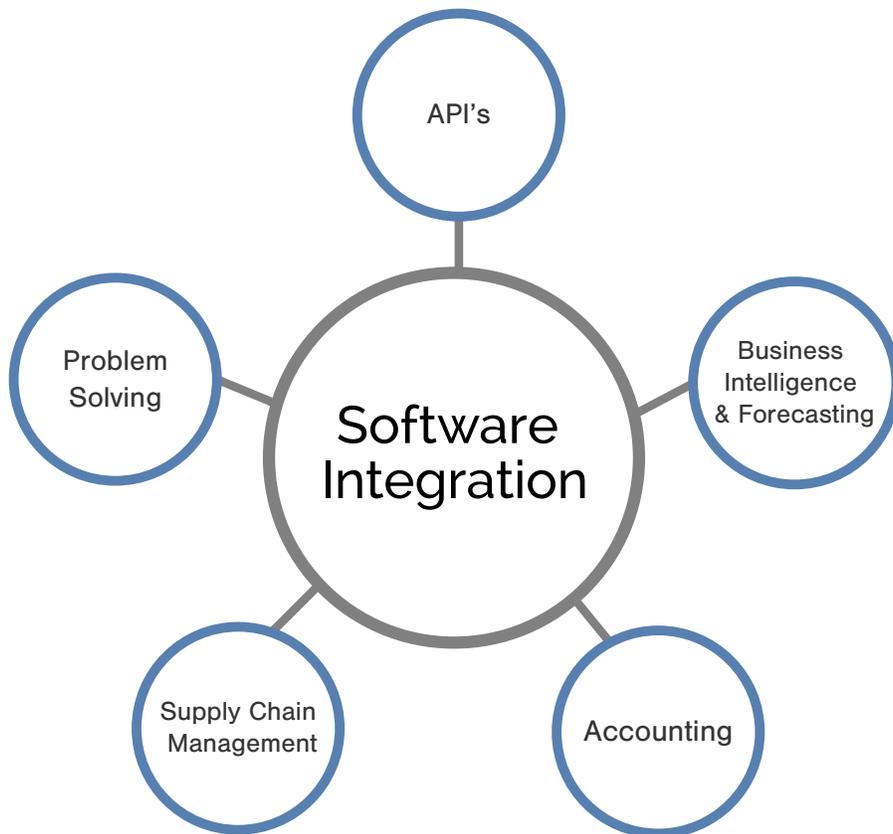




5 Exciting Ways Software Integration is Revolutionizing Logistics

and how modern organizations are getting there



Executive Summary

Integration allows diverse business systems to share data seamlessly, opening up a number of opportunities for cutting cost, increasing efficiency, and reducing error. After discussing common and best practices around integration for inventory and warehouse systems, we look at the benefits that integration brings specifically to the areas of business intelligence and forecasting, accounting, shipping, supply chain management, and problem-solving. We recommend that integration be achieved through investment in systems that are already designed to achieve integration seamlessly.



Common Practices in Software Integration

Say the phrase “software integration,” and you would likely get the attention of someone in an IT department. But it would likely not register—or else would induce a blank stare—when heard by someone handling logistics, receiving, or warehousing. But with technology playing a more and more pivotal role in streamlining operations and finding efficiencies, getting both data and software “right” from the beginning is important for realizing a return on those investments.

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Integration, as defined by Tim Ehrens of TechTarget, is simply “the act of bringing together smaller components into a single system that functions as one.”

When dealing with data systems and software, integration is usually a process, the result being a combination of different subsystems into one, at least temporarily. This allows data to be shared quickly with little error or loss of information.

Indeed, some of the most wasteful processes in any logistics operation are in its extraction, transfer, and analysis of data. Inventory data, for example, should be consistent with purchasing information, accounting data, and shipping data. But getting the different systems housing these data sets to work together is too often a manual chore that introduces error and lag into the workflow.



To see this, consider some of the typical ways critical information “gets into” a new system:

Updating by hand

This is the most time-intensive process, and the one most prone to error. Works only with very, very small numbers of items and infrequent transactions.

Uploading some common format (Excel sheets, for example)

Somewhat surprisingly, a large number of companies export data from one system in some common format, like an Excel spreadsheet, and then import that data into their accounting system manually. Not only does this create a potential bottleneck as data wait to be loaded, but errors can creep in when the exported file is not set up in just the right way, as dictated by the software.

