

## IS YOUR ERP CREATING A LEGACY OF FRUSTRATION?

Take Control with Open Source

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## EXECUTIVE SUMMARY

Mid-sized companies are increasingly recognizing that their legacy ERP systems impose an unacceptable burden in terms of cost, wasted time, and lost business opportunities. For example, an IT executive in the chemical manufacturing industry recently shared this “ERP Legacy of Frustration” with us:

*“We have just installed an ERP system from Epicor systems. We spent ~\$1M, over 12 months to implement, \$90k+/yr for support/upgrades, and it still doesn’t do what we want. We are a simple manufacturing plant with multiple warehouses (some produce, some ship). This is the second time we gone through the upgrade cycle with this particular product. The CEO has asked that we look for an ERP product that could be customized to meet OUR needs. He’s not interested in the constant vicious cycle of upgrading/patching. Every 3-5 years we have to start all over it seems. I use open source products in-house where I can (having nearly 3 decades of programming experience). He is looking for a product that does what he needs for our manufacturing and is flexible enough that if we need to modify it, we can do it ourselves or pay to have someone do it for us. He is looking for a LONG TERM solution. He is hoping we can implement something for him over the next 2-5 years (transitioning away from the other product). I’m reviewing Openbravo and several other open source ERP options for functionality, flexibility, speed, etc. We are putting a list of features together that we are looking for. He doesn’t care if the product doesn’t have all the features, just as long as he can have someone add the features he wants. So, that’s the story in short.”*

This gentleman is part of a growing trend of mid-sized IT executives who have succeeded tactically with open source technologies, and are looking to expand the usage to enterprise applications--a highly strategic area that is often not well-served by incumbent offerings.

This paper further elaborates the nature of the ERP dilemma that many mid-sized companies face, illuminating the problem with a number of common real world experiences and business challenges.

It then describes how modern commercial open source ERP alternatives can help companies end the frustration and regain control over IT costs and business results. Finally, critical success factors for mid-sized company use of open source ERP are presented, and conclusions are summarized (in an executive-friendly tabular format) at the end.

## INSIGHTS FOR EXECUTIVES

For many organizations, open source has simply become “the way smart software development gets done”. Marquee IT-related brands like Google, Amazon, eBay, and Facebook make extensive use of open source to achieve continuous agility, drive down costs and maximize uptime. If you use Google or own an Android phone, shop on Amazon or eBay, or use Facebook, then you are using open source software!

Within your own midsized company, open source software is likely already present or even commonplace at the corporate and/or divisional levels. Whether it is a CRM application like SugarCRM, e-Commerce software like Magento, or a document management system like Alfresco, odds are that your IT staff already has successfully deployed open source within your organization.

## THE MID-SIZED COMPANY DILEMMA

Since mid-sized companies share many business application requirements with their larger counterparts, historically they have tended to purchase “mega-suite” business applications with similar characteristics:

- **a complex array of interrelated features** and functionality that have been built or acquired over decades--implemented as...
- ...millions of lines of computer code **based on legacy technology**

Lacking viable alternatives, mid-market customers over the years have entrusted the automation of their operations to companies with names like JD Edwards, Mapics, Epicor, Navision, etc., many of which have been consolidated under the umbrellas of companies like Infor, Oracle, and Microsoft in recent years.

But something happened on the road to packaged enterprise application nirvana.

In spite of the millions of lines of computer code (and in some cases millions of dollars spent), many customers have not found these systems able to effectively execute the key business processes that are critical to their competitive advantage. The original promise of ERP--a single integrated system that optimizes local operations and provides unified information for decision-making at all levels-- remains broken for far too many mid-sized companies.

The core dilemma for mid-sized companies is that

- ERP companies who service the mid-sized market have created **complex ERP suites with embedded functionality**, intended to cover as much of the market as possible, but
- Mid-sized companies need more than just standard “best practices” functionality, they need **truly adaptable and sustainable IT**.

Because they compete with a combination of both efficient scale and business agility, mid-sized companies **require truly adaptable IT to consistently capture market opportunities and execute their business strategy**. Additionally, with fewer IT staff and financial resources vs. larger companies, they require enterprise applications that remain **cost-effective and sustainable** over time, in the face of change.

