
# *Open Source POS System Evaluation*

**Version 1**

Prepared for Karma Co-op by Freeform Solutions
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## Executive Summary

Karma Co-op has been investigating a move from a cash register and paper-based checkout system, to an electronic point of sale (POS) system. As part of the investigation, Karma engaged Freeform Solutions[1] to evaluate the technical aspects of this move, evaluate some candidate software platforms in particular, and also to provide estimates of some of the costs involved.

This report examines Karma's requirements first, and then examines some candidate software platforms in light of those requirements. Karma staff and volunteers had already narrowed the choice of candidate software platforms to a few front-runners, so that greatly streamlined the evaluation process. In our analysis, one platform, Openbravo POS, stood out from the others because of its ease of use, comprehensive features, and strong backing by a large company.

We estimate the cost for the hardware and software required to setup two checkout lanes at approximately $6530-$13830. In addition, there would be development and/or consulting costs involved in helping Karma learn to use the POS software and adapt it to fit their business processes, and also in meeting some of the other specific requirements that Karma has, as a membership oriented food co-op. Options for addressing these requirements are discussed below.

## Karma Requirements

Karma prepared a lengthy list of requirements as part of its own work on this assessment. These requirements are included as Appendix A. For the purposes of evaluating software systems, the most important areas to address, in order of significance to Karma, are:

- **Point of Sale Processes**: e.g. processing sales, price retrieval, logging transactions, etc
- **Inventory Processes**: e.g. tracking stock figures, triggering re-order activities, etc
- **Reporting Processes**: e.g. analyzing sales & stock in terms of volumes, popularity, etc
- **Membership Tracking Processes**: e.g. Updating a member's details, tracking a member's volunteer hours, recording membership dues, checking membership status, etc
- **Accounting Processes**: e.g. recording sales and premiums paid, recording membership dues, etc

Better visibility over inventory, is a primary goal for Karma in moving to a POS system. This makes the first three items of key importance. Membership tracking is an important process, since shoppers at the store must fulfill certain obligations of membership, but those could be integrated into how the POS system is used, through processes and procedures, and not necessarily technical means. With regard to accounting, Karma does

[1] Freeform Solutions is a not-for-profit organization with a mission to help other not-for-profits and public sector agencies use technology more effectively.

currently carry out some accounting processes in the Quickbooks software package, so as long as the necessary information to keep Quickbooks up to date is easily available from the POS system's reports, accounting processes could continue in their current form if necessary.

When assessing different software platforms, the important thing is weighing the relative degree to which each platform addresses these requirements, taking into account which requirements are the most important. Accordingly, POS capabilities were given the most weight and examined the most thoroughly.

## Open Source

Karma has made a conscious decision to focus on open source software offerings. There are several reasons:

- Open source is philosophically aligned with the goals of Karma as a cooperative
- Open source software has no licensing cost and no limitations on how it can be used
- Open source software is more flexible and adaptable than closed source software
- Open source software is more likely to use standard data storage formats, eliminating that aspect of vendor lock-in

Open source is an approach to developing software. It is not another name for free software, and it is not a special kind of software. It is software like any other, except it has been developed using a different approach from most of the software you can buy in a store.

What makes this approach different, is that the source code for the software, the underlying instructions that the computer uses to run the software, are made freely available along with the software itself. Plus, users are permitted to redistribute the software and source code to others at no charge.

The intention is that users of the software will be able to make changes and improvements to the source code, or will be able to hire programmers to do so for them, and these changes and improvements will be shared with the rest of the community of users of the software. When a large enough community of users participates in an open source project, the effect is that everyone can develop the parts of the software that matter to them, and no one has to develop the entire piece of software from the ground up.

This is a very cost effective way to develop software, since no one is burdened with financing the entire development effort. Everyone benefits from the free availability of source code created by others, and the only costs are the costs involved in specific customizations or improvements that a particular user needs to make.

