# Maël Valais

## Software Engineer | DevOps & Cloud

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*maelvalais.github.io – Passionate developer and DevOps hacker. I value Developer Experience (DX) with nice CLIs and open-source related approaches. I enjoy creating tooling for myself and other developers. Functional programming lover (reasonml, ocaml) and FP approaches (React, Rust).*
*• I want: CI/CD, Terraform, Ansible, AWS, Docker, Kubernetes, Helm and all the nice developer tools.*
*• Stacks: Go, Rust, Bash, C, Python and Ruby on the DevOps and system side; Java/Springboot/Hibernate and Ruby on Rails on the back-end side; Angular/Typescript and React/ReasonML (and a bit of VueJS) for the front-end side. I also love OCaml and more generally fonctional programming. Finally, I would really enjoy playing with Kotlin and Swift.*

## EXPERIENCE

### SQUAD - Cabinet de conseils et d'expertises
*Jan 2019 to Present*

#### Full-stack Developer

• (**Terraform, GCP, Kubernetes, Helm**) Using a everything-as-code methodology, I deployed an Ansible Tower stack (or rather, AWX) with self-managed DNS records (using the Cloudflare API), self-managed ACME certificates (using Letsencrypt) for each endpoint, Traefik as LB/ingress controller, Prometheus Operator (Grafana, node exporter...) for metrics, Helm for k8s' yaml managament. https://github.com/maelvalais/awx-gke-terraform

• (**Springboot, Angular, Couchbase, MongoDB, Postgres**) Create a front-end dedicated to network administrators so that they can monitor and proceed to administrative tasks (either using the Angular UI or through a clean and usable API). Deployed continously using Docker. Front-end uses the NgRx store for state management (a Redux-like). Also developed the LDAP/Active Directory adaptor as well as OAuth2 (password mode).

• (**JHipster, Springboot, Angular, Heroku**) Prototyped a serverless app using Heroku, with features things like e-mail verification, JWT auth, password lost using Mailgrid, administration dashboard with application logs and metrics) as well as CI/CD using Docker. This POC was scaffolded using the (awesome) jhipster CLI. Stack: Gradle, Liquibase for DB migration, Swagger, Postgres (H2 for dev), Cucumber for domain tests.

### SQUAD Conseil et Expertises
*Oct 2018 to Dec 2018*

#### DevOps Engineer contracted to Orange

• (**Golang, Terraform, VMWare vRA7 APIs**) Implemented a Terraform provider in Go for the Orange-flavoured vRA7 internal cloud. Also published a step-by-step walkthrough so that people can get onboard easily and by themselves for creating VMs, security groups and load balancers.

• (**Gitlab CI, Ansible, Docker Swarm, Prometheus, Traefik**) Building the CI/CD for an example project so that the whole stack is tested from provisioning to deployment, including alert testing.

• (**Nodejs, Typescript, NPM, CLI, Artifactory, Jest**) Built a CLI for interacting with a good-old HTML-only provisioning UI based on vCloud Director. Gives developers a pleasant way of interacting with the infrastructure, as well as a being able to be run unattended for CI/CD purposes.

• (**Internal open-source, Gitlab**) Advertise the benefits of doing "corporate open-source" at Orange and get people to share their code. Very tricky task that takes a lot of time through 1-to-1 coaching sessions (often remotely) as well as mentoring on "anyone can see it" platforms like Gitlab, Mattermost and Artifactory.

• (**FloudFoundry**) Some prototyping on how to set up a CF service when an application relies on another one (e.g., front-end server relying on an API server). The goal was to explore the possibility of offering custom services to the marketplace (by implementing a service broker).

**Context:** The shift from a unified and rigid VM-based workflow to a containerized infrastructure with distributed exploitability tools has raised two concerns: (1) how do ensure that every service can be deployed flawlessly using Ansible and integrates nicely in the Docker Swarm infrastructure, and (2) how do we make sure developers trust this new way of dealing with deployment and application infrastructure. My goal is to provide a public CI/CD pipeline that tests and showcases this new workflow from provisioning to application deployment so that developers can trust and copy ideas for their own project.

