# Building the IT Function at Physical Control Center Inc.: A Founding CTO's Account

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August 17, 2026

## Introduction

I joined Physical Control Center Inc. (PCC) as an engineer in March 2024, at an early stage in the company's growth. I was responsible for the IT function, covering application development, cloud and data infrastructure, data analytics, IT strategy, and operational design. As my responsibilities expanded, I went on to serve as CTO.

This document traces the development of PCC's IT foundation over time and provides an overview of the technologies used across its applications, data platforms, infrastructure, and operations.

The factual statements in this document have been reviewed by Ryosuke Nakagawa, the company's Executive Vice President and Director, and the version dated August 17, 2026 has been approved for publication by PCC. Some technical details have been omitted for confidentiality and security reasons. The views and interpretations expressed here are my own.

## About PCC

PCC provides meal services and nutrition support primarily for youth athletes. Beyond daily meal provision, PCC collects and analyzes data on dietary intake, body composition, wellness, training, and physical performance to inform feedback for individuals and teams.

For more information, please visit the official website.

## From a Sole Engineer to an Established IT Function

When I joined PCC, the company had no internal IT function, and everything had to be built from scratch—from digitizing existing operations to establishing the technical foundation for future growth.

Until November 2025, I was PCC's sole engineer. Initially, I collaborated with on-site managers and staff to build systems for existing workflows such as reservations and procurement. In parallel, I worked with the executive team to define what data PCC should collect, which applications it should deploy, and what infrastructure would be required to support the company's growth. Together, we developed a concrete IT strategy from these discussions, with me providing technical guidance on priorities and direction.

I then designed and implemented the systems and infrastructure needed to execute this strategy, including web applications, data collection workflows, analytics pipelines, cloud infrastructure, private

networks, and VPNs. I was also responsible for designing operational processes and deploying these systems at each site, ensuring that these technologies were adopted and integrated into day-to-day operations.

As small data analytics and application development teams began to form, my role expanded to include team leadership and technical oversight. In that role, I set technical direction, led system design, reviewed implementations, and continued to contribute directly to development and deployment.

## Applications for Real-World Operations

### Shared Application Foundation

- Shared identity and access foundation [OpenID Connect]
  - Centralized management of organizational structures, permission models, and access policies
- Containerized application runtime [Docker, Docker Compose]
- Source control and CI/CD [GitHub]

*Representative technologies are shown in brackets.*

### Tools for Internal Teams

- Internal dashboard application [Next.js/React, PostgreSQL]
  - Provides a unified access platform to previously scattered operational manuals, reference materials, and internal applications
- Procurement workflow automation application [Next.js/React, Go, PostgreSQL, Azure OCR, LLMs, OpenAPI]
  - Uses OCR and role-specific LLM agents to reduce manual work such as reading and transcribing documents
  - Retains human review for tasks requiring judgment or correction
- Automated document filing application [LLMs, Python, Cloud Storage API]
  - Automatically classifies and files documents, reducing the staff time spent on document storage and retrieval
- Hygiene management application [Next.js/React, PostgreSQL]
  - Replaces paper-based hygiene inspections with web forms
  - Centralizes records for storage and retrieval

Together, these applications have digitized and automated manual workflows, made records easier to store and retrieve, and reduced the time required for both on-site and administrative work.

### Applications for Athletes and Teams

- Meal and wellness tracker [Next.js/React, PostgreSQL]
  - Tracks daily meal intake, physical condition, and training intensity
  - Makes daily check-ins quick and simple for athletes
- Meal leftover analysis tool [Next.js/React, LLMs, Computer Vision]
  - Tracks each athlete's meal leftovers over time

    - Helps staff identify individual intake patterns and adjust menus accordingly
- Reservation management system

## Data Infrastructure and Analytics

### Data Collection and Integration

- Lifestyle and wellness data (Collection: Custom applications; Frequency: Daily)
    - Caloric intake, sleep duration, fatigue by body region, training volume, and meal completion and leftover rates
- Body composition data (Collection: Body composition analyzers; Frequency: Periodic)
    - Weight, BMI, body fat, muscle mass, segmental muscle and fat mass, body water, basal metabolic rate, and other measurements
    - More than 100 measurement and assessment variables
- Meal and nutrition data (Collection: Menu data; Frequency: Daily)
    - Energy, macronutrients, vitamins, minerals, fatty acids, dietary fiber, salt equivalent, and other nutritional values
    - 45 nutritional variables
- Physical performance data (Collection: Testing; Frequency: Periodic)
    - 3,000-meter run, bench press, squat, countermovement jump (CMJ), and other assessments
- ELT data pipeline [Python, PostgreSQL]
    - Consolidates data from multiple sources into an integrated database
    - Transforms the collected data into datasets for analysis and reporting
    - Automatically stores generated reports in cloud storage

Data collected from multiple client organizations and teams is integrated at the individual-athlete level to support continuous analysis and feedback.

