GSoC 2025

00

JSON Schema

Google Summer of Code

Project Proposal for

Automated Badge Issuance System

GitHub Issue

Ranawakage Pasindu Deshitha

Intern - Software Engineer

About me

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OVERVIEW

I have a strong knack for writing efficient, modular, and highly readable code. A messy, inefficient codebase? That's a definite ick for me. I value simplicity just as much as I value efficiency, and I'm always striving to strike the perfect balance between the two.
With a wide range of interests, I find Computer Science particularly addictive—I simply can't stop once I start working on something. Whether it takes days or nights, I push through until I reach the finish line. I draw immense inspiration from people like Linus Torvalds and Brendan Eich, with Torvalds being my biggest influence. His passion, vision, and mindset introduced me to the world of open source, especially Linux and Git—both of which were turning points in my journey. The simplicity, lightweight nature, and efficiency of Linux and Git made me wonder: What level of expertise does it take to create something so powerful yet so elegant?
While I'm currently pursuing a CS degree, this is far from my final destination. I'm deeply interested in scientific fields—especially physics—where computational knowledge plays a crucial role. My goal is to bridge the gap between Computer Science and the sciences, bringing the best of both worlds together.
I think that's enough about me!

WHY ME AND WHY JSON SCHEMA

I'm a Software Engineering Intern at Synergy Information Systems PVT Ltd. and a third-year Computer Science student. My work primarily involves building network monitoring applications, giving me hands-on experience with Networking, TypeScript, Python, Java, and some C.
I love working on projects that go beyond just software—things that connect with hardware and make a real impact.
JSON has been a core part of my work, from API communication to structured data handling. With over three years of experience working with JSON and BSON (MongoDB), I see JSON Schema as a critical tool for ensuring data validation and interoperability. Given how essential it is in modern development, contributing to its growth feels like a natural step for me.
I've always been drawn to open source- especially GitHub (it is my happy place!), making small contributions here and there, and I see GSoC as the perfect opportunity to take that further—learning from experienced mentors and contributing meaningfully. I enjoy working with structured data, reading documentation, and solving real-world problems collaboratively.
With my technical background, problem-solving mindset, and enthusiasm for open source, I believe I'd be a great fit for JSON Schema. I'm excited to contribute, learn, and grow while working on something that genuinely matters.

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Personal Information

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WEBSITE	KaSaNaa.github.io
MENTOR	Matthew Adams
CONTACT METHODS	Slack, WhatsApp, Google Meet
AVAILABLE TIME	I am available from 3AM to 4PM UTC
AVAILABILITY	As a full-time software engineering intern, I work from 9 AM to 5 PM. However, I'm still accessible via email, calls, Slack, or Google Meet if needed. On weekends, I have university lectures, and some weekday evenings are also taken up with academic commitments. While my schedule can be tight, I always make time for extracurricular activities like going to the gym and socializing, ensuring a healthy work-life balance. Approximately, I can contribute about 10-20hrs/week throughout this GSoC period.

Experiences

CAREER EXPERIENCE

2024 - Present

Software Engineering Intern at Synergy Information Systems Pvt Ltd.

- Working on building network monitoring applications.
- Gained experience with Networking, TypeScript, Python, Java, and some C.
- Developed systems that connect network devices to ensure efficient monitoring.
- Contributed to projects that focused on enhancing the performance and reliability of network infrastructure.

Projects I have involved in:

- SNMP Based Network Topology Discovery Application
- Network Topology Dashboards
- Automated Network Device Configuration Backup Module
- Network Auto Discovery Module

PERSONAL PROJECTS

- Script Scheduling Engine (C language)
- My Current Portfolio Website
- Entertaining Digital Present Web for Valentines
- SNMP Based Network Topology Discovery
- Number Recognition Model Based on Classification
- Blog Website with Firebase
- Facial Emotion Detecting CNN

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EXTRA CURRICULAR ACTIVITIES

2024 - Present

- Member of IOT Club of National Institute of Business Management
- Active Member and Participant of Computing Society of National Institute of Business Management
- Active Member of GitHub Student Community of National Institute of Business Management

FUTURE GOALS

- I am looking forward to apply as the next GitHub Student Expert in my campus on July 2025 to extend my connections with GitHub community and gain experience in social skills to contribute my knowledge to beginner, newbie students.

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Contributions

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Repository	Type	Number	Title	Link
Script-Engine	PR - Merged	#25	Tasks modified event listener	#25
Script-Engine	PR - Opened	#23	Add unit tests	#23
Script-Engine	PR - Merged	#21	Time based scheduling	#21
Script-Engine	PR - Merged	#18	Add wiki	#18
Script-Engine	PR - Merged	#17	Phase 4	#16
Bus-Ticket System	PR - Merged	#3	PR/KaSaNaa	#3
Network-Discovery	PR - Merged	#25	Script Execution Terminates	#25
Network-Discovery	PR - Merged	#24	Enhance SNMP Manager	#24
Network-Discovery	PR -Merged	#18	Recursive Discovery	#18
MS-VSCode	Issue - Out of Scope	#1687	Add response continuation	#1687
YoloUI	Issue - Open	#1	create-react-app is dead	#1

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Repository	Type	Number	Title	Link
Bus-Ticket System	Issue - Closed	#1	Improvements and Potential Errors	#1
Network-Discovery	Issue - Open	#29	NMAP Integration	#29
Network-Discovery	Issue - Closed	#28	Handle infinite recursion	#28
Network-Discovery	Issue - Closed	#22	Validate SNMPv3 credentials	#22
musichub	Issue - Open	#2	Store sensitive data in .env	#2
Script-Engine	Issue - Closed	#20	Event Listener	#20
Script-Engine	Issue - Closed	#3	Scheduler and Monitoring	#3

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High Level Project Summary 07

BENEFITS

- Eliminates manual work, reducing human error.
- Ensures badges are issued in a timely manner.
- Improves scalability by leveraging serverless Cloudflare Workers.
- Provides a structured, open-source solution for future extensibility.

