Curriculum Vitae

Personal information

First name(s) / Surname(s)	**Parwinder Singh**
Address(es)	St. Blichersvænget, 4, St Th, 7400, Herning, **Denmark** (Work permit valid till Sep 2027)
Mobile	+45-52613795
E-mail	parwinder.au@yahoo.com
Nationality	Indian
Date of birth	17.12.1985
Gender	Male

Strength/Capabilities

Vast experience (10+ years) in delivering (30+) projects in different domains covering digitalization, cyber physical systems, dataspace, telecom, networking, industrial IoT, Cloud, Edge computing, AI/ML data analytics, smart city digitalization, smart factory operations using AI, while working with clients across globe in software industry. I can contribute flexibly in different roles as per the need e.g. as system, software or solution architect, DevOps engineer, lead developer, project or product manager. I have completed my PhD on the topic "*Enabling Dataspace Value Chain at Edge for Industry 4.0 and Beyond*". My overall research has yielded 10+ research papers so far.

Profile Summary

- Presently working as a Postdoc researcher in Aarhus University, BTECH, Herning, mainly focusing on the distributed edge architectural designs and convergence of AI, IoT, and Blockchain leveraging semantic methods and system modeling for industry 4.0 oriented real-world use cases and thereby contributing towards cross-domain data-driven value chain development in a multistakeholder environment.
- Research and development experience in business process mappings for SME"s production environment and intervention of pragmatic digitalization methods and technology stacks.
- 800+ hours of teaching and supervision experience for Master students at AU, BTECH in the field of *Managing the Digital Enterprise which consists of* Digital Front-End Solutions and Digital Back-End Solutions.
- Experience in proposal development, managing, or executing research projects (digitalization-focused) with industry collaboration and funded by EU Commission and Danish Industry Foundation.
- Experience in business requirements analysis and their mapping to technological solutions for manufacturing industry dealing with Robots, IoT, ERPs, Database, and printing solutions.
- Experience in building system architectures for IoT platforms, DevOps pipeline, Cloud/Edge computing, AI (LLMs/Generative AI apps), NFV/SDN & Blockchain related applications and also played a lead role in their development, and delivery support for more than 10 years.
- Experience in developing and implementing Infrastructure-as-a-Code for cloud environments
- Expertise in software designing, development & solution engineering along with the system quality assurance scope using various methodologies & technologies like Spring Cloud, Spring Boot, Spring Security, Python, MySQL, NoSQL under Linux/Windows environment.
- Research level experience in IoT semantic knowledge base & TCP/IP protocol stack development that includes Multipath TCP, OSPF routing extensions.
- Experience in developing & design FIWARE IoT based platform product solutions.
- Experience developing International Data Space (IDS) standards-based cross-domain data integration solutions for SMEs or regional industrial contexts.
- Lead the first worldwide implementation of ETSI MANO & NGSI-LD/FIWARE specs.
- Experience of working, planning & executing project development under agile environment.

- Experience in engineering and implementing solution around IaaS, PaaS, SaaS, Edge/fog computing for public/private/hybrid cloud (including cloud burst) models.
- Experience in designing and implementing modern microservices architecture-oriented applications using tools like VM, Docker, Kubernetes, Docker Swarm, and Spring Cloud.
- Experience in cyber security of cyber-physical systems and digital services running on cloud or on-premises. This comprises designing and implementing Identity Access Management (OAUTH2.0/OpenID), PAP/PDP/PEP/PIP, RBAC/ABAC, SSL, PKI, IP Security using strongswan PKI/X.509, VPN, Network Segmentation, vulnerability management, penetration testing, system hardening, perimeter security methods, zero-trust designs, high availability, NAT, PAT, firewall, IDS & blockchain-based permissioned infrastructure, security standards ISO 27001 NIST/ISA/IEC 62443.
- Experience in implementing, designing & implementing production grade mission critical IT or OT systems wherein non-functional aspects like high availability, load balance, scalability (horizontal or vertical), monitoring, security and fault tolerant behaviours were required.

Work experience

Dates	Feb 2022– Jan 2025
Occupation or position held	PhD Student
Name and address of employer	Business Development & Technology, Aarhus University [Click Here]
Working Domain	Industrial IoT, NGSI-LD, Edge/Cloud Computing, Blockchain/DLT based supply chain, AI, Node-Red, Raspberry-Pis, Bluetooth, sensors, Dataspace, IDS, Wind turbines, Digital Manufacturing, Dobots..

