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Software Development Manager

LEADERSHIP PROFILE

A creative (US Patent), versatile, and customer-focused software product leader with over two decades developing, leading, delivering, and supporting complex products in networking and infrastructure for the data-center and service-provider space. Most recent ten years include driving/managing software engineering teams to organize, plan, and deliver complex enterprise software products and solutions in the networking and SDN space.
Deep experience in both IP/MPLS forwarding and control plane, IPv4 Multicast, Software Defined Networking/Openflow, service provider and data center (DC) networking.

With a growth mindset, passionate learner of new processes and technologies at a rapid pace.
Adept working in an early-stage start-up and a large-scale SW ecosystem:

- √ As a Project Manager in India, I delivered off-shore projects for European and US customers.
- √ Management experience includes six years delivering large, complex SW projects with cross-functional & directly reporting teams, w/both technical and leadership responsibilities.
- √ At Cisco, mentored a fresher from college and made her an expert in MPLS. At Foundry/Brocade, mentored the India team on IP forwarding.
- √ Most recently at **Ciena Corp,** PIM and NG-MVPN implementation on Ciena routers.
- √ At **Extreme Networks** as a Principal Engineer led an initiative to implement an event-tracing system.
- √ At during nine years at **Brocade**, as a Sr. Staff SW engineer led the "Brocade Openflow" initiative. Here, led a team of software engineers to design, implement, and deliver this system on time.
- √ At **Foundry** designed and implemented IP forwarding plane (US patent) for the CER family of routers. CER router won the "special prize" in the "Infrastructure Building Products (for Carrier/SP)" category on the Tokyo interop 2010.

TECHNICAL SKILLS

OSs	Languages	Technology	Domains	Other
UNIX, Linux NOS-OS	C, C++, Python, Rust	IP/MPLS,Multicast (PIM-SM, BIER , NG-MVPN), SDN Openflow, VPN, EVPN, Clos Topology Machine Learning	Service provider, Data Center,	Mentoring, Executive presentations Customer focus Project management, AI/ML certification

- **Multicast**: Implemented PIM Source Specific Multicast and designed for an MVPN environment and planned for PIM Sparse mode.
- **Software Defined Networking:** Convinced management to build own Openflow design, led design and implementation in both USA and India.
- **Network Operating Systems:** Cisco IOS, Foundry NOS, Brocade NOS (64b-Linux), Ciena (docker)
- **IP:** Provide architecture and implement IPv4 forwarding infrastructure for Foundry/Brocade CES/CER router; efforts resulted in a US patent.
- **MPLS:** Implement MPLS hardware forwarding flow on Cisco GSR engine-3-line cards and in Brocade, MPLS fast reroute in CES / CER routers.
- **Network Management:** Design/implement the auditing module of an NMS for MPLS/VPN NW.
- **Re-engineering:** Led team from India to take over and revamp failed AMP project in, PA. Team rejuvenated project and added functionality. Led bug management, release definition/ management and software release.

- **AI/ML:** Took courses on Machine Learning fundamentals and Machine Learning – Regression specialization offered by the University of Washington

ACCOMPLISHMENTS CHRONOLOGY

Skills upgrade sabbatical **2024-current**

- General Study: Networking brush up, system design fundamentals, etc.
- AI/ML: Machine Learning Foundations: A Case Study; Univ of Washington
- AI/ML: Machine Learning: Regression: Univ of Washington

Ciena Corporation, San Jose, CA (Principal Engineer) **2020–2024**
Ciena's Routing and Switching Division provided networking solutions to enterprise customers.

- Upon boarding, took on the task of implementing Label Distribution Protocol (LDP) graceful restart (GR) helper module despite any codebase knowledge. The plan was to implement the helper module in RFC3478. Implemented the LDP GR helper functionality for "Topology LDP" on schedule This codebase was used by another team to implement LDP GR for "Targeted LDP."
- Joined the Multicast group when the team was developing "Source Specific Multicast" (SSM) of Protocol Independent Multicast "Sparse Mode" (PIM-SM). This is a simple subset of PIM that would help IP-TV broadcasters. Implemented Multicast Routes (mroutes) functionality specific to our platforms. There was an existing IP-infusion (IPI) codebase which we leveraged. This needed wide rewrites of IPI codebase. We delivered the product on time despite many unknowns and obstacles.
- For the Multicast VPN extension to PIM-SSM project, contributed to the initial brainstorming on the choice of the provider core multicast distribution tree (MDT). We chose point-to-multi-point Inclusive tree only (no selective). This was followed by an architecture discussion. Delivered the design, code, and Unit test for Egress Path where we receive a PIM join from an CE and we need to propagate the request across the core to the remote PE.