As illustrated in the “ERP Legacy of Frustration”, these requirements (and the mismatch with legacy ERP capabilities) can add up to a perfect storm of frustration and dissatisfaction at all levels, with many mid-sized companies learning the hard way how complex, costly and painful it is to try to run their business on a legacy ERP.

## BUSINESS GOALS THAT EXPOSE ERP SHORTCOMINGS

While the internet age and consumerization of technology have allowed businesses of all sizes to more effectively apply IT to some business problems, **many strategic mid-sized business goals have remained surprisingly difficult for legacy ERPs to effectively meet**, including:

- Customization of standard functionality
- Expansion of the ERP implementation to additional business units or regions
- Evolution of the business model to capture new opportunities
- Real time integration with SaaS applications
- Easy access to unified business information
- Need to scale users or volume of data

Let's take a closer look at each mid-sized business goal, and some of the ways in which companies struggle with their ERP.

### CUSTOMIZATION OF STANDARD FUNCTIONALITY

A common cause of legacy ERP frustration is the **customization of standard functionality**, something that these systems were simply never designed to properly accommodate. In fact, the basic premise of these suites is that “best practice functionality is good enough” and ERP selection consultants, vendors, and implementers are unanimous in strongly recommending against customizing a legacy ERP, **correctly warning of the time, expense, and future upgrade difficulties**.

And yet, according to well-regarded ERP consulting firm Panorama, “Only 23% of organizations implement vanilla ERP software with little to no customization.” [1]

Obviously the “good enough” premise is not being bought by the vast majority of ERP customers, who understand that **revenue-generating business processes are a source of competitive differentiation**. Consider that the best in class business characteristics for automating processes such as “order to cash”, “make to order”, etc. include these key points [2]:

- Target maturity level is competitive
- More focus on effectiveness than efficiency
- Higher tolerance for business risk
- Rapid development (time to market)
- Spend money to make money
- Business requirements will be evolving
- Business scenarios will have multiple variations (pushing against consistency)

Clearly, mid-sized companies require agile business applications that can be easily and sustainably adapted to their specific needs, especially for business-critical, revenue-generating processes. And just as clearly, **legacy ERPs are not delivering on this fundamental business goal.**

## ORGANIZATIONAL EXPANSION OF THE ERP IMPLEMENTATION

Once an initial ERP implementation is stable, a typical **customer goal is to extract as much value out of the investment as possible** by using the software and internal expertise across additional business units and geographical regions.

However, many mid-sized companies quickly find that different business units have slightly different requirements, even for commodity processes like accounts payable and human resources. These local differences may arise from regulatory and compliance considerations, or simply a resistance to changing current working practices because of the organizational impact. Faced with inherent limitations and no viable way to overcome them, the team responsible for expanding a legacy ERP implementation is often **forced to create multiple ERP instances (each with its own database)**, resulting in:

- dramatically increased cost, complexity and effort for corporate reporting and analytics
- added complexity to support transactions among business units
- increased hardware and IT administration cost and complexity
- a natural tendency toward local optimization at the expense of overall visibility and effectiveness

ERP consultants tend to love the added complexity of this “divide and conquer” compromise, and most guide their mid-size customers to multi-instance ERP implementations as a standard best practice.

But mid-sized companies who have gone down this path often express **great frustration at the high percentage of the IT budget that is consumed by this “mis-matched” scenario**--mis-matched because what they really need is a flexible, centralized solution that can meet both local and global needs cost-effectively in a single instance.

## EVOLUTION OF THE BUSINESS MODEL

Mid-sized companies who consider their ERP system a strategic asset may rightly assume that their large investment will position them to **easily evolve their business model to capture new opportunities.**

For example, a distributor may be able to deliver more value by introducing a light manufacturing operation in a specific business unit, while a manufacturer may find it necessary to establish contract manufacturing or vendor managed inventory relationships.