Scheduled FTP

Some automation can be had by programming an application to run an FTP on schedule. The FTP application can place exported files from one piece of software into a predetermined location for another piece of software to “find.” While this does eliminate some of the human error in the process and guarantee some level of integration, the process does not yield anything near real time data.

Direct integration

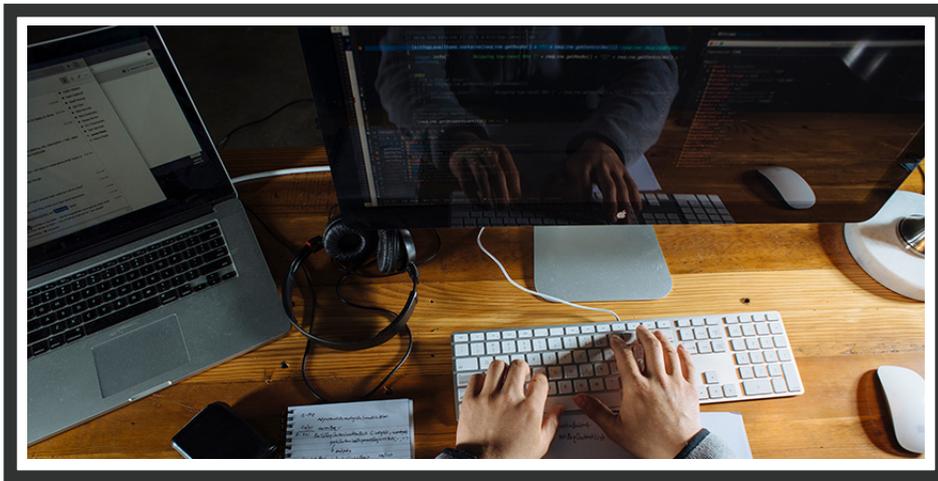
This is the ideal situation, where one system has been integrated with the other to the extent that data can be pushed (or queried when needed). This eliminates any steps that a person must do, and so also cuts down on human error (not to mention the time saved).



Most direct integrations these days are done with APIs, which enable the highest degree of integration in real time (see below). Integrations are also routinely handled by native “plugins” when a software producer want to guarantee compatibility with certain popular pieces of software. For example, makers of online shopping cart software often offer plugins so that third-party

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software creators (or owners/clients) can create additional functionality. Popular examples of programs that use plugins routinely include wordpress, Outlook, and Google Chrome, though



more specific systems (like Warehouse Management Systems) also enhance functionality by allowing plugins.

Time and the possibility of error, then, are two measures of how efficient an integration is. They also tend to be correlated, in that direct automated integration tends to be both faster and less error prone, while manual updates are slower and more likely to invite error.

The remainder of this report reviews best practices for achieving system integration, as well as the benefits of doing so. Specific arguments address the benefits of integration for business intelligence and forecasting, accounting, shipping, supply chain management, and problem-solving.

Best Practices in Software Integration: APIs

APIs—short for Application Programming Interfaces—are a messaging format that allows data to be transmitted from one system to another in near-real time, enabling smoother application integrations, faster decision-making, and better business insights. This in turn enhances productivity and allows companies to realize more revenues. APIs accomplish this with code that is simplified and structured to define, as clearly as possible, how the application should interact with other applications and networks.

APIs are nothing new; they have existed in one form or another for decades, although the rise of social media websites made their use more widespread. This made it common practice to publish APIs in a secure, scalable environment on the internet, which in turn grew the network of developers for many common applications and networks. API management is now seen as a core part of business strategy—even though that idea is only now picking up steam.

Enterprises, for their part, needed a way to connect their web services environments and cloud-based SaaS products. As it turned out, the APIs made available by web companies fit the bill,.....

What set the stage for APIs' widespread use was the need to break down massive chunks of code into smaller, more manageable units that were easier to test, update, and deploy.

(CORBA, Ice, and service-oriented architectures are earlier attempts at such smaller chunks.) Although implementations were expensive, these steps were seen as a great improvement over more monolithic, proprietary software development.



Things took off with social media and content websites, which had to grow quickly and prove value just as fast. Many sites (including Facebook, Twitter, and Netflix) did this by inviting developers to write apps that interacted with their websites. To facilitate this, they created and released simple, manageable APIs for free, helping them quickly gain traction via strong developer support.

Enterprises, for their part, needed a way to connect their web services environments and cloud-based SaaS products. As it turned out, the APIs made available by web companies fit the bill, providing an abstraction layer between their various internal and external systems. They also enabled a level of customizability. (For example, if an SaaS website's front-end did not allow for a certain use case, an API could provide a means to create solutions specific to a businesses' needs.)

