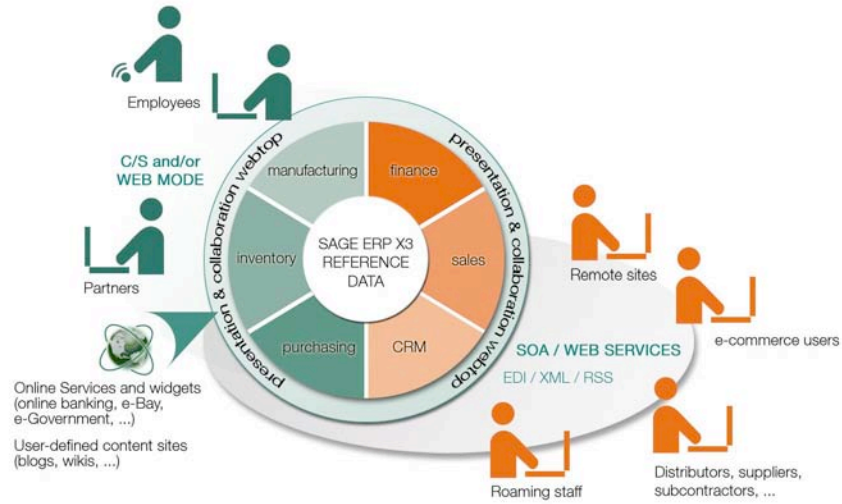


Document Scope

The material covered within this document reviews Sage ERP X3 interfaces to external systems. It is intended to support a recommendation for companies interested in refining their understanding of X3's approach and capabilities, pursuant to a decision based on business need for systems interoperability.

Complementary material may be provided to satisfy your level of interest.



A communicative architecture

A Communicative Architecture

Sage ERP X3 provides an Enterprise Resource Planning platform for companies that emphasize integration and natively enabled functionality. The approach empowers companies with the choice to scale their business' ERP within a unified context. This is exhibited by a mature, comprehensive field of processes provided as standard in Sage ERP X3 installations: Accounting and Financials Management, Purchasing, Inventory, Sales, CRM, Manufacturing and Workflow Management.

Where there is a business demand for vertical integration, X3's flexibility permits ready development of add-ons and interoperation with external business entities. Sage invests in a cooperative business model with its customers. Customer challenges are ours, and this is reflected in the very active Research & Development of Sage ERP X3 to build-in technologies that are on the forefront of business.

Correspondingly, companies have a remarkable flexibility in choice to address business demands:

- Customizations can be developed in-house, using Sage ERP X3's 4GL Integrated Development Environment.
- Fourth generation languages (4GL) provide programming abstraction suitable for business, while emphasizing development of business processes. For example, integration of new objects into a business process with heavy reliance on business-class database systems for configurable, but self-guided decision making.
- Sage can build and support customizations for companies, utilizing its skills and knowledge of the ERP platform development.
- Interfacing to external entities in support of specific protocols for data exchange is realized with X3's native tools by many customers.
- Solutions combine cooperation, experience, and constraints to address real-world applications and can co-exist across a spectrum business relationships.

With these points in mind, an overview of North American interfaces in-use and Add-Ons follows¹.

¹ A comprehensive review of Sage ERP X3 solutions provided for customers is beyond the scope of this document, but further discussion is encouraged based on the contents presented here.

Available Interfaces and Add-Ons

Generally, for every interface or Add-On, a set of X3 windows and screens is provided, which constitute a high-level interface to business process. This necessarily reflects the integration of X3 4GL to external services and provides a convenient way to conduct and manage a business process. As dependent technology changes, or special cases are realized, the business process implementation may evolve behind the scenes. Service Integration and Interfacing share this view, where X3 user interactions are concerned. Application interface management is via X3 objects and subprograms.

A subtle comment regarding customizations is that processes can often be developed for a specific business demand or set of requirements imposed by governmental entities. Wherein the process manages process-specific details, it may be valuable to realize that annual or periodic reporting stemming from an ERP process may comply with an “implicit” interface; new or special guidelines for quality control, for example. The value is in planning for a time when the business rules are codified into a formal context, suitable for full electronic evaluation. By enabling Sage ERP X3 customers actively with modern technology, transitions to future demands may be eased.

→ Please note that some of these interfaces and add-ons are available in the USA and Canada only.

Manufacturing and Warehousing Add-Ons: Automated Data Collection (ADC) & Radio Frequency (RF) Warehousing

ADC and RF Warehousing provide an X3 solution addressing staff efficiency in warehouse management, including accuracy and timeliness.