Similarly, a brick and mortar retailer may pursue a multi-channel strategy by introducing mobile capabilities at the point of sale and integrating its back office with an e-Commerce web shop. Worldwide, much of the Retail industry in particular is facing significant challenges from global competition and e-Commerce, and many retailers are burdened with a complex mix of legacy systems that clearly do not provide a strong foundation for the future.

Some companies seek to break new ground in their industry by launching an entirely new business model. For example, an LED Light manufacturer sees an opportunity to establish a franchise model to create a distributed network of assemblers, who will be able to compete more effectively for local government contracts. The company wants to leverage its ERP system to package a standardized vertical, and offer it as a SaaS product to franchisees--a key part of the overall value proposition for the new line of business.

In all of these cases, it should be natural for a forward-thinking business person to expect the ERP or back office system to add strategic business value by supporting such business initiatives. Sadly, this thought may never even occur to many executives in mid-sized companies, who have experienced first hand the **limitations of legacy ERPs that block strategic deployment**, for example:

- cryptic ERP UI with steep learning curve that is not usable by intended users
- client-side software installation requirement that limits access by external users (or forces additional development of web extensions)
- no ability to easily secure users by role and organization
- lack of a single centralized database that is updated from the point of sale
- no ability to package vertical extensions for external use (from both licensing and technology perspectives)
- lack of cloud deployment
- restrictive licensing agreements prohibiting such extended use scenarios

All of these constraints prevent a legacy ERP from supporting the business model evolution and extensions that are increasingly necessary for mid-sized business to compete effectively in today's world. **Your ideal ERP must allow you to combine the agility of a startup with the scale and efficiency of a large company.**

## REAL TIME INTEGRATION WITH SAAS APPLICATIONS

All mid-sized companies implement a mix of specialized "point solutions" like document management, shipping, transportation management, marketing automation, CRM, etc., and most of these can benefit from integration with the ERP platform. For example, using your ERP as the hub for master data management is a natural way to maintain high quality customer, product, and supplier information with a single point of control.

Mid-sized companies are increasingly turning to the SaaS (Software as a Service) deployment model for these peripheral applications, which typically exposes a critical and unexpected shortcoming in legacy ERPs: **lack of native support for web services, which is often the only way to integrate with today's SaaS applications.**

This lack of native web service support greatly increases integration costs, which means that in many cases valuable integrations never happen, resulting in lower productivity due to the “bridge processes” that must be executed manually to move data between systems. So, while functional or departmental productivity is boosted with SaaS applications, **legacy ERP technology limitations often put a cap on overall end to end productivity and business agility.**

## EASY ACCESS TO INFORMATION

One of the main benefits anticipated by sponsors of ERP projects is that they will finally have **timely access to the information they need to run the business.** Sadly, this simple vision is often not achieved by mid-sized companies due to one or more of the following factors:

- multiple ERP databases make it expensive and difficult to maintain a single version of the truth
- lack of modern embedded query and reporting capabilities force lengthy implementations of costly business intelligence systems
- poor usability limits direct access to critical real time operational data
- lack of integrated data security limits widespread use of ERP data
- limited ERP deployments (due to other legacy ERP deficiencies) often result in **poor data quality**, as accountability is not distributed to the groups who naturally own the data

While “easy access to high quality business information” is easy enough to say, it is not an isolated task that can be handed to a team of data analysts. It is really more of an outcome of a best in class ERP implementation, fully achievable only when everything else in the implementation goes right--no wonder **we hear so many complaints in this area by legacy ERP users.**

## NEED TO SCALE UP OR DOWN

Today's business environment is dynamic, and many mid-sized companies understandably report a desire to scale ERP software and hardware costs with actual usage and benefits. The goals are quite varied, and may include the need to:

- accommodate demand seasonality
- engage in business pilots and joint ventures
- acquire or divest business units



- scale up on an organic growth trend
- scale down in response to a business downturn

Legacy ERPs often fail to accommodate the mid-sized need to scale, from both technology and licensing perspectives. Lacking the ability to deploy on pay-as-you-go public cloud infrastructure like Amazon EC2, these “on premise only” systems often result in either over-provisioned or under-provisioned systems as needs change, causing either excess spending on hardware or degraded system response times.

