SPOORTHY INNOVATIONS PRIVATE LIMITED

Vasavya Yagati

Technology Founder | AI-Native Product Engineering Specialist

Enterprise Architect | Utility Digital Transformation Leader

Architect — Spec to Production · Build — Hardware to Cloud · Scale — State-wide Platforms · Secure — Compliance-ready

Executive Summary & Impact at Scale

Technology leadership across the full stack — from PCB to portal

25+
Years in Technology

13+
Live Platforms

1M+
Citizens Served

2.5M+
Transactions Processed

10+
Years Production Operations

What Stands Out

- From embedded firmware (1997) to AI-native delivery (2026)
- One owner across architecture, backend, cloud, security & UX
- Regulated domains: CGD, water infrastructure, identity & solar
- Govt specs → production systems with audit & compliance

Business Promise

Turns government and enterprise specifications into working production systems. Reduces vendor fragmentation by owning hardware, firmware, networking, software, cloud, security, and operations in one delivery flow.

Deployed at Scale

Government & enterprise platforms in production

NTR Sujala

Smart water · 450+ IoT endpoints · 10+ yrs

HNGPL

PNG billing · CRM · Govt portal · Payments

ISRO / IMD

Satellite weather telemetry

APSFL

AP Fiber Grid · GPON FTTH · iREM · ONT/STB

IGL

Spot billing · SAP integration

Educational Institutions

ID cards · QR verification

Five generations of technology — 1997 to today

from **Broadcast & VSAT Systems** in the late 1990s to
Cloud-Native IoT Platforms, **Triple Play on GPON**, and **AI-assisted Engineering Workflows** today

1ST GENERATION — LATE 1990s

Broadcast & VSAT Systems

CONNECTING THE WORLD
Laying the foundation for global communication

2ND GENERATION — 2000s

IP Networks & Telecom Solutions

BUILDING CONNECTIVITY
Enabling reliable networks and telecom infrastructure

3RD GENERATION — 2010s

Cloud-Native IoT Platforms

EMBRACING INTELLIGENCE
Connecting devices, data and environments

4TH GENERATION — 2020s

Triple Play Service on GPON Technology

ENHANCING EXPERIENCES
Delivering integrated voice, video and data services over GPON networks

5TH GENERATION — TODAY

AI-assisted Engineering Workflows

DRIVING INNOVATION
AI-powered insights and automation for smarter, faster engineering

Profile

A single owner — from PCB to portal

Current Role

Founder & MD, Spoorthy Innovations (2013–Present). Leads strategic direction and multi-vertical expansion across utility, IoT, identity, and security platforms.

Core Stack

C, C++, PHP, MySQL, Linux, RTOS, networking, APIs, DevOps & enterprise application design.

Focus Areas

Utility billing · Government IoT · Solar EPC · Secure identity · Cloud security · AI-native engineering

1997	ETV (Eenadu News Channel)
2002–09	MIC, NetIndia, Wipro, Ikanos, TAGV — Embedded & Telecom
2013	Founded Spoorthy Innovations
2019–24	Altice Labs India
2026	Spoorthy Innovations Research Foundation

End-to-End Engineering Capability

Capabilities Matrix + full delivery stack — route projects by domain and technical fit

Hardware Engineering

- High-Speed Digital Hardware Design
- Analog & Mixed-Signal Hardware Design
- Power Electronics & Industrial Interfaces
- EMI/EMC-Aware Design

Embedded Systems

- Firmware Development (C/C++)
- RTOS Development
- Bootloaders & Device Management
- Board Bring-Up & Debugging

Communication & Telecom

- TCP/IP Stack Development
- GSM/GPRS/LTE
- Satellite Communications
- GPON / FTTH
- V5.1 / DLC / DSLAM
- IPTV / Triple Play

Cloud & Infrastructure

- AWS Cloud Architecture
- Linux System Administration
- Cybersecurity & Infrastructure Security
- DevOps & Deployment Automation
- Monitoring & Observability Systems
- Networking and Firewall

AI-Native Engineering

- AI-Assisted Development Workflows
- LLM-Based Product Engineering
- Rapid Prototyping & MVP Development
- AI-Augmented Enterprise Solutions
- AI-Native Rapid Application Development

Enterprise Software

- PHP Application Development
- MySQL Database Design & Optimization
- JavaScript & Web Applications
- REST API Design & Integration
- Dashboards, Analytics & Reporting

Capability	Level
Enterprise Architecture	Expert
Embedded Systems	Expert
Telecom Infrastructure	Expert
Utility Platforms	Expert
Cloud & DevOps	Advanced
Cybersecurity	Advanced
AI-Native Engineering	Advanced

Domain Expertise

Core strengths in Telecom, Utility & Embedded — plus full sector coverage

Route projects by domain — deepest delivery experience highlighted below

CORE

Telecom & FTTH

GPON · OLT · Triple Play · ONT/STB · NOC operations · PoP infrastructure monitoring · statewide fiber grids

CORE

Utility & CGD

PNG billing · govt portal APIs · spot billing · multi-channel payments · CRM · HNGPL · IGL · customer portals

CORE

Embedded Systems

Firmware · RTOS · board bring-up · IoT RDUs · GSM/GPRS & satellite · iREM · AWS loggers · TCP/IP on constrained MCUs

