

# Santanu Sen

Bangalore, India

☎ (+91) XXXXXXXXXX | ✉ XXXXXX@gmail.com | 🌐 santanusen | 📞 santanu-sen-18740418

## Summary

Seasoned Software Development Engineer with a strong 19-year track record in designing, implementing, and leading the development of complex, large-scale distributed software systems. Currently serving in a technical leadership capacity, driving end-to-end project execution, cultivating collaboration across cross-functional teams, and providing mentorship. Recent work involves spearheading multiple projects focused on enhancing space management within distributed file system environments.

## Skills

Proficient in C, C++, Object Oriented Design, Design Patterns, Distributed Systems, Data Structures, Algorithms, Programming in Linux and Unix Environments, Multithreading, Multi-core Applications, IPC and File Systems.

## Work Experience

### NetApp India Pvt. Ltd.

Dec. 2018 - Present

MEMBER TECHNICAL STAFF

BANGALORE, INDIA

- Led the design of space management features of OntapX, NetApp's next generation disaggregated data management platform, and contributed to the implementation of automatic space rebalancing, space reservation management for guaranteed client operations and proactive space reclamation through autodelete of old snapshots.
- Drove the design and delivery of Granular Data Distribution on NAS volumes. Ideated the architectures of efficient management of space guarantees, autoheal and lost data recovery for distributed files which were filed for patenting.
- Spearheaded the design and implementation of exporting the multipart file layout to pNFS clients.
- Replaced fixed space reservation for the inode metafile with dynamic allocations, achieving a 50% reduction in space reserved for volume metadata and an 8-fold increase in the maximum number of files in a volume.
- Optimized the infrastructure for cluster-level space attributes retrieval using caching to reduce REST API response timings from more than 5 seconds to less than a second.
- Led the development efforts of containerization of Ontap data management components to offer a software defined cloud storage solution which later became the core of Google Cloud NetApp Volumes. Implemented the system startup, software upgrade, and liveness and readiness features for Data Management pods helping in detection of multiple issues early in the development cycle.
- Designed and implemented a scheme for protection of system-critical memory pages from accidental writes in the Data Management binary.

### Infinera India Pvt. Ltd.

Jul. 2012 - Nov. 2018

STAFF SOFTWARE DEVELOPMENT ENGINEER

BANGALORE, INDIA

- Enhanced the Network Element Transaction Framework through private workspace for write transactions which achieved a superior scaling to support 15 simultaneous NMS connections compared to only 3 NMS connections by a 64 chassis Network Element cluster.
- Created a Network Element Link Traversal Framework to simplify the fault correlation logic. The framework, later patented, was reused by multiple features which saw a reduction in the number of traversal related bugs from 2 per feature on average to 0.
- Designed and developed a declarative Fault Correlation and Management Framework for the Software Defined Network suite. The framework accomplished specification of new alarm definitions and fault correlation rules without recompilation and was filed for a patent.
- Designed and developed a C++ Cryptographic Wrapper Library to simplify digital signature verification and decryption of Instant Bandwidth licenses. The library was later reused to implement several other security features.
- Contributed to engineering efforts from object modelling, to implementation and delivery of a number of Network Element Management Plane Software modules such as Optical Amplifiers, Broadcasting Modules, Multiplexers, Cross-Connects and Protection Switching modules across several releases.

### Tejas Networks Ltd.

Jun. 2006 - Jun. 2012

LEAD ENGINEER, R&D

BANGALORE, INDIA

- Enhanced the Network Element Software transaction performance by backgrounding and batching of configuration database commits which reduced centralized NMS based circuit restoration timings from 40 seconds to sub-second. The work was recognized with an achievement award.
- Designed and implemented different Automatically Switched Optical Network service classes using Generalized Multi-Protocol Label Switching. Created a User Mode Linux based simulation framework which effected a drastic reduction in unit-testing time.
- Designed and developed a System Startup and Failover Manager supporting a state machine based phased initialization of Network Element Software.
- Improved management layer security of Network Elements through implementing HTTPS support for the web server, user session management, and audit logging of configuration changes.
- Simplified user-management across multiple Network Elements by implementing support for a centralized RADIUS based authentication. The feature relieved the operators from adding and managing users separately in each individual Network Element.

## Education

### Master of Technology in Computer Science and Engineering

2006

NATIONAL INSTITUTE OF TECHNOLOGY, DURGAPUR, WEST BENGAL, INDIA

- CGPA: 9.58/10
- Thesis: Integrated Feature Analysis, Fuzzy Set Selection and Fuzzy Rule-Based System Identification in a Neuro-Fuzzy Paradigm

### Bachelor of Engineering in Computer Science and Engineering

2004

THE UNIVERSITY OF BURDWAN, WEST BENGAL, INDIA

- TCPA: 79.5%

## Patents

### Methods and Systems for Managing Multipart Files Stored in Networked Storage Systems

Dec. 2024

Intellectual Property India, App. No. 202411105206, Status: Filed

### Systems and Methods for Decoupled Optical Network Link Traversal

Jun. 2020

USPTO, App. No. 16/136,810, Doc. Id: US 20200100003 A1, Status: Grant

### Defining Architectures using Declarative Parametric Language

May. 2019

USPTO, App. No. 16/415,853, Doc. Id: US 20200364061 A1, Status: Filed

## Publications

### A Neuro-Fuzzy Scheme for Integrated Input Fuzzy Set Selection and Optimal Fuzzy Rule Generation for Classification

Dec. 2007

International Conference on Pattern Recognition and Machine Intelligence, pp 287-294, LNCS, vol. 4815, Springer

## Honors & Awards

### Spot Bonus Reward, NETAPP

Awarded for delivering the last-minute design changes during the absence of the lead for the TCM project.

Apr. 2023

Recognized for the design and development of Automatic Incremental Repair of multipart files.

Jul. 2022

Rewarded for contributions to the Flex Group Rebalancing project and mentoring new joiners.

Jan. 2022

### Hackathon Notable Project Winner, NETAPP HACKATHON

Awarded for demonstrating the idea of ``Photon Asynchronous IO Using io\_uring."''

Nov. 2022

Awarded for demonstrating the idea of ``Vertical Pod Autoscaling for DMAP Containers."''

Feb. 2020

### Peer Recognition Award, NETAPP

Recognized for teamwork during the ``Quark Version Upgrade" project by the Cloud Engineering Team Peers.

May. 2020

### Spot Bonus Reward, INFINERA

Rewarded for significant contributions to design and development of FBM Management Plane Software.

Mar. 2017

Rewarded for exceptional performance in design and development of Fault Integration and Alarm Correlation.

Jun. 2015

### Hackathon Star Project Award, INFINERA HACKATHON

Awarded for demonstrating the project titled ``Parametric Software."''

Jun. 2015

### Achievement Award, TEJAS NETWORKS

Awarded for optimizations in management plane software to reduce ASON circuit restoration time.

Apr. 2011

### Overnight Contest Winner, MUKTI, ANNUAL NATIONAL LEVEL TECHNICAL SYMPOSIUM, LUG, NIT DURGAPUR

Won First Prize in C Programming Contest.

Jan. 2006

Secured Third Prize in System Administration Contest.

Jan. 2006

## Certifications & Test Scores

IBM Certified Associate Developer, IBM WebSphere Studio V5.0

Apr. 2005

IBM Certified Database Associate, IBM DB2 Universal Database V8.1

Apr. 2005

Secured a Percentile Score of 92.33 in Graduate Aptitude Test in Engineering

Mar. 2004