Dates	April 2020– Jan2022
Occupation or position held	Research Assistant
Name and address of employer	Aarhus University https://btech.au.dk/
Working Domain	IoT Crawler, NGSI-LD, GraphQL, RDF, Edge & Cloud Computing, Blockchain AI, Node-Red, Python, JavaScript, Java Spring Boot, IoT Platform, NGSI-LD, FIWARE, DLT

Dates	April 2019 – April 2020
Occupation or position held	Technical Specialist (System/Solution Architect)
Name and address of employer	NEC Technologies India Pvt Ltd. http://in.nec.com
Working Domain	Cloud, SDN, MANO, NFV-VNF, IoT Platform, FIWARE, Security, AI, ML, Big data, SparQL

Dates	August 2017 – March 2019
Occupation or position held	Senior Technical Lead
Name and address of employer	NEC Technologies India Pvt Ltd. http://in.nec.com
Working Domain	Cloud, SDN,NFV, MANO, IoT Platform, FIWARE, Security

Dates	May 2012 – August 2017
Occupation or position held	Technical Leader Engineering
Name and address of employer	Aricent Technologies (now known as Altran), Gurgaon, India . http://www.aricent.com/
Working Domain	Datacom, LTE Transport, IP Security, Telecom, NFV MANO & Cloud, NLP, AI, ML, Python

Dates	Jan 2011 – December 2011
Occupation or position held	Student Research Assistant
Name and address of employer	Comnets at University of Bremen, Germany. http://www.comnets.uni-bremen.de/typo3site/
Working Domain	R&D, Future Internet Protocol, TCP/IP protocols like MPTCP, MCTCP, OSPF extensions

Dates	July 2007 to October 2008
Occupation or position held	Lab-Coordinator
Name and address of employer	Genius Informatics, New Delhi, India.
Working Domain	IT Support, System & Network Administration for remote learning centres connectivity.

Platform and Tools	Openstack, Redhat OSP, OVS, Linux bridge, UML, FI-Lab, Fogflow, Kolla openstack, OOO, Kubernetes, Docker, Docker Swarm, Java, Spring boot, Spring Cloud, Spring security, FIWARE, Strongswan (Ipsec Open source implementation), C, C++, Shell Scripting, Linux, Cisco routers, switches,Test Center, Spirent/IXIA Networks, Openstack, Python, Cloud computing, SVN, Eclipse, Wireshark, Tcpdump, Jira, Github, Gitlab, Devops tooling, SVN.

Certification/Training	• **Cisco Certified Network Associate Engineer**:
	✓ Fundamentals of networking - OSI model, TCP / IP protocols, IP addressing
Name of Institute	Cisco Network Academy at University of Applied Sciences Bremen, Germany.
	• **Six months training on Cloud Computing**
	✓ Fundamentals of Cloud computing
	✓ Introduction and Installation of Openstack environment.
	✓ Development of PoCs based on Openstack.
Name of Institute	Aricent Technologies, Gurgaon, India.

Education	**PhD – Business Development and Technology**
Dates	February 2022 to January 2025 https://www.au.dk/en/parwinder@btech.au.dk
Name of Institute	University of Applied Sciences Bremen, Germany
	Master of Science – Electronics Engineering (specialization Comm. System Engineering)
	(Grade: 1.8 (90 ECTS) -European Grading Scheme**)**
Dates	September 2009 to November 2011
Name of Institute	University of Applied Sciences Bremen, Germany. http://www.hs-bremen.de/
Degree	**Bachelor of Electronics & Telecommunication Engineering** **(Grade: 58.88%)**
Dates	June 2002 – June 2007
Name of Institute	IETE (The Institution of Electronics & Telecom. Engineers), New Delhi, India. http://www.iete.org/

Personal skills	**Understanding**	**Speaking**	**Writing**
English	Proficient	Proficient	Proficient
German	Basic	Basic	Basic
Danish	Intermediate	Intermediate	Intermediate (PD2)
Hindi	Proficient	Proficient	Proficient

Research Publications	• Singh, Parwinder, Michail J. Beliatis, and Mirko Presser. "**Enabling edge-driven dataspace integration through convergence of distributed technologies**." Internet of Things (2024): 101087.
	• Singh, Parwinder, et al. "**Digital dataspace and business ecosystem growth for industrial roll-to-roll label printing manufacturing: A case study**." SENSORCOMM 2023: The Seventeenth International Conference on Sensor Technologies and Applications. IARIA. For the complete list of publications please check here.