The standard legacy ERP license model (large up front license fee + ongoing maintenance) encourages overbuying of user seats with “end of quarter license discounts”, resulting in ongoing overpayment of maintenance fees--which are a fixed % of the non-discounted list price, and rarely if ever negotiable.

The need to scale up or down is very real for many mid-sized companies, and **the legacy technology and business models of traditional ERP vendors simply do not accommodate it.**

## THE COMMERCIAL OPEN SOURCE ERP OPTION

Open source ERP has rapidly matured in recent years due in part to the superior productivity of the development process, which effectively uses the internet to enable collaboration by thousands of skilled individuals globally. While historically it has taken traditional ERP companies 10-12 years to develop a stable and functionally mature product that is worthy of consideration by mid-sized companies globally, several commercial open source ERP companies have managed to achieve this feat in about half that time!

So what does open source bring to the table from the customer perspective? Many customers **look to open source as the ultimate low cost option**, and it is certainly the case that the price / performance of open source ERP is superior to proprietary ERPs for mid-sized customers. While superior cost-effectiveness is a huge (and potentially strategic) benefit in the costly area of enterprise applications, that is not the only open source advantage.

## STRATEGIC ADVANTAGES OF OPEN SOURCE

Most of the critical challenges and frustrations that mid-sized customers face with legacy ERPs are tied to the **rigidity of the applications and the vendor licensing policies, which together prevent full realization of the ERP promise**. And this is where the open source process and products deliver their most strategic benefits to mid-sized companies, through:

- vastly greater investment in superior architecture that emphasizes adaptability
- use of open standards and best in class open source technologies
- licensing that puts end users in control

Successful open source projects are characterized by an obsession with technical excellence, coupled with a transparent global development process. The result is **much greater initial and ongoing investment at the platform level than proprietary ERP vendors can afford, with commensurately better results**.

For many classes of software, the attributes of the underlying platform are largely irrelevant, but for ERP the platform and architectural concerns are absolutely paramount. ERP practitioners who have worked with many ERPs across decades can attest that the potential value of an ERP is largely determined by its architecture. **Mid-sized companies who seriously assess and compare open source vs. proprietary ERP architectures consistently report amazement at the overwhelming superiority of the open source options**.

While architecture is critical to implementing a best fit and sustainable ERP, the licensing and terms offered by commercial open source vendors are equally important in allowing mid-sized companies to extract as much business value as possible from the system, across all of the business goals highlighted above.

Unlike restrictive proprietary licenses, **open source licenses and commercial support terms are structured to encourage widespread use of the system inside and outside the enterprise, and most provide full freedom to exploit the software in support of innovative business models.** For mid-sized companies looking to use IT strategically, the freedom and control benefits of open source ERP cannot be overstated.

These strategic considerations, combined with the clear cost advantages and maturing state of commercial open source ERP, clearly indicate that **now is the time for mid-sized companies to include commercial open source ERP vendors in their selection process.**

Note that in this white paper we use the common term “ERP”, since most people are familiar with it. However, the best open source ERPs are really business management systems that can be applied across industries. In fact, some open source vendors strategically maintain a vertical focus and develop very **compelling industry-specific functionality like web based Point of Sale for Retail.** So, don’t get tripped up on the terminology, and don’t make assumptions about whether open source “ERP” can work for you. It takes a bit of work to understand all that open source has to offer, but the results for your company can be truly transformational.

The next section provides some practical guidance to help you navigate the complex and dynamic world of open source ERP.

## 7 FACTORS FOR OPEN SOURCE ERP SUCCESS

It must be stated that open source is not a panacea for all software challenges, and not all open source ERPs are created equal. There are literally dozens of open source ERP projects in existence globally, but very few have achieved the maturity and commercial critical mass to warrant consideration by mid-sized companies.

To succeed with an open source ERP, here are 7 critical success factors to consider at the front end of your ERP assessment process:

- Sufficient and usable out of the box functionality
- Robust application architecture
- Modular and upgradeable
- Scalable and cloud-ready deployment
- Availability of knowledge and expertise
- Use of mainstream open source technologies and processes
- Acceptable commercial license terms

## SUFFICIENT AND USABLE “OUT OF THE BOX” FUNCTIONALITY

Achieving adequate business functionality has historically been a significant barrier to entry for mid-market ERP vendors, and it is true for open source as well. Even with the best proven web technology and architectural advantages, creating functionally rich, fully integrated business applications that are usable in the real world is a multi-year, multi-disciplinary effort that must be driven by a talented team of dedicated professionals.

