

# **Dr. Muhammad Faraz Hyder**

Assistant Professor,  
Department of Software Engineering,  
Co-PI, Digital Forensics Lab,  
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## **Academic Qualification**

- **PhD Computer Systems Engineering** from *NED University of Engg & Tech*, Karachi, [Cyber Security & Privacy] in 2020.
- **M.Engg. Computer Systems Engineering** from *NED University of Engg & Tech*, Karachi, (CGPA 3.56) in 2014.
- **M.Engg. Telecommunication Engineering** from *NED University of Engg & Tech*, Karachi, 2010 (CGPA 3.5) in 2010
- **BE Computer & Information Systems Engineering** from *NED University of Engg & Tech* Karachi, with 77% in 2006.
- HSC from **Adamjee Govt. Science College**, Karachi with A+ Grade (81%) in 2001.
- SSC from **Karachi Academy GBSS**, Karachi with A+ Grade (88%) in 1999.

## **Professional Experience**

### **CO-PI**

#### **Digital Forensics Lab**

#### **National Center of Cyber Security**

#### **NED University of Engineering & Technology (June 2021 till date)**

- Development of indigenous digital forensics tool.
- Opensource and Commercial tools analysis.
- Research activities in numerous domains of Digital forensics.
- Industry and academia collaboration.
- Mobile Forensics
- Privacy preserving digital forensics.

### **Vice President**

#### **Cloud Security Alliance Pakistan Chapter (August 2021 till date)**

- Organization of CSA PAKISTAN SUMMIT 2021
- Cloud Adoption in Pakistan
- Cloud Security Awareness and trainings.

## **Assistant Professor**

### **Department of Software Engineering**

#### **NED University of Engineering & Technology (March 2018 till date)**

- Teaching at undergraduate and postgraduate levels.
- Final Year Project Supervision.
- Courses file up-gradations.
- Curriculum designing and up-gradation.
- Lab Manuals designing and up-gradation.
- Final year design project coordinator
- OBE Management cell of the department.

#### ▪ **Teaching Experience**

##### ➤ **PhD level**

- [CS-634] Advanced Network Management.

##### ➤ **Graduate level**

- [CT-569] Virtualization and Cloud Computing.
- [CT-555] Cloud Security
- [CS-564] Cloud Computing.
- [CT-509] Distributed Systems.
- [CS-523] Routing and Switching.

##### ➤ **Undergraduate level**

- [SE-206] Web Engineering.
- [CT-460] Network & Information Security
- [CS-426] Computer Systems Security.
- [CS-413] Internet Computing.
- [CS-318] Computer Communication Networks.
- [CS-352] Digital Communication Systems.

#### ▪ **PhD Co-Supervision**

- Moving Target Defense SDN and NFV Based Security Framework for Intelligent Network Adversaries [Co-Supervisor]

#### ▪ **MS Thesis Supervision**

- A Verifiable Digital solution for Supply chain network using Block chain technologies, **2022.**
- Blockchain-based Decentralized Auditing Infrastructure for external services, **2022.**
- Privacy-Preserving Scheme for Smart Contracts, **2022.**
- Application of Digital Forensic for Moving Target Defense in Containerized Environment. **2021.**
- Ransomware prevention using Moving Target Defense Based Framework, **2021.**
- Protection of Containerized Applications During Live Migration in a Multi-cloud Environment, **2021.**
- A framework for Crossfire DDoS Protection using SDN and NFV, **2020.**
- A Framework for the protection of Intrusion attacks in Cloud Environment., **2020.**
- Enhancement in Homomorphic Encryption Scheme for Cloud Data Security, **2019.**

## ▪ Final year Project Supervision and Co-supervision

- Kernel Optimization For NFV.
- Botnet Detection in Cloud Using Artificial Immune System.
- Block Chain Architecture on Xeon Phi.
- Secured and Optimized Solution for Accessing Clouds.
- Optimized Big Data Processing Using SDN.
- Stream Processing for The Detection of Intrusions Using SDN.
- Docker Engine Services in Android Operating Systems.
- Firewall as a service (Soft Firewall).
- Deployment of Secure SDN for Cloud.
- PlaniT: Online Tour Planning Application
- **Meal Proof-** A blockchain based Application for Tracing Food Industry Supply chain
- **Try on the go** – Artificial Intelligence and Computer vision powered virtual try on for e-commerce.
- An AI Based Applicant Tracking System for HR

