Tracking Attendance and Assets using RFID Technology and Embedded Database Systems in Education

Plurilogic

Business

Integrated solutions for K-12 and higher education institutions

Challenge

Automate and accurately track students and school assets to bolster security, reduce theft, and improve operational efficiency and attendance-based reimbursements

Solution

Extend the Plurilogic Integrated School Management platform to support campus-wide, classroom, and mobile capture, and tracking for RF-ID badging (students) and tags (assets)

Outcomes

Bolster student security

Improve parent satisfaction (K-12)

Reduce school asset losses

Improve billing accuracy for paid-attendance classes

Increase attendance-based reimbursements

"With Actian Zen data management products, we've been able to extend our integrated solutions in the classroom and across campuses to better track and manage students and institutional assets, extending our capabilities to IoT and mobile devices."

- André Beauchamp, CEO, Plurilogic

About Plurilogic

Established in 1983 in Laval, Québec, Plurilogic is a leading private education SIS (School Information System) provider in the province of Quebec in Canada. Plurilogic delivers products and services to a range of private and public education institutions from remote village primary and secondary schools to urban college campuses in Montreal. Plurilogic provides integrated systems to support administrative functions (admissions, student records, library management, financial management, etc.), classroom management, exams, curriculum delivery, and other ancillary functions such as learning and content management, after school activities, daycare, cafeteria, asset management and comprehensive reporting and analytics solutions.

Challenge

Tracking students and school assets can be a time-consuming, manual process that is often an unwelcomed but necessary part of school administrators, teachers, custodial, parental and student routines. For example, in many child daycare facilities, administrators use paper lists to track student attendance and movement of students from one activity to another. Paper lists can be lost and are difficult to manage when dealing with last minute changes in activity schedules and sporadic attendance of students to daycare services. In other cases, attendance is limited to classrooms and does not extend to daily bus routes let alone school excursions.

Whether it's a private or public educational institution, tracking where students are is vital from a safety and - in most cases - an operational budget standpoint as schools must either charge parents or request reimbursement from governmental organizations based on attendance rolls. Asset tracking can also be critical, text books can be out of print, capital assets not always insured for full value, and the time to replace mid-term often impacts the quality of education delivered.

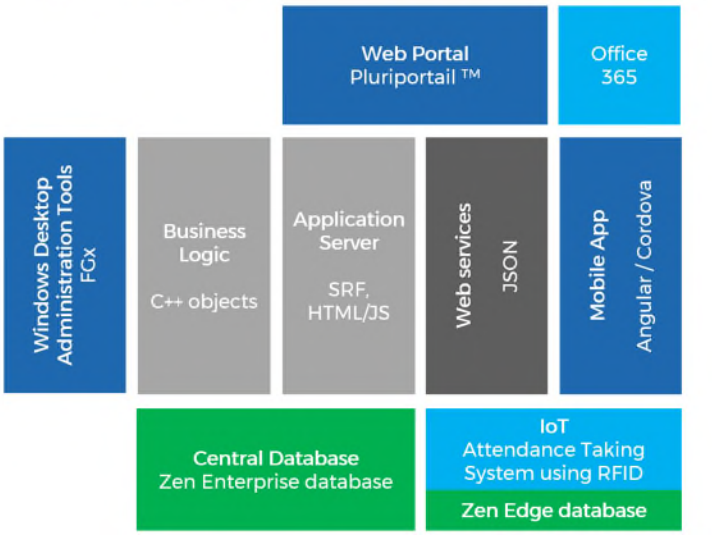
Many schools and school districts have employed barcode scanning, but solutions based on this approach can be slow, may still require manual intervention, and do a poor job of handling distributed attendance scanning locations. A key critical requirement remains unaddressed with barcode approaches: Accurately taking attendance, particularly if connectivity to the centralized school server is not available or sporadic.

Solution

Plurilogic has implemented an RFID-based solution for automated student and asset tracking for primary and secondary schools to surveil and control school entry and departure, automate attendance taking for classes, daycare, and after-school activities and manage library and textbook checkout and return. Additionally, the RFID solution is used to monitor location and use of everything from smart classroom displays and projectors to IT equipment.

Plurilogic selected an RFID-based solution because there's no line-of-sight requirements for scanning, RFID tags offer high durability, are reusable, inexpensive and can be integrated into Student IDs worn as badges or bracelets or tags affixed to equipment. They also have inherent security as they are difficult to clone (unique IDs are preserved). Also, the infrastructure for RFID tags is inexpensive, consisting of a reader that can be connected to small form-factor low-cost platforms such as Raspberry Pi with a range of a few feet. This is adequate for most classrooms and labs or they can be deployed in small lots across libraries, cafeterias, and other larger spaces.

The Plurilogic Platform Architecture



Plurilogic combined RFID readers on Raspberry Pi devices, running Windows 10 IoT and the Actian Zen Edge database to locally store Student or Asset ID, Parent or Asset Owner ID, Course ID, a time stamp, and the location of the reader (which local device in which room, building, campus, etc.). The information (or changes to it in the case of assets) are periodically sent over local Wi-Fi to a centralized database, the Actian Zen Enterprise database running on a Windows Server and exposed as RFID web services. The web services are then leveraged by asset management, attendance tracking or other modules within the Pluriportail ™ centralized student information system.

Why Actian Zen?

Plurilogic had been using prior versions of Actian Zen Enterprise (PSQL) as the underlying data management system and was looking for a local data management solution to run in non-server constrained environments. Plurilogic initially selected SQLite, but shifted their development midstream over to Actian Zen Edge database for Windows IoT core because it offered them several key advantages including:

- NoSQL API calls for inline data management from C++ (Zen also supports Java and interpreted languages including Python and JavaScript) as well as reporting and query with SQL.
- The ability to run a single data management platform across both remote back-end and local front-end systems.
- Avoidance of any need to decrypt and re-encrypt data to perform ETL operations between SQLite and Zen (analogous to what most client-server data management systems do between SQLite and MS SQL).
- Ability to extend their RFID Services code to mobile devices – again without ETL – for iOS and Android through use of Zen Core database for Android and iOS.
- Developer-side configuration and other set-and-forget features (auto-reconnect and synchronization of remote central data to local data, auto-defragmentation to avoid system crashes or other faults, etc.) that ensure the data management is hidden from end-users or the Educational institution's IT staff.
- OEM support model and track record dating back to the starting point for both companies.

www.actian.com | **Toll Free** +1 888 446 4737 | **Tel** +1 650 587 5500 2300 Geng Rd., Suite 150, Palo Alto, CA 94303