# Igor DC

## Basic Data


Full name: Igor Duarte Cardoso
Degree: Master of Science in Computer and Telematics Engineering (2014)
Location: United States of America (born in Portugal)
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## Professinal Summary

I am passionate about designing solutions that prioritize user experience, thriving in collaborative environments:

- **Cloud Computing:** Experience with both open and closed-source projects.
- **Artificial Intelligence:** Eager to deepen my involvement in AI-driven projects.
- **Networking Technologies:** Expertise in Software-Defined Networking (SDN) and Network Functions Virtualization (NFV).
- **Hardware & Server Management:** Ensuring robust system operations.
- **Cybersecurity:** Implementing secure solutions.
- **Mobile App Development:** Crafting user-centric applications.

I am particularly interested in roles where I can fully immerse myself in AI, contributing to projects that benefit from collective expertise and teamwork. My approach is always to enhance product development through collaborative efforts rather than working in isolation.

## Work Experience (summarized)

*November 2024* – February 2024
**AI Solutions Engineer**
Intel Corporation (Hillsboro, OR, United States of America)
I was a founding member of an innovative team with the mission to develop a cutting-edge, production-ready AI datacenter cloud software stack. Our goal was to maximize the efficiency of Intel Gaudi AI accelerators on a massive scale. Despite our promising start, the project was ultimately discontinued due to financial constraints.

*February 2024* – November 2018
**Senior Cloud Orchestration Software Engineer**
Intel Corporation (Hillsboro, OR, United States of America)
In reverse chronological order: Designed and developed features and solutions for a Cloud Security and Cloud Native project, for Intel Tiber Edge Platform, for Open-source EMCO (edge multi-cloud orchestrator) and Open-source Akraino (edge project). Lots of OpenStack, Kubernetes, Linux. Took roles such as EMCO TSC alternate chair, EMCO technical marketing rep, main point of contact for PM-related topics initiated by the EMCO open-source community at large.

*November 2018* – September 2015
**Network Software Engineer**
Intel Communications Europe (Shannon, Ireland)
NFV, SDN, Service Function Chaining leadership in OpenStack, Open-source OpenStack contributions, hardware enablement and later solutions, including based on Intel Rack Scale Design.

*September 2015* – October 2014
**Researcher and Software Engineer**
Instituto de Telecomunicações (Aveiro, Portugal)
NFV, SDN, telco vHGW/CPE, with the help of Open-source cloud computing (mainly OpenStack).

*November 2015* – May 2013
**Developer, Designer and Product Manager**
Wrkout (*remote*, Portugal)
Android mobile app with thousands of paying customers.

*September 2012* – September 2011
**Research Scholarship**
IEETA (University of Aveiro, Portugal)
User Experience and Human-Computer Interfaces.

## Patents

1. "Methods and apparatus to manage heat in a central processing unit", US11048540, granted 2021
2. (title hidden until publicly available) - on cloud native & computer security, expected 2024
3. (title hidden until publicly available) - on cloud native & computer security, expected 2024

Note: patent submissions turned into trade secrets will not be public and thus are not listed.

## Achievements and Awards

| | |
|---|---|
| 2023 | Intel Security Leadership Award for my contributions to Cloud Burst Canyon. |
| 2022 | Intel Distinguished Invention Award in single-author patent work deemed trade secret. |
| 2021-22 | EMCO Technical Steering Committee alternate chair. |
| 2020-21 | Intel Recognition Award for work in EMCO, which I can't seem to dig up right now. |
| 2018 | Intel DSG DRA (Division Recognition Award) for my work in advancing IETF SFC and NSH. |
| 2017 | Intel DNSG DRA (Division Recognition Award) for my work in advancing IETF SFC and NSH. |
| 2017 | Intel Marketing DOT. |
| 2016 | Founded the CCF for Neutron in OpenStack, successfully bringing the community together. |
| 2016 | Intel DNSG recognition for co-organizing the first ever OpenStack Days Ireland event. |
| 2014 | Invited to develop a mobile Android app (ActUA) by the University's top staff. |
| 2013 | First place on a University's Mobile App Development challenge awarded by Blip.pt. |
| 2011 | Research Integration Scholarship (12-month) at IEETA, financed by FCT. |
| 2008 | Top (#1) High School Student Award. |

## Skills

To keep the first 2 pages compact, detailed skill list has been moved to page 5.

