



Understanding Open Source CRM

OPTAROS WHITE PAPER

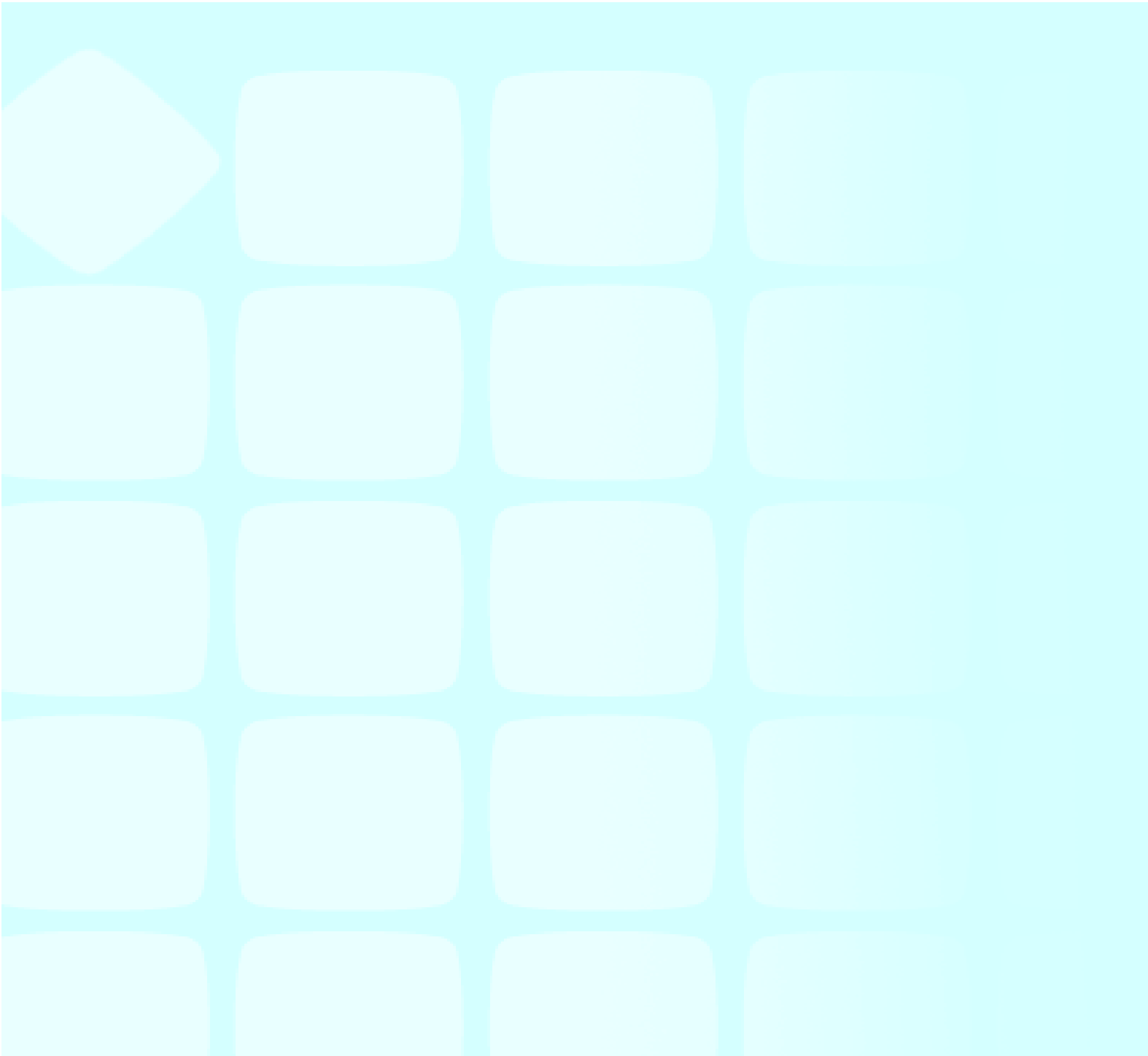


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About Optaros

Optaros (www.optaros.com) is an international consulting and systems integration firm that helps enterprises solve IT business problems by providing services and solutions that maximize the benefits of open source software, open standards and global sourcing.

Bringing together experts in creating enterprise IT solutions and experts in the power of open source and open standards, Optaros plans and builds business solutions that give you better value today and increased control in the future. By applying state-of-the-art methodologies and leveraging open source communities as well nearshore and offshore development capacity Optaros is able to deploy better solutions in less time and at fraction of the cost of traditional development. Optaros has offices in Boston, Geneva, Zurich, New York and San Francisco.

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Executive Summary

Open source software has rapidly established itself as a major competitor to proprietary software in the operating systems and infrastructure software domain. It is now establishing itself as a viable alternative in the business software domain as well. Optaros identifies three major reasons why open source is becoming an important force in the CRM space:

- ◆ **Customer satisfaction:** many companies have had negative experiences in integrating and managing large functionality-loaded CRM packages (e.g. Siebel, PeopleSoft, SAP). Companies want to return to a flexible, manageable CRM solution that offers a low total cost of ownership, minimal vendor lock-in and an open architecture allowing the system to grow as the business grows.
- ◆ **Open source and open standards:** Open source CRM – through open source and open standards – provides unmatched flexibility in terms of modifications and integration standards, and is in many cases a "more than good enough" starting point, bringing in the base functionality you need at a low cost, while allowing you to in a straight-forward way implement specific functionality.
- ◆ **Application Assembly:** Open source enables you to evaluate products and components hands-on, and gives you the freedom to assemble solutions from pre-built components – basically opening up a middle way between the classical approaches of package implementation and customer development.

Depending on the nature of the business problem you want to address, different implementation approaches are called for. An open source based CRM implementation can be very competitive in the following situations:

- ◆ **a package-centric approach** for a front-office oriented solution with reasonably standard requirements, e.g. sales force automation, marketing & campaign management, customer service & support
- ◆ **an application assembly approach** for when the organization is faced with non-standard requirements, complex and tight integration with mission-critical applications, or when it is addressing a very confined issue, e.g. a highly integrated multi-channel customer support platform, partner integration, or extensions to an existing CRM infrastructure

While evaluating the open source CRM product and component landscape, we have come across and analyzed a number of products. Three very interesting players in the package category are SugarCRM, Compiere and openCRX:

- ◆ SugarCRM has a model that combines the dynamics of open source with the commercial reality of a competitive CRM market. SugarCRM provides an intuitive user interface, relatively easy technology to work with, and introduces new functions and features at a rapid rate.