## Professional Certifications

1. AWS Certified Solutions Architect – Associate (June 9, 2021-June 09, 2024), (Validation Number 721WXBYDD2Q41XG7)

## Publications

### Journals

1. M. F. Hyder, Waseemullah, M. U. Farooq, “Towards Countering the Insider Reconnaissance Using a Combination of Shuffling and Diversity Moving Target Defense Techniques”, Eng. Technol. Appl. Sci. Res., vol. 11, no. 6, pp. 7745-7749, Dec. 2021.
2. Waseemullah, M. F. Hyder, M. A. Siddiqui, and M. Mukarram, “TV Ad Detection Using the Base64 Encoding Technique”, Eng. Technol. Appl. Sci. Res., vol. 11, no. 5, pp. 7605–7609, Oct. 2021.
3. M. F. Hyder and T. Fatima, "Towards Crossfire Distributed Denial of Service Attack Protection Using Intent-Based Moving Target Defense Over Software-Defined Networking," in IEEE Access, vol. 9, pp. 112792-112804, 2021, doi: 10.1109/ACCESS.2021.3103845.
4. M. F. Hyder, Waseemullah, M. U. Farooq, U. Ahmed, and W. Raza, “Towards Enhancing the Endpoint Security using Moving Target Defense (Shuffle-based Approach) in Software Defined Networking”, Eng. Technol. Appl. Sci. Res., vol. 11, no. 4, pp. 7483–7488, Aug. 2021.
5. M. F. Hyder, S. Tooba, and Waseemullah, “Performance Evaluation of RSA-based Secure Cloud Storage Protocol using OpenStack”, Eng. Technol. Appl. Sci. Res., vol. 11, no. 4, pp. 7321–7325, Aug. 2021.

6. M. F. Hyder and M. A. Ismail, "Toward Domain Name System privacy enhancement using intent-based Moving Target Defense framework over software defined networks," *Transactions on Emerging Telecommunications Technologies*, vol. 32, p. e4318, 2021.
7. M. F. Hyder and M. A. Ismail, "Securing Control and Data Planes From Reconnaissance Attacks Using Distributed Shadow Controllers, Reactive and Proactive Approaches," in *IEEE Access*, vol. 9, pp. 21881-21894, 2021, doi: 10.1109/ACCESS.2021.3055577.
8. M. F. Hyder and M. A. Ismail, "INMTD: Intent-based Moving Target Defense Framework using Software Defined Networks", *Eng. Technol. Appl. Sci. Res.*, vol. 10, no. 1, pp. 5142–5147, Feb. 2020.
9. Muhammad Faraz Hyder and Muhammad Ali Ismail, "Distributed Shadow Controllers based Moving Target Defense Framework for Control Plane Security" *International Journal of Advanced Computer Science and Applications (IJACSA)*, 10(12), 2019. <http://dx.doi.org/10.14569/IJACSA.2019.0101221>.
10. H. Ahmed, M. A. Ismail, M. F. Hyder, S. M. Sheraz, and N. Fouq, "Performance Comparison of Spark Clusters Configured Conventionally and a Cloud Service," *Procedia Computer Science*, vol. 82, pp. 99-106, 2016.

## **Conferences**

1. Syed Muhammad Sheraz, Muhammad Faraz Hyder, Muhammad Ali Ismail and Nida Fouq, "Forensic Analysis of Cross-Site Scripting Attacks", in proceeding of 2<sup>nd</sup> International Conference on Anti-Cyber Crimes (ICACC 2017), 27-28 March 2017, Riyadh KSA.
2. Syed Muneeb Arif, Muhammad Ali Ismail, Muhammad Faraz Hyder, Marwan Qaiser, Yousuf Siddiqui, Sonia Ali, "Soft Firewall: Firewall as a Service", in proceeding of 2<sup>nd</sup> International Conference on Anti-Cyber Crimes (ICACC 2017), 27-28 March 2017, Riyadh KSA.
3. M. F. Hyder, M. A. Ismail "Hybrid Trust Model for Enhancing Operational Trust in Cloud Computing", 2016 International Electrical Engineering Congress (IEEC), Karachi, 2016.
4. M. F. Hyder and M. A. Ismail, "Application Level Trust Mechanisms for Enhancing the Operational Trust in a Cloud", 2015 International Conference on Cloud Computing (ICCC), Riyadh, 2015, pp. 1-6.
5. M. A. Ismail, M. F. Hyder and H. Ahmed, "Openstack Cloud Performance Optimization using Linux Services", 2015 International Conference on Cloud Computing (ICCC), Riyadh, 2015, pp. 1-4.