Affiliations/AWARDS	• Associated Member of Institution of Electronics and Telecommunication Engineers,India
	• https://www.iaria.org/conferences2024/awardsINTERNET24/internet2024_a3.pdf https://github.com/ScorpioBroker/ScorpioBroker/blob/development/CREDITS
	• Won AIOTI 2024 Award in Research Category;
	• IDS Community Contributor

Conference Talks	• Open Networking Days, Linux Foundation Summit (Jan 2018)– ONAP, Delhi, India, • IoT M2M Summit (Jan 2019)- Fog/Edge Flow Computing, IIT Delhi, India • FIWARE Global Summit (June 2019) – The Scorpio NGSI-LD Broker: Features and Supported Architectures, Italy - https://www.slideshare.net/FI-WARE/fiware-global-summit-the-scorpio-ngsild-broker-features-and-supported-architectures • FIWARE Global Summit (Nov2018)– Building Personalized FIWARE Enabled IoT Sandbox Solution, Malaga, Spain - https://www.slideshare.net/FI-WARE/fiware-global-summit-building-personalized-fiware-enabled-iot-sandbox-solution • FIWARE Global Summit(Nov 2019) - Building Production Grade IoT Platform Leveraging FIWARE, Berlin, India- https://www.slideshare.net/FI-WARE/fiware-global-summit-building-production-grade-iot-platform-leveraging-fiware
Interests and hobbies	Group Discussions, Travelling and Cooking.
Projects Handled	Please refer the appendix at last page
References	Michail Beliatis (Current supervisor) Associate Professor Department of Business Development and Technology Email: mibel@btech.au.dk Mobile: +4530490976

Appendix

List of Projects Handled:

Title	**Advancing Digital Edge Enablers leveraging IDEAL technologies**
Client	PhD Project at BTECH, Aarhus University
Duration	Feb 2022 to Jan 2025
Description	This is PhD research and development project that focused on investigating the theoretical and practical foundations for Cloud-Edge-Device (CED) architectural design so that CED design can be extended to accommodate modern technologies (IoT, AI, DLT) at edge to develop cross-organizational value chains such as Dataspace in industrial contexts and by addressing the classical problems of integration, heterogeneity, interoperability, and scalability. This project handled real-world industrial use cases of wind turbine and label printing SME-related real-world challenges.
Tools & Technologies	Cloud, Edge, IDS, NGSI-LD, Node-Red, MySQL, DevOps, JSON-LD, Grafana, OAUTH2.0, REST APIs, AI/ML algorithms, AWS, Azure, Kubernetes, Docker.

Title	**IoT Crawler Platform & DLT** https://github.com/IoTCrawler/Framework
Client	EU H2020 Partner Collaboration
Duration	April 2020 to Dec2021
Description	IoTCrawler addresses dynamic search, discovery of IoT resources and security and privacy. This will assist us in building a new internet paradigm where not just websites are discoverable through search, but also dynamic data sources and IoT devices, considering the complexity of internet connectivity. I am working as developer in this research project to develop IoT applications.
	In parallel, I am also working on DLT based test bed development to deliver its distributed architecture and security values in Wind turbine industry to manage the related assets.
Tools & Technologies	Scorpio (NGSI-LD), Node-Red, MySQL, JSON-LD, Grafana, Influx-DB, OAUTH2.0, REST APIs, AI/ML algorithms, Hyper ledger Fabric, Ethereum, AWS, Google Cloud, Kubernetes, Docker.

Title	**Common Services FIWARE Enabled IoT Platform (CSP)**
Client	NEC Corporation, Japan
Duration	May 2019 to March 2020
Description	This platform was envisioned to provide common service IoT platform for building of new/common services by combining/linking of data/services from multiple business domains or ontologies and addresses common custom business use case requirements & environment to have quick development & delivery of their IoT smart solutions such as smart city, smart home, smart industry. I was the lead architect and developer in this project.
Tools & Technologies	FIWARE, AI, JSON, IoT Agent, Postgres, Kafka, Spring boot Security, Keyrock, Wilma, OAUTH2.0.