Water & Dispensing

Sujala monitoring · Smart Water ATM · dashboards & admin

Infrastructure & EPC

WorkPro · BOQ · field workforce · offline mobile

Identity & Security

ID Flow Pro · QR verify · SISG gateway · SSH & RBAC

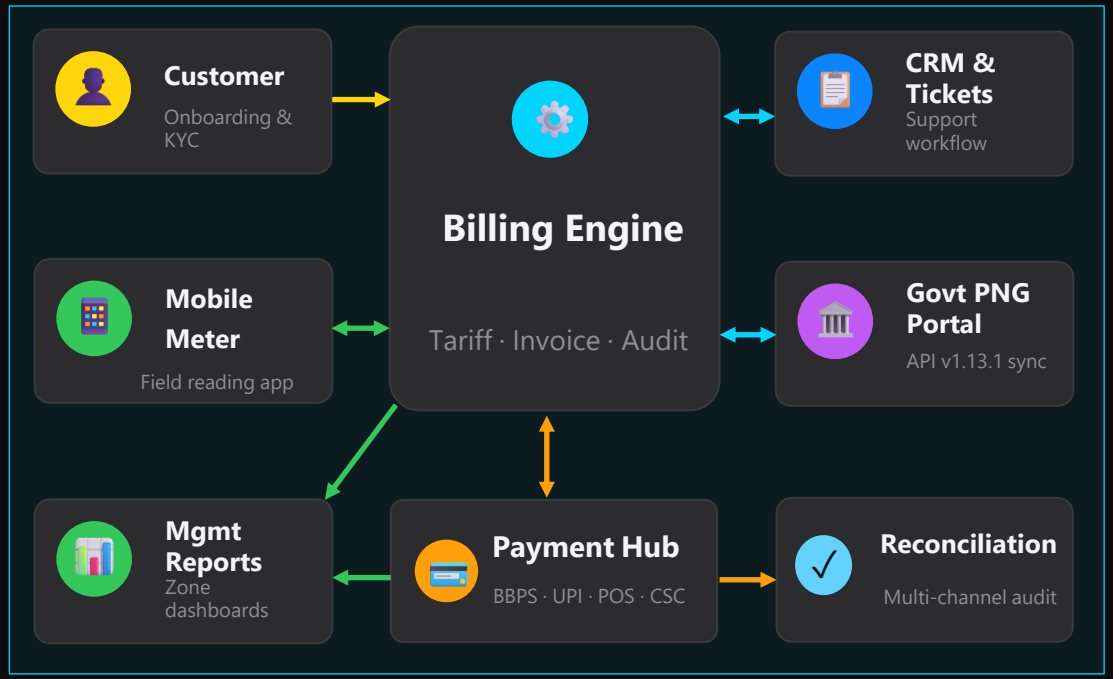
Solar & Renewable

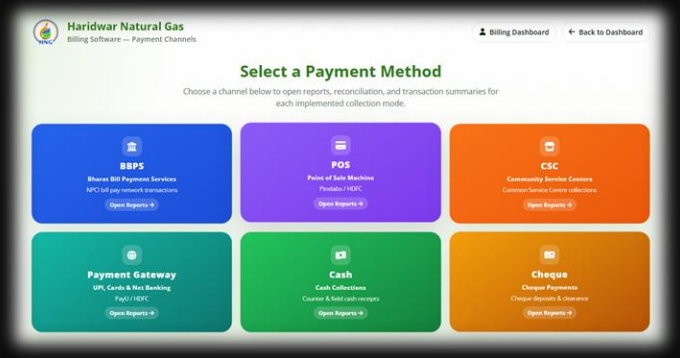
Rooftop solar CRM · SolarTrack · field monitoring

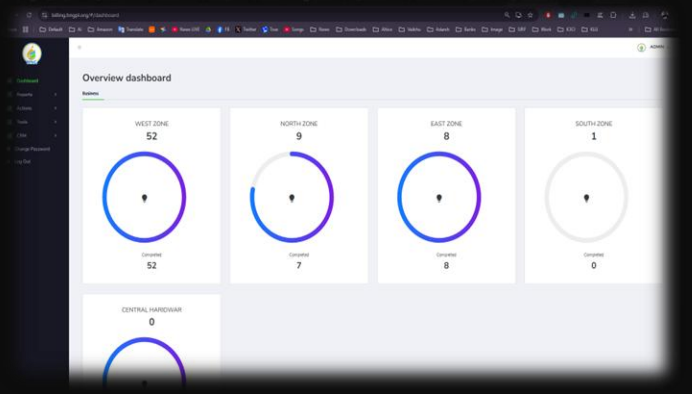
HNGPL Architecture

· cs.hngpl.org · billing.hngpl.org

Complete PNG billing + CRM + payments ecosystem







Live production — entire PNG customer operations

Case Study: HNGPL

Haridwar Natural Gas — complete operational backbone

Architecture

Fintech

Integration

Deployment

Challenge

- PNG Central Portal API v1.13.1 integration under government mandate
- Legacy billing extension without disrupting live operations
- Multi-channel reconciliation: BBPS, POS, CSC, UPI, cash & cheque
- Unified audit trail for all government API communication

Solution & Outcome

APIs 4.1–4.3 & 5.1–5.4 with queue-based sync & OAuth. 10+ integration modules. Zone-wise management dashboards. Full PNG lifecycle on one platform.

