Introduction to Sage ERP X3 Technology and Architecture

The foundation for the next generation of ERP

The consumerization of IT drives the reorientation of products and services used within an enterprise to be more focused around the individual user. The adoption of popular consumer market technologies and devices outside of work have an unavoidable impact on enterprises as they are introduced in the workplace. Business management solutions such as ERP are no longer an island designed for users in administrative functions, but must be designed to connect to users in both the front and back office.

This new interaction paradigm is user-centric, collaborative, participative, and social. These words may sound a bit lofty, but actually can be harnessed to drive process efficiency, improved productivity, higher customer satisfaction, and better decision making. Businesses can experience great success when introducing a business management solution designed to support these next generation realities. Ultimately, the adoption of a user-centric ERP will not be a nice-to-have, but an economic necessity for the enterprise.

Sage ERP X3 introduces an entirely new user experience, and a range of new technology components that are recognized as the best, forward-looking choices in the industry built for multi-browser and mobile usage, designed to deliver rapid search results, capable of supporting web service development, and integrated with document management.

Simply put, Sage ERP X3 is not just another product release, it is also the foundation of a next generation ERP designed for the connected, mobile, social, collaborative, intelligent enterprise of today and the future.

The technology behind Sage ERP X3

Sage serves millions of start-ups, and small- and medium-sized businesses around the globe. In these competitive business segments, there can be limited IT departments, varying levels of executive support for IT initiatives, and no thorough user training or access to professional services. Comprehensively supporting customers within these segments and providing the solutions and support services to help them thrive is unique to Sage, and contributes to its ability to develop user-centric solutions to maximize success for mid-sized businesses.

Sage ERP X3 is an integral part of the global technology strategy for Sage to better support those customers. In fact, it's this ability to leverage the Sage global footprint, and the breadth and depth of its product and service portfolios that enables Sage and Sage ERP X3 to help customers excel in a connected business world and differentiate with so many competitors in the marketplace.

The stability and predictability of Sage ERP X3

To drive a successful technology strategy with an emphasis on mobility, Sage balances the need for stability and predictability in the core system of record, the backbone of enterprise IT, against the rapid release cadence required to mobilize the enterprise.

Mobile apps are entirely driven by the pace of adoption. To drive innovation can mean to fail fast, fail often, and learn quickly; however, this is most certainly not what anyone wishes for in an ERP solution where stability and reliability are paramount.

The architecture of Sage ERP X3 allows the solution to be both, be mobile first without compromising more traditional ERP values. Naturally, the cloud is the enabling technology behind the connected, social enterprise. With all the talk about SaaS it is easy to forget that it is one aspect of the cloud, be it important aspect for some applications and segments.

Sage ERP X3 Technology Features
Integrated business intelligence
Interactive user portal
Visual process maps and process editor
Workflow engine
Graphical query tool
LDAP integration / Single sign-on support
Predefined configurations, roles, processes
Eclipse plugin for development
Microsoft Office integration to Word, Excel and PowerPoint
Mobile web apps
Tablet view
Full Web Client via HTML5
Online help portal
User and Role Page Personalizations
Full text Search capabilities
Web interface supported by node.js
Document storage supported by mongoDB

However, customers want choice of deployment, and many businesses still prefer an on-premise business management solution. This is why Sage subscribes to hybrid cloud technology. This is an architecture that avoids the lock-in that comes with conventional SaaS solutions which typically run on proprietary technology. It provides customers choice whether to deploy in the cloud, on-premise, or in a hybrid model where the cloud can supplement on-premise resources.

Deployment Options

Sage ERP X3 offers on-premise and hosted (private cloud) deployment options to best meet your requirements as a mid-sized customer. Since Sage ERP X3 is designed to scale from 8 to more than 2,000 concurrent users, and deploy locally or in multi-country scenarios it can help you succeed in today's competitive marketplace no matter where your business takes you. The proven implementation process for Sage ERP X3 is designed to be streamlined yet flexible enough to meet your unique business requirements. This process includes a comprehensive implementation tool kit, role-based user profiles, and an implementation methodology for more rapid deployment at home or abroad.