PROJECT OUTCOMES

1. A working automated script for badge issuance.
2. Integration with Google Sheets to track completion status.
3. Integration with Badgr API for badge generation and issuance.
4. Cloudflare Worker deployment for scheduled execution.
5. Error handling and logging to ensure system reliability.
6. Comprehensive documentation for installation and usage.

Implementation Plan

API & ENVIRONMENT SETUP (WEEK 1-2)

- Introduce myself to the community and study the codebase and relevant documentation
- Discuss my project plan with mentors
- Create a test account for Badgr and Cloudflare Workers.
- Configure Google Sheets API access.
- Explore Cloudflare Workers' cron-based execution capabilities.
- Document API credentials management (secrets handling best practices).

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DATA HANDLING (WEEK 3-4)	• Read user completion data from Google Sheets. • Implement duplicate check and clean up entries. • Add a "badge issued" column to track processed entries. • Develop logging system for tracking badge issuance attempts.
BADGE ISSUANCE LOGIC (WEEK 5-6)	• Implement Badgr API integration for badge creation and issuance. • Handle API rate limits and response validation. • Implement retry mechanisms for failed badge issuance attempts while getting frequent reviews from mentors
CLOUDFLARE WORKER DEVELOPMENT (WEEK 7-8)	• Develop the Cloudflare Worker script to run on a scheduled basis. • Connect Cloudflare Worker with Google Sheets and Badgr APIs. • Test Cloudflare Worker execution and verify results. • Optimize script for minimal API calls to stay within free limits.
ERROR HANDLING AND NOTIFICATIONS (WEEK 9-10)	• Implement error handling and logging for API failures. • Integrate Slack notifications for critical failures. • Validate system robustness by simulating API downtime scenarios.
DEPLOYMENT & DOCUMENTA-TION (WEEK 11-12)	• Finalize and deploy the script to a production Cloudflare Worker while writing detailed documentation for setup and maintenance. • Conduct final end-to-end testing with real user data and submit work for review and feedback from mentors.

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Approach and Tech Stack

LANGUAGE	• TypeScript (Node.js) / Python
APIs	• Google Sheets API • Badgr API • Cloudflare Workers / GitHub Actions (if preferred)
DEPLOYMENT	• Cloudflare with GitHub
SECURITY CONSIDERATIONS	• Store credentials using ENVs. • Implement rate-limiting, load-balancing, retry mechanisms, and error recovery mechanisms.

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Qualification Task Summary

[GitHub Repository]

OVERVIEW

This qualification task for Google Summer of Code 2025 with JSON Schema Organization involves creating an automated badge issuance system. The system reads user data from Google Sheets, issues digital badges via the Badgr API to users who complete the JSON Schema Tour, and updates the spreadsheet to track badge issuance.

TECHNICAL IMPLEMENTATION

I've developed a Node.js application with the following components:

1. Core Badge Issuance System:
   - index.js: Main entry point that orchestrates the badge issuing process
   - badgr.js: Handles integration with Badgr API for badge issuance
   - sheet.js: Manages Google Sheets data reading and updating
   - logger.js: Provides structured logging for operations and errors
2. Automated Deployment:
   - workflows/worker.yml: GitHub Actions workflow configured to run daily to automatically process new completions

CHALLENGES SOLVED

1. API Integration Complexity: Successfully integrated with both Google Sheets API and Badgr API
2. Error Handling: Implemented robust handling of network issues, rate limits, and API errors
3. Automation: Created a GitHub Actions workflow for scheduled execution without manual intervention
4. Privacy Concerns: Ensured email addresses are partially masked in logs

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KEY FEATURES

Reliability & Error Handling

- Retry Logic: Implements exponential backoff for API failures
- Validation: Validates all inputs and environment variables
- Detailed Logging: Logs all operations with timestamps and contexts

Security & Privacy

- Uses service account authentication for Google Sheets
- Stores sensitive credentials as GitHub Secrets
- Masks email addresses in logs (only first 3 characters visible)

Configuration & Extensibility

- Environment-based configuration via .env file
- Customizable column mappings for flexibility
- Support for optional features (badge ID tracking, timestamp recording)

Maintainability

- Clear error messages and status logging
- Daily log rotation for easier debugging
- Statistics reporting for monitoring badge issuance rates

DEPLOYMENT STRATEGY

The solution can be deployed via:

1. GitHub Actions (implemented)
2. Any server with Node.js installed using cron job

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Post GSoC Plans

CONTINUED CONTRIBUTION

After GSoC, I plan to continue actively contributing to the JSON Schema ecosystem and other open-source projects that align with my interests. Open source isn't just a one-time experience for me—it's something I genuinely enjoy, and I want to stay involved long-term.

Additionally, I'm planning to apply for the GitHub Student Expert program. With the experience gained from GSoC, I aim to mentor newcomers, help them navigate open source, and actively contribute to solving their issues. Sharing knowledge and guiding others is something I value, and I see it as a way to give back to the community.

This journey will not only benefit the JSON Schema community but also contribute to my personal growth. By the time I graduate, I'll have over two years of industry experience combined with hands-on open-source contributions—equipping me with both technical expertise and a strong foundation in collaboration and mentorship.

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