Sujala IoT Pipeline

Smart water dispensing ecosystem

EDGE DEVICES
- RFID Card
- Water ATM
- TDS / pH Sensor
- Tank Level

CONNECTIVITY
- GSM/ GPRS
- Telemetry Gateway
- Secure Tunnel

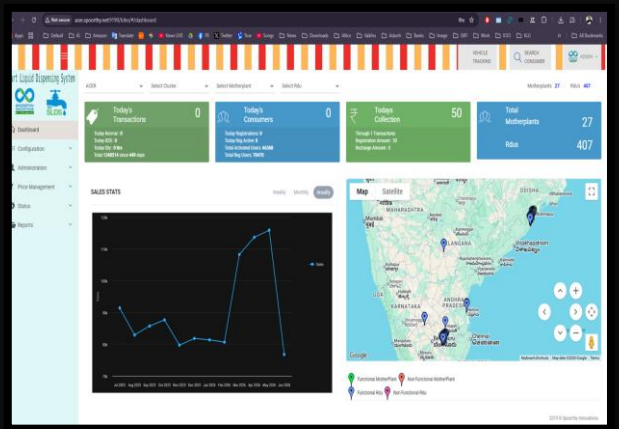
CLOUD PLATFORM
- AWS Cloud
- Data Pipeline
- Analytics DB

DASHBOARDS & APPS
- Ops Dashboard
- Mobile App
- Voice Guidance

sujala.org
ntrsujala.in
SLDS Dashboard

2.5M+
Transactions

450+
RDUs Live



Case Study: Sujala (RO water supply to Rural areas)

State-scale smart water infrastructure — 10+ years in production

70,000+	30+	450+	10+ Yrs
Registered Users	Motherplants	Remote Units	In Operation

Platform Capabilities

- RFID Smart Cards
- GSM/GPRS Telemetry
- TDS & pH Monitoring
- Tank Level Sensors
- Multilingual Voice
- Mobile Apps
- Cloud Dashboards
- Price Management

Impact: More than a decade of successful operation in rural Andhra Pradesh, supporting safe drinking water initiatives at state scale with real-time monitoring and fintech-integrated dispensing.

AP Fiber Grid Project

Altice Labs India (2017–2020) · Triple Play Services on GPON Fiber-to-Home · APSFL

2017–20
Altice Labs India

GPON
FTTH Network

Triple
Play Services

APSFL
State Fiber Grid

NOC Implementation

Network Operations Center setup for statewide fiber grid monitoring & service management

OLT Install & Config

Optical Line Terminal deployment, provisioning & GPON network configuration

Smart Rack Monitoring

iREM system — design, development & supply for PoP rack infrastructure

STB / ONT Supply

Design, production & supply of OTT / Android Set-top & ONT boxes to APSFL

End-to-end telecom delivery: from NOC & OLT backbone to customer-premises ONT/STB devices and intelligent PoP rack monitoring — a statewide fiber infrastructure program.

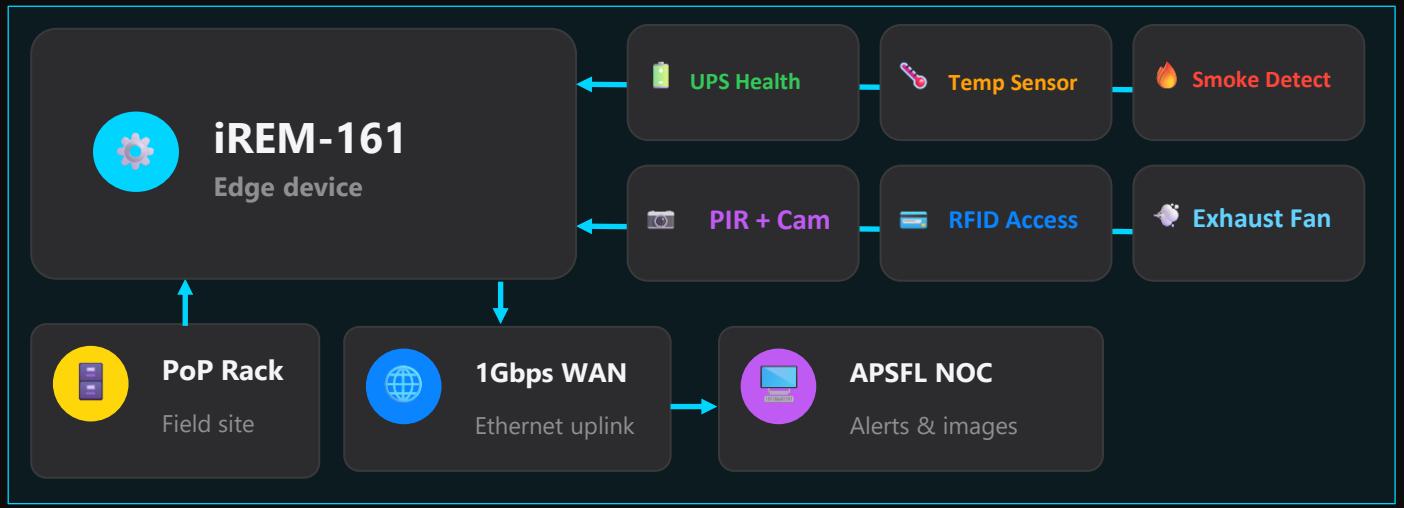
Intelligent Remote Equipment Monitoring

Model iREM-161 · Designed & supplied ~2,000 devices to APSFL · PoP Rack Monitoring