ANSI compliant data collection devices interface to Sage ERP X3 directly, as a client application. Client technologies include RF communication devices, stationary scanners, and time clocks. For each X3 process (Material Handling, Shop Floor Control, Directed Picking, Directed Putaway, Warehouse/Location Inquiry, Sales Order Picking, Receiving, etc) an ADC Gateway services the connection. The gateway is coded in the X3 4th GL and communicates through Apache/Tomcat to X3. The server is capable of managing user sessions when devices are out of range.

The add-on demonstrates X3’s facilities for integration of client gateway services using specific client server models.

Further, It illustrates comprehensive bridging of the ERP with heterogeneous client technologies and data sources for sophisticated and simultaneous synchronous transactions.

Shipping Systems: ConnectShip, FedEx, UPS

Sage ERP X3 uses ODBC-compliant data sources for interoperation with external shipping systems. A single X3 interface provides for connectivity to third-party shipping systems. Mapping of parameters between systems may be handled automatically or manually, via X3 or the external system. Interface definitions are managed via standard methodology for X3 tables and screens.

This add-on demonstrates application-to-application interfacing on-server or via network.



F9

F9 is a 3rd party financial reporting system based on Excel add-on. The integration occurs by summarizing data through SQL into a format suitable for incorporating data into a financial reporting package.

FRX

FRx is a 3rd party financial reporting package that maintains its own SQL database for reporting and budgeting. The integration with package is suitable for companies requiring more sophisticated financial reporting.

SmartForecast

Smart Forecast is a product used to provide demand forecasts for manufacturing and purchasing. This set of interfaces provides for both extracting historical data for the application and update of demand data used in MRP and ROP processes of Sage ERP X3.

Credit Card Interface

CC processing has been implemented for the Paypal Verisign Payflow Pro™ System. The add-on demonstrates embedded connectivity through SSL and COM connection to a propriety system for payment.

Vertex Interface for Advanced Taxing

An advanced taxing solution is provided in X3 via the Vertex. Initially providing tax data based on taxing jurisdiction, the interface is readily generalizable to fuller set of Vertex product features. Sales module applications (Sales Orders, Shipments, and Invoicing) have modified in X3 to integrate calls to Vertex, using the client-server interface. Web Services and Java interfaces are also options. A Visual Basic application has been developed for interfacing to the Vertex system.

One Click Faxing

Sage ERP X3 One Click Faxing is comprehensive document faxing solution which operates in a network environment as a directly interfaced application. It includes an interface with ActiveFax™ Server (provided). Applications include generation and faxing of formatted Report documents and Automated Invoicing either by e-mail the recipient of executing a fax.

Genesis (ESHA) Interface for Nutritional Labels

A bill of materials (BOM) document is generated by X3 and exported to flat file. The Genesis software retrieves the file for printing of nutritional labels. The process utilizes Sage ERP X3 standard Import/Export facilities.

Worldwide Environmental Regulatory Compliance Solutions (WERCS) Add-On

The WERCS add-on provides an integrated Material Safety Data Sheets (MSDS) Authoring Solution for Sage ERP X3. Integration with the Sales Order Process and Customer Service Modules allows automated MSDS distribution and response to ad-hoc requests by customers for MSDS information. Further integrations include Regulatory Data Subscription Service and Tracking Capability, Hazard Label Design and Printing, In-bound Vendor/Supplier MSDS management, Reporting and Automated Classifications Tools.

The add-on provides an example of incremental incorporation of services as required for business connectivity.

Sage Application Framework for the Enterprise X3 (SAFE X3)

Sage ERP X3 is built on the Sage Application Framework for the Enterprise X3 platform (SAGE X3), shared by a full set of Sage applications for mid-to-large enterprises (HR/Payroll, WMS...). This SOA/Web-native platform provides Sage ERP X3 customers with best-in-class collaboration capabilities including (but not limited to):

Import/Export

The Import & Export functions utilize templates to provide on-demand access to the business logic in an X3 process through simple formatted data, most commonly a 'CSV' type file. Processing occurs within X3 by loading the file from a specified location, and then subsequently using the contained data on X3 screen or for automated processing. Correspondingly, exports are similarly defined for post-processing.

File Transfer Protocol (S/FTP)

An SAP integration has been implemented for exchange of XML data between X3 and an SAP system. XML Sales and Purchase Order documents are both parsed and generated with the near term exchange mechanism being FTP. As the protocol is matured (by the vendor) it is expected that HTTP may supplant FTP, and additional services will be expressed through the interface.

The example combines 4GL programming for internal process development and interfacing to external systems, wherein the interface is free to evolve with future technology.

External Executables

Sage ERP X3 subprograms can call external executables as the process runs. The calls require dedicated installation procedures, but this is also a native part of the X3 functionality. A few example options include Microsoft Windows' BAT, DLL, EXE files.

In version 5, Office productivity applications may be embedded in X3 screens (e.g. MS Word, MS Excel).