This is also a very efficient way to develop software, because the contributions of a wide range of users can be captured to improve the software; it's not just the programmers working at one company that have to do all the work. Bugs – errors in the source code – can also be found and fixed easily in this model, because all users can participate in the development process, and anyone and everyone has a chance to examine the source code to correct errors.

## *Philosophical Alignment*

There are obvious parallels between the open source philosophy of software development, and the cooperative movement. This makes open source software particularly attractive to Karma, as a means of meeting the more abstract goals of its mission.

## *No Licensing Fees*

The free availability of open source software is a financial incentive, though it must be understood that the setup, customization and enhancements to open source software do have costs. Also, like any piece of software, ongoing support and maintenance costs must be factored in. Skilled staff or volunteers at Karma can provide ongoing support and maintenance, and/or an organization like Freeform Solutions can provide that service. For more information about support issues and open source software, you can consult a recently published article by Freeform Solutions on this topic:

"Supporting Not-for-Profits: an Opportunity for the Commons"
http://www.osbr.ca/ojs/index.php/osbr/article/view/403/364

## *Flexible and Adaptable*

The free availability of the source code, makes open source software inherently more flexible and adaptable than closed source alternatives. Although closed source software is often more polished than open source software, it is not always more stable, and it certainly does not necessarily have less bugs. Users of closed source software are limited to whatever fixes the original vendor chooses to make, and must live with whatever shortcomings are left. With open source software, users always have the option of going to the source code and making changes or fixes themselves, or hiring others to do so.

The availability of the source code also makes it much easier to integrate different open source systems, and to customize the behaviour of systems to tailor them to specific business processes. This makes open source software particularly attractive as an option for complex systems like POS and accounting and reporting functions, which usually involve their fair share of specific processes, unique to each organization.

## *Open Standards*

Lastly, at a technical level, open source software is built on open standards, which are publicly known methods of accessing, sharing, using and storing information. This is to be contrasted to closed standards, such as the Microsoft Word .doc file format, which was, until recently, only fully known by Microsoft. Closed standards do not allow other

pieces of software to make use of them. This makes interoperability and data exchange very difficult, if not impossible. Using open source software means there are fewer limits on what other pieces of software you can effectively draw into your IT ecosystem, and it ensures your data is not locked into a specific piece of software, making it otherwise inaccessible.

## System Architecture

Regardless of the particular software platform to be used, the general architecture of the POS system at Karma will be a client-server LAN within the store, where each checkout lane operates as a client computer connected to a server that stores the database of products and prices, and records the transactions.

Our recommendation is that the checkout lanes use local software that connects to the server only as necessary to log information to the database. This is to be contrasted with web-based or thin client architectures, where the server computer processes all operations, and the checkout lanes would simply be displaying the current state of information on the server. The reason for this recommendation is that local software has a much faster response time than web-based or thin client architectures, even when the server is on the same LAN. In general, it would seem unwise to tie the performance of all lanes to the capabilities of the server; instead each lane should operate as autonomously as possible.

This architecture implies certain facts about the eventual deployed system:

- The system will involve at minimum three computers
- The system will require a wired network operating between the lanes and the server (wireless networks present security issues that can be sidestepped by using a wired network)
- The POS software should be local, “desktop” software if possible, not web-based or thin client

## Candidate Systems

Two main candidates were identified by Karma: Openbravo POS and Ledger-SMB. Also, IS4C was an interesting third option that was recommended, though not as strongly as the first two. All three are open source software projects.