~2,000
Devices Supplied

24/7
NOC Alerts

PoP
Rack Deployed



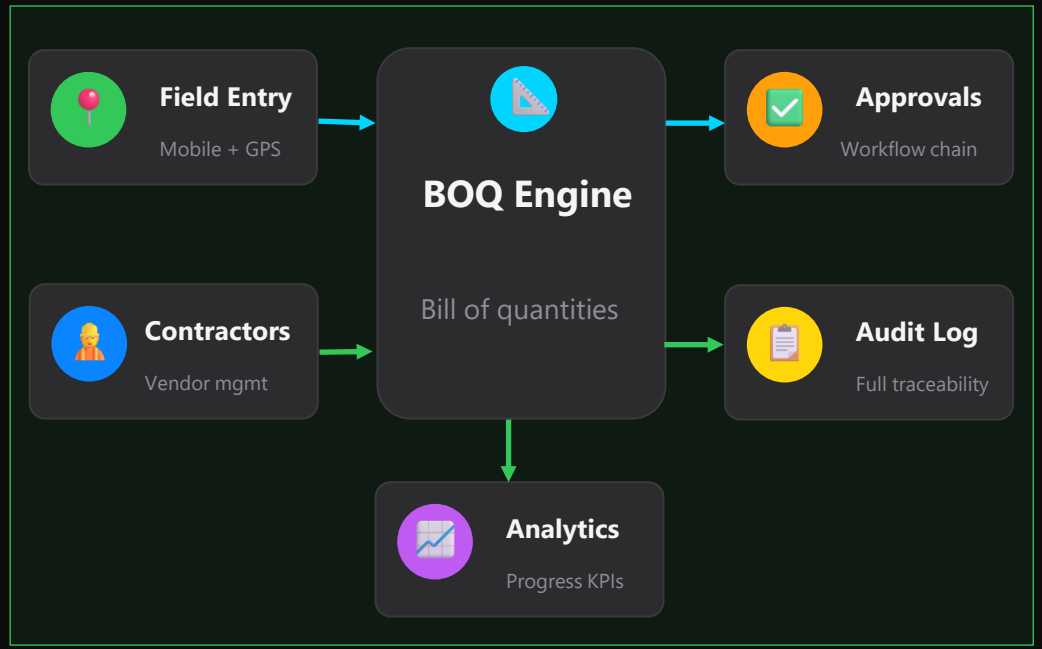
Key Capabilities

- UPS health monitoring with NOC alerts
- PIR-triggered photo capture with flash
- RFID service personnel attendance
- Ambient temperature reporting
- Smoke sensor — fire prevention
- Exhaust fan control (temp + AC power)
- LED & buzzer local indicators
- USB port for backup & maintenance

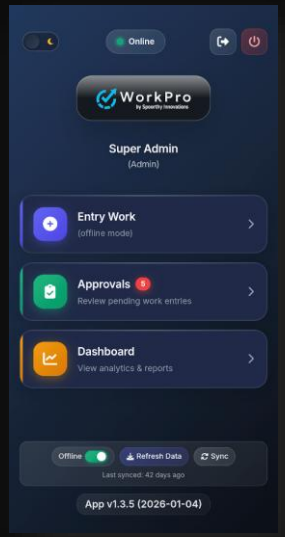
Hardware Design | Firmware | Production | Field Deployment | NOC Integration

WorkPro

Infrastructure project execution platform

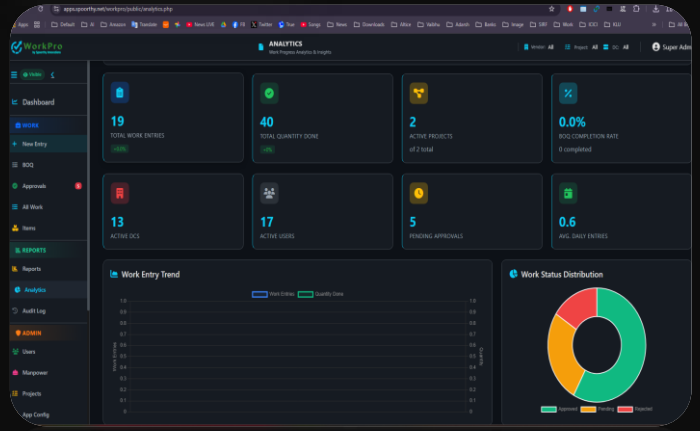


Digitizes project execution with management visibility into infrastructure deployments



