.

Consultant's role – Team lead: In march of 2023, Halvor took over the role as team lead. As a team lead, Halvor had the overall responsibility for the team. He was responsible for planning and following up the deliveries and continuously ensuring that they were in line with the needs of the customer. This also involved coordinating several customer teams which Team TOD delivered to.
As part of an agile delivery team, Halvor also held the role of Scrum Master during the common Scrum ceremonies.

Competencies: Apache Kafka, Test automation, Test data, Java, Spring Boot, REST API, Docker, Red Hat OpenShift, XML/XSLT, JSON, GitLab CI/CD, DevOps, CI/CD pipelines, Amazon S3 Bucket, Customer Management, Team management, Delivery Scheduling, Needs analysis, Red Hat Ansible, Kubernetes, Atlassian Jira

Customer: Sopra Steria
Assignment: Service development - Test Data
Role: Service developer, Researcher, Developer
Duration: 03.2022–07.2022

Project description: In the aftermath of the test data project at Statens vegvesen, Sopra Steria wanted to set aside time to refine and further develop the test data initiative. The purpose was to map the test data needs in the market, identify investment areas, commercialize the investments, conduct customer visits and establish a set of services within test data. The work resulted in a strategy for further test data investment in Sopra Steria, as well as the establishment of a set of specialized test data services within analysis, masking, generation and management of test data.
The strategy is based on well-established principles on test data generation from, among others, Syntethic Data Vault (SDV), and is in line with the guidelines related to differential privacy and the GDPR legislation.

Consultant's role – Service developer: Halvor established a strategy and a roadmap for further test data investment in Sopra Steria. This involved assessing and mapping different approaches to test data, identifying solution options, establishing and commercializing various service packages, and contributing with internal and external visibility.

Halvor has been the driving force behind the establishment of three service packages: Discover Test Data Privacy Insight, Accelerate Data Generation and Accelerate Test Data Management. He has also been on a number of customer visits, and lectured at both internal and external conferences - including Testdagen ODIN.

Halvor's work has revitalized the test data area in Sopra Steria, and ensured that the field has clear and relevant service initiatives within analysis, masking, generation and management of test data. His work has been crucial in ensuring that Sopra Steria has a strong value message within the test data area in the market, which complies with the privacy requirements, and is in line with the GDPR legislation.

Consultant's role – Researcher: In connection with the development of a Proof-of-Concept and the definition of service packages, Halvor explored various approaches and technologies to solve the challenges associated with a solution for data generation. This included, among other things, surveys of frameworks, providers and technologies that could be relevant, as well as discussions and negotiations with relevant subcontractors.

Consultant's role – Developer: Halvor developed a Proof-of-Concept in Python for one of the services in question, Accelerate Data Generation. Functionality was developed for interaction with databases with SQLAlchemy, analysis and generation of synthetic data with SDV, built an API with FastAPI and a simple frontend in React for visualization of generated data from the API.

Competencies: General Data Protection Regulation (GDPR), Service development, Computer modeling, Sales, SQLAlchemy, React.js, Python, Pandas, Microsoft PowerPoint, Presentation skills, Differential Privacy

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Customer: Norwegian Public Roads Administration
Assignment: Syntopia
Role: Developer, Backend developer
Duration: 09.2021–02.2022

Project description: The Norwegian Public Roads Administration (Statens Vegvesen) is responsible for the construction and maintenance of roads and supervision of vehicles and road users. They must offer electronic services where possible. A new Autosys has been implemented as a major project to replace Statens Vegvesen's existing systems for the areas of driver (driver's licenses) and vehicle.

Halvor's engagement in the project was to generate representative synthetic test data which complies with the GDPR regulations for Autosys Trafikant. This mainly involved development of a tool that automated the injection of large amounts of new data by being able to generate an arbitrary number of data points with the purpose of creating a good data foundation for further testing. This system was developed using Python.