Functionally, make sure that the open source ERP covers the core functionality you will need, for example:

- Financial and Management Accounting
- Master Data Management
- Inventory Management
- Order to Cash
- Point of Sale
- Procurement Management
- Production Management & MRP
- Project Accounting & Billing

While large functional gaps (for example, a critical functional area missing) may disqualify a candidate open source ERP product from consideration, small gaps should not. Remember, a core strength of open source is the adaptability and development productivity that arise from the ERP platform.

**Some mature commercial open source vendors have established a vertical focus, and aggressively seek co-development opportunities around those verticals, especially for functional areas on the product roadmap.** Additionally, some have also established a commercial “ERP modules catalog / app store” ecosystem, and in these cases the implementation partners may also be eager to co-develop enhanced commercial reusable functionality with you. Done correctly, **open source co-development can be a win/win on both sides, since the buyer gets a perfect fit system, while the supplier assumes the maintenance responsibility going forward in exchange for the rights to reuse the software with other customers.**

**Usability is a huge issue for ERP adoption, and most mid-sized companies looking to make a strategic investment in ERP are now mandating 100% native web solutions** due to the reduced learning curve, easy deployment, and superior scalability. If you require native web applications, it makes sense to focus on ERP projects that have been 100% dedicated to the web from the very start. Some projects started with a client/server architecture and still maintain a client/server code base that they have extended with web extensions, diluting the development investment and resulting in a web experience that is less than optimal.

From the usability perspective, all viable open source ERP projects maintain a live demo so that you can experience the product directly, and most offer free downloads and free trials of commercial extensions so that you can try the software in your own environment with your own data [3,4,5].

Commercial open source vendors often schedule periodic live public webinar demonstrations of their products, which is a good way to **observe a knowledgeable person putting the software through its paces, and also to get your questions answered.**

## ROBUST APPLICATION ARCHITECTURE

While it is very easy to get a quick feel for a system's technical architecture by looking at a diagram, equally important (and more difficult to assess) for ERP is the application architecture. Here are some checklist items for mid-sized companies to **ensure that the ERP application architecture is sufficiently robust and configurable to meet immediate and long term needs:**

- hierarchical organizational model that enables multiple organizations within an enterprise to share a single instance
- integrated role-based security by organization
- option to easily transact across organizations
- master data setup by organization
- ability to tailor screens and processing by organization
- user-configurable document types, document status, etc. to accommodate custom business processes
- embedded accounting datamart to serve as an easy to query single source of truth for management reporting
- user-configurable auditing to ensure high quality data and meet compliance requirements
- multi-tenant capabilities to support new business models
- integrated data model that lets users easily navigate related information on all screens
- integrated application dictionary to allow easy addition of new data elements, which automatically appear on screens

The last two points are critically important for all mid-sized customers. **Model-driven applications that generate standard screens from an “application dictionary” deliver much greater development productivity and ensure that new technologies (like a mobile touch-screen UI) can be easily incorporated on an automated basis.** They also put more power directly in the hands of your business analysts, properly segregating roles and allowing both analysts and developers to focus on what they each do best.

## MODULAR AND UPGRADEABLE

The key assertion of this white paper is that **open source ERP deserves a look by mid-sized companies, and one of the reasons is the superior adaptability**. However, merely providing full access to source code is not a viable solution to the very real problem of upgrading software that has been customized. Modifying application source code is not practical because too much manual rework is required at upgrade time.