Batch Server

- Management of periodic X3 transactions
- Full Recurring Schedule administration

Workflow Engine

Sage ERP X3 provides a very mature Workflow system. Workflow triggers are used to automate processes derived from the fully configurable contexts describing the Workflow. Linking triggers into Sage ERP X3 Workflows provides an interesting means of directly tying external connectors to business rules defined from the back-office.

For example, as electronic mail is a fully integrated part of the Sage ERP X3 Workflow system, a triggering agent could be developed and attached to a mailbox that initiates a Workflow on receipt of electronic mail messages . Typically, the Workflow generates e-mail messages as part of an outgoing flux, on satisfaction of certain conditions or criteria.

Triggering agents could be developed in combination with Web Services for more general interoperation between established Workflows.

Electronic Data Interchange (EDI)

EDI is envisioned by X3 as a process for handling vendor-specific “inbound” and “outbound” documents. It provides enough sophistication to process a diverse set of interchanges. The documents are automatically retrieved for incorporation or generated pursuant to an X3 business process. Automation is a combination of decision logic and native X3 server functions that manage recurring tasks. Generally, setup is configurable via X3 screens.

A delivery mechanism is established for the process depending on the EDI client implementation. Supported transactions include Sales Invoices, Purchase Orders, Sales Acknowledgement, and Ship Notice, for “outbound” data. For “inbound” documents, Purchase Invoices and Sales Orders are processed.

Connectivity can further be determined by the specific process. In any case, structured documents may be accepted or placed via FTP, E-mail, Import/Export, Batch Processing, or Web Services, for example.

Message Queues

Message queues support asynchronous communication of data. X3 supports the integration of message queues through the X3 import/export facility described in this document. Essentially X3 is looking for a message dropped into a particular location as a file (e.g., CSV file) and using a batch process read and process the particular message. In processing the message, X3 can respond by also placing flat files into a location for ‘pickup’ by the message system. For example, this is the method used to process EDI transactions.

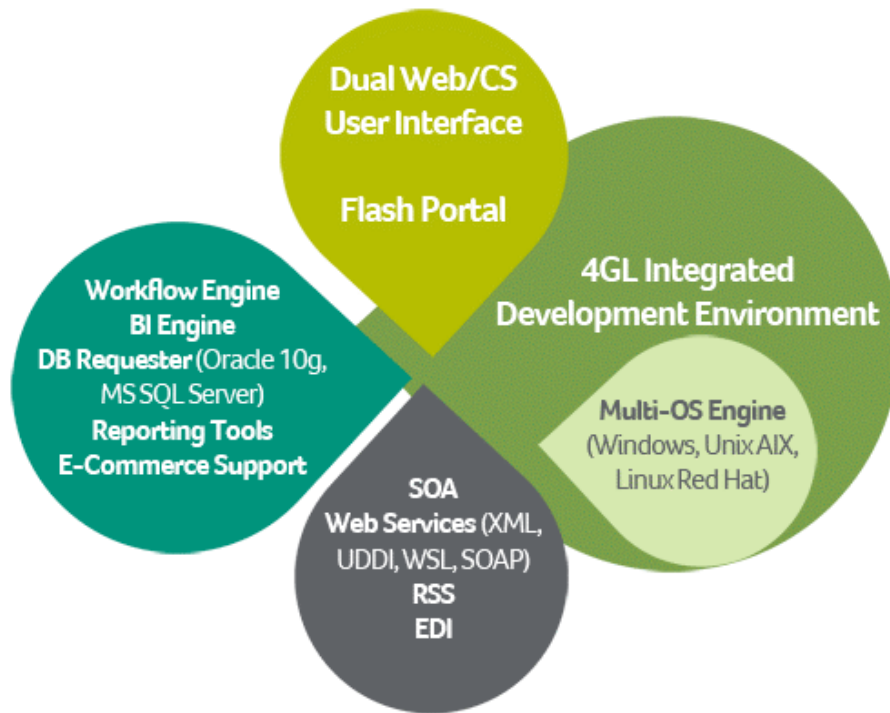
Web Services

Sage ERP X3 Version 5 fully integrates Web Services into ERP platform. The Web Services comply with W3C recommendations for implementation.

Once prepared, X3 Subprograms can be published as a Web Service and made available to third-parties seeking connectivity. Further, X3 processes can integrate data from external Web Services into its result sets and used later in subsequent steps (X3V5.1). An external server can be dedicated to Web Services and tied into the ERP X3 system.

Provision of Web Services implicitly facilitates interoperability by invoking parties using popular languages, such as, .NET or Java applications. Sage ERP X3 realizes the opportunity customers have to utilize their investment in the ERP by providing compatibility with such common programming methods. Web Designers and Developers may work with greater freedom and companies are better able to leverage their access to resources for competitive advantage.

Web Services are also a fundamental part of the Sage Xtend e-Commerce system. With Xtend, an integrated set of services dedicated to e-Commerce is presented.