Halvor also contributed to the development of a plugin-based system (Syntopia) for the administration of test data across the IKT solutions in Statens vegvesen. He became acquainted with technologies such as OpenShift, Jenkins, Spring, JPA and Hibernate. Syntopia was developed in Java using the Spring framework and deploy via OpenShift. The transition to fully synthetic test data created a need to be able to create representative historical data for testing. This

would be very time consuming and an almost impossible task to do manually. By developing a tool in Python for automated creation of an arbitrary number of road users with associated data, the customer quickly gained a good basis for further testing with synthetic data. This also ensured that the customer could be confident that the test system was GDPR compliant.

Consultant's role – Developer: Halvor worked in an agile development team where he developed and designed a data generation tool that would create large amounts of synthetic data to effectively test a large IKT portfolio in Statens vegvesen. Halvor performed data flow analyzes to investigate the complex connection between the various IKT systems, which clarified the needs and solution space for the test data solution. Synthetic data were generated based on analyzes of current data and statistical models, so that the data was in accordance with GDPR legislation. Halvor also worked with the integration of the synthetic data up against the national synthetic population register - Tenor.

The tool was written in Python, and SQL was used to retrieve and insert data into databases. Communication with the Oracle databases was done using the cx_Oracle library and Pandas and NumPy were used for data analysis. Jira and Bitbucket were used to integrate DevOps workflows. The test library Pytest was used to test that the generated data maintained its integrity with respect to references and limitations given by the database schema.

Halvor planned and conducted workshops with testers and developers within the Norwegian Public Roads Administration to map their needs and requirements for the solution. He also conducted workshops with external actors with the purpose of gaining experience from other similar projects.

Consultant's role – Backend developer: Halvor contributed to the development of a plugin-based system (Syntopia) for the administration of test data across the IKT systems in Statens vegvesen. Halvor implemented search and deletion of data in databases based on given criteria through the existing plugin framework. The project was developed in Java using technologies like the Spring framework, hibernate, JPA, JSON schema, and was deployed via OpenShift. Confluence and Jira were used for dokumentation and work tracking.

Competencies: Git, Oracle Database, SQL, Python, Pandas, Atlassian Jira, Atlassian Bitbucket, Java, Spring, SQL Developer, Pytest, JPA, Jenkins, Apache Maven, Hibernate, JSON, Anaconda, IntelliJ IDEA, Microsoft Visual Studio Code, General Data Protection Regulation (GDPR), Postman, Test data, XML/XSLT, Spring Boot, Application Programming Interface (API), DevOps, Atlassian Confluence, Red Hat OpenShift, Continuous Integration and Continuous Delivery (CI/CD)

Customer:	Norwegian University of Science and Technology (NTNU)
Assignment:	Master Thesis
Role:	Developer & Author
Duration:	01.2021–06.2021

Project description: Halvor's master thesis focuses on stabilization of off-shore windturbines using machine learning, specifically Safe Reinforcement Learning. Off-shore windpower is becoming increasingly important on the path towards a more sustainable world. Due to high wind speeds and large waves, the turbines experience extremely large destabilizing forces, thus active stabilization can increase both safety and efficiency.

Traditional control methods require mathematical models of the turbine dynamics. These are known to be complicated and hard to derive control laws for. This master thesis takes an alternative approach by using Reinforcement Learning, where an agent teaches itself the dynamics and the optimal action in a given state. The lack of guarantees on constraint satisfaction is a root problem in machine learning, thus the thesis combined Reinforcement Learning with Predictive Safety Filtering to ensure constraint satisfaction.

The thesis was written as a joint master thesis with one other student. The thesis was also nominated for Norwegian Open AI Lab's "Best AI Master's Thesis Award 2021".

Consultant's role – Developer & Author: The implementation is in Python and the OpenAI Gym framework. An extensive report is also written, which includes both results and the required theoretical background.

Competencies: Python, Machine learning, Git, Simulation, Artificial intelligence (AI), LaTeX, Project Planning, Matplotlib, NumPy, Mathematical modeling, Troubleshooting

Customer: Norwegian University of Science and Technology (NTNU)
Assignment: Specialization Project
Role: Developer & Author
Duration: 08.2020–12.2020

Project description: Halvor's work on the specialization project explored various Deep Reinforcement Learning algorithms and investigated their performance in the application of path-following and obstacle-avoidance for autonomous vessels. This was done through training of multiple agents for each algorithm as well as extensive generalization testing. A custom performance function was developed to create a quantitative measure of performance for comparison of the selected algorithms. The project also led to a publication in the journal Frontiers in Robotics and AI.