User Experience

Woven into the DNA of Sage ERP X3 is an exceptional user experience so it's no surprise that usability is a primary focus of the ERP and helps to foster a wide adoption by all users across the organization. Usability enhances individual efficiency while contributing to the improvement of business performance company-wide. Sage ERP X3 is designed to give a true web experience throughout including web pages, hyperlinks, bookmarks, search and more. Sage ERP X3 provides broad yet simple personalization capabilities for all pages of the application, directly in the hands of end-users.
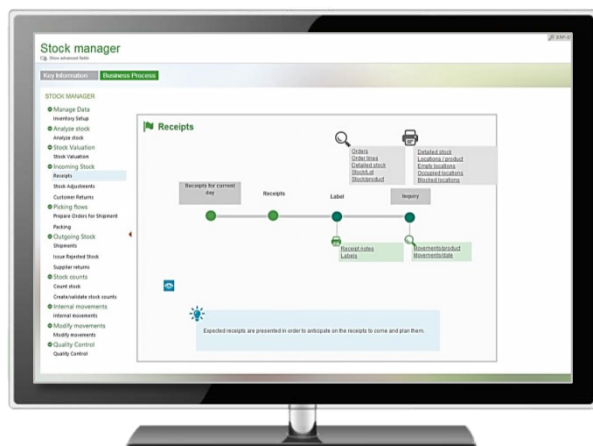

In addition, Sage ERP X3 guides the users efficiently in their journey thanks to visual processes and workflows – just another way that the solution is designed with the user experience as a priority.

Power users can personalize the screen layout of Sage ERP X3 in WYSIWYG mode, and share their personalization with others. This personalization can be defined by user and by role, shared and shipped from one environment to another. A default personalization is supplied within Sage ERP X3, based on the experience of our consultants.

Security

Security was a strong focus in the design and development of Sage ERP X3. The solution was audited and certified by a third-party for safe operation in the Cloud. Sage ERP X3 supports external identity providers like LDAP, Oauth2 (Google and Microsoft Live accounts) and Sage ID. This improves security by offloading the management of user credentials, and also improves the user experience by providing a Single Sign-On (SSO) experience. User credentials do not transit through the ERP when integrated with Oauth2 identity providers or with Sage ID. In addition, communications with the various client components can be secured with HTTPS, and communications between server-side components are authenticated with certificates.
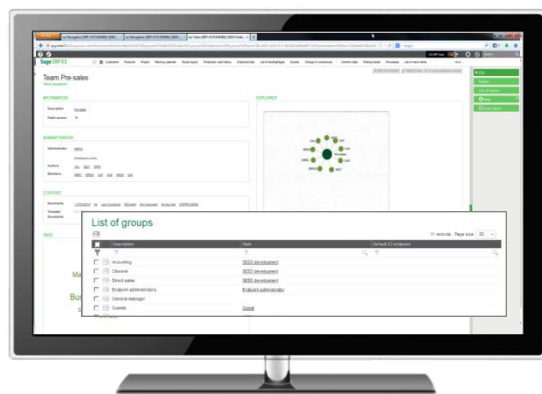

Collaboration

Collaboration between users is another important topic that enhances the efficiency of ERP customers. The collaboration platform within Sage ERP X3, and the TEAMS functionality allows users throughout the organization to better share, review and contribute to documents, templates and processes using the teams functionality within Sage ERP X3 company-wide.

Openness

Integration and the ability to exchange information securely were key drivers for Sage ERP X3. The solution is architected around RESTful Web APIs, with simple JSON feeds. External processes can easily consume data feeds coming from the ERP and the ERP can also easily consume data feeds from the external world.