- ◆ openCRX provides a mature enterprise-class J2EE architecture with a sophisticated security model and a model driven architecture approach that is suitable for large and complex integration and development efforts.
- ◆ Compiere has proven over time to enjoy the support of an active community staying true to its open source principles, and a solid installed base of customers leveraging the CRM and ERP features of this package.

In addition, we have investigated the major open source products and components in the areas of Technology & Integration Platforms, Business Intelligence, Multi-channel Integration, eService & eCommerce, and Workflow Management. Our conclusion is that these products are rapidly maturing and are now ready to serve as building blocks for advanced CRM solutions.

This Optaros white paper provides an overview of the open source domain relevant to Customer Relationship Management (CRM) solutions, and explains why, when, and how an open source based approach makes sense when implementing CRM solutions. The paper also provides insights we made when evaluating some key open source CRM products and components.

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About this Whitepaper

This white paper is targeted for a broader audience of people with a general interest in the CRM solution domain and / or solutions coming out of the open source realm. The paper defines CRM and how CRM is impacted by the open source movement. It furthermore outlines the new approaches for how to go about CRM systems implementation leveraging open source products and component. The paper moves on with providing an overview of the key CRM packages as well as solution components, and rounds off with Optaros' conclusions and proposed next steps.

This paper is first in a series of white papers that helps you understand exactly where the opportunities are in open source CRM. What are the names to remember? What should I consider? What changes in my implementation approach?

What is Open Source Software?

Not attempting to provide yet another definition of open source software, one can say that it is **free** software, where "free" is often misinterpreted. There is a popularly cited quote from GNU.org, that identifies the nuance:

"Free Software" is a matter of liberty, not price. To understand the concept, you should think of "free" as in "free speech" not as in "free beer".

The code base of open source software is available to everyone and can be changed and reused as desired. But the intellectual property owner retains authorship of the code and can consequently reserve rights on its distribution as part of a commercial product. Consequently, open source software is not necessarily free of charge. CRM products in particular often come in at least two versions, a community version and a commercial version:

- ◆ the community version is provided at no charge and can be downloaded and installed without license fees
- ◆ the commercial version of the same software may add functional extensions and/or vendor support on top of the product for a fee

However, the license fees for an open source product are often a fraction of the costs of a commercial product, thanks to the low overhead of the vendor organization for distribution, marketing and sales and above all product development.

When considering open source software, one must be aware of the different types of open source licenses. That is not the topic of this whitepaper. If you want to understand more about open source licenses and the differences between them, please turn to the Optaros whitepaper "Free and Open Source Licenses, Software Development, and Distribution" [1].

What is CRM?

CRM is a business and technological domain that can be defined most conveniently by looking at it from a functional perspective.

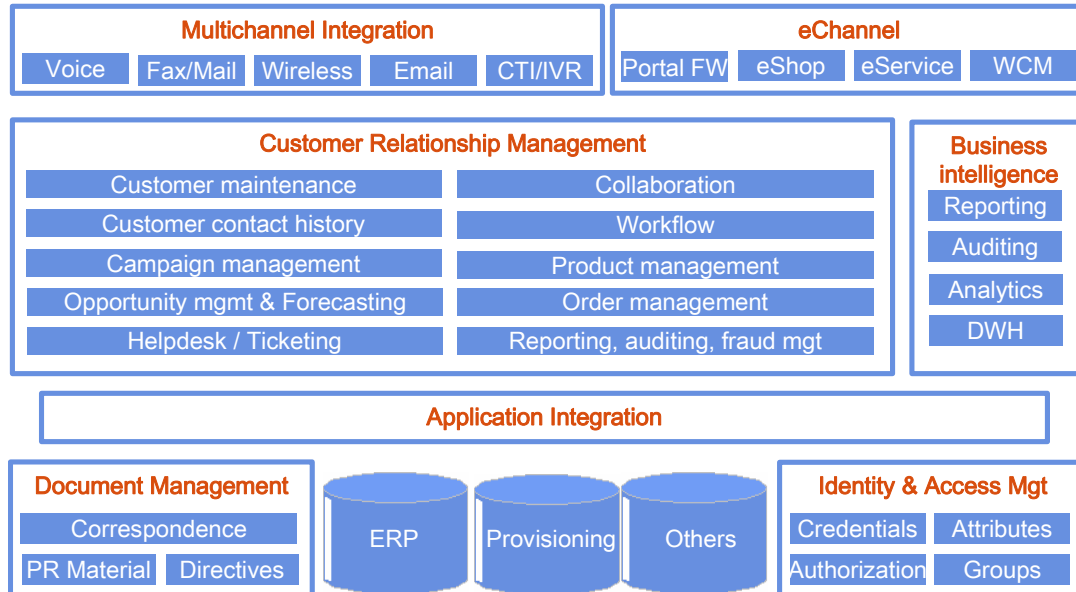


Figure 1: CRM functional overview

A CRM solution helps you to better know and interact with your customers, your suppliers and your partners. It facilitates the interactions that your customers, suppliers and partners have with your company, and in an ideal case covers all your customer touch-points, supporting marketing, sales, and customer service & support as well as the customer herself.

CRM is about a strongly customer-centered view on your data and your business processes, but the requirements for the enterprise CRM solution also cover CRM-peripheral domains such as document management, multi-channel customer interaction, data warehousing, analytics, etc.

Open source in the CRM context

Open source as a technology driver in the IT landscape has a long-standing tradition: thinking of widely used technologies such as Unix, BIND, Linux, QMail, LDAP, one will recognize that sharing software source code has been the standard since the pioneering days of software.

