Santanu Sen

Bangalore, India

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Summary

Seasoned Software Development Engineer with a strong background in designing, implementing, and spearheading the development of scalable distributed software systems. Currently in a technical leadership role, driving end-to-end project execution, fostering collaboration across cross-functional teams, and mentoring team members in multiple projects centered around space management within distributed file systems.

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 reclaimation 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, softwre 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 demonstratimg 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 Admininstration 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*