6. M. F. Hyder, M. A. Ismail and H. Ahmed, “Performance comparison of Hadoop Clusters configured on virtual machines and as a cloud service”, 2014 International Conference on Emerging Technologies (ICET), Islamabad, 2014, pp. 60-64
7. H. Ahmed, M. A. Ismail and M. F. Hyder, “Performance optimization of Hadoop cluster using linux services”, 17<sup>th</sup> IEEE International Multi Topic Conference 2014, Karachi, 2014, pp. 167-172.

## **IT Manager**

### **High Performance Computing Centre (HPCC)**

#### **Department of Computer & Information Systems Engineering**

#### **NED University of Engineering & Technology (July 2012 to March 2018)**

### **Technical Experience**

- Managing the IT Infrastructure and services of the Department.
- Managing the Data Centre Operations of HPCC.
- Deployment and Management of Cloud services using Open Source solutions (OpenStack based cloud).
- Deployment of different SDN solutions like OpenVswitch, OpenDaylight, Ray Faucet Controllers.
- Deployment and Management of Linux from Scratch (LFS) systems.
- Deployment and Management of different Engineering Software like Matlab, Cadence, Fluent etc.
- Deployment and Management of Virtualization Solutions using VMware, Microsoft Hyper V, KVM etc.
- Deployment and Management of Docker/Container Technology
- Deployment and Management of Puppet and Chef tools for IT Automation.
- Deployment and management of Different Cluster Computing Solutions like Hadoop Clusters, Apache Spark Clusters etc
- Administration and deployment of MPI, OpenMPI, CUDA, GNU compilers, math libraries.
- Deployment and administration of GPGPU systems, CUDA upgrades.
- Amazon Web Services (AWS). Deployment of EC2 instances. Working with different services like RDS, Elastic Beanstalk, Cloud watch, SES and S3 etc.
- Deployment of Different Penetration testing tools for software penetration testing.
- Datacenter operations, WAN Connectivity, Network & Information Security, WiFi deployment.
- Providing level-II Network and System support.
- Deployment of NAGIOS NMS. Monitoring of different servers and service through it.
- Deployment of different software like Git repositories, SVN etc.
- Virtualization solutions implementation using HyperV, VMware.
- Managing the IT Infrastructure and services of the Department.
- Deployment of Cloud using OpenStack in the department. Deployment of Controller, Compute, Network, block nodes, proxy and storage nodes. Launching different instances. Monitoring of instances. Security hardening of the deployed cloud.
- Managing the High Performance Computing Center (HPCC) of NED University. Deployment of Cloud services using Open Source/Commercial solutions. Deployment of different Engineering related software.
- Deployment and Management of Hadoop Cluster for Big Data Processing.