Here is a chart outlining the characteristics and features of the different systems. For this evaluation, only the POS component of all three systems was examined in enough detail to provide a relative rating. However, the general information about additional components is useful for comparing the systems against the established requirements of Karma.

| | Openbravo POS | Ledger-SMB | IS4C |
|---|---|---|---|
| **Programming language:** | Java | Perl | PHP |
| **Architecture:** | Local client, database server | Web-based | Local client, database server |
| **Primary maintainer:** | Openbravo, a Spanish-based ERP and POS vendor | Dieter Simader | Wedge Coop, Minneapolis |
| **Ease of setup/use:** | Excellent | OK | Poor |
| **POS component** | Excellent | OK | Excellent |
| **Inventory tracking** | Yes | Yes | Not built in |
| **Reporting** | Yes, plus it can be integrated natively with Openbravo ERP | Yes | Not built in |
| **Membership management:** | Customer tracking, but no membership features in the food co-op sense. | Not built in | Not built in |
| **Accounting features:** | Yes | Yes | Not built in |

## *Openbravo POS – the preferred solution*

From the above comparison, it should be clear that Openbravo POS comes the closest of the three candidates to satisfying the various needs that Karma has identified. Openbravo POS also has the preferred architectural design. Perhaps most importantly, Openbravo has a large software vendor behind it, with millions of investment dollars sunk into promoting, support and developing Openbravo POS and their flagship product, Openbravo ERP. It is of critical importance to have a strong development community, and/or a commercial developer, behind an open source project.

Openbravo POS uses a MySQL database on the server computer to track all data in the system, including products, inventory, transactions, customers, etc. Each checkout lane runs a local Java application that is connected to the database.

Openbravo POS is fully compatible with all the necessary hardware, including touchscreens, receipt printers, customer displays, barcode scanners, scales, etc.

On the POS basis alone, we feel that Openbravo POS beats out Ledger-SMB: Openbravo POS is designed for use with touchscreens, and it runs locally on the lane, whereas Ledger-SMB is a web-based application, with known performance issues in some POS situations, and it does not work well with touchscreens.

When compared to IS4C, which also has very strong POS capability, Openbravo POS also comes out ahead, due to the phenomenally better ease of use, and the greater support for other activities, including the possibility of integration with a full-blown open source ERP solution.

### *Openbravo POS – potential shortcomings*

The one area where Openbravo POS does not meet minimum requirements is in the area of membership management. There are no built in features as part of the checkout process, to handle situations like non-working member surcharges, or membership renewals, etc.

However, Openbravo POS does have a built in customer list. It seems feasible to integrate the customer list with the actual POS processes, including adding custom buttons to the screen for special actions like surcharges and renewals. This would, however, be additional development work on the software beyond the initial setup and configuration time (see below for full estimates).

Alternatively, Karma may wish to create a separate system for managing membership information. There has been some concern, on a privacy basis, about the possibility of all transaction information being directly related to membership information in the database, and thereby facilitating reports of individual member's purchase histories. A separate lookup system could be developed for checking membership information, and cashiers could then simply use custom buttons added to the Openbravo POS touchscreen to activate the appropriate charges or discounts.

## Cost Estimates

There are several costs associated with the setup of a POS system, even when freely available open source software is used. Here is a table with rough estimates of the costs involved.

Labour costs may vary up or down depending on the exact hardware used, and the precise complexity of the setup tasks; Freeform Solutions does not have direct prior experience setting up computer systems in this exact situation.

Labour costs have been estimated based on Freeform Solutions' hourly rate of $60 (GST not included).

| | Cost estimate | Notes |
|---|---|---|
| **Computer Systems…** | | |
| **Computer for operating one lane:** | $500 - $1000 | Exact price depends on components chosen. Linux operating system recommended. |
| **POS software:** | $0 | Open source! |
| **Labour configuring POS hardware and software:** | $960 | We have estimated approximately two days of work configuring and testing hardware and software. |
| **Scanner or scanner-scale:** | $150-$2000+ | Depends on the exact model chosen. Hand scanners are very cheap. Good scanner-scales are not. |
| **Cash drawer:** | $0-$300 | Depends if the existing cash drawers can be reused, or exact model chosen if not. |
| **Touchscreen:** | $500-$650 | Can come with an integrated card swiper. |
| **Customer display:** | $200-$300 | Depends on the exact model chosen. |
| **Receipt printer:** | $0-$400 | Depends if the existing printers can be reused, or exact model chosen if not. |
| **Subtotal for one lane:** | $2310-$5610 | |
| **Total for two lanes:** | $4620-$11220 | |
| **Server computer for operating the database:** | $800-$1200 | It needs to be a bit higher grade than the checkout lane computers. Again, Linux operating system recommended. |
| **Database software:** | $0 | Open source! |
| **LAN equipment:** | $150-$450 | Cables, hubs, maybe an internet connection and router, if remote access is needed, etc. |
| **Labour configuring server and LAN:** | $960 | We have estimated approximately two days of work configuring and testing hardware and software. |