## Publications

| | |
|---|---|
| 2016 | Vitor Cunha, Igor D.C., J.P. Barraca, R.L. Aguiar:<br>"Policy-driven vCPE through dynamic network service function chaining".<br>NetSoft Conference and Workshops (NetSoft), 2016 IEEE, 156-160. |
| 2016 | Igor D.C., J.P. Barraca, Carlos Goncalves, R.L. Aguiar:<br>"Seamless integration of Cloud and Fog networks".<br>International Journal of Network Management 26 (6), 435-460. |
| 2015 | Igor D.C., J.P. Barraca, Carlos Goncalves, R.L. Aguiar:<br>"Seamless integration of Cloud and Fog networks".<br>1st IEEE Conference on Network Softwarization (NetSoft 2015). |
| 2014 | Paulo Dias, Tiago Sousa, Joao Parracho, Igor D.C., André Monteiro, Beatriz Sousa Santos:<br>"Student Projects Involving Novel Interaction with Large Displays".<br>IEEE Computer Graphics and Applications, vol. 34, no. 2, pp. 80-86, Mar.-Apr., 2014. |
| 2014 | Tiago Sousa, Igor D.C., João Parracho, Paulo Dias, Beatriz Sousa Santos:<br>"DETI-Interact: Interaction with Large Displays in Public Spaces Using the Kinect".<br>HCI 2014 - 16th International Conference on Human-Computer Interaction: 196-206. |
| 2014 | Igor D.C.:<br>"Network infrastructure control for virtual campuses".<br>Universidade de Aveiro (Master's Dissertation). |
| 2013 | Tiago Sousa, João Parracho, Igor D.C., Paulo Dias, Beatriz Sousa Santos:<br>"Interação com ecrãs de larga dimensão usando o kinect".<br>Atas da 5 Conferência Nacional sobre Interação-Interação. |
| 2012 | Igor D.C., Paulo Dias, Beatriz Sousa Santos:<br>"Interaction with large displays in a public space using the Kinect sensor".<br>20 Encontro português de Computação Gráfica - EPCG 2012, pp. 81–88 (2012). |

For additional experience or greater detail, see pages below.

# Work Experience

*November 2024* – February 2024

### AI Solutions Engineer

Intel Corporation (Hillsboro, OR, United States of America)

I was a founding member of an innovative team with the mission to develop a cutting-edge, production-ready AI datacenter cloud software stack. Our goal was to maximize the efficiency of Intel Gaudi AI accelerators on a massive scale. Despite our promising start, the project was ultimately discontinued due to financial constraints.

*February 2024* – November 2018

### Senior Cloud Orchestration Software Engineer

Intel Corporation (Hillsboro, OR, United States of America)

Initially joined the Open Source Technology Center (OTC) with a focus on networking contributions to Neutron, the OpenStack networking project. Co-worked on Intel Omni-Path Architecture testing and development/enabling in Neutron, joined in on existing miscellaneous OpenStack contribution work that was ongoing such as distributed virtual routing, virtual data path acceleration, and OVN, helping to close those by being an overall jack of all trades. Helped set up server hardware and development environments to optimize team performance and expectations. Contributed deployment and automation scripting to the Akraino edge project. Had brief exposure to the ONAP project, followed by the multi-k8s sub-project which eventually spun off to become EMCO, the Edge Multi Cloud Orchestrator, initiating my venture into Kubernetes and edge computing/orchestration. Contributed multiple features to EMCO, starting with multi-tenancy and ending with Google Anthos GitOps rendering support for apps deployed over Google Cloud. Throughout my time in EMCO, my software engineering role was raised to a senior level. Was named alternate TSC chair of EMCO by the TSC chair throughout most of 2021/2022, and was briefly part of the technical marketing team. I also mentored a student under the Linux Foundation mentorship program. After the EMCO investment wound down, I began working on Intel Tiber Edge Platform, contributed a significant chunk of a key component within Maestro-A, especially the multi-threaded state machine architecture that, as far as I'm aware, is still being used. Participated extensively in meetings about all parts of Maestro-A. After Tiber Edge, went on to work on Intel Cloud Burst Canyon, part of cloud native security and sustainability, contributing to a fundamental piece in the scheduling of applications with security requirements/expectations and created an IDF that is now pending patent submission. Finally, during my final time in this position, I have worked on ramping up in Intel TDX and a bit of IDC (Intel Developer Cloud) with the aim of accelerating TDX adoption (with Intel Amber attestation support) in IDC and provided extensive documentation about my findings and obstacles. As I was ramping up on Kubernetes KEDA (scaling), my team was defunded. Throughout these years I have earned some group awards and several recognitions from peers, managers and architects.