However, open Source in the sense of a true commercially viable market force is a trend that is strongly (re-)gaining the public's attention. The days are over, when open source software was confined to the infrastructural layer in a company's IT backbone. The open source CRM applications market has rapidly matured over the last couple of years.

Customer Relationship Management is undergoing a strong re-orientation towards open source, thanks to a number of aspects.

- ◆ The functionalities of CRM have matured during a decade of commercial evolution. CRM software has become a **commodity** where stealing the show with a smart set of functions is getting increasingly difficult.
- ◆ Part of this evolution has undeniably led to a wide CRM awareness within the industry. The technology push of the past has morphed into a highly competitive and well-educated market requiring **true value for money**.
- ◆ Strong open source product offerings are reaching the market today, combining the power of the **open source community approach** with **business savvy** product companies knowing how to position these products as viable solutions for both small to medium businesses (SMB) and enterprise customers.

Last but not least, many customers are concerned with the consolidation going on among the traditional proprietary CRM product vendors. With e.g. Siebel and PeopleSoft being acquired by Oracle, there is substantial uncertainty whether and how the individual product lines will be supported in the future as well as concerns with having to perform major system migration efforts to comply with future product lines.

Categories of CRM Solutions

As is the case with commercial CRM products, there is no “one size fits all” approach for implementing solutions based on open source CRM products and components. Depending on the range of requirements, timelines, organizational coverage, scale of implementation, and integration needs, different approaches are required. When approaching a CRM initiative with open source ingredients to it, it is helpful to relate the implementation to one of the following categories.

- ◆ **CRM Package solutions**
The open source community offers specialized CRM systems that cover the core requirements. Here you benefit from solutions that are of fairly low complexity and stand out for their uncomplicated installation, rapid implementation, and flexible deployment.
- ◆ **Component-based CRM solutions**
CRM initiatives that target a more comprehensive set of requirements - and/or having complex integration needs - must look to identify the optimal assembly of components. Here you benefit from the exceptionally flexible nature of open source software, based on open standards, platform independence, the openness of its source, modularity, and the freedom to download and experiment with relevant products.
- ◆ **CRM Point solutions**
Optaros, together with its partners, is in the process of developing a set of best-of-breed pre-configured solutions to help address some commonly seen business challenges in the CRM space (e.g. Campaign Management). Here you benefit from the efficiency of a proven technology stack and the deep business understanding embedded therein, along with the

undiminished support for open standards, platform independency and openness of source. These CRM point solutions will be described in one or more future whitepapers, and are not addressed in any more detail in this whitepaper.

We will look into the first two of these categories in more detail and provide you with key information to make the next steps with open source software readily.

CRM Package Solutions

The open source community has produced a substantial number of products that address the essence of CRM each in their own way. Not all of these have stood the test of time, but there are a number of projects that possess the right mix of functional features, architecture and go-to-market approach. For this white paper, we have chosen to take a look at three promising products:

- ◆ SugarCRM
- ◆ openCRX
- ◆ Compiere

SugarCRM



Homepage and download location

Homepage: <http://www.sugarcrm.com/>

Download: <http://www.sugarforge.org/>

Description of solution

SugarCRM is a rapidly expanding open source CRM solution, whose functionality includes sales force automation, marketing automation, collaboration, helpdesk/customer service functions, mobile functionality and more. The application is available in over 30 languages.

SugarCRM uses a dual-license model. The open source product is subject to a modified Mozilla Public License (MPL), an attribution clause regarding the redistribution of the software. The Professional and Enterprise versions add functional and architectural extensions to the base product, aiming at making the application more fit for purpose in a professional or enterprise context. These extensions cannot be freely distributed.

Related solutions

- ◆ Application server: PHP implementation, based on Apache or MS IIS.
- ◆ Relational database management: MySQL, PostgreSQL, Oracle 10g¹

¹ Enterprise license (commercial)

Development tools

- ◆ Built-in studio for user interface customization tasks
- ◆ XTemplates

Adherence to integration standards

- ◆ SOAP
- ◆ Planned adapters for different standard enterprise applications

Project team background, adoption, and endorsements

Founded in 2004 by a team coming from proprietary CRM vendor E.piphany, SugarCRM was one of the first VC-funded open source application companies. SugarCRM is based in Cupertino, CA and employs a team of around twenty full-time developers and is supported by a community of over 4'000 part-time and voluntary developers and testers worldwide. SugarCRM is supported by a number of online user communities, including the company-sponsored <http://www.sugarforge.org/>, <http://sourceforge.net/projects/sugarcrm>, sugaraddicts.org/.de/.nl, and forums on sugarforge: <http://www.sugarcrm.com/forums/>.

SugarCRM is supported by more than 100 official systems integrators and other partners worldwide.

Project motivation and qualitative analysis

SugarCRM entered the open source CRM market with a dual-license model. Revenue that is realized with the Professional and Enterprise editions sponsors the development and continuous improvement of SugarCRM. In return, the commercial versions offer enterprise-relevant extensions to the open source base version in terms of functionality and architecture, and are provided along with a support services programme.

SugarCRM impresses through its completeness and depth of CRM functionality, high-paced release cycles and a remarkably flexible, multilingual user interface. The application is light to install and maintain thanks to the strategic choice of PHP. On the critical side, this choice limits the integration with popular choices of Java-based peer applications in the enterprise landscape. In addition, the long-term functional extensibility and upgradeability of the application requires a certain level of programming discipline.

openCRX**Homepage and download location**

Homepage: <http://www.opencrx.org/>

Download: <http://www.opencrx.org/downloads.htm>

**Description of solution**

openCRX is a component-based CRM system that provides functionality for sales force automation (SFA), customer service, project and activity management, products and services, and others. This platform-independent and scalable J2EE application excels through its choices of a mature and professional system design, built on the open source MDA platform openMDX. openCRX is primarily targeting the enterprise customer segment. openCRX is actively being developed – the current roadmap is always available from <http://www.opencrx.org/project.htm#roadmap>

openCRX is distributed under the terms of an OSI-certified open source license, BSD style.