Open source ERP communities have solved this problem through **well-defined APIs (application programming interfaces) and by providing formal facilities to isolate new and overridden functionality in modules**. The best in class commercial ERP vendors additionally:

- provide central hosting and curation for both open source and commercial modules (ERP App Store concept) [6]
- provide a collaborative environment (typically called a “forge”) to facilitate the creation and maintenance of modules [7]
- provide “scan for update” feature to allow customers to easily install module updates and new maintenance packs [8]
- include sophisticated module dependency management capabilities (for both centrally hosted and customer-specific modules) to ensure valid installation state [9]
- create, document, test and publish monthly maintenance packs that can be installed automatically with no manual intervention [10]
- track module maturity status and provide options to only install modules of desired maturity in a given ERP instance (for example, only “confirmed stable” modules allowed for a production instance) [11]

Enabling true business agility requires a sophisticated and mature layer of modularity, combined with the power of model-driven development and rigorous adherence to best in class software engineering and quality assurance practices. Mid-sized companies looking for an adaptable yet sustainable ERP should look very closely at these feature sets and practices, as they are core to the open source ERP value proposition.

**Many mid-sized customers of legacy ERPs report that it is not possible to cost-effectively upgrade to the latest vendor release, which means they end up wasting a lot of money on annual maintenance fees with no business value in return.** Most open source ERP business models, on the other hand, are specifically designed to put the end customer in control, allowing you to pay for only the value you realize and to avoid one-sided dysfunctional business relationships.

## CLOUD-READY, GLOBAL-READY DEPLOYMENT

Mid-sized companies are increasingly looking to cloud computing for cost savings, scalability, and anywhere access. While relatively few have deployed ERP in this manner as of this writing, **given the long term nature of the ERP investment, full flexibility of deployment options should be a priority item**--and not all open source ERPs provide them. Things to look for on the deployment side [12] include:

- full service On Demand option to facilitate easy assessment and pilot project
- self service Public Cloud option (e.g. Amazon EC2)
- On Premise option for full control
- ability to migrate between options as needs change
- pre-configured 100% open source technology stack, e.g. PostgreSQL database, Apache Tomcat application server, Linux Server OS--to minimize system costs
- commercial options for key system components, e.g. Oracle database, Windows Server OS--to align with existing corporate skills and standards

If global access / use of the system are key drivers behind a decision to deploy in the cloud, do not make the **mistake of assuming that just because an ERP is “cloud ready” that it is also “global ready”**. Very few ERPs (open source or proprietary!) are architected to properly accommodate a truly global implementation in a single instance. Things to look for in the area of global readiness include:

- full Unicode implementation, including demonstrable support for all required character sets (which may include Asian double-byte and Middle Eastern right to left languages)
- multi-lingual user interface with run-time choice of language
- ability to easily install and upgrade language packs and localizations via modules
- option to create and package your own language packs and localizations if required
- ability to configure one or more language packs and localizations at any levels of the organizational hierarchy
- ability to accommodate both local and corporate financial requirements in a single instance by allowing transactions to generate multiple accounting representations (often known as “multi-schema accounting”)

**For a mid-sized company looking to operate efficiently and effectively on a multinational basis, the right open source ERP can provide an incredible advantage.**

## AVAILABILITY OF KNOWLEDGE AND EXPERTISE

No matter how great an ERP product is functionally and technically, a key qualifying point for mid-sized company adoption is the **broad availability of professional implementation expertise and knowledge assets**, including online training programs and public documentation.

Qualified ERP implementation specialists ensure that the customer gets maximum business value at minimal cost and risk. The value and need for these professionals is hard to overstate, and open source does not change that. **Look for open source ERP vendors who certify their implementation partners, and review partner web sites** to make sure you are dealing with an implementation organization with the scale and expertise to meet your needs. Many open source ERP projects are serviced by individual freelancers, who may not have the capacity to properly service a typical mid-sized implementation.

The best open source projects also offer **public access to the same online training and certification resources that they use with their implementation partners** [13], allowing mid-sized companies to train and certify their own IT staff if desired.