## IRIT (Institut de Recherche en Informatique de Toulouse)
*Oct 2016 to Sep 2018*

### PhD | Artificial Intelligence

• (**Travis CI, Appveyor, Circle CI**) continuous integration and deployment (for Windows, macOS, Linux app releases)

• (**OCaml, Menhir, Jbuilder, OUnit**) fast and advanced compiler/parser/solver published to OPAM

• (**Java, Swing/AWT, Gradle**) graphical interface with IDE-grade features (syntax highlighting, linter, errors showing on hover). Source: https://github.com/touist/touist

• (**Travis CI, Bintray, Homebrew, Ruby, AWS S3**) pre-compiled binaries automatically published on a Homebrew tap (package manager macOS/ Linux) with bottles automatically uploaded by Travis CI to Bintray. Source: github.com/touist/homebrew-touist

• (**Javascript, VueJS, Rust, Docker**) webapp with an IDE look and feel and associated API (in Rust). Source: github.com/maelvalais/touist-editor

• (**Docker, Terraform, AWS ECS & Route53** & cie) infrastructure-as-code for provisionning the webapp infrastructure through AWS, using autoscaling, load-balancing, monitoring (Watchdog) with zero downtime. Source: github.com/maelvalais/terraform-touist

**Context:** My PhD consisted in finding and implementing translations from theoretic logics to solvable formulas in order to solve problems in a descriptive way (as opposed to imperative).

## Institut de Mathématiques de Toulouse
*Mar 2016 to Sep 2016*

### Research Intern | Sparse Approximation for Image Processing and Machine Learning

• (**C, Matlab API**) native re-write of slow ad-hoc Matlab functions on sparse matrices with a speedup of 10

• (**Matlab**) design of the algorithm for learning how to generate images using a network of convolutions

**Context:** during this internship, my goal was to develop a working prototype for a new image compression algorithm based on Deep Learning (except that we do it the opposite way: produce an image instead of analysing it). Work presented publicly during a workshop at UPMC -- Paris.

## MobiGIS - Expert SIG Transport
*May 2015 to Aug 2015*

### R&D Intern Developer | Algorithms & Continuous Integration

• (**DevOps, git, Gitlab**) installing and maintaining the on-premises infrastructure required by GitLab: a GitLab server as well as 5 GitLab CI runners running on virtual machines. I also proposed the new workflow based on continuous integration using pull-requests with GitLab

• (**SVN, Git, sysadmin**) migrating from SVN to git as well as help the team deal with this new tool (7 developers using Windows and TortoiseGit)

• (**C#, NUnit, Msbuild, C++**) audit and rework of the test suite in order to shorten the feedback loop (the feedback went from ~2 hours to 10 minutes using shorter and simpler integration tests).

• (**C++, Visual C++, Boost, ArcGIS**) develop the carpooling algorithm (based on Dijsktra as well as the ESRI ArcGIS framework)

**Context:** As part of a team working on a carpooling project (similar to BlaBlaLines), we built a cloud-based carpooling application, moveazy.fr.

## IRAP - Institut de Recherche en Astrophysique et Planétologie
*Sep 2014 to Sep 2014*

### Junior Software Developer | Solar Instrumentation for Astrophysics

• (**Linux, C, C++, Autotools, Qt**) Updating 7-years-old softwares to ensure their compatibility on new architectures,

• (**C++, Qt**) Adding features according to users complaints when upgrading to the latest Qt version.

**Context:** Software upgrade of the acquisition system CLIMSO (for the coronagraphs at the Pic du Midi). In collaboration with the hardware team to make this evolution durable with ESXi virtual machines.