Related Solutions

- ◆ Application server: any J2EE-compliant server, notably BEA Weblogic, IBM WebSphere, JBoss
- ◆ Relational Database Management: notably Oracle, DB/2, MS SQL, PostgreSQL, MaxDB, MySQL
- ◆ Open source Model-Driven Architecture Platform: openMDX
- ◆ Business Intelligence: BIRT (planned tight integration)

Development tools

- ◆ Eclipse, IBM Rational Software Modeler, openMDX

Adherence to integration standards

- ◆ J2EE RMI, CORBA, JMS, JCA
- ◆ SOAP (planned)
- ◆ OMG's MDA, MOF, JMI (OpenMDX)
- ◆ Planned adapters for mySAP CRM, Siebel, PeopleSoft, and Abacus
- ◆ Planned integration with MS Exchange, MS ActiveDirectory, Novell Groupwise, Lotus Notes, Asterisk, MS Office, Open Office

Project team background, adoption and endorsements

openCRX is developed by a community primarily made up of CRIXP Corp., openCRX partners, and various customers/users. CRIXP Corp. and openCRX partners provide professional services worldwide and raise the necessary funding for functional extensions that are requested by the user community (customers).

Project motivation and qualitative analysis

openCRX aims to establish a core reference model for relationship management (CRM) and enterprise resource planning (ERP) with a professional enterprise-class open source CRM solution. Furthermore, openCRX is advertised as a strong showcase application for openMDX - the MDA implementation framework on which it is built - see "The architecture

of choice for a changing world " [4] for more information. This provides a strong basis for the development team to shift their attention to modeling the actual CRM processes and interfaces, and let good design prevail. On the downside however, one must admit that the generic user interface is not as intuitive and as attractive as some of its open source competitors. As a matter of fact, there is no openCRX-specific user interface; the GUI is provided by openMDX, and it is fully generic and model-driven, i.e. there is no manual programming involved because the GUI is automatically generated. An AJAX GUI is on the roadmap.

Compiere

Home page and download location

Home Page: <http://www.compiere.com/>

Download: <http://www.compiere.org/download/index.html>

Compiere

Description of solution

Compiere is a respected enterprise-class application with a successful mix of CRM and ERP functionality. It is targeted at small to medium businesses looking for "brick and click" first-tier functionality. Compiere is provided under the Mozilla Public License (MPL 1.1).

Related Solutions

- ◆ Application server: Java-enabled server, e.g. JBoss, Apache/Tomcat, planned: Websphere
- ◆ Relational Database Management: Oracle RDBMS² through JDBC
- ◆ Client: Java/Swing, Sun JRE 1.5.0 and higher. A thin client is available but not fully recommended by Compiere.

Development tools

- ◆ Any Java development tools

Adherence to integration standards

- ◆ Client to database: Thin JDBC
- ◆ Client to application server: RMI

Project team background, adoption and endorsements

Compiere is probably the longest-standing open source CRM project (productional since 2000) that still has a highly active community. The community consists of a loyal core group of around fifty developers and a large group of occasional contributors. Compiere

² Other RDBMS's (DB/2, MS SQL) currently supported in beta-stage

has always ranked high among the top-ten most active projects on Sourceforge since its introduction in 2002. This broad user base makes ComPiere a relatively safe bet.

ComPiere³ Inc. is a Portland, OR based privately held company that focuses on providing professional support and services and providing back-office services to partners and users of ComPiere.

Project motivation and qualitative analysis

ComPiere is first and foremost an open source product that strives to provide ERP functionality with fully integrated CRM software solutions. ComPiere is the commercial partner of the project and the largest contributor. Their revenue is made by selling professional services, trainings, and documentation material.

ComPiere offers a very mature set of functionality that is continuously being improved and extended. But the choice for a predominantly one-tier Java/Swing client is slightly off the beaten path. An HTML client is available but not fully recommended by ComPiere.

SugarCRM, openCRX and ComPiere are just three out of a much larger group of open source CRM projects. A more in-depth assessment of these and other open source projects is presented in the Optaros white paper "An Insider to Key Open Source CRM Products" [2].

Conclusions on the CRM Package category

The three products that we introduced above represent an interesting selection of open source CRM packages:

- ◆ SugarCRM has a model that combines the dynamics of open source with the commercial reality of a competitive CRM market. SugarCRM provides an intuitive user interface, relatively easy technology to work with, and introduces new functions and features at a rapid rate.
- ◆ openCRX provides a mature enterprise-class J2EE architecture with a sophisticated security model and a model driven architecture approach that is suitable for large and complex integration and development efforts.
- ◆ ComPiere has proven over time to enjoy the support of an active community staying true to its open source principles, and a solid installed base of customers leveraging the CRM and ERP features of this package.

The "business readiness rating" [5] found at openbrr.org provides companies with an evaluation method for determining whether the open source software they are considering is mature enough to adopt. We have used the same evaluation method to rate the three products, as displayed in

³ Mind the capitalization...

the below table. To better deal with the special aspects of open source business products, we extended this framework to include community management as well as business-oriented perspectives such as enterprise-level customer services and go-to-market approach.

- ◆ **Community management** - is the product roadmap and development driven forward arbitrarily based on the ideas of a large number of individual members, or does it have its direction set by a market-oriented body that also controls and contributes a majority of the development resources?
- ◆ **Enterprise-level customer services** - to what extent is the product augmented by a strong support and professional services offering, either through an offering tightly tied to the product itself or through strong partnerships with renowned companies providing these services?
- ◆ **Go-to-market approach** - what is the marketing and sales approach, and to what extent does that approach support the creation of a solid base of customer installations thus ensuring the longevity of the product?

































































































		 Excellent	 Very good	 Good	 Fair	 Poor	SugarCRM ⁴	openCRX	Compiere
Application	Functionality								
	Usability								
	Quality								
Technology	Security								
	Performance								
	Scalability								
	Architecture								
Organization	Support								
	Documentation								
	Adoption								
	Community								
	Community management								
	Business orientation								

Figure 2: CRM Package Solutions

⁴ SugarCRM v4.0 Enterprise, openCRX 1.8.1 - MySQL, Compiere 2.5.3

We have chosen to not weight the individual criteria. Our experience is that each project situation merits its own evaluation and weighting of criteria, and one should therefore consider the weighting of each criteria on a case by case basis.