One huge advantage of open source ERP for mid-sized companies is the **100% process transparency of the top projects, which enables large scale knowledge transfer, collaboration, and full exploitation of the software** through free public resources like:

- complete documentation in online wiki format [14]
- online help forums [15] and IRC chat channel [16]
- product roadmap [17]
- issues database [18]
- source code repository [19]
- latest maintenance pack in virtual machine and AMI formats [20]
- latest automated live builds (to test current code directly) [21]
- latest automated QA test results [22]

Most mid-sized companies have full time staff dedicated to their ERP, and **access to these kinds of best in class resources empowers them in unprecedented ways to assume more responsibility for the packaged application and add more value to the organization.**

In fact, encouraging motivated IT staff to become engaged and contributing in the open source ERP community is a great way to develop deep expertise and also strongly influence the direction of the project, on a peer basis. **This kind of “influence through participation” is simply not an option for legacy ERPs, and can be extremely valuable for mid-sized companies intent on strategic use of enterprise software.**



## USE OF MAINSTREAM OPEN SOURCE TECHNOLOGIES AND PROCESSES

All open source projects are responsible for making the best possible technology choices based on the application characteristics and end user needs. **Since ERP is a long term investment, it is very important to verify the choice of mainstream technology that has a stable future and is sustainable over time.**

Open source is known for experimentation, and the trap of niche programming languages and frameworks that are “the next big thing” one year--but then fade from common use over time--is a very real risk. Simply put, **if your chosen open source ERP is built using a niche programming language or framework that has a limited following or is in decline, the project will not be sustainable over time.**

As a strategic user of open source, you want to be able to leverage a large pool of skilled and knowledgeable IT people who know the technology that your ERP is built on. **Here are the rock solid core open source technologies that have been proven for ERP use across multiple decades, with strong corporate sponsorship, large pools of skilled practitioners, and no signs of decline:**

- **Java programming language** (for server-side processing) - the gold standard for scalable enterprise applications, and the most popular language globally for business applications [23]
- **Javascript programming language + HTML + XML** (client-side processing in browser) - the only game in town for fully standards-based rich client technology in the browser [24]
- **PostgreSQL database** - proven best choice for the transaction processing workload of ERP [25]
- **Apache Tomcat application server + Apache web server** - most popular in their class globally (these workhorses run the internet) [26]
- **Linux operating system** - popular and cost-effective server OS for enterprise applications [27]
- **Eclipse** - a highly productive integrated development environment sponsored by IBM and many other technology companies [28]

This world class open source mix of technologies is very accessible to staff of mid-sized companies with Microsoft-centric expertise. For example, C# web developers can transition easily to Java, SQL Server experts will find PostgreSQL easy to administer, and many Visual Studio developers who start using Eclipse on a daily basis end up preferring it. Companies with Microsoft-centric IT operating standards may be surprised to find that all proven open source technologies work great on Windows, not just Linux. Regarding the choice of the ERP itself, a 100% web based ERP that supports all modern browsers is the best way to accommodate whatever client operating systems your IT is supporting now and in the future.

Additional newer technologies that are relevant and best in class for ERP use include:

- **Jaspersoft** - user-friendly embedded report writer [29]
- **Activiti** - embedded business process management engine [30]
- **RESTful web services** for easy interoperability using today's highly productive drag and drop standard tooling in Eclipse and other IDEs [31]
  - » Note: this is not the same as legacy XML-RPC interfaces (which are much more developer-intensive and less productive)
- **Enyo** - high performance mobile javascript framework [32]
- **SmartClient** - full-function desktop-grade javascript framework [33]
- **Quartz** - embedded scheduling engine for running periodic asynchronous processes [34]
- **Hibernate** - best in class relational persistence for Java and .Net [35]
- **Weld / Seam** - critical low level infrastructure that reduces code volume and aids scalability and easy integration of new functionality [36]

While appropriate technology choices are needed for any successful open source project, **the inherent complexity of ERP projects also requires that a rigorous, best in class open source *development process* be established and maintained to ensure the ongoing quality and successful growth and evolution of the software.** Here are the key points to look for regarding the development process for ERP:

- public documentation online, including functional, technical, user documentation, and road map [37]
- transparent agile development process with well-defined sprints and ongoing release of working code to the public (best practice is monthly) [38]
- distributed version control system like Mercurial [19]
- standardized automated test suites using a tool like Selenium [39]
- continuous integration process [40] using a robust tool like Hudson
- public issues list for reporting and tracking [18]
- public ERP forums for collaboration [15]

**An open source ERP project that consistently leverages these proven processes and technologies at a high level is one that a mid-sized company can rely on over the long term.** Additionally, companies whose staff collaborate with successful world class open source projects frequently report a rapid rise in their own development productivity, as the open source best practices diffuse into the organization.