All the new ERP clients (mobile client, web UI, Microsoft Office add-ins) interact with the platform through the RESTful Web API. Service orientation is handled at the heart of the ERP rather than through a separate middleware tier.
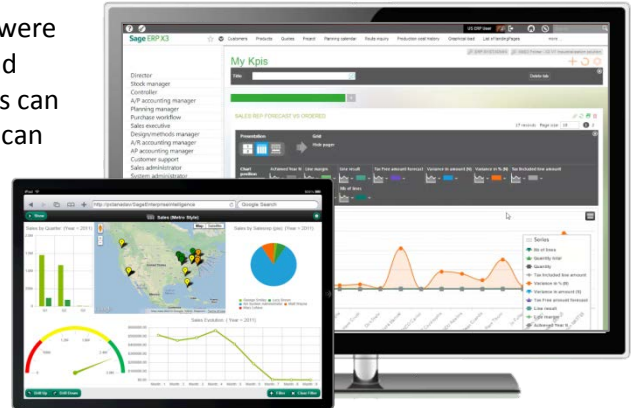
A closer look at the architecture of Sage ERP X3

The architecture of Sage ERP X3 is organized in layers so that data management, process execution, and information display are handled independently. This multitier architecture ensures that the ERP operations are highly reliable in all circumstances. The following diagram summarizes the architecture of Sage ERP X3.
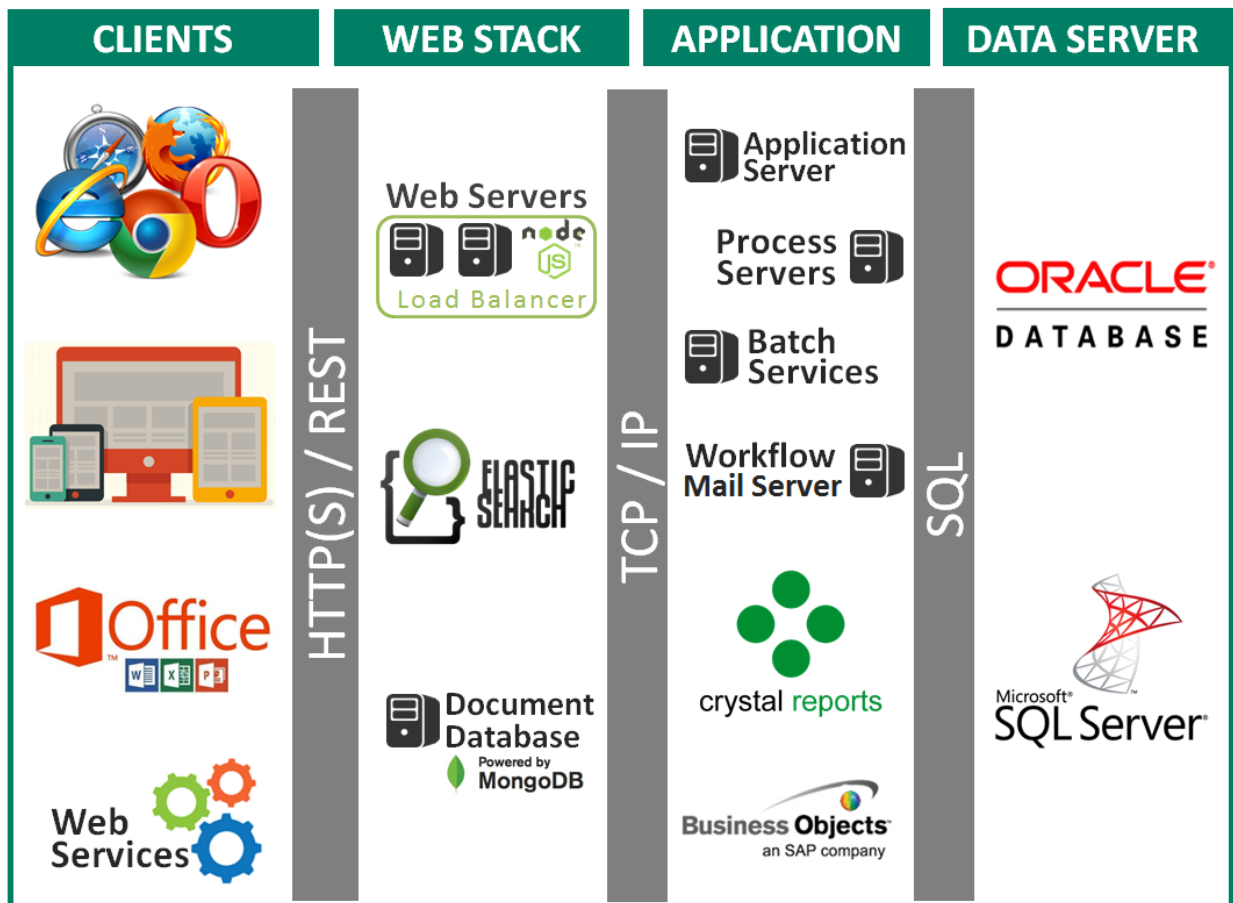
Clients