The white paper "An Insider to Key Open Source CRM Products" [2] revisits these and other CRM package solutions in greater detail, also addressing the functional coverage of each product.

Component-based CRM Solutions

CRM applications have gained a pivotal role in many organizations today, because businesses have become more and more customer focused over the past decade and have realized the criticality of having strong CRM application support for their processes. CRM as a stand-alone system is rarely the norm. A seamless functional integration with a series of IT applications is often required, to obtain optimal use of the CRM application (see Figure 1).

In the paragraphs below, we discuss the impact that this observation has on your system development strategy and provide an overview of the available technologies in some of the identified functional areas.

Understanding the Business Problem

Over the last five years, the perception in the market has been that a company stands the highest chances of solving their CRM requirements if they buy the largest, most functionality-rich and all-encompassing CRM system out there. Traditional CRM software like Oracle, Siebel, PeopleSoft, and SAP have successfully played on this sentiment. They provide functionality rich, pre-integrated, comprehensive solutions attempting to meet as many requirements as possible.

What sounds like a clear advantage, has often turned into a burden though. You pay for more than abundant functionality that is however insufficiently understood by your users and only close to what you are looking for. Functions are disabled or ignored because they don't fit, while you are investing in complementary custom functions that the package misses. All of this costs money, compromises the quality of the software, impacts the efficiency of your processes and can develop into an application that becomes increasingly cumbersome to use and manage over time.

The origin of this phenomenon is often found in a lack of thorough understanding of the requirements. Money cannot supersede deep understanding: if you are not firmly confident with exactly what you need, what your priorities are and how much they may cost, you run the risk of making an uninformed decision. Exploring the essence of your CRM requirements and the dynamics of your business might in fact lead you to conclude that you cannot afford to lock yourself into a proprietary product. Rather, you need to retain the flexibility of adapting your software to the processes as these evolve. Secondly, you will soon recognize that sometimes

"good is good enough" and instead spend money wisely in enabling your IT organization, not trying to buy the remaining 20% of the functionality for 80% of the license costs.

Open source software - also in the CRM domain - has some unquestionable characteristics. It adheres to open standards and the code is open, thus allowing you more flexibility to modify the software to meet your changing requirements. In addition, it comes at a low cost while still bringing in the base functionality you need - it's in many cases a "more than good enough" starting point for your implementation.

Optaros Application Assembly

Open source solutions do not attempt to be champion in all disciplines but rely on open standards and the possibility to include other open source components. The free and uncomplicated access to software components allows you to identify and evaluate solutions in an iterative manner as your understanding of the requirements matures. You can single out the best components for the given situation with each new iteration, providing high transparency of the solution as it develops.

Open source software implementation therefore benefits from a different approach compared to traditional CRM software implementations. Optaros' approach is to help you **assemble** the exact solution you are looking for in an **iterative** manner.

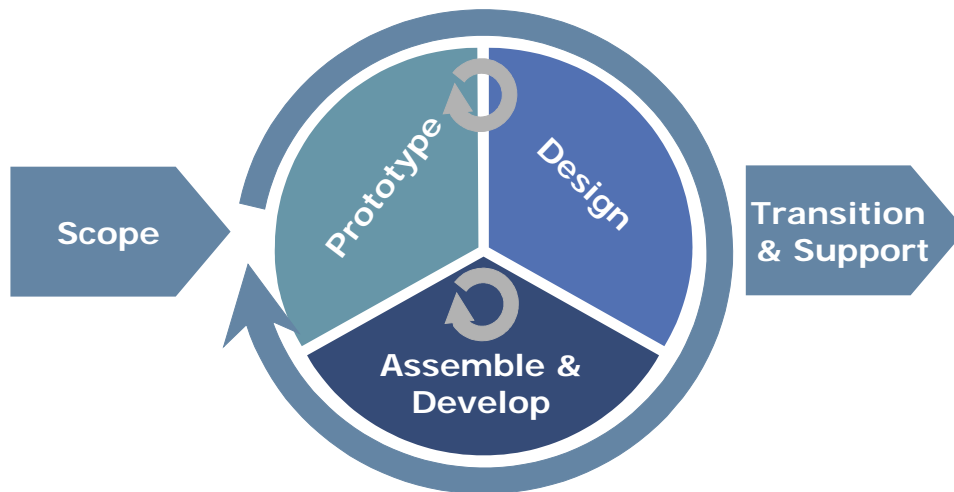


Figure 3: iterative application assembly methodology

The Optaros Application Assembly methodology consists of the following steps:

- ◆ **Requirements Discovery Workshop (Scope):** defines the requirements together with the project stakeholders and identifies a shortlist of suitable open source software products or components. The phase targets a plan for the rest of the implementation, and a proof of concept covering some of the preferred solutions that serves as a first prototype.

- ◆ **Prototype:** the prototype is evaluated with the stakeholders, the spin-off of which is fed into the further design of the application and/or identified for later priority.
- ◆ **Design:** the learnings from the prototype are analyzed and converted into a technical design.
- ◆ **Assemble & Develop:** the open source technology stack is adapted to cater for the changes in the technical design and the components are further integrated.
- ◆ **Transition & Support:** the resulting application is brought into production-ready shape and tested. The application is then rolled out and serviced.

Assembly Building Blocks

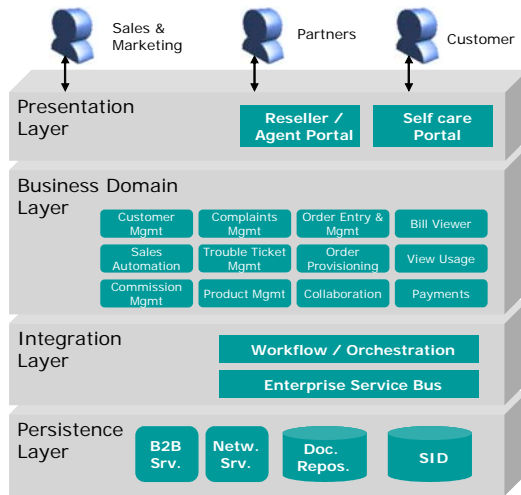
The assembly of a CRM application to meet your requirements in an optimal manner requires broad yet thorough knowledge of the available technology. Open source has produced some of the industry's leading technologies on the infrastructure level, such as operating systems (UNIX, Linux distros), web and application servers (JBoss/Jetty, Apache/PHP/Tomcat) and many more key components. Many companies are discovering that open source software already covers important areas of functionality that pertain to the CRM domain as well.