## ACCEPTABLE COMMERCIAL LICENSE TERMS

While one important benefit of open source is the potential freedom it offers, an alphabet soup of licenses across various ERP projects can complicate the assessment process. Many open source licenses are clearly safe for strategic commercial use, but some may not be.

Make sure to choose a project with a commercial friendly license that protects your freedom to use the software as you see fit, **with no risk of claims on any of your own intellectual property that you may develop with the software.** Even if your initial goals are prosaic, remember that the sky is the limit re: use of open source software, as Google, Amazon, and others have shown.

In this age of IP trolls, patent wars and acquisitions, you can't risk your business on mission critical software code that could potentially make you a lawsuit target at some point. Be especially wary of the AGPL license [41], which contains publication requirements in section 13 that may impact companies who allow external personnel to access the software.

**Finally, make sure to include your legal counsel early in the open source ERP qualification process, to avoid wasting your valuable time and effort assessing a product that will not pass legal muster.**

## CONCLUSION

Mid-sized companies are struggling with legacy ERPs, and many are seriously considering other alternatives--before resigning themselves to yet another expensive spin on the “Business as Usual ERP Merry Go Round”.

Here is a brief recap of some of the common business challenges related to legacy ERP, with a look at how commercial open source ERP meets each challenge:

BUSINESS CHALLENGE	LEGACY ERP	COMMERCIAL OPEN SOURCE ERP
Customization of standard functionality	Results in significant downstream costs, particularly at upgrade time.	Modern modular architecture enables easy extensions without sacrificing upgradability.
Expansion of the ERP implementation to additional business units or regions	Rigid processes typically force multiple ERP instances, driving up overall cost and complexity and resulting in a loss of the promised “single version of the truth”.	Adaptable processes and modular localization capabilities allow multiple business units and regions to be accommodated in a single instance, resulting in a unified view of the entire business.
Evolution of the business model to capture new opportunities	Poor usability, restrictive licensing and client-side technologies limit possibilities.	Easy to learn browser UI, secure and scalable cloud deployment, and business-friendly licensing unlock business opportunities like cost-effective multi-channel retail, direct collaboration with trading partners, new industry-transforming business models, etc.
Real time integration with SaaS applications	Lack of native web services dramatically increases integration complexity and cost.	Native RESTful web services enable fast, low cost integration that is easy to maintain as systems evolve.

Easy access to unified business information	Cryptic UIs, lack of modern embedded query and reporting capabilities, deficient data security, lack of a single version of the truth, and other implementation factors all conspire to limit the informational / decision support benefits of legacy ERPs.	Conversely, open source ERPs are designed around the principle that end users own their data, and should be able to easily and securely access it. The result is a system that can truly meet end user information access needs on a daily basis.
Need to scale users or volume of data	Inability to cost-effectively scale is rooted in both legacy technology and restrictive licensing policies.	State of the art web technology, full deployment options (including cloud, on demand, and on premise), and open source licensing that encourages full use all work together to ensure scalability as needs change.

Whether you are a **retailer, manufacturer, distributor or professional services organization**, your ERP / business management system is the means by which you execute your business strategy, and open source enables exceptional execution across common real world challenges. Additionally, the commercial open source ERP alternative--unlike SaaS-only systems--provides **sustained ROI and lowest risk over the long term, keeping you in full control of your mission critical applications, data, and costs.**

At the top of the commercial open source ERP movement, significant development investment (enabled by VC funding) has harnessed the amazing productivity and architectural excellence of the open source development model to create a vastly **superior value proposition for mid-sized companies.** The right open source ERP, well implemented and embraced by your organization, can be truly transformation from both the cost savings and revenue opportunity perspectives.

**Commercial open source ERP is ready for prime time for mid-sized customers, and clearly deserves a serious look during your next ERP or Retail Management System [42] selection process.**

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