JONATAS A. MARQUES

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EDUCATION

2017 – 2022   **Federal University of Rio Grande do Sul (UFRGS)**, Brazil
Ph.D., Computer Science
Advised by Prof. Luciano Paschoal Gaspary

2019 – 2020   **University of Illinois at Urbana-Champaign (UIUC)**, USA
Research Scholar
Supervised by Prof. Kirill Levchenko

2015 – 2017   **Santa Catarina State University (UDESC)**, Brazil
M.Sc., Applied Computing
Advised by Prof. Rafael Rodrigues Obelheiro

2011 – 2015   **Santa Catarina State University (UDESC)**, Brazil
B.Sc., Computer Science
Final Project Advised by Prof. Rafael Rodrigues Obelheiro

EXPERIENCE

Jul, 2021 – Present   **Federal University of Rio Grande do Sul (UFRGS)**, Research Assistant
Project: SkyNet – Towards Smart Data Planes

Aug, 2021 – Aug, 2022   **Federal University of Rio Grande do Sul (UFRGS)**, Part-time Professor
Classes:
- Introduction to Algorithms in C
- Introduction to Algorithms in Python

Mar, 2021 – May, 2021   **Int6 Tech – Internet Service Provider**, R&D Intern
- Improved network operation practices with Open vSwitch
- Evaluated the deployment of an Open vSwitch + DPDK solution

Aug, 2017 – Dec, 2017   **Federal University of Rio Grande do Sul (UFRGS)**, Teaching Assistant
Classes:
- Communication Protocols
- Programming Challenges

Mar, 2016 – Jul, 2016   **Santa Catarina State University (UDESC)**, Teaching Assistant
Class: Operating Systems

Jul, 2014 – Dec, 2014   **Unimed Federação Santa Catarina**, Systems Analyst Intern
- Developed new features for client billing system

HONORS & AWARDS

2022   **Ph.D. Graduation with Honors**
Federal University of Rio Grande do Sul (UFRGS), Brazil

2019   **Best Student Paper Award**
IFIP/IEEE International Symposium on Integrated Network Management (IM 2019)

2018   **Best Paper Award**
Brazilian Symposium on Computer Networks and Distributed Systems (SBRC 2018)

2015   **B.Sc. Graduation with Honors**,
Santa Catarina State University (UDESC), Brazil

2013   **Honorable Mention**
ACM Brazilian Final of the International Computer Programming Contest (ICPC)

RESEARCH INTERESTS

• Programmable Networks

• Software-defined Networking

• Network, Service and Application Management

• Machine-Learning for Networking

PUBLICATIONS

(1)   Guilherme R. Pretto, Bruno L. Dalmazo, **Jonatas A. Marques**, Zhongke Wu, Xingce Wang, Vladimir Korkhov, Philippe O. A. Navaux, and Luciano P. Gaspary. 2022. Janus: a framework to boost HPC applications in the cloud based on SDN path provisioning. **Cluster Computing** 25, 2 (Apr 2022), 947–964.

(2)   **Jonatas A. Marques**, Zhongke Wu, Xingce Wang, Ruslan Kuchumov, Vladimir Korkhov, Weverton L. C. Cordeiro, Philippe O. A. Navaux, and Luciano P. Gaspary. 2021. Harnessing Cloud Computing to Power Up HPC Applications: The BRICS CloudHPC Project. In **Computational Science and Its Applications – ICCSA 2021**: 21st International Conference, Cagliari, Italy, September 13–16, 2021, Proceedings, Part VIII. Springer-Verlag, Berlin, Heidelberg, 336–349.

(3)   Bruno L. Dalmazo, **Jonatas A. Marques**, Lucas R. Costa, Michel S. Bonfim, Ranyelson N. Carvalho, Anderson S. da Silva, Stenio Fernandes, Jacir L. Bordim, Eduardo Alchieri, Alberto Schaeffer–Filho, Luciano Paschoal Gaspary, and Weverton Cordeiro. 2021. A systematic review on distributed denial of service attack defense mechanisms in programmable networks. **Int. J. Netw. Manag.** 31, 6 (November/December 2021).

(4)   L. A. Q. González, L. Castanheira, **J. A. Marques**, A. Schaeffer-Filho and L. P. Gaspary. 2021. BUNGEE: An Adaptive Pushback Mechanism for DDoS Detection and Mitigation in P4 Data Planes, **2021 IFIP/IEEE International Symposium on Integrated Network Management (IM)**, 2021, pp. 393-401.

(5) A. d. S. Ilha, Â. C. Lapolli, **J. A. Marques** and L. P. Gaspary. 2021. Euclid: A Fully In-Network, P4-Based Approach for Real-Time DDoS Attack Detection and Mitigation, in **IEEE Transactions on Network and Service Management**, vol. 18, no. 3, pp. 3121-3139, Sept. 2021.