Title	**Scorpio Broker – IoT Platform -** https://github.com/ScorpioBroker/ScorpioBroker
Client	NEC Lab Europe & Fiware Foundation
Duration	Jan 2018 to March 2020
Description	Scorpio is the first reference implementation of ETSI NGSI-LD standard specifications. It is a core component of IoT platform that offer dynamic data context, data collection/enrichment/persistence, device registration and allow development of different IoT application. This has been implemented using modular & distributed microservices, scalable, secure by design, easy to monitor/debug, fault tolerant, and highly available architecture concepts. I was the lead architect for this project.
Tools & Technologies	FIWARE, NGSI-LD, Json-LD, Spring boot, Spring Cloud, Postgres, Go, Kafka, KeyCloak

Title	**Pan India Cloud Platfrom- RFP Evaluation**
Client	NICSI Govt. of India
Duration	Aug 2017 to Jan 2018

Description	Under the RFP, there was a need to build PAN India Cloud for over 1000 server Nodes that can be distributed & & managed over different states across India. As System Integrator from NEC side we evaluate the planning, operations & large scaling of resources over Openstack to validate if this could fulfill the given requirements. I was the main lead for the Architecture designing & evaluator for this RFP.
Tools & Technologies	Kolla, OOO, CentOS, Ubuntu, Rally, Cinder, Iperf3, DPDK, SRIO

Title	**Snaps-Openstack & Snaps Boot** https://github.com/cablelabs/snaps-openstack
Client	CableLabs USA
Duration	May 2017 to August 2017
Description	SNAPS is an automated tool to install cloud environment on the provisioned cluster of server that offers IaaS & PaaS to end users. It also builds the user specific networks and provision the same VMs on the fly. This tool install Openstack cloud over server clusters very fast within few hours and abstract the complexity via automation step in very simple & flexible manner. It is very helpful in building & preparing Infrastructure as a Service, Software Defined Networks (SDN), Network Function Virtualization (NFV) or building private cloud. I was the lead architect for this project and lead developer for the implementation of its modules. This tool was made open source.
Tools & Technologies	Kolla, YAML, JSON, Ansible, PXE, DHCP, IPMI, Python, Dell AMD x86_64 infra, Ubuntu, snaps-boot

Title	**NFV/VNF MANO**
Client	Mitel, Canada
Duration	Sep 2015 to March 2017
Description	ETSI MANO specification has defined how the market vendors could leverage their Virtualized Network functions (VNF) on virtual infrastructure to use the scaling capability of cloud environment and also lower the operational costs in carrier grade Telco business. In this project, I was responsible to design, develop and implement components of network function virtualization which included components like VNF life cycle manager, NFV orchestrator, Virtual resource manager over the given multivendor cloud environment.
Tools/Technologies	Openstack Mitaka, Tacker, Linux-Ubuntu, Java, Spring, Apache, DevOps, REST, Network protocols.

Title	**Mobile Edge Computing framework**
Client	Deutsche Telecom
Duration	August 2016 to Nov2016
Description	For every RAN the central cloud hosted applications were needed to be deployed in local cloud environment. Doing so it would enhance the overall API response time of the application running on the UE at the customer end. MEC framework is designed to run time edge cloud environment infra provisioning for requested application using Openstack, Docker and kubernetes orchestration interfaces. The whole framework is then planned to provide the end to end Devops chain for the operator/developer to onboard applications to use the services provided by MEC ecosystem.
Tools/Technologies	Openstack, AI, YAML, Python, DevOps, JSON, Kubernetes, Docker,DevOps, Linux, Github, and AWS..

Title	**LTE Transport (4G) Platform**
Client	Nokia Solutions &Networks (NSN)
Duration	August 2012 to Aug 2015
Description	**Transport Software** module is responsible to transport traffic to/from core network over IP and radio access air interface under the given eNB architecture. Transport module handles different plane traffic according to TCP/IP layer stacking and performs all layer functions. e.g. it classifies the user, control, management and supervisory plane related traffic and accordingly perform L4(TCP, UDP) classification of packets to identify corresponding planes, L3(routing, IP security, firewall) routing, security & QoS functions, and in the end L2 switching (Vlan, QoS mapping, shaping, policy based filtering, rate limiting) functions. It does involve packet processing in slow(based on Linux environment) and fast path (based on Simple executive). I was involved in related development & testing activities for this project.
Tools/Technologies	C, C++, IP Security, Strongswan, PKI, X509, Octeon-SDK, Spirent, Ixia.