Extreme Networks, San Jose, CA. (Principal Engineer) **2017-2019**
Extreme Networks ($400M/Yr.) provides enterprise networking solutions and support.

- **Binary Event Tracing Support for Network OS**: Requests came from Customer Service and Test groups for a debugging system that would trace an event flow from source to hardware program or destination across all subsystems. Discussing with dev. and testing teams to arrive at the specs, made a proposal to the management. Delivered the core module and integrated it with Openflow and then trained some personnel on how to use this.
- **Leading Federal Certification for Layer-3**: Working with test groups to obtain test suite results, translating them to actionable items, identifying resources to address these issues or solving them, following up progress and interacting with the Certification Manager. This was a project that had high management visibility and urgency.

Brocade Communications San Jose, CA (Sr. Staff Software Engineer) **2008-2017**
Brocade ($2.2B/Yr.) made comm. Hardware, was acquired by Broadcom and Extreme.

- **Openflow Project**: Upon onboarding to the Openflow project, quickly found out that the team was porting third party Openflow code not suitable to the Brocade architecture. Instead, proposed and convinced for investment in "Brocade Openflow initiative," where we develop our own stack:
  - √ Working with Product Management to define specifications and architected the Openflow sub-system for the Brocade family of products.
  - √ Developed the Openflow engine to handle Openflow requests, providing technical leadership to the team in US for rest of control plane and Bangalore to develop the forwarding plane.
  - √ In the next version, ported the product to a 64-bit Linux based operating system.
- **Supporting Layer-3 on CER family of routers**: As principal point of contact supported customers who deployed Brocade's CER family of routers. Work involved discussing with customers and debugging their issues.

Foundry, Inc., San Jose, CA (Staff Software Engineer) **2007-2008**
Foundry Inc ($600M/Yr.) made comm. Hardware, was acquired by Brocade.

- **IP forwarding in CES/CER routers:** Upon onboarding to Foundry, took ownership of the Layer-3 module of a new CES/CER router development which is a pizza-box router with the feature set of Cisco top end routers but with lower scale limits. I architected, designed, and implemented IPv4 forwarding. **The CER router won the "special prize"** in the "Infrastructure Building Products (for Carrier/SP)" category on the Tokyo interop 2010.

Cisco Systems, San Jose, CA (Senior Software Engineer) **1998-2007**
Cisco (now $45B/Yr.) makes infrastructure and networking equipment for global enterprise customers.

- Joined Cisco in the Network & Service Management Business Unit: At that time MPLS-VPN as a networking model was evolving. We were building a product to provision and manage such networks. Designed/implemented the "auditing module," which provides NOC provisioning data.
- Moved to Gigabit Switch Router BU, where a new router Line card was being developed—Edge engine—for the Provider Edge router. Designed and implemented IP & MPLS forwarding plane. To get help, mentored a fresher from college and made her an expert in MPLS. Later, implemented line card redundancy for ATM based edge line cards. Provided a software architecture for Layer-3 forwarding for a new operating system for the Gigabit Switching Router (GSR)

Ultrexx Corp, Seattle, WA (Director) **1997-1998**
Ultrexx provided AI decision making software to enterprise customers.

- Drove Technical Marketing of Ultrexx product and CruXpert and committed partners for development solutions based on the product engine.
- Led a team to release the software in box format including user manual.

PSI Data Systems Bangalore, India (Project Manager) **1989 - 1997**
PSI Data Systems provided services to enterprise customers with customer projects on enterprise data.
Managed offshore partners (US & Europe) to control turnkey projects, prepare project specs., build teams and supervise implementation including P&L and cash flow. Some of the interesting projects are:

- ***AMP project*:** AMP Inc. PA, gave the project to a Boston based co. to develop an NMS project for their Token Ring concentrator, who failed to deliver. Led a team from Bangalore to the sites to take over the operations. Delivered a successful product/project and added extra functionalities in the next phase. Work entailed bug management, release definition & management and software release.
- ***PSOM project (Outsourcing):*** A PC (DOS) based Systems Operation Monitor to manage Network Elements of a Telephone Network. This was one of the very early outsourcing projects to India.

CERTIFICATIONS

Machine Learning Foundations: A Case Study
University of Washington
Credential ID FSLLVBCYO105

Machine Learning: Regression
University of Washington
Credential ID 1K06RFPZ95JB

EDUCATION/ACHIEVEMENTS

Indian Institute of Technology, Kanpur: Master of Technology – Computer Science.
Indian Institute of Technology, Kharagpur: Master of Science – Physics

- Patent # US 12/610,143: Techniques for next-hop optimization in IP Forwarding
- Hostel president of Hall-IV IIT Kanpur in 1984