Consultant's role – Developer & Author: The implementation is in Python and the OpenAI Gym framework. An extensive report is also written, which includes both results and the required theoretical background.

Competencies: Deep Learning, Machine learning, Project Planning, Git, LaTeX, Python

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Customer: Kongsberg Maritime
Assignment: SmartShip
Role: Developer
Duration: 06.2019–08.2019

Project description: Halvor worked on the summer project SmartShip in the "Autonomous Control" group. Together with a team of about 12 students, he developed an autonomous ship. This was a colaboration between three groups: Autonomous control, Cyber security and Shore control center. A scaled-down model of the Yara Birkeland ship was equipped with algorithms for autonomous waypoint following and obstacle avoidance. Halvor implemented the object detection using radar imaging for use in the obstacle avoidance algorithm.

On this project, Halvor worked mainly with technologies such as the ROS framework, C++, OpenCV, Azure boards and repos, as well as position and velocity estimation using Kalman filters.

Consultant's role – Developer: Development of software and algorithms for autonomous vessels, as well as real world testing by regularly lauching a scaled-down ship model. Programming mainly in C++ and using ROS. Halvor both worked on a team of 5 people, and cooperated with the other groups on the project.

Competencies: C++, Scrum, DevOps, Multidisciplinary team, OpenCV, Robotics, Project Planning, Git

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Customer: Norwegian University of Science and Technology (NTNU)
Assignment: Project - Real Time Elevators
Role: Developer
Duration: 01.2019–05.2019

Project description: As part of the subject TTK4145 - Real-time programming, Halvor carried out an elevator project where the goal was to program an arbitrary number of elevators to cooperate optimally over a given number of floors. A central part of the project was also to make the system fault-tolerant so that unforeseen events such as loss of power or network connection for one of the elevators did not affect functionality. Physical models of elevators with associated control panels were used. The lifts communicated over the network so that several units could work together. Logic for handling orders was implemented with the programming language Go and for the transfer of information over the network the protocol UDP was used.

Competencies: Golang, User Datagram Protocol (UDP), Real-time systems, Fault tolerance

Work experience

Sopra Steria	Software Engineer, DevOps	08.2021–present
Geilo Entreprenør	Construction worker	05.2020–08.2020
Kongsberg Maritime	Summer intern, developer	06.2019–08.2019
Norwegian University of Science and Technology (NTNU)	Teaching Assistant	01.2018–06.2019
Lumenia AS	Sales representative	02.2017–12.2017
Retail House Norway AS	Promoter	03.2017–09.2017
The Norwegian Army	Military service, HMKG	07.2015–06.2016
Geilo Entreprenør	Construction worker	06.2014–08.2018
Liodden Camping	Web Developer	05.2015–05.2015
Ødegård Teigen Hytteutleie AS	Web developer	2014
Expert Geilo	Store employee	2012–2013

Work experience – details

Employer: Sopra Steria
Position: Software Engineer, DevOps
Duration: 08.2021–present

Halvor is employed as a Software Engineer in the software development division of Sopra Steria.

Employer: Geilo Entreprenør
Position: Construction worker
Duration: 05.2020–08.2020

The job consisted of construction work such as driving construction equipment, laying power and water lines, as well as developing plots.

Employer: Kongsberg Maritime
Position: Summer intern, developer
Duration: 06.2019–08.2019

Halvor worked on the summer project SmartShip in the "Autonomous Control" group. Together with a team of about 12 students, he developed an autonomous ship. A scaled-down model of the Yara Birkeland ship was equipped with algorithms for autonomous waypoint following and obstacle avoidance. Halvor's main responsibility during the project was implementing object detection using radar imaging.