WorkPro
by Spoorthy Innovations

apps.spoorthy.net/workpro

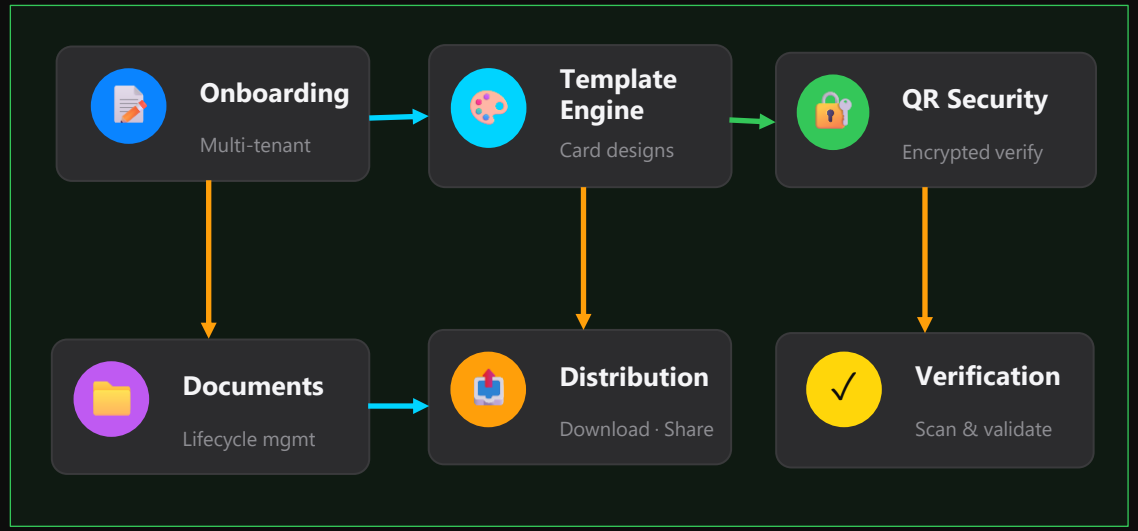


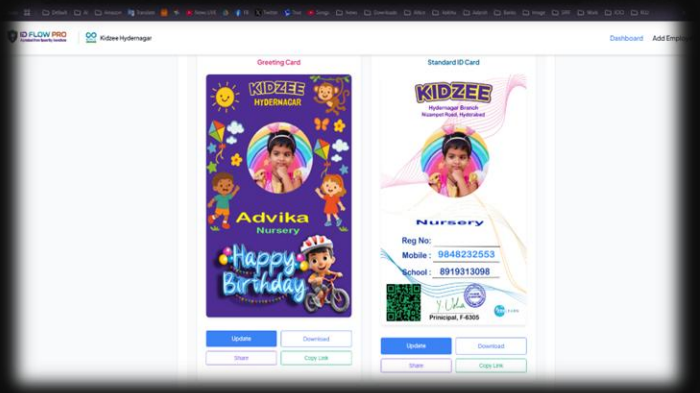
ID Flow Pro

Enterprise identity management

ID FLOW PRO
A product from Spoorthy Inovations

apps.spoorthy.net/idflowpro

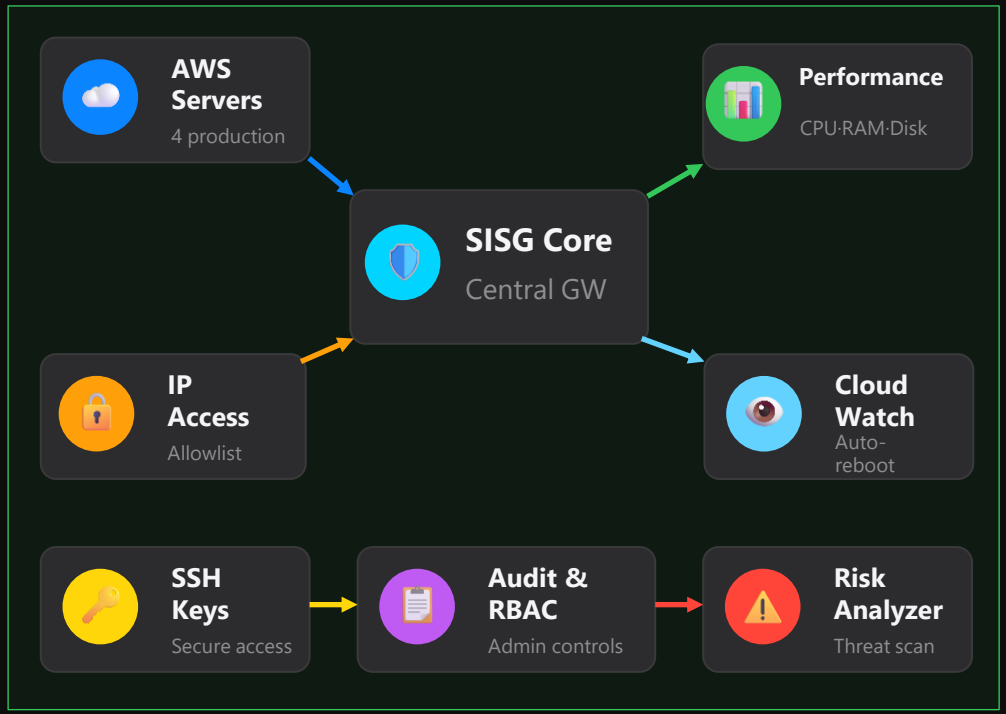




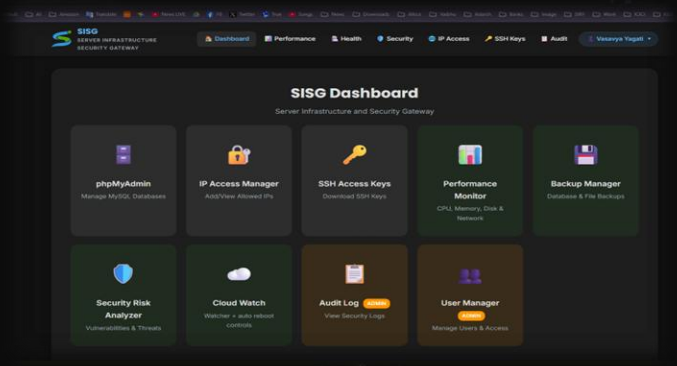
Deployed for Kidzee (Zee Learn) — ID cards, greeting cards & QR verification at scale