*November 2018* – September 2015

### Network Software Engineer

Intel Communications Europe (Shannon, Ireland)

I have helped use cases and projects in the SDN, NFV and Orchestration areas on multiple occasions. Originally, I worked on the Group-Based Policy OpenStack project where I integrated QoS support from existing Neutron's APIs. Later, and during the majority of my time at Intel Communications Europe, I worked with SFC (Service Function Chaining). With a deep understanding of IETF SFC's proposal, architecture and the NSH protocol, I have fought through different obstacles in the OpenStack community in order to enable standards-compliant SFC, designing and proposing a compatible solution. I later implemented SFC Encapsulation support for OpenStack's Neutron (networking-sfc) through multiple patches, mainly the ones enabling Service Graphs and the NSH protocol (for Open vSwitch), and became part of the core team. Additionally, I have designed, developed and successfully contributed an abstract SFC interface for the VIM connector layer in the Open Source MANO (OSM) project, together with an OpenStack implementation of it, and enabled ETSI NSD/VNFFGD to be converted to the VIM connector's SFC interface, thus enabling top-to-bottom, end-to-end SFC from orchestration all the way down to Open vSwitch (optionally together with OpenDaylight), all based on open source projects. Another very significant endeavour was resurrecting the effort around traffic classification in OpenStack's Neutron, by founding and leading the Common Classification Framework project, creating an initial design and bringing the community together to discuss, suggest and agree on use cases and models. Most recently, I began working with Intel Rack Scale Design (RSD), where I have provided contributions on a diverse set of layers. My most tangible contribution in RSD is the inception of the `rsb_` module umbrella and the creation of the `rsd_node` module, allowing Ansible to deploy composed nodes in an idempotent manner. Finally, I've worked on multiple innovation tasks during my time.

*September 2015* – October 2014

### Researcher and Software Engineer

Instituto de Telecomunicações (Aveiro, Portugal)

Given the experience I acquired in OpenStack during my Master's Dissertation and the related work I did during it, I was invited to stay at Instituto de Telecomunicações doing research related to Network Functions Virtualization (NFV). There, I kept working on OpenStack although initially not upstream. Then started making contributions to the Group-Based Policy project for OpenStack. Most of my work, though, has been around other aspects of NFV: automating configuration of Virtual Network Functions (VNFs), improving and discussing the Traffic Steering implementation to meet the purposes of Service Function Chaining (SFC), testing and integrating other implementation artifacts of the team.

*November 2015* – May 2013

### Developer, Designer and Product Manager

Wrkout (*remote*, Portugal)

Not really a job, but an amazing work experience. Wrkout is a mobile Android app which I've created. By dealing with multiple aspects related to developing, publishing and monetizing the app by myself, I have learned plenty. This project turned product also teaches me exactly why I should be working in a team. Wrkout also gave me the first non-college exposure to software product management, as I took customer requirements and iterated over those alongside my long-term vision for the app. On November 2015 the app was made free and I became less engaged with it in order to better focus on my new endeavours.

*September 2012* – September 2011

### Research Scholarship

IEETA (University of Aveiro, Portugal)

In this part-time scholarship awarded by merit during university, I got introduced to the world of academic research for the first time. Here I developed solutions in the area of user interfaces, user experience and human-computer interfaces. I was able to get acquaint myself with Microsoft Kinect, Oculus Rift, 3D sensing and modeling, UI Testing, and refine my existing C# and Visual Studio skills. The developments led to publications and one public speaking engagement at a conference.

## Skills

| | |
|---|---|
| Basic Experience: | Ansible, ASP.NET, bison, C, C++, Computer Architecture, Dansguardian, flex, iOS dev, Jekyll, MIPS assembly, Objective-C, OpenDaylight, OpenWrt, OSM, Perl, PHP, Ruby, Squid3, x86 assembly, SMO, AI/ML/DL, GKE, Anthos, Heroku, MongoDB, Akraino, GitOps, Kyverno, Intel TDX, Microsoft Project, Marketing, Product Management, Hugging Face, PyTorch, MPI, Ray, SPIFFE/SPIRE, KEDA, Intel Gaudi. |
| Intermediate Experience: | Android dev, bash, C, C#, Cisco IOS, CSS, ETSI NFV, Excel, GlassFish, GNS3, GNU/Linux, Google Analytics, HTML, IETF SFC/NSH Intel Rack Scale Design, Java, JavaScript, Jenkins, LAMP, LaTeX, Computer Networks, Computer Security, Neutron, OpenFlow, OpenStack, Open vSwitch, Public Speaking, golang, EMCO, Helm, project management, Distributed Systems, CI, Python, Redfish, SQL, Technical Writing, UML, Vim, Visio, XML, Wireshark, Software Architecture, Mentoring, Jupyter, KubeRay, Video editing. |
| Advanced Experience: | APIs, docker, git, JSON, JIRA, Linux dev environments, VSCode, Microservices, Kubernetes. |