Web Interface

Sage ERP X3 is accessible from PCs and laptops, even an Apple Mac and Linux PC, via its web interface. The web interface runs on every modern browser (IE9 or above, Chrome, Firefox, Opera, and Safari), and it is built in HTML5, CSS3 and JavaScript.

The interface for Sage ERP X3 is redesigned to be fully compliant with modern web standards. For example, every page has its own URL which can be bookmarked or emailed; the browser's back button and history function as part of the ERP; communications are asynchronous; and user choices such as last tab visited, column ordering, folded/unfolded sections are saved transparently. The portal and the navigation menus within Sage ERP X3 have been redesigned to provide a more pleasant and fluid user experience, and are complemented by an efficient and rapid search service.
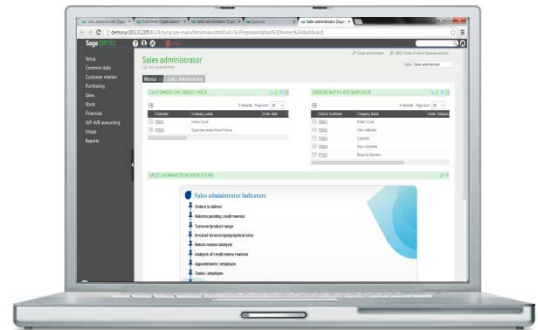
The Sage ERP X3 web interface has been adapted for tablet devices as well. Gestures are recognized and user-interface elements can be zoomed to ease direct manipulation. Tablet users can choose to access specific ERP functions through mobile applications or access the entire ERP through the web interface.

Mobile Devices

Mobility is critical in supporting agile businesses and ensuring the efficient distribution of information in real time. The Sage ERP X3 mobility platform features support for multiple devices and operating systems including smartphones and tablets, and Android and Apple iOS.
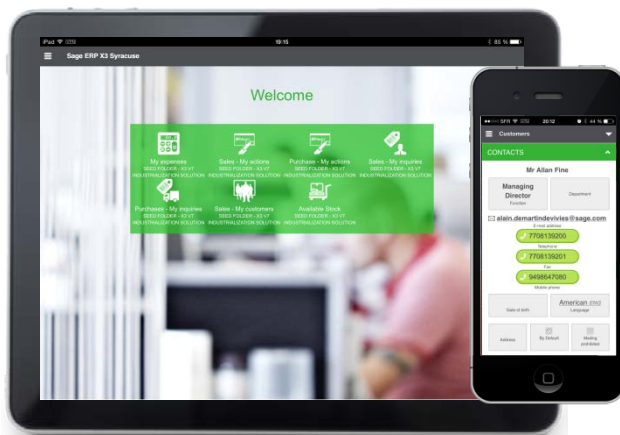
Sage ERP X3 mobile application framework, written in HTML 5 and JavaScript, is web based making it accessible from mobile applications that are optimized for touch and small screens. It is downloaded and updated directly from the ERP's web server, and the applications themselves are modeled via dictionary artifacts and then published on the ERP portal. Users can browse through the list of applications that have been published and install them on their devices, and when an application is installed the dictionary artifacts are downloaded and cached on the device.