| | | |
|---|---|---|
| **Subtotal for server:** | $1910-$2610 | |
| **Subtotal for all computer systems:** | $6530-$13830 | Around $10,000 is a fair guess, since scanner-scales are highly recommended. |
| **Consulting, development and training services…** | | |
| **Consultation with Karma about exact business processes, designing modifications to the POS software, and devising proper usage patterns for the POS software:** | $14400 | This is the biggest unknown component of the entire project. We have suggested the equivalent of one person full time for six weeks.<br><br>Every piece of software has certain ways of working, "out of the box." Those may or may not be truly appropriate for Karma's needs. A system that does reporting almost certainly will not report on everything in exactly the way that the existing business processes demand it be reported on.<br><br>This is where the real benefit – and cost – of experienced consultants enters the equation. Good IT consultants will work with you to determine exactly how your precise needs intersect with the capabilities of the software, and how best to use the software to meet those needs.<br><br>The exact time spent on this task can vary, depending on the extent to which Karma is willing to live with the way reporting, and other actions, are done "out of the box." Also, Karma staff or volunteers may be able to shoulder some of this work, and reduce the workload for outside consultants in this area. |
| **Customization and development work on the POS software:** | $9600 | Actual development work on software is one of the most time consuming activities in any project. In this case, there may be development work required on the customer/membership management capabilities of the software, or other as-yet unidentified areas.<br><br>We have made a general estimate for four weeks of development work by one person, since there appears to be only the one major area that requires customization. This estimate may be revised based on what is learned in the consultation process. |

| | | |
|---|---|---|
| **Training staff:** | $2400 | The estimate here is based on preparation and delivery time for three days of training with all staff and volunteers, including specialized training for managers and others with special roles.<br><br>It is possible that general training could be carried out by Karma staff who had been previously trained during shorter, more intensive sessions. |
| **Total for consulting, development and training:** | $26400 | |
| **Grand Total:** | $32930-$40230 | |

## *Other costs*

In addition to costs associated with setting up the software and putting in place the systems and processes for using it, there will be ongoing maintenance required, as well as additional one-time and ongoing operational tasks required in the store.

Karma staff and/or volunteers may be able to provide maintenance, or an outside organization like Freeform Solutions could provide maintenance. In general, for a mission critical, complex piece of software like this POS system, it would be normal to expect $500 to $1000+ in support costs for the first few months. This could trail off to only a few hundred dollars a month or less after that if everything works smoothly.

Besides system maintenance, there are other tasks in the store that someone must carry out, such as maintaining the price tags on shelves, since individual items are no longer tagged with prices.

Also, there will be one time costs in staff time associated with populating the database of the POS system with all the products and prices, and membership information.

## Recommendation

An examination of the available software solutions has shown that the technology exists for robust POS solutions based on open source software. The opportunity presented through a possible integration of Openbravo POS with Openbravo ERP is very compelling. When combined with the ease of setup and use found in the Openbravo POS software by itself, this project becomes very interesting and exciting from an IT consulting point of view. This is an opportunity for advanced IT systems to truly have an impact on the operations of a not-for-profit organization. It is up to Karma Co-op to determine whether the cost-benefit case is there, and whether there will be sufficient return on the investment.

Improved accuracy at checkout will result in a small marginal increase in sales. The more noticeable effect day-to-day would be in better inventory tracking, and more systematization of processes within the store, not to mention better access to reports and information, compared to the paper-based system in place now. If embraced by all levels of staff as an opportunity to improve processes, this project could be truly transformative.