## IRAP - Institut de Recherche en Astrophysique et Planétologie
*Apr 2014 to Aug 2014*

### Junior Software Developer Intern | Solar Instrumentation for Astrophysics

• (**C++, Qt, Autotools, Git, Github**) Implement a graphical interface for guiding, write an algorithm for precisely locating the Sun, write the optimal control algorithm for sending commands to the Arduino, implement communication with the USB astronomy camera and Arduino

• (**Arduino**) Set up of the production hardware (micro-controllers) for moving the 16-tons telescope mount. Sources: https://github.com/maelvalais/climso-auto

**Context:** During this internship, I had to design, prototype, and develop an Auto Guidance System for the coronagraphy observation in an astronomical observatory (Pic du Midi, France). This project aims to get better pictures of the Sun and remove the heavy task

of moving manually the coronagraphs. This system is still currently used in production.

## EDUCATION

### Université Paul Sabatier Toulouse III
*2016 to 2019*

Doctor of Philosophy - PhD

The idea behind my PhD thesis is to implement a tool that would ease the process of modeling combinatorial problems using propositional logic. The tool, named "TouIST", is used for teaching logic as well as in research for comparing solvers and encodings. I defended on April 8th, 2019.

### Ecole nationale de l'Aviation civile
*2015 to 2016*

Master's degree

• Nonlinear local optimization and convex regularization (inverse problems, parsimonious approximation)
• Linear optimization (dual simplex, PLNE by Branch and Bound and valid cuts, Benders decomposition, column generation)
• Deterministic global optimization (intervals) and stochastic (annealing, taboo, genetics)
• Production planning and scheduling

### Université Paul Sabatier Toulouse III
*2014 to 2016*

Master's degree (first year)

• Operations Research (CSP, dynamic programming, linear optimization) • Artificial Intelligence (Tabu search on state space, heuristics and A* algorithm) • Classification and signal processing • Language translation and compilation • Parallel computing Laureate of the Excellence Scholarship awarded by the "Centre International de Mathématiques et d'Informatique".

### Université Toulouse 1 Capitole
*2011 to 2014*

Bachelor's degree

• Firm scientific and project management basis
• Algorithmics – Complexity, Graphs • Computer architecture, Unix environment, Networks • Numerical linear algebra, Statistics, Probabilities • Software Engineering, Project management, Economics, Law, Accounting

### Lycée Saint-Sernin
*2010 to 2011*

Scientific Baccalaureate

## SKILLS

Continuous Integration, Golang, Terraform, Project Management, Apprentissage automatique, Shell Scripting, Développement de logiciel, Génie logiciel, Programmation, Intelligence artificielle, Optimisation, Scrum, Intégration continue, Algorithms, Signal Processing, Gestion de projet, Testing, Machine Learning, Docker, Git, Linux, Ruby, C, Python, Java, Matlab, LaTeX, SQL, Arduino, Ruby on Rails, JavaScript, macOS, Anglais, Continuous Delivery, Ansible, Kubernetes, Gitlab, Rust, Amazon Elastic Compute Cloud, Qt, Gradle, ReasonML, Amazon Web Services (AWS), Spring Boot, Angular

## PUBLICATIONS

### Transport humanitaire et la logistique de crise : comparaison de deux méthodes de calcul de tournées de véhicules

Cet article

étudie deux méthodes utilisées dans le cadre du transport humanitaire en cas de crise (désastre, épidémie...). Le Covering Tour Problem se focalise sur l'équité de distribution des vivres, alors que le Capacitated Vehicle Routing Problem se concentre sur l'urgence de la distribution. Nous proposons une nouvelle approche mélangeant ces deux approches pour former une solution à la fois équitable et rapide. Ce article a été rédigé dans le cadre du TER 2014-2015 a cours du M1 à l'université Toulouse III - Paul Sabatier.