Once installed, mobile applications can be used either in online or offline mode. In online mode, the applications interact directly with the ERP through its Web API. In offline mode, the applications can display ERP data on the device. Data entry is also supported, by storing the data locally on the device and letting users synchronize to the server when connectivity becomes available later.

The service oriented architecture (SOA) of Sage ERP X3 ensures that the mobile applications rely on the same dictionary artifacts as the desktop and office clients, and all clients share the same business logic written in the language of Sage ERP X3. This makes the design very agile allowing for the development, customization and publishing of mobile applications without a major investment in development resources.

In fact, developers do not need to learn new skills -- they can leverage their existing ERP programming skills and are not required to dive into the specifics of mobile devices such as APIs and native languages. Several mobile applications such as purchase approval, expenses management, and sales information are bundled with Sage ERP X3. These applications can be used out-of-the-box, or customized, and new mobile applications can be cost-effectively developed as mentioned earlier.

Microsoft Office Add-ins

Sage ERP X3 includes a suite of Microsoft Office add-ins for Excel, Word and PowerPoint that serve as collaboration tools for sharing documents and templates between members of a team. These add-ins provide live links between Microsoft Office documents and the ERP data such as Excel tables, PowerPoint tables and charts, and Word mass mailing content linked to data feeds.

In addition, Microsoft Word can also be used as a reporting tool, by populating a template document with a data feed from a specific ERP record. The links are saved together with the Microsoft Offices documents that can then be circulated, re-opened and refreshed as necessary.

For security reasons, user credentials are not kept in the documents. When a user opens an existing document, he or she will be prompted for credentials, if not already authenticated, and access to Sage ERP X3 granted with the individual's own security profile.
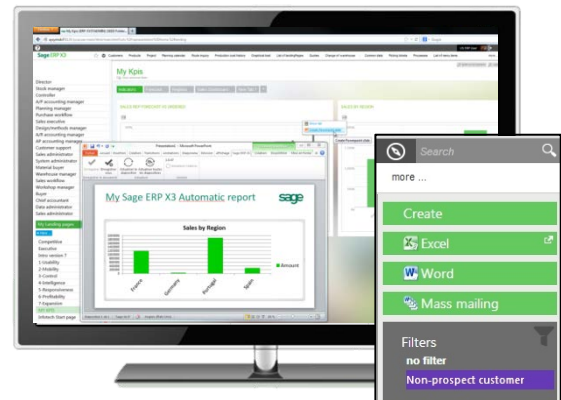
Web Services

Sage ERP X3 delivers standard capabilities for web-based services that enable customers to integrate external or custom-built systems to support their ERP business requirements. As a result of these core capabilities, any Sage ERP X3 user can publish user interfaces for numerous functions available for consumption by a web service application. Used primarily as a means for businesses to communicate with each other and with clients, web services allow organizations to communicate data without intimate knowledge of each other's IT systems behind the firewall.

The architecture of Sage ERP X3 is based on REST, and as such all the services that power interactive clients (mobile, web browsers, add-ins) can be used to access the ERP programmatically.
This REST API is SData 2.0 compliant and stateless. The REST API gives access to all the ERP services developed with the new dictionary artifacts (classes and representations), but it does not give access to the classic services inherited from the previous version of Sage ERP X3. These classic services are available through SOAP services for backward compatibility, and are powered by a different web stack (Java server) than the REST API (node.js).

Web Stack

The Sage ERP X3 web stack is built on components widely used in Cloud solutions. Below is some information to better acquaint you with the web stack components used within Sage ERP X3. All of the components listed below are scalable and may be deployed in clusters. Regarding the web servers, a load balancer is included, to front-end the node.js processes.