- Implementation of SDN solutions using OpenVSwitch and OpenDaylight controller.
- Implementation of VMware virtualization solutions.
- Managing the HPC system in the research labs of Department of Computer Engineering
- Administration of different large scale Linux clusters, servers and workstations having different OS like Ubuntu, Debian, Redhat, Fedora etc.
- Deployment and administration of GPGPU systems, CUDA upgrades.
- IT/System Administration Automation through Puppet Labs.
- Network Deployment using Cisco, 3 COM devices like Routers, Switches, and Firewall etc.
- Administration and deployment of MPI, OpenMP, CUDA, GNU compilers, math libraries.
- Coordination with vendor regarding hardware problems, installs firmware or software patches as necessary.
- Deployment of critical OS patches across workstations and Linux clusters.
- Designing and deployment of network/information security policy for the department's network. Comprehensive knowledge of PKI, Security Algorithms, ISO/IEC 27001:2005.
- Guiding other departments about the security recommendation, proactive counter measures against security vulnerabilities.
- WiFi Deployment within the department.
- Monitoring of the network through different NMS like Cacti, SolarWinds, NAGIOS.
- Windows Server 2008 Administration, Deployment of Active Directory, Group Policy Management.
- OS hardening by applying security patches and other best OS level security policies.
- Deployment and support of the certification process.
- MS Exchange 2010 deployment and maintenance.
- Linux Server Administration for different services like Squid, Web, FTP, NTP, DHCP, VPN and Email etc.
- SUN Server Administration.
- Department's Website Management.
- Supporting the faculty and the students of the Department in their Research Activities especially in the areas of Operating Systems, Data Networks, Routing & Switching, IPv6, MPLS, Network Security, High Performance Computing and Cloud Computing.
- Deployment of Linux based Print Server (CUPS+PYKOTA)
- Managing a team of 15 members for ICT operations.
- Deployment of an SDN using OpenvSwitch. Security management, QoS, Monitoring.
- Amazon Cloud Computing. Deployment of EC2 instances. Working with different services like RDS, Elastic Beanstalk, Cloud watch and S3 etc.
- Deployment of Cloud On Microsoft Azure, RackSpace Cloud.
- Deployment of **Debian Linux**. Installation of software through Repository and implementing best security practices on the server.
- **OpenVPN Server deployment**. Generation of client and server's site certificates for securely connecting the clients to server.
- Installation and configuration of **Shorewall firewall**. Defining rules for securing the server
- **Apache, Nginx, Apache Tomcat** Server Deployment. Virtual hosting and PHP deployment. SSL installation and deployment of secure websites. **APC PHP** and **Memcached** deployment.
- **WordPress, Joomla, Magento, Drupal Server** installation and configuration. Upgradation of versions and Multisite installation on these platforms. Plugin updates and Site Migrations.

- Installation and configuration of **MySQL server**. Optimizing its performance as per the requirement. Management of databases.
- **ZABBIX NMS** installation and configuration. Monitoring of services and network through it.
- **HAProxy Deployment**. Load balancing through it for high availability.
- **Moodle, MediaWiki**, Installation and configuration.
- Deployment of **Alfresco**.
- **Puppet Labs, Mcollective**. Basic idea about automations through these tools.

### **IT Manager Network Operation Center, I.T. Department NED University of Engg & Tech Karachi (December 2008 to 30th June 2012)**

- Configured and maintained Core devices like Cisco Routers and Switches, Cisco PIX firewall, Cisco ASA etc.
- Configured and maintained different servers like Web servers, DNS server, Squid cache, FTP, RRAS, DHCP, NTP, Samba, etc.
- Coordinating with vendors and service providers for technical support
- Configured and maintained MacAfee Email & Web security 3100 device.
- Maintaining network diagram with complete details of WAN, LAN and Data Center.
- Supporting team in troubleshooting network related problems that occur on daily basis.
- Configured and maintained TekRADIUS; RADIUS software for the WiFi network, Access points.
- Implementation of AAA (Authentication, Authorization & Accounting) services for WiFi Clients.
- Periodic Data Backups through HP storage solution (HP storage works).
- Video Conference Management.
- Ensuring network equipments configurations are uniform and standard.
- Implementing changes in network topology as per policy and through procedures.
- To perform capacity planning to ensure best utilization of network resources and to proactively identify future requirements.
- Configuration and implementation of Spanning Tree protocol
- Ensuring maximum uptime of NEDUET network
- High Performance Computing (HPC). Configuration & Implementation of Linux based Clusters. Running different Engineering Software like Cadence(Electronic Simulation Software), Matlab
- Budgeting and evaluating network infrastructure and new hardware at university level.
- Collaboration and technical support to all other IT sections and service of University like Information System Operations, Web development, High Performance Computing Center, Examination and Finance ERP.
- Managing team of seven members for the Network Operation Centre (NOC)

### **Network Engineer LINKdotNET Pakistan (June 2007 to June 2008)**

### **Network Engineer WOL Telecom (February 2006 to May 2007)**

- Configured and maintained Alteon Layer 4 Switches, Implementation of ISP's Network Security policies, controlling its traffic flow, by making rules/policies on this device and making appropriate routing.
- Configured and maintained ISP Core Routers. Controlling of Inbound and Outbound traffic with help of Route Maps and Acls. Basic implementation of BGP peering between ISP Router and their upstream provider.
- Provisioning of routers, switches, DSLAMs, BRAS and access servers.