### Compact Tree Encodings for Planning as QBF

Inteligencia Artificial (Ibero-American Journal of Artificial Intelligence), pp. 103-114, Vol 21, Nº62, 2018

Considerable improvements in the technology and per- formance of SAT and QBF solvers has made it pos- sible to use them for the resolution of various prob- lems in Artificial Intelligence, and among them the problem of generating plans. In this article we present a translation from STRIPS planning problems into quantified propositional formulas. We introduce two new encodings: CTE-EFA based on explanatory frame-axioms, and CTE-OPEN based on causal links. Then we compare both of them to the CTE-

NOOP encoding which is based on No-op actions (Cashmore, Fox, and Giunchiglia 2012). In terms of execution time over benchmark problems, CTE-EFA and CTE-OPEN always performed better than CTE-NOOP.

## Twist your logic with TouIST

### International Congress on Tools for Teaching Logic (ICTTL 2015)

Khaled Skander Ben Slimane, Alexis Comte, Olivier Gasquet, Abdelwahab Heba, Olivier Lezaud, Frederic Maris and Mael Valais

SAT provers are powerful tools for solving real-sized logic problems, but using them requires solid programming knowledge and may be seen w.r.t. logic like assembly language w.r.t. programming. Something like a high level language was missing to ease various users to take benefit of these tools. TouIST aims at filling this gap. It is devoted to propositional logic and its main features are 1) to offer a high-level logic langage for expressing succintly complex formulas (e.g. formulas describing Sudoku rules, planification problems, …) and 2) to find models to these formulas by using the adequate powerful prover, which the user has no need to know about. It consists in a friendly interface that offers several syntactic facilities and which is connected with some sufficiently powerful provers allowing to automatically solve big instances of difficult problems (such as time-tables or Sudokus). It can interact with various provers: pure SAT solver but also SMT provers (SAT modulo theories - like linear theory of reals, etc) and thus may also be used by beginners for experiencing with pure propositional problems up to graduate students or even researchers for solving planification problems involving big sets of fluents and numerical constraints on them.

## PROJECTS

### TouIST, l'outil pour exprimer les problèmes de logique propositionnelle

*Jan 2015 to May 2015*

https://github.com/touist/touist

Outil basé sur un solveur de logique propositionnelle proposant un langage de haut niveau ainsi qu'une interface utilisateur adaptée à l'enseignement et à la recherche. Toute la force de Touist repose sur son langage : il permet à l'utilisateur l'expression de formules condensées, réduisant considérablement l'écriture des problèmes ; Touist permet aussi de séparer les formules (c'est à dire le coeur du raisonnement) des données. Un article présentant l'outil a été présenté lors de la conférence internationale "TTL 2015" à Rennes.

## HONORS

### Master Fellowship Laureate

The CIMI LabEx (International Center for Mathematics and Computer Science, Excellence Laboratory in Toulouse) offers master's scholarships in mathematics and computer science. Selected on the criteria of academic excellence, each of the ten laureates each year are rewarded up to 10,000 euros distributed during their last year of Master's degree.

### Doctoral Fellowship Laureate

The CIMI LabEx (International Centre for Mathematics and Computer Science, Excellence Laboratory in Toulouse) offers a 3-year support grant for students starting a PhD in one of the teams related to mathematics and computer science. These fellowships are open, on a competitive basis, to French and foreign students and awarded on the basis of the quality of the academic records. I was awarded with this fellowship.

## LANGUAGES

**Anglais** (Full professional proficiency), **Français** (Native or bilingual proficiency), **Espagnol** (Elementary proficiency), **Khmer** (Elementary proficiency)

## RECOMMENDATIONS

### laurent Koechlin

*9/5/14, 6:12 AM*

recherche scientifique, IRAP - Institut de Recherche en Astrophysique et Planétologie

Maël est un l'un des meilleurs stagiaires que j'ai encadrés, par ses compétences, sa rigueur dans le travail et son esprit d'initiative, ainsi que par ses qualités humaines. Il a conçu et mis au point dans les délais un système de guidage de haute précision pour les instruments astronomiques (CLIMSO) à l'observatoire du pic du midi de Bigorre. Ce système sert maintenant pour un survey de l'activité solaire à long terme, et environ 80 personnes vont l'utiliser.