SISG — Security Gateway

Server infrastructure & security



SISG
SERVER INFRASTRUCTURE
SECURITY GATEWAY

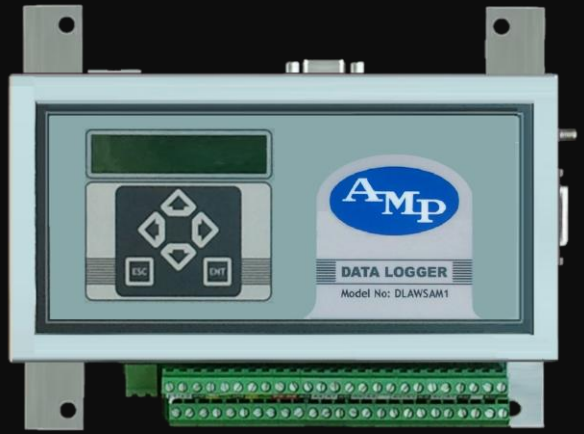


Monitors SPOORTHY · SUJALA · HNGPL · VAIBHU production servers in real time

spoorthy.net/sisg

Automatic Weather Station (AWS) Data Logger

Automatic Weather Station | ISRO / IMD | Model DLAWSAST-IMD-AGRO



System Overview

Mission-critical agro-meteorology data logger for IMD / ISRO. Reads wind, temperature, humidity, pressure, rain, soil moisture, solar radiation and more. Stores data in flash and transmits hourly via satellite to national weather infrastructure.

Sensors to Acquisition to Processing to Storage to Satellite uplink

16 Analog Channels	24-bit ADC	SDI-12 / RS232
GPS + RTC	15 Yrs Data Log	Solar + 12V

Cortex-M4	**32 Mbit**	**1 Hr**	**<120mA**
100 MHz MCU	Flash Storage	Satellite Tx	@ 12V DC

Key Capabilities

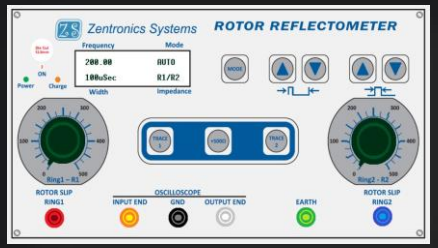
- Wind, temp, humidity, pressure, rain, soil and solar sensors
- Hourly satellite transmission with GPS-synchronized RTC
- Menu-driven LCD and 6-key field configuration
- USB data export in Excel and AMP formats
- EMI/EMC protected, solar-battery field deployment
- Hardware design, firmware and production

Power Generator Testing Equipment

Generator Protection & Predictive Maintenance

Digitally Controlled Rotor Reflectometer

RSO Ver 2 | Rotor slip-ring fault detection



ROTOR REFLECTOMETER

- 5 - 1000 ohm impedance matching
- 10Hz - 1000Hz digital pulse control
- 10us - 400us pulse width
- Generators up to 100 MVA
- 14hr Ni-Cad battery backup
- Surge protected, oscilloscope ready

Application

Rotor winding fault location using reflectometry on slip rings of turbo and hydro generators.

Ground Brush Monitor (GBM)

Shaft Voltage → Shaft Current → Bearing Insulation → GBM Controller

Hall effect transducer + true RMS measurement

- 4x20 LCD + 5x4 keypad interface
- Configurable warning & alarm threshol
- Auto log on alarm events
- RS232 log upload to PC
- Split-core galvanic isolated CT
- Deployed at 250MW thermal units (KTPS)

Application

Predictive maintenance for grounding brushes - protects turbine & generator bearings from electrical pitting damage.

TCP/IP Stack — Built from Scratch (2004)

One of my best engineering achievements · RFC-driven · bare-metal embedded

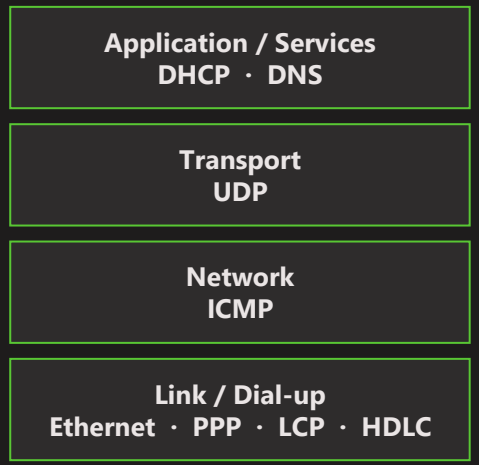
Full network stack on 8/16-bit microcontrollers **with only 4 KB RAM** — for small handheld field devices

The Achievement

- One of my proudest engineering achievements — a full TCP/IP stack written from scratch
- Implemented directly from RFC specifications — no off-the-shelf network library
- Target platform: 8/16-bit microcontrollers with only 4 KB RAM — extreme constraint
- Purpose-built for small handheld field devices needing real network connectivity
- Protocol-by-protocol design: framing, state machines, buffers & timing on bare metal
- Proved that connected embedded systems are possible before IoT was a mainstream term

Protocol Stack (RFC-Driven)

Every layer implemented in firmware — memory-budgeted for 4 KB total RAM



From Scratch | RFC-Driven | 4 KB RAM | 8/16-bit MCU | Handheld Dev | Bare Metal

Additional Achievements

Telecom · Research · Legacy enterprise systems

DLC over SDH Fiber

Digital Loop Carrier V5.1 over SDH — MIC Electronics telecom access

Digital Excitation Controller

Regulates a synchronous generator's output by adjusting the DC current to its rotor

IGL Spot Billing

Indraprastha Gas — Billing Software SAP integration & online payments

Indian EVM Research

Co-author: Security Analysis of India's Electronic Voting Machines

Product Certifications & Compliance

Hands-on certification audits & liaison with government agencies — products cleared for Indian market entry