- Network expansion/upgrade, opening of new POPs, replacement and upgrade of hardware.
- Configured and maintained MAX TNT Access Servers. Basic configuration of these devices like configuration for client authentication and accounting through Radius Servers, Syslog configuration for Monitoring of Access Servers Status.
- Configured and maintained ATM Switches, BRAS, DSLAM, MALC and DSL Modems. Configuration on these devices for clients DSL's configuration and their bandwidth management.
- Configured and maintained Packeteer, a device used for bandwidth management. Configuration of rules for bandwidth management of Wireless Internet and Data Clients.
- Configured and maintained Linux Email Servers. Configuration of SMTP, POP and VPOP, Webmail Servers. Configuration of Mail Scanner, software used of spam controlling and RBLs.
- Configured and maintained Squid Proxy Servers and DNS Servers.
- Configured and maintained Linux MRTG Servers, Apache Server. Configuration of httpd file, virtual hosting.
- Monitoring of ISP Internet and DSL Network and Devices through NMS (Host Monitor).
- Configured and maintained SQL based Billing Servers and Windows based RADIUS Servers.
- Implementing changes in network topology.

## **Research Interests**

- Cyber Security, Privacy Engineering, Software Defined Networking (SDN)
- Cloud Computing, High Performance computing, Big Data, and Cluster Computing.
- Network & Information Security, Cloud computing Security, Privacy and Trust in Cloud Computing, Big Data Security,
- Blockchain
- Semantic Web Security and Privacy
- Virtualizations, Hypervisor, Open Container
- Trusted Computing, Computer Networks, Data Centre Operations, MPLS, IPv6, VoIP, Operating Systems, Open Source solutions.
- Computer Communication Networks,

## **Technical Skills**

### **Routers, Switches, Broadband Remote Access Servers, Remote Access Servers**

- Cisco Boxes (3800, 7200, 7500 Series)
- Cisco Switches(6500,4500, 2960,)
- Lucent MAX TNT Remote Access Servers, Cisco Access servers.
- Cisco, 3COM switches for high speed Ethernet networks.
- Broadband RAS (UT Star and Redback)

### **Data Communication Infrastructures & Network/System Software**

- Layer 4 switches (Alteon AD3)
- DSLAMs (Paradyne), DSL Modems, DSLAM Aggregators (MALC)
- ATM Switches (ASC), Packeteer
- Cisco PIX Firewall, Cisco ASA, Cisco VPN concentrator
- hp and ALCON Access Points
- hp, IBM Server machines
- Different NMS System like Cacti, SolarWinds,
- Asterisk, Soft phones.



- Wireshark(Ethereal)
- MRTG/PRTG, Syslog,
- Alcatel IP Phones
- XAMPP/LAMPP
- VMware Workstation, VMware vSphere
- Open Source Email and Calendar Groupware software like VMware Zimbra, Horde, AtMail.
- Webmail software like SquirrelMail, Roundcube.
- MPLS operation and troubleshooting. MPLS L2, L3 VPN, MPLS-TE, Quality of Services (QoS).
- Cloud Computing. IaaS, PaaS, SaaS.
- Windows 2008 Server Administration. Active Directory deployment.

## **Projects**

### **As IT Manager, High Performance Computing Centre, NED University**

- Final year project supervision
- Deployment of WiFi in HPCC
- Deployment of Big Data Servers for research
- Deployment of different engineering software as cloud service

### **As IT Manager, Dept of Computer Engineering NED University**

- Deployment of Cloud Computing Solutions.
- Supervised undergraduate level projects like SDN Deployment, MPLS, IPv6 Deployment, Asterisk Server Deployment etc.
- Up-gradation of Department Network Infrastructure.
- Deployment of different Open source solutions and thus saving substantial financial assets of the department.

