Anastassios **Nanos**

SYSTEMS ARCHITECT

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Research Interests

Hypervisor technologies, Systems Software, Unikernel Frameworks, Lightweight workload deployment, I/O Virtualization, Orchestration, Hardware Acceleration, System support for Machine Learning & Artificial Intelligence.

Skills

Programming	C, python, bash, C++
Linux Kernel Programming	Device Drivers (Block/Network), Virtual Memory Management, x86 and ARMv7/8, SoC bootstrap
Virtualization	Xen (extensive experience with MM, scheduling, device/drivers integration), KVM (MM, virtio)
Unikernels	rumpkernels, unikraft, LKL, OSv
Orchestration	Kubernetes, Container Runtimes: runc, containerd, docker
Container Runtimes	runc, containerd, docker, kata-containers, custom
Edge/Embedded systems	NVIDIA Jetson variants, Google Coral, RPi, Exynos (5422, 7420), Zynq-7000/Ultrascale+, KU3, LanaiXP
Interconnects	10GbE, Infiniband, Myrinet/GM & MX, Open-MX
DBMS	MySQL, PostgreSQL, MongoDB

Technical & Language Skills

Operating Systems	Linux, Unix, Free/Net/OpenBSD, MS Windows
Systems Administration	Extensive experience setting up various Data Center related services such as: DNS (bind), WWW (apache, nginx), Mail (sendmail & postfix, dovecot), DBMS (MySQL/Postgres, MongoDB), Auth and Directory services (openLDAP & Heimdal Kerberos), VoIP (Asterisk), Networking (CISCO IOS, iptables, openVPN), Monitoring (collectd, graphite, munin & mrtg). Familiar with the setup and deployment of Cloud Computing platforms (OpenStack), Orchestration Frameworks (K8s) & HPC schedulers (SLURM).
Typesetting	LaTeX, MS Word
Languages	English (Fluent), French (Moderate), Greek (Native)

Experience

Nubificus Ltd   *Athens, GR - Sheffield, UK*

DIRECTOR & SYSTEMS ARCHITECT   *Aug. 2018 - Present*

- Nubificus Ltd is a software consultancy tackling complex virtualization problems. We explore lightweight virtualization solutions for edge, low power devices, aiming to bring Serverless and FaaS at the Edge.
- At Nubificus:
    - we enable hardware acceleration for Serverless Computing (`https://vaccel.org`)
    - we experiment with the systems software stack to reduce OS system overhead by enabling in-Kernel task isolation using virtualization techniques (in-kernel VMM)
    - we explore container runtimes to facilitate efficient workload placement in the Cloud and at the Edge, focusing on interoperability.

Up2Metric S.A.   *Athens, GR*

CLOUD CONSULTANT   *Sep. 2020 - Present*

- Container and Cloud consulting solutions for ML acceleration and orchestration.

Mellanox Technologies LTD   *Athens, GR*

SOFTWARE - SYSTEMS ENGINEER   *May 2020 - July 2020*

- Design and develop a TMfifo virtual device to passthrough a physical QRNG device to a Bluefield PCIe SmartNIC.

Sunlight.IO Limited   *Cambridge, UK*

RESEARCHER - SYSTEMS ENGINEER   *Jul. 2018 - Apr. 2020*

- Span out from the Emerging Technologies department of OnApp Limited
- Architected, implemented, and optimized a state-of-the-art hyperconverged hypervisor stack that achieves extreme storage and network performance.

OnApp Limited
Cambridge, UK

RESEARCHER - SYSTEMS ENGINEER
Feb. 2015 - Jun. 2018

- Conducted research in emerging, power-efficient micro-server architectures on scalable network and storage IO, and energy-driven resource management in cloud architectures.
- Additionally, I was involved in architecting and implementing low-level hypervisor and OS mechanisms in the context of EU-funded projects (EUROSERVER, SHARCS, ACTICLOUD, SUPERFLUIDITY, NGPaaS).

Up2Metric S.A.
Athens, GR - Sheffield, UK

SOFTWARE ENGINEER
May. 2016 - Sep. 2016

- Ported a computer vision algorithm to provide Augmented Reality annotation to staircases for Otolift core products.

Computing Systems Lab, NTUA
Athens, GR

POST-DOCTORAL RESEARCH FELLOW
Jan. 2014 - Jan. 2015

- Worked on IO Virtualization, systems software for high-performance I/O in virtualized environments, communication architectures for clusters, and scalable storage architectures based on clusters.

JUNIOR RESEARCHER
Apr. 2007 – Dec. 2013

- For the purpose of my PhD thesis, I worked on scalable block-level storage systems, communication architectures for clusters, custom 10gigE interconnection frameworks and I/O Virtualization.