Experience across telecom, electronics, wireless & safety compliance | Audit support | Documentation & test coordination

MTCTE

Mandatory Testing & Certification of Telecom Equipment (DoT)

Trusted Source / Trusted Product

Govt. trusted product & source validation pathways

TEC GR / TEC IR

Telecom Engineering Centre — Generic Requirements

BIS CRS

Bureau of Indian Standards — Compulsory Registration Scheme

WPC ETA

Wireless Planning & Coordination — Equipment Type Approval

ITSAR / NCCS

Indian telecom security assurance & NCCS frameworks

TEC QM-333 / TEC 14016

Environmental testing - QM-333 & TEC 14016 standards

Safety Testing

Product safety validation for certified market entry

EMC / EMI Testing

Electromagnetic compatibility & interference compliance

TSEC (BSNL)

BSNL Telecom Security Certification

Import Compliance

Import licensing, customs & regulatory clearance support

CE/FCC Reports

Supporting Test Reports

AI-Native Engineering — Aggressive Adoption, Enterprise Results

AI workflows are embedded in daily delivery — not experiments. Production systems across 13+ live platforms.

Spec to code · architecture to docs · live debug · rapid MVP — measurable velocity without sacrificing compliance

3-5×
Faster spec-to-code on govt API & integration projects

60-70%
Less manual time on architecture docs & endpoint manuals

Hours
Not days — AI-assisted debug on live integration issues

2-4 weeks
MVP / pilot delivery vs traditional 8-12 week cycles

Requirements → Code

Government PDF API guides & client specs translated into production PHP/MySQL — OAuth, queues, audit logs & portal modules shipped aggressively

Architecture → Documentation

System design, endpoint manuals, vendor docs & operational runbooks generated alongside code — documentation keeps pace with delivery

Rapid MVP Development

Pilot platforms & product features from idea to working demo in weeks — WorkPro modules, yagati.com, myPC myRight & client portals

AI-Assisted Debugging

Payload validation, log triage & iterative resolution during live HNGPL, Sujala & multi-vendor integration projects — faster root-cause closure

Daily AI Workflow | 13+ Live Platforms | Govt API Delivery | Spec → Production | Audit-Ready Code | MVP in Weeks

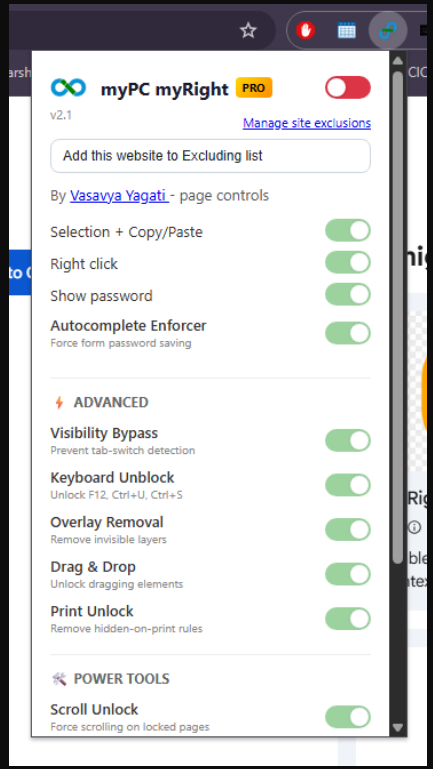
myPC myRight - Open-Source Chrome Extension

User-control browser extension · Published on Chrome Web Store · v2.1

Take back copy, paste, selection & right-click on websites that block them — privacy by design

Core Features

- Force copy, paste & text selection on restrictive websites
- Restore right-click and the normal context menu
- Optional password visibility while hovering or editing
- Master ON/OFF toggle with per-site exclusion list
- Privacy-first: no accounts, analytics, or data collection
- Open source on GitHub — Public & Pro editions (v2.1)



Open Source | Chrome Web Store | No Tracking | Local-Only Logic | MV3 Extension

Yagati.com — Family Social Portal

AI-Assisted

Hobby project · Private family connect · yagati.com

Help my family stay close — feeds, milestones, greetings & alerts in one self-hosted platform

Platform Features

- Family feeds, greetings & announcements
- Birthday & anniversary tracking with timely SMS and email alerts
- Interactive family tree — hierarchy, lineage & relationships
- Member-managed biodata — profiles, photos & personal history
- Shared photo gallery & event milestones in one private portal
- Self-service login — members update their own data securely
- Built end-to-end as a hobby with AI-assisted PHP development

PHP

Self-Hosted

SMS / Email

Family Tree

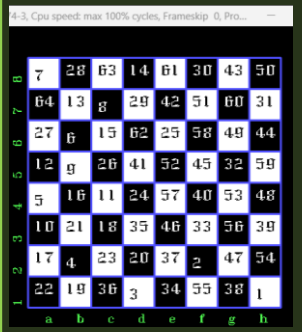
Member Portal

Hobbyist Roots — Logic & Graphics (1996–97)

Built as a hobby in school/college — C, C++, and QBasic with BGI graphics

Early grip on algorithms, backtracking, combinatorics, OOP, and trigonometry

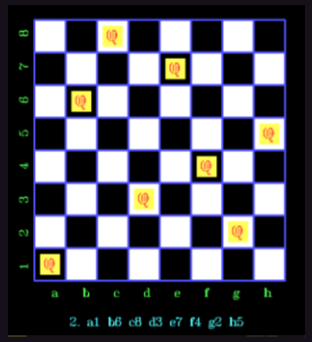
Foundation before embedded firmware and enterprise platforms — logic, coordinate geometry, and real-time graphics under DOS.