(6) Marcus Vinicius Brito da Silva, **Jonatas A. Marques**, Luciano Paschoal Gaspary & Lisandro Zambenedetti Granville. 2020. Identifying elephant flows using dynamic thresholds in programmable IXP networks. **J Internet Serv Appl** 11, 10 (2020).

(7) **Jonatas Marques**, Kirill Levchenko, and Luciano Gaspary. 2020. IntSight: diagnosing SLO violations with in-band network telemetry. In **Proceedings of the 16th International Conference on emerging Networking EXperiments and Technologies (CoNEXT '20).** Association for Computing Machinery, New York, NY, USA, 421–434.

(8) **Jonatas A. Marques**, Marcelo Caggiani Luizelli, Roberto Irajá Tavares da Costa Filho & Luciano Paschoal Gaspary. 2019. An optimization-based approach for efficient network monitoring using in-band network telemetry. **J Internet Serv Appl** 10, 12 (2019).

(9) Guilherme R. Pretto, Bruno L. Dalmazo, **Jonatas A. Marques**, Zhongke Wu, Xingce Wang, Vladimir Korkhov, Philippe O. A. Navaux & Luciano P. Gaspary. 2019. Boosting HPC Applications in the Cloud Through JIT Traffic-Aware Path Provisioning. In: , et al. **Computational Science and Its Applications – ICCSA 2019**. ICCSA 2019. Lecture Notes in Computer Science, vol 11622. Springer, Cham.

(10) Â. C. Lapolli, **J. A. Marques** and L. P. Gaspary. 2019. Offloading Real-time DDoS Attack Detection to Programmable Data Planes. **2019 IFIP/IEEE Symposium on Integrated Network and Service Management (IM)**, 2019, pp. 19-27.

(11) **Jonatas A. Marques** and Luciano P. Gaspary. 2018. Explorando Estratégias de Orquestração de Telemetria em Planos de Dados Programáveis. In **Anais do XXXVI Simpósio Brasileiro de Redes de Computadores e Sistemas Distribuídos**, maio 10, 2018, Campos do Jordão, Brasil. SBC, Porto Alegre, Brasil, 1299-1312.

(12) Marcus Vinicius Silva, **Jonatas A. Marques**, Luciano P. Gaspary, and Lisandro Zambenedetti Granville. 2018. Identificação de Fluxos Elefantes em Redes de Ponto de Troca de Tráfego com Suporte à Programabilidade P4. In **Anais do XXXVI Simpósio Brasileiro de Redes de Computadores e Sistemas Distribuídos**, maio 10, 2018, Campos do Jordão, Brasil. SBC, Porto Alegre, Brasil, 1131-1144.

(13) Weverton Luis Costa Cordeiro, **Jonatas A. Marques**, and Luciano Paschoal Gaspary. 2017. Data Plane Programmability Beyond OpenFlow: Opportunities and Challenges for Network and Service Operations and Management. **J. Netw. Syst. Manage.** 25, 4 (October 2017), 784–818.

(14) **J. A. Marques** and R. R. Obelheiro, "Escada: Predicting Virtual Machine Network Bandwidth Demands for Elastic Provisioning in IaaS Clouds," **2017 International Conference on Cloud and Autonomic Computing (ICCAC)**, 2017, pp. 10-21, doi: 10.1109/ICCAC.2017.9.

(15) **Jonatas A. Marques** and Rafael R. Obelheiro. 2017. Um Modelo de Estimação para Provisionamento de Rede de Máquinas Virtuais em Nuvens IaaS. In **Anais do XV Workshop em Clouds e Aplicações**, maio 19, 2017, Belém, Brasil. SBC, Porto Alegre, Brasil.

THESES & DISSERTATIONS

- **Advancing Network Monitoring and Operation with In-band Network Telemetry and Data Plane Programmability**, 2022, Ph.D. Dissertation
  Federal University of Rio Grande do Sul (UFRGS)
  Advisor: Prof. Luciano Paschoal Gaspary

- **A Model for Virtual Machine Network Provisioning in IaaS Clouds**, 2017, Master Thesis
  Santa Catarina State University (UDESC)
  Advisor: Prof. Rafael Rodrigues Obelheiro

- **A Tool for Resource Provisioning Diagnosis in IaaS Clouds**, 2015, Bachelor's Thesis
  Santa Catarina State University (UDESC)
  Advisor: Prof. Rafael Rodrigues Obelheiro

STUDENTS & MENTEES

2022 – Present **Gabriel Vassoler**, M.Sc. (UFRGS, Brazil)