SENIOR UNIX/LINUX ADMINISTRATOR
Apr. 2007 – Dec. 2013

- Maintained, administered and supported the lab (10-20 grad students, faculty members and visiting staff) providing services such as: DNS, WWW, Mail, VoiP and DBMS. From Sept 2011, my role was mostly advising the systems administration team.

Maxeler Technologies Ltd
London, UK

INTERN
Sep. 2011 - Mar. 2012

- Worked on porting the company's custom FPGA boards to virtualized environments. As my task was completed quickly, I joined the hardware group working on the company's new product line (MPCX), doing performance evaluation at first as well as kernel developing for the board's interface driver and the networking stack (Infiniband).

Mist.io Inc
Athens, GR

COFOUNDER AND SYSTEMS ENGINEER
Jan. 2012 - Jan. 2015

- Design, develop, deploy and maintain the company's product.
- Mist.io is about cloud server management, monitoring and automation across multiple cloud providers from any web device. Mostly develop in python, Javascript and bash.

Unweb.me Ltd
Athens, GR

SYSTEMS ENGINEER
Jan. 2011 – Dec. 2013

- Served as a systems engineer, deploying, administering and maintaining the company's infrastructure both on bare-metal servers (co-located) as well as cloud servers (mostly Amazon EC2).

Computer Center, ECE, NTUA
Athens, GR

SENIOR UNIX/LINUX ADMINISTRATOR
Oct. 2005 - Sep. 2010

- Setup the entire lab (25-30 workstations, 5 servers), migrated from Solaris-SunOS 4.3 to Debian GNU/Linux, and maintained the lab which featured a fully autonomous setup, able to provide the necessary software for students to work on ECE school's projects.

PC Systems S.A.
Athens, GR

UNIX SUPPORT ENGINEER
May 2004 – Sep. 2004

- Served as backend support for the company's clients mostly Solaris and some Linux-based setups.

Small accounting business
Athens, GR

LINUX/WINDOWS ADMINISTRATOR
Sep. 2001 – Sep. 2006

- Maintained all workstations (5) based on Windows 95/98/XP, migrated the server from Novel Netware to Windows server and finally Linux. Provided support for the integration of commercial software suites specific to the business (accounting) as well as general purpose software (network file sharing, scanning/printing etc.).

Freelance
Athens, GR

WEB DEVELOPER
Sep. 2002 – Sep. 2005

- Built small sites (static/dynamic) using HTML, PHP and mySQL.

Education

NTUA (National Technical University of Athens)
Athens, GR

PH.D. IN COMPUTER ENGINEERING
Dec. 2013

- Thesis title: Efficient I/O Device Sharing in Virtualized Environments

NTUA (National Technical University of Athens)
Athens, GR

DIPLOMA IN ELECTRICAL AND COMPUTER ENGINEERING
Sep. 2006

- Thesis title: Design and implementation of a mechanism transferring data from storage devices to Myrinet networks bypassing the memory hierarchy

Publications

Extending storage support for unikernel containers

WOSC 19, MIDDLEWARE 19

O. Lagkas-Nikolos, K. Papazafeiropoulos, S. Psomadakis, A. Nanos, and N. Koziris.

UC Davis, CA, USA 2019

- DOI: https://doi.org/10.1145/3366623.3368138

V4VSockets: low-overhead intra-node communication in Xen

CloudDP 15, EuroSys 15

A. Nanos, S. Gerangelos, I. Alifieraki, and N. Koziris

Boredaux, France

- DOI: http://dx.doi.org/10.1145/2744210.2744215

I/O Performance Modeling for Big Data Applications over Cloud Infrastructures

IC2E 2015

I. Mytilinis, D. Tsoumakos, V. Kantere, A. Nanos and N. Koziris

Tempe, AZ, USA

- DOI: http://dx.doi.org/10.1109/IC2E.2015.29

Xen2MX: High-performance communication in Virtualized Environments

Journal of Systems and Software

A. Nanos and N. Koziris

2014

- DOI: http://dx.doi.org/10.1016/j.jss.2014.04.036

Xen2MX: Towards High-performance communication in the Cloud

VHPC 2012, EuroPar 2012

A. Nanos and N. Koziris

Rhodes, Greece

- DOI: http://dx.doi.org/10.1007/978-3-642-36949-0_64

A Smart HPC interconnect for clusters of Virtual Machines

VHPC 2011, EuroPar 2011

A. Nanos, N. Nikoleris, S. Psomadakis, E. Kozyri and N. Koziris

Bordeaux, France

- DOI: http://dx.doi.org/10.1007/978-3-642-29740-3_45

Coexisting Scheduling Policies boosting I/O Virtual Machines

VHPC 2011, EuroPar 2011

D. Aragiorgis, A. Nanos, and N. Koziris

Bordeaux, France

- DOI: http://dx.doi.org/10.1007/978-3-642-29740-3_46

Exploring I/O Virtualization Data paths for MPI Applications in a Cluster of VMs: A Networking Perspective