Employer: Norwegian University of Science and Technology (NTNU)
Position: Teaching Assistant
Duration: 01.2018–06.2019

Halvor worked as a teachin assistant in Procedural and Object-Oriented Programming (C++) for two semesters (spring 2018 and spring 2019). He guided students attending the course and approved their assignments.

Employer: Lumenia AS
Position: Sales representative
Duration: 02.2017–12.2017

Halvor worked with selling promotion to companies through advertisements in compendiums at NTNU.

Employer: Retail House Norway AS
Position: Promoter
Duration: 03.2017–09.2017

Halvor worked as a promoter for various products for Retail House Norway

Employer: The Norwegian Army
Position: Military service, HMKG
Duration: 07.2015–06.2016

Halvor did his military service in His Majesty The King's Guard the year after high school.

Employer: Geilo Entreprenør
Position: Construction worker
Duration: 06.2014–08.2018

The job consisted of construction work such as driving construction equipment, laying power and water lines, as well as developing plots.

Employer:	Liodden Camping	Developed the website for Liodden Camping using the software Adobe Muse.
Position:	Web Developer	
Duration:	05.2015–05.2015	

Employer:	Ødegård Teigen Hytteutleie AS	Development of website (not current site) using Adobe Dreamweaver. Mainly with html and css.
Position:	Web developer	
Duration:	2014	

Employer:	Expert Geilo	Summer job in an electronics store the summer of 2012 and 2013.
Position:	Store employee	
Duration:	2012–2013	

Education

NTNU - Norwegian University of Science and Technology | 08.2016–06.2021 | Master of Technology
Halvor has a master's degree in cybernetics and robotics from NTNU with specialization in autonomous systems. Halvor's main interest has been to combine machine learning and control theory, and he wrote his master thesis about the use of machine learning in off-shore wind turbines.

University of California, Santa Barbara (UCSB) | 09.2019–03.2020 | Studies Abroad
Halvor spent his fourth year abroad at University of California, Santa Barbara. He took courses in machine learning, computer vision, nonlinear control theory, as well as subjects in other non-engineering fields.

Professional duties and positions

Volunteer UKA-17: Halvor volunteered during the UKA festival in 2017 where he worked as a bartender at Samfundet in Trondheim.	2017

Course participation

Kotlin for Java Developers	05.2023
Cyber Security Academy Foundation	11.2021
Presentation Techniques - Foundation	10.2021
Digital Presentation Techniques - Foundation	08.2021
Architecting on AWS - Amazon Web Services	08.2021
Java SE 12 Programming	08.2021
Learning assistant training (LAOS)	04.2019
77-853: MOS: Microsoft Office OneNote 2010	05.2014

Certifications

GitLab Certified CI/CD Associate	08.2023
Professional Scrum Developer I (PSD I)	05.2023
Professional Scrum Master I (PSM I)	01.2023
DP-100 Azure Data Scientist Associate	10.2022
AZ-204: Azure Developer Associate	09.2022
PRINCE2 Agile Foundation	07.2022
Certified Tester AI Testing (CT-AI)	05.2022
Confluent Kafka Fundamentals Accreditation	04.2022
DP-900: Azure Data Fundamentals	02.2022
AZ-900: Microsoft Azure Fundamentals	02.2022

AZ-900: Microsoft Azure Fundamentals	01.2022
REQB (IREB) Foundation Level Certified Professional for Requirements Engineering	10.2021
ISTQB Foundation Level Certification Agile Tester	10.2021
AWS Certified Solutions Architect - Associate	09.2021
ISTQB Certified Tester, Foundation Level	08.2021
77-853: MOS: Microsoft Office OneNote 2010	05.2014

Publications

Comparing deep reinforcement learning algorithms' ability to safely navigate challenging waters, Frontiers in Robotics and AI.	09.2021

Presentations and courses

Techday 2023: Testautomation and testdata at Statnett	04.2023
RUBIKS 2022: Differentially private synthetic data using deep learning	06.2022
Lightning Talk at Testdagen ODIN: How to generate representative synthetic test data at Statens Vegvesen	11.2021
Teaching Microsoft OneNote to high school students	05.2014

Languages

Norwegian	Native speaker
English	Fluent