Node.js is an open source, cross-platform runtime environment for server-side and networking applications. Node.js applications are written in JavaScript, and can be run within the Node.js runtime on OS X, Microsoft Windows, Linux and FreeBSD.Fast and asynchronous, node.js is notably used by Groupon, SAP, LinkedIn, Microsoft, Yahoo!, Walmart, and Paypal.
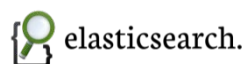
Elasticsearch is a search server based on Lucene, a free, open source information retrieval software library. It provides a distributed, multitenant-capable full-text search engine with a RESTful web interface and schema-free JSON documents. Elasticsearch is developed in Java and is used by Deezer, github, and Mac-Graw Hill, Foursquare, Etsy, FDA, CERN and Stack Exchange.

mongoDB is a document database for administration data and documents that is fast, scalable, and able to work very efficiently with JavaScript structures. It is regarded as the most popular NoSQL database system available today. Companies using mongoDB to store production data include Expedia, eBay, Foursquare, LinkedIn, SAP, SourceForge, CERN, github, and the New York Times.

Application Server

The Sage ERP X3 application server is composed of a large set of services designed to ease the configuration and the administration of the ERP platform. This includes a batch server to schedule tasks and manage recurring tasks, and a management console to administrate the components and services offered by the solution. In addition, there is a workflow engine, as part of the application server, that can be triggered by any business event, a comprehensive set of import and export tools, and log and profiling tools designed to tune the performance of the ERP at any level.

Data Tier

SQL server and Oracle, the leading relational databases, may be used with Sage ERP X3, and all documentation stored in a mongoDB repository.

Reporting and Business Intelligence

Extracting and distributing relevant information is critical in an ERP solution. The reporting and analytics capabilities as well as the library of predefined reports within Sage ERP X3 centralize data and enable real-time access to key business data. Standard reporting and analytics capabilities within Sage ERP X3 include requesters to quickly build ad-hoc requests that can be displayed in user dashboards, and a standard data mart can connect to several business intelligence solutions (SAP Business Objects for instance). Specifically, this data mart can be personalized through a report dictionary with hundreds of predefined reports, associated to SAP Crystal Reports printing engine.

Development Environment

The development environment within Sage ERP X3 is based on the following three principles: simplicity of development and evolution, reusability of existing code, and independence from platform execution. The Sage ERP X3 development environment, which is inclusive to the solution, does not require a third-party integrated development environment like Microsoft Visual Studio. It provides a meta-data description of the database structure, including the classes definition and the UI structure, and clear identification of standard, vertical and specific entities as well as modifications that enable the development of customizations within Sage ERP X3. It is important to note that any customizations developed within the Sage ERP X3 Development Environment are not effected when upgrades are implemented.

Sage ERP X3 also includes a 4GL object-oriented code with embedded SQL-like syntax that is independent from both the execution environment (Windows, Linux, Unix) and the user interface (Windows client, web browser, portable terminals). For the development of applications within Sage ERP X3, there is a set of integrated development tools such as an editor and debugger available through an Eclipse integrated development environment (IDE). In addition, the same code is used for business logic regardless of platform (smartphones, tablets, and desktop PCs), and regardless if it is called as a REST web-service from another component of the development, from a user interface, or from Microsoft Office. Finally, as part of the development environment Sage ERP X3 includes an automated tool to run the services in QA test mode.

About The Sage Group plc

We provide small and medium-sized organizations with a range of easy-to-use, secure, and efficient business management software and services—from accounting and payroll to enterprise resource planning, customer relationship management, and payments. Our customers receive continuous advice and support through our global network of local experts to help them solve their business problems, giving them the confidence to achieve their business ambitions. Formed in 1981, Sage was floated on the London Stock Exchange in 1989 and entered the FTSE 100 in 1999. Sage has over 6 million customers and more than 12,700 employees in 24 countries covering the UK & Ireland, mainland Europe, North America, South Africa, Australia, Asia, and Brazil.

For further information please visit www.sage.com.