VHPC 2010, EuroPar 2010

A. Nanos, G. Goumas and N. Koziris

Ischia, Italy

- DOI: http://dx.doi.org/10.1007/978-3-642-21878-1_82

MyriXen: Message Passing in Xen Virtual Machines over Myrinet and Ethernet

VHPC 2009, EuroPar 2009

A. Nanos and N. Koziris

Delft, Netherlands

- DOI: http://dx.doi.org/10.1007/978-3-642-14122-5_45

GMBlock: Optimizing Data Movement in a Block-level Storage Sharing System over Myrinet

Journal of Cluster Computing

E. Koukis, A. Nanos and N. Koziris

2010

- DOI: http://dx.doi.org/10.1007/s10586-009-0106-y

Synchronized Send Operations for Efficient Streaming Block I/O over Myrinet

CAC 2008, IPDPS 2008

E. Koukis, A. Nanos and N. Koziris

Miami, FL, USA

- DOI: http://dx.doi.org/10.1109/IPDPS.2008.4536142

Presentations & Posters

ML inference acceleration for lightweight VMMs

Brussels, Belgium

Virtualization and IaaS devroom, FOSDEM

Feb. 6-7, 2021

Lightweight Hypervisors in the Cloud and at the Edge

Brussels, Belgium

Virtualization and IaaS devroom, FOSDEM

Feb. 2-3, 2020

Systems software for HPC

Bilbao, Spain

Convergence of Big-Data Analytics, Cloud, and High-performance Computing with EVOLVE, HiPEAC CSW

Oct 30, 2019

Unikernel Support for NFV-like Applications on Xen ARM 64bit

Budapest, Hungary

Design Session, Xen Summit

Jul. 2017

Hypervisor support for emerging scale-out/scale-up architectures

Frankfurt, Germany

VHPC 17, ISC-HPC 2017

Jun 22, 2017

High-performance I/O in Virtualized environments

Heraklion, Greece

Invited Talk, CARV group, FORTH-ICS

Nov. 2013

I/O in Virtualized environments

Berlin, Germany

Invited Talk, WBI seminar, Humboldt University of Berlin

Jun. 2013

Experimenting with I/O data paths in Virtualized Environments

London, UK

ASPLOS 2012 Doctoral Workshop

Mar. 2012

High-Performance I/O in Virtualized Environments: A Networking Perspective

Paris, France

Eurosys 2010 Doctoral Workshop

Apr. 2010

System-level Support for Heterogeneous Architectures

Cambridge, UK

Poster in ARM Research Summit

Sep. 11-13 2017

Towards an HPC I/O framework for clusters of Virtual Machines

Fiuggi, Italy

Poster in ACACES 2011, HiPEAC summer School

July 10-16, 2011

Deploying MPI applications in a cluster of Xen VMs: A Networking Perspective

Terrassa (near Barcelona), Spain

Poster in ACACES 2010, HiPEAC summer School

July 11-17, 2010

Message Passing in Xen VMs

New Orleans, Louisiana, USA

Poster, Cluster 2009

Sep 2, 2009

Program Committees

2012-2021	**Co-chair**, Workshop on Virtualization for High-Performance Cloud Computing	*VHPC @ EuroPar, SC, ISC*
2015	**Co-chair**, Workshop on Dependable Parallel, Distributed and Network-Centric Systems	*DPDNS @ IPDPS*
2013	**Co-chair**, Workshop on Middleware on HPC and Big Data systems	*MHPC @ EuroPar*
2019	**TPC Member**, IEEE/ACM International Symposium in Cluster, Cloud, and Grid Computing	*CCGrid*
2015 – 2016	**TPC Member**, Workshop on Dependable Parallel, Distributed and Network-Centric Systems	*DPDNS @ IPDPS*
2015	**TPC Member**, IEEE 4th Symposium on Network Cloud Computing and Applications	*NCCA*
2015 – 2017	**Shadow PC member**, European Conference on Computer Systems	*EuroSys*
2008 – 2010	**External Referee**, Workshop on Communication Architecture for Clusters	*CAC @ IPDPS*
2008	**External Referee**, International Conference on Parallel Processing	*ICPP*
2008	**External Referee**, International Forum on Next-Generation Multicore/Manycore Technologies	*IFMT*

Honors, Grants & Awards

2021 – 2024	**EU H2020 project**, "SERRANO", Funding: €5M, NBFC: €330k, PI-100%
2019 – 2022	**EU H2020 project**, "5G-COMPLETE", Funding: €6M, NBFC: €280k, PI-100%
2010 – 2013	**PhD thesis Scholarship**, EU "IRAKLITOS II", Funding: €45k
2007 – 2010	**PhD thesis Scholarship**, Greek State Scholarships Foundation, Funding: €16k