Knight's Tour

KNIGHT.C · Turbo C · BGI graphics

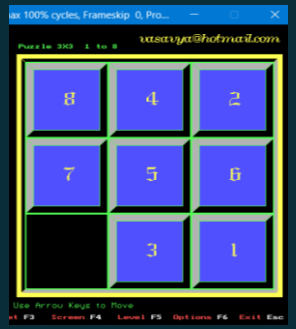
Finds a knight's tour — 64 L-shaped moves visiting every square once. Backtracking from your start square (a1–h8). Animated board; solutions cached to KNIGHT.RSL.



Eight Queens

QUEEN.C · Turbo C · BGI graphics

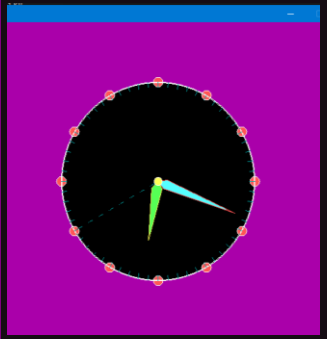
N-Queens solver: 8 queens with no row, column, or diagonal conflict. Enumerates all 92 valid layouts; step through each on an animated chessboard.



Puzzle Game

PUZZLE.CPP · Turbo C++ 3.2 · C++ OOP

Sliding-tile N-puzzle from 3×3 to 10×10. Eight target patterns, dual-screen play, high scores & sequential level-up. BGI UI, sound, timers & PUZZLE.INI save.



Analogue Clock

CLOCK1.BAS · QBasic · SCREEN 12

Live clock from system TIME$. Sin/cos polar math for 60 ticks, 12 hour dots & filled triangle hands. Smooth hour/minute carry; erase & redraw each second.

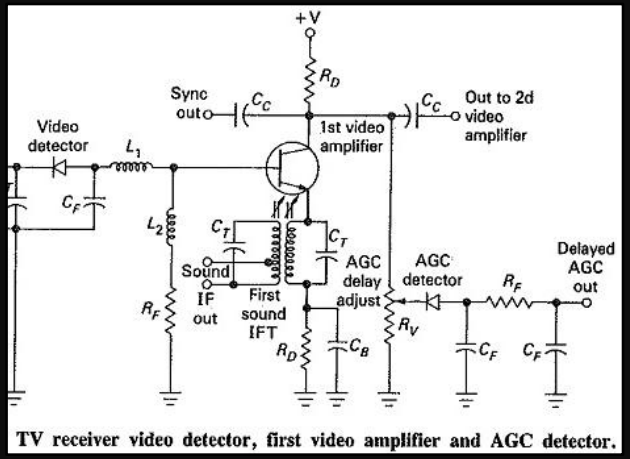
Early Engineering (1992) — TV Repair & IC Substitution

Student days · Analog hardware · Discrete-component design

When a damaged IF + video-driver IC could not be sourced, I rebuilt the entire stage from discrete parts

The Achievement

- During studies, I routinely repaired televisions — hands-on analog & RF
- One TV failed: a multi-function IC with built-in IF stage and video driver was damaged
- The exact IC was unavailable in the market — no direct replacement to source
- Reverse-engineered the functional blocks: IF input, video detector, 1st video amp & AGC
- Designed an equivalent circuit using discrete transistors, diodes, passives & IFT stages
- Built and wired on a general-purpose PCB; integrated into the TV chassis
- Result: TV restored to full working picture — custom substitute for an obsolete IC



TV receiver video detector, first video amplifier and AGC detector.

TV IF → video detector → 1st video amplifier & AGC (discrete equivalent design)

TV Repair | Discrete IC | IF Stage | Video Driver | GP PCB | Make It Work

Foundation: analog problem-solving before embedded firmware — read the circuit, design the substitute, ship a working repair

College Days — Experiments & Achievements (1994)

Custom hardware, handmade PCBs & embedded programming — built before enterprise platforms

Sense · decide · act · communicate — the same embedded mindset behind today's IoT systems

Automatic Water Tank Controller

Home automation · Level sensing · Motor control

- Live water-tank level display on the built-in screen
- Doubles as a digital wall clock at home when not pumping
- Motor switches ON when level reaches the reserve threshold
- Motor switches OFF automatically when tank is full
- Three modes — Auto, Time-Based & Manual
- Designed end-to-end: schematic, handmade PCB & firmware

RF Transceiver — HAM Radio

Amateur radio · Long-range RF design

Custom RF transceiver designed and built for HAM radio hobby

Complete hardware: RF stages, control logic & field-ready assembly

Long-distance amateur communication from home station

Successfully contacted fellow hobbyists in Sri Lanka

Hands-on RF engineering — antenna, tuning & real-world range

Handmade PCB | Embedded FW | Tank Automation | HAM Radio | RF Design | College Build | Field Proven

Building Technology Ecosystems, Not Just Software

1 Discovery Call

2 Architecture Review

3 Pilot Delivery

4 Production Rollout

Vasavya Yagati · Founder & Managing Director · Spoorthy Innovations Pvt Ltd

vasavya@spoorthy.org · Hyderabad, India · spoorthy.net · linkedin.com/in/vasavya

Ver 3.0