This paragraph introduces a collection of solution components relevant for the CRM domain, and gives you a feel for where they're positioned in terms of maturity, functionality, etc. These and other technologies are reviewed in more detail in "Building Enterprise-Ready Open Source CRM" [3]. We have divided up the landscape into logical sections (see also Figure 1: CRM functional overview).

- ◆ CRM package functionality (already addressed in section "CRM Package ")
- ◆ Technology & integration platform
- ◆ Multi-channel integration
- ◆ Web channel integration & eCommerce
- ◆ Workflow management
- ◆ Business intelligence

Technology & Integration Platforms

Open source software has a reputation for setting the standards for an integrated component-based solution development adhering to an architecture that makes best use of strong and proven technologies.



Open source offers support in every layer of the architecture.

- ◆ Portal frameworks bundle and present a consistent stream of content while adding general technical services (login, navigation, etc.).
- ◆ The business logic is offered by a variety of applications such as the aforementioned CRM components, but also eCommerce, web content management and selected elements from the existing infrastructure.
- ◆ The functions and information of the application components are orchestrated and integrated to present a consistent and reliable view on the application and its business information.

Internet portal frameworks offer the technical framework to efficiently manage the aggregation and delivery of services and content to the online user. The portal framework implements a number of content-independent functions such as rendering/presentation, searching and sitemaps, navigation, authentication and authorization, personalization, etc.




Name	Description	License	Maturity
JBoss Portal	Portal application framework with content management capabilities. Commercial backing: JBoss Technology: J2EE	LGPL	
Apache Jetspeed 2	Portal application framework for device-independent publishing. Commercial backing: Apache foundation Technology: JSP	Apache	
Apache Tomcat	Web- and application server implementing servlets and Java Server Pages (JSPs). Commercial backing: Apache foundation Technology: Java	Apache	
JSR-168	A Java Standards Request describing the Java Portlet Standard.	(n/a)	released

Table 1: portal frameworks and relevant JSR standards

Not all portal-related functions are pre-integrated within a single portal framework, but the open source world offers several products that solve individual functions for you. Some relevant examples are given in the table below.





Name	Description	License	Maturity
OpenLDAP	A shared directory implementing the Lightweight Directory Access Protocol (LDAP). This directory is developed by the OpenLDAP Project and integrated into many existing LDAP software products through slapd and slurp. Commercial backing: corporate sponsoring, contributions Technology: C	(own)	
Apache Directory	Enterprise directory server platform (and its components) to allow other applications snap in through LDAP, DNS, DHCP, SLP and Kerberos. Aspires to become reference JNDI provider platform. This project has not released a production version as yet. Commercial backing: Apache foundation	ASL 2.0	 (beta)
Yale CAS	Proxy that handles user login authentication for web applications and provides SSO through a browser cookie. Commercial backing: Yale university Technology: Web application (jar)	(own)	
SourceID	Provides Java toolkits for enabling Liberty protocol v1.1 Single Sign-On and federated identity exchange. Implements SAML 1.0 and 1.1. Commercial backing: PingIdentity, Microsoft? Technology: Java, .NET	OSL 1.0	

Table 2: authentication & authorization products

A number of open source application development frameworks have emerged, making application development substantially more effective. Some relevant examples are given in the table below.

Name	Description	License	Maturity
Java Server Faces (JSR-127, JSR-252)	JSF is a Java-based Web application framework that simplifies the development of user interfaces for Java EE applications. Out of the box, JSF uses JavaServer Pages for its display technology. Commercial backing: Sun, Oracle, Apache MyFaces	(n/a)	Released




Name	Description	License	Maturity
Apache Struts	<p>An MVC pattern implementation and framework for developing Java EE web applications. It uses and extends the Java Servlet API to encourage developers to adopt an MVC architecture.</p> <p>Commercial backing: Apache foundation</p> <p>Technology: Servlets</p>	Apache	
Spring	<p>A framework implementing the MVC pattern, for Java, J2EE and .Net. Spring is often used in combination with Hibernate for Java based applications.</p> <p>Commercial backing: none</p> <p>Technology: Java, .NET</p>	(n/a)	
Hibernate	<p>A data abstraction layer for Java to mediate between application logic and the data persistency layer (databases, document base, etc.).</p> <p>Commercial backing: JBoss</p> <p>Technology: Java</p>	LGPL	
Enterprise Java Beans	<p>A J2EE API specifying a data abstraction layer for Java to mediate between application logic and the data persistency layer (databases, document base, etc.). EJB is often considered more complex than Hibernate.</p> <p>Commercial backing: Sun, Java Community</p> <p>Technology: Java</p>	(n/a)	released (v3.0)

Table 3: application development infrastructure products and components

The topic of application integration is a key component of most CRM solutions, with a wide variety of concepts and products involved. Service oriented architectures are addressing this complexity. The white paper "Service Oriented Architecture and Open Source Solutions" [9] addresses this topic in great detail, also discussing the most interesting open source offerings in this field.

Multi-Channel Integration

Enterprises are required to interact with their customers through an increasing number of media while experiencing a growing necessity to reduce communication and interaction costs. The majority of the customer interaction is still handled through telephony and email, but the web, fax and printed communication handle a significant part of the traffic as well.

Customers expect similar or the same level of responsiveness independent of which channel they choose. Ensuring that each channel meets the expectations set on it, while managing the customer experience across several channels, becomes imperative. Open source offers practical and inexpensive solutions, for example the products listed below.