### **As IT Manager Network Operation Centre, IT Department NED University**

- Responsible for carrying out up gradations & new deployment in Core ISP Network.
- Maintained IP backbone of the network and intercampus and intra campus connectivity.
- Part of the team for the deployment of IT projects by Higher Education Commission of Pakistan in NED UET.
- Configured Policy based routing to use Satellite link in case of Fiber optic media problem.
- Configured and maintained WiFi network.
- Responsible for maintaining the computer network infrastructure and information network security for the university.
- Installing and Configuring VPN 3000 Concentrator, Remote Access VPN through Pre-Share and Digital Certificates as well as configuring Firewall features.
- Applied both in bound and outbound access-lists on PIX firewalls as well as static, conduit statements and created NAT pools for private IP addresses.
- Management and configuration of NEDUET Metro LAN Project.
- Implementation of AAA service for WiFi Clients. The Captive portal solution is implanted through pfSense
- Deployment of NPM node for the PingER (Ping end-to-end reporting) project.
- Security hardening of typical Linux servers for commercial operations
- Deployment of Open Source Email and Calendar Groupware software VMware Zimbra, VMware Zimbra Desktop.
- RAID Configuration and management on Servers.
- Maintenance of infrastructure equipment such as UPS, and KVM console Panel.
- Maintenance of ASHRAE standards for Datacom equipments.
- Configuration and deployment of KASPERSKY Antivirus Server solution.

- Configuration and deployment of LON-CAPA (the free open source Distributed Learning Content Management and Assessment System)
- Analyze and resolves technical problems for established network.
- Email Server Migration from sendmail and squiremail based server to **VMware Zimbra** Server. This includes user accounts, passwords, address books and email boxes migration

#### **As Network Engineer WOL Telecom and LINKdotNET Pakistan**

- Core member of the team for the Convergence of WOL Telecom & Dancom Core Network for LINKdotNET.
- Configuration and implementation of IP Routing in the network of WOL Telecom and LINKdotNET Pakistan.
- Responsible for carrying out up gradations & new deployment in Core ISP Network using Multi-vendor devices such as Cisco, Zhone/Paradyne, Redback & ASC.
- Configure & Test Multi-vendor devices using Protocols such as OSPF, BGP, Frame-relay, ATM.
- Provide level II support for troubleshooting of 100+ enterprise customers' issues.
- Provisioning of media which include E1, E3, and STM1 for interconnecting network devices for both IP and ATM networks.
- Act as a focal point for complex ISP's Core Network problem resolution.
- Connectivity of ATM links/branches of multinational companies, banks other large enterprises, using ATM Network.
- Deployment and configuration of DSLAM at different exchanges
- Actively follow the global issue of spam. Implemented Mail scanner solution in WOL Telecom and NED UET for spam control.

### **Professional Memberships**

- PAKISTAN ENGINEERING COUNCIL (COMP/3699).

### **Summary of Operating System /Computing Skills/Programming Languages**

- Project Development Experience in C/C++
- Project Development Experience in Visual Basic 6.0
- Microsoft Windows 98/2000/XP/2003, 2008, Red Hat Enterprise Linux 5, RHEL 6, Fedora, SUSE Linux, Ubuntu.
- Labview, Oracle 9i, Electronics Workbench, Multisim, Matlab , Microsoft Office, Visio.

### **Additional Courses Attended**

- Cisco Certified Network Professional (CCNP) Training, 2010.
- Cisco Certified Network Associate (CCNA) training from CTTC in 2004.
- Red Hat Linux administration course from OnWire in 2003.

### **Communication Skills**

- Excellent written and spoken skills in English and Urdu.

### **Conferences**

- **IEEE 10th International Conference on Emerging Technologies 2014 (ICET 2014)**, (FAST-NU), Islamabad, Pakistan December 8-9, 2014
- **2014 IEEE 17th International Multi Topic Conference (INMIC 2014)**, BAHRIA University Karachi, Pakistan December 8-10, 2014
- **National Information Security Conference 2014 (NISC-14)**, 28<sup>th</sup> March, 2014, NUST Karachi Pakistan.
- **SANOG 20 (South Asian Network Operator Group)** held 10th July to 16th August 2012 Karachi Pakistan, MPLS Network Design and Deployment Workshop (**Fellowship awarded for the Event**)
- **TeleCON 2012**, April 19, 2012, Karachi, Pakistan
- **First National Conference on Ubiquitous Computing**. April 04,2012, Karachi, Pakistan
- **SANOG 8 (South Asian Network Operator Group)** held 27<sup>th</sup> July to 4<sup>th</sup> August, 2006