### Turning Data into Action

- Analytics and visualization platform [Next.js/React, PostgreSQL]
    - Provides analytical views of aggregated daily records and body measurement data
    - Supports period-over-period comparisons, athlete overviews, and individual reports
- Data analysis [Python: scikit-learn, SciPy, Seaborn]
    - Longitudinal analysis tracking changes within individual athletes
    - Comparisons across athlete groups, sports, teams, and ages
    - Clustering and regression analysis to examine group characteristics and relationships among variables
- Feedback and collaboration
    - Sharing and reviewing findings with client teams
    - Joint interpretation with nutritionists, coaches, and on-site staff
    - Collaboration with universities and research institutions

The analysis spans multiple years of data from hundreds of athletes, covering dietary intake, body composition, wellness, training, and physical performance testing. Across sports such as baseball,

soccer, and rugby, it examines longitudinal changes within individual athletes, differences among athlete groups, and patterns across teams.

More specifically, the analysis explores relationships between dietary intake and changes in muscle mass, between training patterns by body region and changes in body composition and athletic performance, and common characteristics among athletes who later compete at the professional level.

The findings are not presented as evidence of causation. Instead, they are interpreted jointly with nutritionists, coaches, on-site staff, and client teams. The resulting insights inform feedback to athletes and teams, refinements to athlete support strategies, menu improvements based on meal completion and leftover data, and ongoing improvements to PCC's IT strategy and services.

## Cloud Infrastructure, Security, and Reliability

**Current implementation details are not disclosed for security reasons.*

- Cloud infrastructure [AWS, GCP]
  - Designed and operated cloud infrastructure for PCC's applications and data systems
  - Managed cloud configuration as code, making changes reproducible and reviewable [Terraform]
- Databases [PostgreSQL]
  - Designed databases and data models
  - Maintained a separate data store for authentication data
  - Integrated external storage, APIs, and internal notification systems
- Networking and security
  - Separated the DMZ from private networks
  - Designed and operated DNS, load balancers, reverse proxies, NAT, and VPNs
- Monitoring and backups [Amazon CloudWatch, AWS CloudTrail]
  - Set up monitoring, alerts, and audit logs
  - Designed database backup processes

## Operational Design and Field Adoption

- Operational workflows and on-site movement designed around meal pickup and data recording
- Development and operational procedures, including checklists, for engineer onboarding and offboarding
- Integration of existing processes, such as procurement and hygiene management, into application workflows

For systems that depend on daily input from teams and athletes, the burden of data entry can become a barrier to continued use. To address this, we analyze real-world operations and apply low-friction UX as a design principle, minimizing input effort and pursuing zero-input data collection.

In practice, the system sometimes has to rely on a facility's existing Wi-Fi network. At schools in particular, UDP traffic may be restricted, and network extenders may be required. Addressing these constraints may require each deployment to be adapted to the site's network environment, involving firewall changes or other site-specific configuration, in coordination with on-site and facility staff.

### Technical Leadership

- Strategy and governance
  - Defined data strategy to support business growth
  - Evaluated application and infrastructure priorities, trade-offs, and costs
  - Designed organizational and access-control models that incorporated privacy requirements
  - Worked with the executive team to set technical priorities and make ongoing decisions
- Cross-functional collaboration
  - Reviewed requirements and operational workflows with nutritionists, managers, and on-site staff
  - Helped incorporate analytical findings into sales materials and client communications
  - Established rules for removing personally identifiable information based on how the data would be used

## Conclusion

When I joined PCC, the company had no dedicated IT function. As its sole engineer, I worked with on-site staff to understand their operational needs and constraints, then designed, built, and deployed the applications, data systems, infrastructure, and security controls required at each site. As the team grew, I became responsible for its technical direction and system design while remaining hands-on in development and deployment.

Through this experience, I developed the ability to translate ambiguous business needs into clear technical requirements, make technical decisions with stakeholders, and turn those decisions into systems used in day-to-day operations. Working alongside colleagues with expertise in different areas broadened my perspective and sharpened my technical judgment. Looking ahead, I hope PCC continues to build on what we established and move beyond it, evolving its technology and engineering practices to better support its services, operations, and work with athletes.

## Acknowledgments

I am deeply grateful to everyone within and beyond PCC whose collaboration made the work described here possible. I would also like to thank Ryosuke Nakagawa, PCC's Executive Vice President and Director, for reviewing this document, and PCC for authorizing its publication.