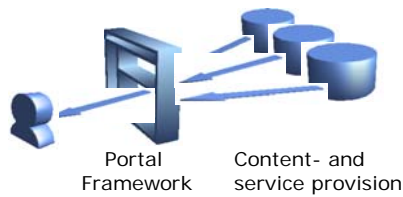
Name	Description	License	Maturity
Apache James	SMTP and POP3 Mail server and NNTP News server Commercial backing: Apache foundation Technology: Java application	Apache	
JBoss Mail Server	SMTP and POP3 Mail server Commercial backing: JBoss Technology: J2EE	LGPL	
QMail	Highly resilient, highly secure and widely accepted Unix mail server: SMTP, POP3 Commercial backing: none Technology: native application, written in C	License free	
HylaFAX	Fax server: sending, receiving facsimile, polling, alpha-numeric pages, etc. Commercial backing: iFAX Technology: binary distro for unix or linux, written in C++	Copyright only	
Asterisk	Telephony PBX and Voice over IP (VoIP) gateway to the public switched telephony network (PSTN). Clients communicate with Asterisk either by hardware-supported telephony, or one of the VoIP protocols (SIP, H.323 or Asterisk's own IAX). Commercial backing: Digium Technology: native application, written in C	GPL	

Table 4: Multi-channel products & components relevant for the CRM domain

Web Channel Integration and eCommerce

The web is not an information channel, but a medium to communicate and interact in a bi-directional manner. Many enterprises have discovered the power of providing a range of on-line services to customers or business partners.

This aspect has obviously gained particular relevance in the CRM area. Leveraging the Web, the enterprise saves manpower to support the interactions, and the customer benefits from convenient, time-efficient and around-the-clock services. Plus the web-channel opens up a palette of possibilities for effective cross-selling and innovative ways of creating added value towards the customer. Web channels are nowadays considered a significant if not crucial aspect of customer relationship management.



Web channel integration from a technical aspect can be seen as a combination of content and services that are aggregated and channeled by a portal framework.

The portal framework implements the presentation (stylesheets etc.), authentication and authorization, personalization, navigation, and other strictly content-independent functionality.

The applications that provide the content and services to the user through the portal can be various, but in the context of CRM these can roughly be split into the following domains.

- ◆ **eServices**, allowing the user to self-service his/her information, place online orders or requests, download brochures and forms, etc. and at the same time offer the enterprise the medium to provide more outbound oriented information services (e.g. stock information, etc.).
- ◆ **eCommerce**, allowing the enterprise to activate the Internet as an extra sales channel. eCommerce provides an online store with functionalities such as a product catalogue, shopping carts, online payment, special promotions, 1:1 marketing, etc.
- ◆ **Content management** provides the infrastructure to publish company and product information, marketing information, news-feeds, etc.

This way of looking at the web channel permits us to find the right technology for each component in the channel.

eServices

Implementing the eServices stream can be done in a couple of ways, and typically depends on whether or not a front-office focused CRM system already exists inside the organization, how easy it is to integrate into such a system, and of course whether requirements and integration needs are general or very specific in nature.

The benefit of leveraging existing CRM software to implement the web channel is particularly apparent in the case of inbound customer self-service applications that need to plug into your in-house CRM processes. Examples of such functionality are maintenance of customer information (e.g. address changes), viewing billing data and placing online orders. The information exchange between your CRM software and your self service channel is greatly facilitated by a common data model, the same technology stack, identical web services, and compatible workflows.

eCommerce

Customer portals that have a strongly marketing or sales focused mission will benefit more from specialized products that provide product catalogues, promotions and campaigns, online stores, shopping carts, online payment and many more specifically targeted functions. The open source community provides products in this area, with eCommerce platforms like OFBiz, OSCommerce, or a more content-management focused application like eZ publish.

Content Management

Open source has produced a great variety of strong document- and content management products. These applications bear considerable relevance also in the area of CRM, allowing your organization to maintain the more static kind of information for the web channel: company- and product information, brochure-ware, news. But also blogs, wikis and other modern, more interactive content management technologies fall in this category.


The Optaros white paper "Content Management Problems and Open Source Solutions" [6] covers the most prominent players in detail.

Workflow Management

Workflow in the context of a CRM application can be split between front-end user functionality and back-end automated processing.

- ◆ Front-end oriented processes are typically implemented as an integral part of your chosen CRM product. Such processes would be involved in campaign management, customer support (e.g. second/third level support and complaint handling), sales force automation, etc. The key purpose of front-end workflows is the structuring of the user interactions along a set of predefined processes.
- ◆ Back-end processes on the other hand might be triggered by front-end processes, but otherwise form a relatively independent cluster of business logic that can be modeled quite conveniently using some of the available open source workflow engine platforms. Such processes might include service (de-)provisioning, order handling, multi-channel integration (e.g. fulfillment of printed media), enterprise application integration, partner integration, etc.

The following products fit predominantly in the latter category.

Name	Description	License	Maturity
Enhydra	Enhydra workflow platform is an Open Source WfMC and OMG compliant Java workflow solution consisting of an editor for XPD (JaWE) and a Java XPD workflow execution engine (Shark) Commercial backing: ObjectWeb and commercial SI partners Technology: Java, JSP	LGPL	
jBPM	jBPM is a workflow management system. Business processes expressed in iPdI and packaged in process archives, serve as input for the jBPM runtime server Commercial backing: JBoss Technology: J2EE	LGPL	



Name	Description	License	Maturity
Bonita	An EJB implementation of a workflow engine, compliant with WfMC specifications, which incorporates the anticipation of activities as a more flexible mechanism of workflow execution. Bonita possesses a graphical process editing facility Commercial backing: ObjectWeb Technology: J2EE, EJB 2.0 implementation	LGPL	
OpenWFE	An engine and maintenance tool for defining a task flow involving multiple user roles and applications. Commercial backing: sponsoring Technology: Java	BSD (rev.)	

Table 5: Workflow Management products & components relevant for the CRM domain

Business Intelligence

Competitive organizations accumulate business intelligence (BI) in order to gain sustainable competitive advantage ⁵. The challenges of BI are to collect and structure large volumes of data that are generated in the organization, to discern patterns and meaning within that data (thus cultivating data into information) and to respond to this information in an informed and effective way.