# Appendix A – Karma's Requirements List

## Costs

## Purchase Costs - Basic

- Checkout Terminals (2 lanes)
- PC or thin client
- Keyboard (programmable or regular)
- Cashier monitor
- Receipt printer (existence of journal tape printer depends on system)
- Cash drawer(s)
- Cash trays
- Scanner/scales (in-counter, scale integrated)
- Scale
- Display pole
- Network cabling

### *System network*

- Server
- Operating system
- Network hub

### *Back office*

- Terminal
- Screen
- Printer

## Purchase Costs - Extended

- Additional terminal (Receiving)
- Operating system
- Terminal
- Screen
- Hand held scanner

### *Optional configurations*

- Tied-in scales
- Wireless hand held scanner
- Batch data collector (PDA style scanner) or
- Radio frequency data collector (PDA style scanner)

## POS software

Software package

## Installation Costs

- On-site training
- Installation
- Customization

## Ongoing Costs

- Store system software maintenance per year
- Software Updates
- Hardware Maintenance Contract per year

## Functionality Requirements

### *Payment terms*

- Deposit
- Lease

### *Membership Management*

Co-op member functions are accommodated or membership module can be integrated with system. (includes suggestions for custom applications and how they would work with your POS)

### *Accounts*

- Allow different membership types and groupings
- personal information (address, e-mail, committee)
- group members by household
- add information on people shopping "for" members
- record maternity/sick leaves
- hour payment (pay off accumulated hours)
- member lookup
- postal code of trial shoppers

### *Account sales*

- Accommodate both member and trial shoppers
- tracking member expenses per category/shopping
- member accounts have equity/fee/surcharge data
- Stock purchases/fees collection

- Pay-ahead on accounts: ability w/ running balance
- Member card scanning
- Returns
- Special orders
- IOUs

### *Discounts, Fees*

- Variable discount and surcharge levels
- temporary surcharges
- flat fees (instead of monthly non-working surcharge)
- annual membership fee
- annual building fee
- loan
- discounts recorded by type

### *Member labor tracking*

- tracking hours
- trigger working and non-working status (and surcharge) depending on hours worked

### *Shrink*

- shrink tracking

### *Check-Out*

- Bottle deposits
- (know how much cash back is possible)
- Price override
- PLU lookup

### *Media*

- Credit/debit card
- Post-dated cheque file
- Coupons tracked by type

### *Backend*

- In-store shelf tag generation
- PLU file maintenance at register
- Cheque printing

### *Usability*

- System is "user-friendly" for store personnel

### *Training*

- training mode or package

### *IT support*

- online, phone support
- 365 days a year
- In store

### *Reports*

- integration with third-party reporting software
- General journal, balance sheet
- End of day cashouts
- Realtime inventory control data
- Custom reports
- Ratio trial shoppers to new members

### *Budgeting*

- variable markup report - COGS estimate
- Integration with accounting software
- Includes accounting software

### *Technical/Integration*

- System is highly modular, up-gradable, and expandable.
- System easily accommodates industry standard scanner/scales, hand-held terminals, card readers, printers, and other peripherals.
- System is durable, has history of minimal downtime.
- Data formats are compatible with open data standards for supplier/wholesaler/retailer data transfer.
- Software supports all standard grocery industry POS functions and inventory functions.
- Easy import/export of data between system and third party software such as spreadsheets, database applications and accounting programs.
- Can hardware be bought separately
- Easy product data import

### *System Supplier*

- Hardware/software has installations in co-operatives or businesses like ours.

- Post-installation service/support includes on-site and off-site problem solving. Company can offer an excellent record of providing service.
- Ample software-modifications capability
- company has specific distributor or multi-store discounts in place
- Healthy software "ecosystem": other companies are providing same software; broad developer base; modular software
- level of commitment to open API, and/or Free/Open Source Software