## Formal Education

2014 Master of Science in Computer and Telematics Engineering,
**Universidade de Aveiro**, Aveiro, Portugal,
Dissertation: "Network Infrastructure Control for Virtual Campus",
Based on a broad Computer Science foundation, further focuses on Software Engineering and Computer Networks.
*Final grade: 18 out of 20 (dissertation)*.

2011 Bachelors in Computer and Telematics Engineering,
**Universidade de Aveiro**, Aveiro, Portugal,
Degree with a broad Computer Science foundation (linear algebra included) and multiple practical projects.
*Final grade: 16 out of 20*.

2008 High School,
**Agrupamento de Escolas da Guia**, Guia, Portugal:
*Final grade: 18 out of 20 (top of class)*.

### Master's Dissertation

On my Master's Dissertation I have designed and developed an extension for OpenStack Neutron that allows virtually any computer network to be extended beyond their physical boundaries up to a Cloud-managed network, per a Cloud tenant's request. This is achieved through an architecture that uses pluggable drivers to communicate with remote devices that directly connect or manage these computer networks.

### Non-formal education

- Cisco CCNA-1 - 2007.
- Public Speaking course (1 day) - 2016.
- Crucial Conversations and Conflict Resolution course (1 day) - 2017.
- Bitnami Kubernetes training (CKA+CKAD-like) (3 days) - 2019.
- Ardan Labs Ultimate Go training (2 days) - 2019.

## Public Presentations

Presentation on human-computer interaction
Viana do Castelo, Portugal, 2012

Presentation on 24-hour mobile app hackaton
Lisbon, Portugal, 2013

Empower your NFV Services through Service Function Chaining and SFC Graphs
OpenStack Summit 2016, Barcelona

Developing, Deploying, and Consuming L4-7 Network Services in an OpenStack Cloud
OpenStack Summit 2016, Austin, Texas

Cloud, SDN, NFV
ENEI 2016, University of Aveiro, Portugal

*On Intel OPA (submission was accepted but travel was not approved)*
Open Infrastructure Summit 2019, Shanghai, China

EMCO: Deploying to target clusters (and public clouds) via git
LFN DTF June 2022, Porto, Portugal

EMCO: distribution of Istio CA certificates to target clusters (on behalf of 3rd party)
LFN DTF June 2022, Porto, Portugal

Project Overview and Update (on behalf of 3rd party)
LFN DTF June 2022, Porto, Portugal

Simplifying Edge Deployments Using EMCO and GitOps
KubeCon North America 2022, Detroit, Michigan

## Open-Source Output

I have made upstream contributions to a diverse set of projects within the OpenStack umbrella.

I have made other contributions to Open-Source software that are public but not all of them upstream, including irssi, Yakuake, metastore, tox, etc. I have also developed other simple side projects in the past, some of them available at my GitHub.

You can check most of my public output through the links/profiles/dashboards/pages below:

- OpenStack Gerrit and new one
- OpenStack Stackalytics and new one
- OSM Gerrit
- CCF Wiki
- Launchpad Profile
- GitHub Profile
- GitLab Profile

## Presence

*ATNoG* — September 2013
Advanced Telecommunications and Networks Group
I became associated with ATNoG as part of my Master's Thesis. This group is established inside Aveiro's pole of Instituto de Telecomunicações.

*GLUA* — July 2011
University of Aveiro's Linux Group
Member of the University of Aveiro's Linux Group (Grupo Linux da Universidade de Aveiro).

## Events

*As a co-organizer* | OpenStack Days Ireland 2016

## Interests and Activities

Computer Software, Computer Hardware, Cloud Computing, GNU/Linux, Open-Source, Computer Networks, Brainstorming, User Experience, Health and Fitness, Brazillian Jiu-Jitsu, Reading, Artificial Intelligence.

## Languages

| | |
|---|---|
| Portuguese: | Native |
| English: | Fluent |
| Spanish: | Basic understanding |