2021 – Present **J. Vicente Lessa**, Undergrad (UFRGS, Brazil)

2021 – Present **Lucas Hagen**, Undergrad (UFRGS, Brazil)

2019 – 2022 **L. Andrey Quintero González**, M.Sc. (UFRGS, Brazil)

2019 – 2022 **Alexandre Ilha**, M.Sc. (UFRGS, Brazil)

2017 – 2019 **Ângelo Lapolli**, M.Sc. (UFRGS, Brazil)

2017 – 2019 **Marcus Vinicius Brito da Silva**, M.Sc. (UFRGS, Brazil)

2018 – 2018 **Fernando L. Spaniol**, Undergrad (UFRGS, Brazil)

TECHNICAL SKILLS

Programming Languages Proficient in Python, P4, and C.
Experience with C++, PL/SQL, Java, Haskell, and Lua.

Technologies Scapy, Pandas, Numpy, matplotlib, scikit-learn, Git, Jupyter, LaTeX.

Areas of Expertise Computer Networks; Programmable Networks; Network, Service, and Application Management; Network Monitoring.

PROJECTS & ACTIVITIES

Software Projects (Core Contributor)

2022 **Felix**: A prototype system for responding to network failures at data-plane speeds

2020 **IntSight**: A prototype system for diagnosing service-level objetive violations with in-band network telemetry

2015 **RePD**: A tool for resource provisioning diagnosis in cloud computing environments

Activities

May, 2019 **Staff Volunteer**
Brazilian Symposium on Computer Networks and Distributed Systems (SBRC 2019)

Dec, 2013 – **Student Body Representation**
Nov, 2014 Department of Computer Science, Santa Catarina State University (UDESC)

Aug, 2013 – **Undergraduate Teaching Assistant**
Jul, 2014 Data Structures, Santa Catarina State University (UDESC)

Aug, 2012 – **Undergrad Research Assistant**
Dec, 2012 Geographic Information Systems, Santa Catarina State University (UDESC)

INVITED TALKS & PRESENTATIONS

2022 Invited Talk: **Rising Stars in Data Science Workshop,** The University of Chicago, Chicago, USA

2020 Paper presentation: **ACM CoNEXT'20**, Online Conference

2020 Invited Speaker: **P4 and Programmable Data Planes**, SENAC, Porto Alegre, Brazil

2019 Invited Speaker: **P4 and Programmable Data Planes**, SENAC, Porto Alegre, Brazil

2017 Paper presentation: **IEEE ICCAC 2017**, Tucson, AZ, USA

2017 Paper presentation: **SBC SBRC 2017**, São José dos Campos, Brazil

2016 Tutorial: **Introduction to Data Analysis with Python**, UDESC, Joinville, Brazil

2013 Tutorial: **Introduction to Programming Contests**, UDESC, Joinville, Brazil

REVIEW SERVICE

2022 ACM SIGCOMM Conference on emerging Networking EXperiments and Technologies (CoNEXT) (Artifact Evaluation)
IEEE Transactions on Network and Service Management (TNSM)
International Conference on Network and Service Management (CNSM)
Computer Communications Journal (ComCom)
Brazilian Symposium on Information and Computational Systems Security (SBSeg)

2021 IEEE Communications Magazine (ComMag)
IEEE Transactions on Network and Service Management (TNSM)
IFIP/IEEE International Symposium on Integrated Network Management (IM)
International Conference on Network and Service Management (CNSM)
IEEE Open Journal of the Communications Society (OJ-COMS)
Brazilian Symposium on Computer Networks and Distributed Systems (SBRC)
Brazilian Symposium on Information and Computational Systems Security (SBSeg)

2020 IEEE/IFIP Network Operations and Management Symposium (NOMS)
IEEE Transactions on Network and Service Management (TNSM)
International Conference on Network and Service Management (CNSM)
Journal of Network and Systems Management (JNSM)
IEEE Networking Letters
Computers & Operations Research
Wiley Networks
Workshop on Flexible Network Data Plane Processing (NETPROC)
Escola Regional de Redes de Computadores (ERRC)

2019 IFIP/IEEE International Symposium on Integrated Network Management (IM)
Journal of Network and Systems Management (JNSM)

2018 Brazilian Symposium on Computer Networks and Distributed Systems (SBRC)
International Conference on Information Science and Cloud Computing (ISCC)
IEEE/IFIP Workshop on Security for Emerging Distributed Network Technologies
(DISSECT)

2017 International Conference on Network and Service Management (CNSM)
Journal of Network and Systems Management (JNSM)
International Workshop on Management of SDN and NFV Systems (ManSDN/NFV)