Sage Application Framework for the Enterprise X3

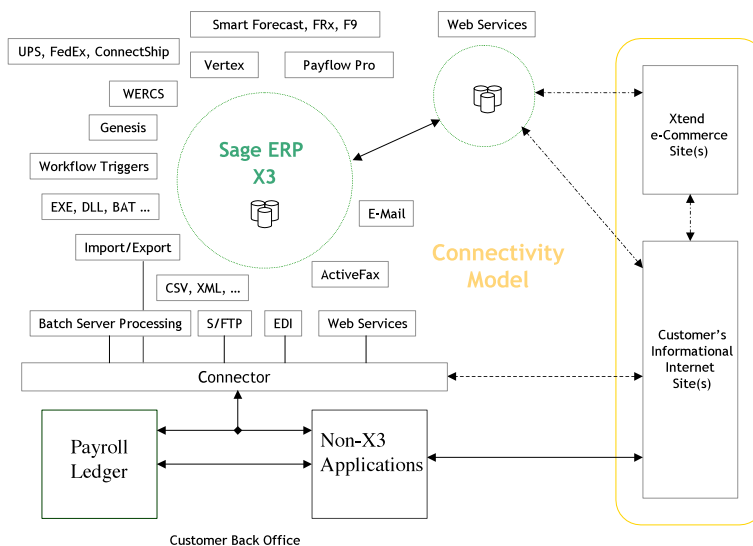
Specific Customer Recommendations

In developing these recommendations, it is useful to consider technical barriers that may need scope and resolution for making an informed decision. Specifically, what is the potential to hurdle a barrier? The above review of capabilities provides a basis on which to extract core capabilities in support of a heterogeneous array of services using Sage ERP X3.

With a 4GL supporting development of core processes, and native methods for scheduling, import/export, file transfer, electronic mail triggers, batch processing, status tracking, Electronic Data Interchange, and Web Services, a broad array of interoperability is addressable by X3. These may be real-time or queued. They may be high-volume and demand high-throughput. The services provided to a business client can be scaled from intermittent or low volume to continuously high volume. Scalable design is part of the Sage ERP X3 architecture, which shifts the burden of building a reliable business platform to the ERP and away from the Sage customer. The customer can focus on its business.

A full course of Development Training will allow a skilled, willing customer to implement new functionality predicated on business logic as business needs require. Sage R&D will continue advancement of X3 technologies constituting the business platform. The following diagram illustrates a connectivity model for Customer's back-office environment:

The figure shows a generalized, architectural view of a Customer's existing systems coexisting with a Sage ERP X3 V5 system. Dashed lines possessing arrows can be interpreted as optional flows that may be introduced over time.



The element labeled “connector” represents a generic or specialized interface, as needed, per service to interface preserved back-office applications into the operating domain of X3. (Domain elements are shown as floating entities that form the context for the ERP.) Additional servers may be involved where load or network level security issues are of concern.

Several scenarios for going forward could arise when considering the diagram:

- Sage ERP X3 technologies can be merged with the existing architecture in a phased fashion.
- Key components would be identified and established before low-priority or sensitive processes are activated for primary, real-time processing.
- Activation could be further refined for sensitive flows, by first running specific processes in parallel for testing.
- Gradual incorporation of functions will allow the X3 and Customer processes to be matured and switched into the back-office X3 system in a well-paced manner.
- Connectivity leveraging X3 Web Services can be applied for in-house procedures, as well as being published for use with external interfaces

Web Services and Sage ERP X3:

- The technology is extensible enough to be compatible with a gradual migration to X3.
- Standards based methodology allows a unification layer for business processes connecting to X3.
- This increases or stabilizes application efficiency within the X3 model.
- In-house skills may be leveraged with greater reach, or over a long term.
- Lower cost of operation in the long run (as with EDI, the protocol appears here to stay).
- The modular approach allows client specific interfaces, naturally.

To support synchronous communications between systems, e.g. wherein a reply is required, it is recommended that X3 Web Services be developed to support interaction. Web Services, co-developed, will address specific requirements on both ends of the message objects.

Existing Web Services supporting e-Commerce are already developed and available through the Xtend product. Customization of these Web Services could ease the merging of existing Customer requirements within X3.

Asynchronous applications can rely on the other native technologies (mentioned in the previous section) built-into Sage ERP X3. The fundamental techniques and approaches are very mature and can be established for the Customer in detail.

As mentioned previously, scalability and performance are treated as architectural concerns. Sage ERP X3 has committed ongoing resources to ensure reliability of the business platform for real-time, real-world systems.

Supplemental documentation may be provided to complete the overall assessment. Taken together with this overview, it is hoped that the customer will realize a comprehensive Sage ERP X3 solution including all relevant technologies.

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