The technologies that support this highly strategic activity of an organization deal with functions such as:

- ◆ **Data mining:** also known as knowledge-discovery in databases (KDD), is the practice of automatically analysing large stores of data for patterns. To do this, data mining uses computational techniques from statistics, machine learning and pattern recognition.
- ◆ **Data warehousing:** primarily a record of an enterprise's past transactional and operational information, stored in a database designed to favour efficient data analysis and reporting.
- ◆ **OLAP or Analytics:** providing the technical infrastructure needed to be able to query for valuable strategic information (trends, strengths and weaknesses, competitive advantages, business performance) by accessing one or multiple data warehouses.

The open source space offers solutions that are rapidly gathering strength in these areas. The table below lists representative examples of projects that should be considered as candidate foundation for a BI solution or solution component.

⁵ http://en.wikipedia.org/wiki/Business_intelligence





Name	Description	License	Maturity ⁶
BIRT	<p>The "Business Intelligence and Reporting Tool" is used to produce and publish reports and charts</p> <p>Commercial backing: (co-)developed by Actuate, hosted by the Eclipse foundation</p> <p>Technology: BIRT is a stand-alone application based on the Eclipse framework.</p>	Eclipse license	
Bizgres	<p>Data warehouse focused on supporting BI applications</p> <p>Commercial backing: GreenPlum</p> <p>Technology: based on PostgreSQL</p>	BSD	
Pentaho	<p>Project aspiring to create a complete open source BI platform that excels existing custom solutions, by leveraging best-of-breed components in open source.</p> <p>Commercial backing: VC (Index Ventures, NEA)</p> <p>Technology: Integrates a number of existing open source J2EE-compliant reporting and BI tools: Mondrian, BIRT, Weka, jPivot, ...</p>	Mod. MPL	
Spago-BI	<p>Business Intelligence Platform assembling a number of existing modules in BI</p> <p>Commercial backing: Engineering Ingegneria Informatica, ObjectWeb</p> <p>Technology: collection of J2EE-compliant components</p>	LGPL, BSD, FOSS	

Table 6: Business Intelligence products & components relevant for the CRM domain

Conclusion

Open source software is continuing to gain momentum in the IT industry, gradually establishing itself as credible alternatives to proprietary software also higher up in the stack. Although technologies like Linux, Apache and JBoss set the stage for open source to attract the attention, the market is now seeing products that conquer the business application domain.

It is clear that open source software is providing true alternatives for many CRM opportunities, next to the commercial or custom built solutions.

- ◆ Open source software is much more accessible. While online demos of proprietary software might give you a first impression of the product, it is normally difficult to get access to evaluation versions. Downloading and installing open source software involves a minimum of bureaucracy and provides real insights into the products.
- ◆ Open source software is capturing the essence of what the market is looking for, rather than attempting to provide an overkill of functionality that quickly becomes unmanageable.

⁶ Maturity is a subjective impression of functional completeness, adoption and production readiness.

- ◆ Open source software brings full flexibility to customize it to do what is needed. There are no limits to what you can change, no license infringements, no contractual obligations and consequences.
- ◆ Open source does not require you to enter a commercial liaison with the vendor of your software. This avoids the initial overhead of defining that liaison and the obligations associated with that, in particular the annual license maintenance costs and having to follow the vendor's upgrade path to not fall outside the support requirements.
- ◆ The necessary technology skills needed to maintain or extend your open source software is no longer in the exclusive possession of an elite group of product experts. This fact enables your own organization to be in the position to quickly respond to any support matters rather than having to recruit or maintain expertise.

Not every CRM situation is an open source opportunity. But with the rapidly maturing product landscape, and the possibility to assemble solutions to fit your exact needs, more and more companies start realizing the potential of open source in a CRM context. We strongly believe that an open source option should always be part of the evaluation process when assessing a new CRM project, or when looking to extend an existing CRM solution.

This whitepaper presented an overview of the position of CRM applications in relation to generally heard requirements. The two major streams of CRM solutions discussed in this whitepaper are elaborated in more detail in separate whitepapers.

- ◆ **"An Insider to Key Open Source CRM Products"** gives a more in-depth understanding of the core CRM solutions that were introduced in this whitepaper, also addressing other similar products and emerging projects and setting the context to compare these with known commercial software.
- ◆ **"Building Enterprise-Ready Open Source CRM"** expands on the assembly of CRM functionality that completes a base CRM installation, exploring a bit more in-depth the products that are relevant in that context.

If you have questions or comments regarding CRM in your organization, or would like to know more about our CRM delivery methodology then please do not hesitate to contact us: <http://www.optaros.com/>.

Getting more information

The following resources provide excellent sources of additional information on some of the topics addressed in this paper.

- [1] **"Free and Open Source Licenses, Software Development, and Distribution"**
by Stephen Walli, VP Open Source Development Strategy at Optaros, Inc. *
- [2] **"An Insider to Key Open Source CRM Products"**
by Thomas Lundqvist, Hans Waarle at Optaros, Inc *
- [3] **"Building Enterprise-Ready Open Source CRM"**
by Thomas Lundqvist, Hans Waarle at Optaros, Inc *
- [4] **"The architecture of choice for a changing world"**
by the Object Management Group (OMG) on <http://www.omg.org/mda/>
- [5] **"Business Readiness Rating"**
by Carnegie Mellon West Center for Open Source Investigation, O'Reilly CodeZoo, SpikeSource and Intel.
<http://www.openbrr.org/>
- [6] **"Content Management Problems and Open Source Solutions"**
by Seth Gottlieb, Content Management Practice Lead at Optaros, Inc.
- [7] **"State of the art application development: Optaros application assembly methodology"**
by Optaros, Inc.
- [8] **"Delivering Service Oriented Architecture"**
by Adam Michelson, Enterprise Architecture Practice Lead at Optaros, Inc.
- [9] **" Service Oriented Architecture and Open Source Solutions"**
by Adam Michelson, Enterprise Architecture Practice Lead at Optaros, Inc.

* Whitepapers are freely available from: http://optaros.com/publications_wpapers.html