Over time, startups using APIs were able to get to market more quickly than larger organizations stuck in more component-based development techniques. Many enterprises now consider them to be must-have products.

Why Are APIs Important for Logistics Software?

Today, APIs are used to connect various systems, both within organizations and between suppliers, carriers, cloud providers, and more.

- APIs allow for fast and simple integration across systems, which means better updating and reporting.
- APIs allow for fast and simple mobile integration, which means application data and reports can easily be ported to mobile devices as needed.
- APIs are useful when there is legacy technology in play. Networks and web applications built up over many years might not lend themselves easily to third-party integration, especially when it comes to mobile apps. APIs allow for an abstraction layer that can mediate different existing networks, whether internal and external.
- APIs support a new level of customizability. For example, SaaS software might not have the exact interface needed for a given business case...but using the API would allow for a custom solution to be built quickly and easily.





The Benefits of Integration: Business Intelligence and Forecasting

Different business cases for integration can be built, depending on which department one is standing in. For this reason, it would be helpful to explore a few different, yet compelling, cases for software integration using APIs.

To start with, take the benefits that integration provides to those looking for business intelligence and forecasting:

1. **Better reporting with real time data.** The right reports open up new avenues for cutting costs and boosting profits. Will inventory levels be enough to support sales until the next shipment arrives? Was the most recent Cyber Monday promotion worthwhile? Are units moving quickly or slowly in North America? Are returns eating into the bottom line? There are countless reports that one might want access to, and these reports need accurate, up-to-the-minute data. By integrating inventory software with accounting systems, both goals can be achieved.



2. **Utilizing new reports for market intelligence.** Shipping records, destination, quantities, and purchasing patterns, can provide extensive amounts of marketing intelligence. For example, one can answer questions such as:
 - What regions of the country are generating the most orders?
 - Which items are going to which cities and regions?
 - Which items are frequently purchased together?
 - Is there a seasonality to any items?



In the past, these records were seldom used as sources of information, because it was simply too costly and time consuming to gather the data. Appropriate integrations can change that.

3. **Real time inventory reporting and purchase decisions.** Along with better reporting, there are several operations that will need to trigger at appropriate times. For example, if inventory levels for an item get low, a purchase order will need to be generated and sent well before the stock runs out. If this process can be automated (with appropriate checks, of course), it reduces the chances that something gets missed.
4. **Forestalling versioning problems.** What happens when sales is working with one set of order numbers, purchasing with another, and the C-suite is receiving yet a third set of numbers? This is a recipe for chaos.



The Benefits of Integration: Accounting

Integrating accounting systems with inventory systems enables a greater level of accuracy, as well as greater control over the organization's books. This control is achieved through:

1. **Real cost of goods calculations.** The true cost of an item to a company far exceeds what the company pays for it. Items also cost insofar as they must be shipped, received, organized, stored, and insured. These might include straightforward dollar costs, and they might include labor costs as well. When inventory software is integrating with accounting software, calculating the real cost of the goods in one's inventory is easier—and makes for...
2. **More accurate profit calculations.** Having the “true” cost of goods sold is the first step to getting accurate profitability data. And while sales data are the main part of any profit calculations or forecasts, so are things like returns, shipping costs, warehousing costs, and so on. Finding these costs allows for more accurate calculations; isolating them and doing something about them is another part of cost control.

When inventory software is integrating with accounting software, calculating the real cost of the goods in one's inventory is easier...
3. **Better audit trails.** Reporting is extremely important during tax time as well—both for reporting and for possible audits. Using automation software to generate real-time audit trails gives a better, more accurate picture of your tax liability. It also puts your organization in a more charitable light, because audits would be more systematic, more open, and easier to follow.



All of these benefits assume, of course, that your systems are appropriately set up to implement the integration. This means that general accounting ledger codes must be entered accurately into the inventory management system, for example. Costs for each item must be correct as well. Reconciliation must be done at a time that makes most sense, given the business (for example, a monthly roll-up by product line might make more sense in some cases, whereas a reconcile-per-order might make sense in others).



The Benefits of Integration: Shipping

Shipping, although rarely a differentiator for companies, is a prime target for cost-saving measures. For example, appropriate integrations with shipping systems can afford:

1. **Accurate packing and labeling.** Some of the most common customer complaints about eCommerce sites have to do with receiving the wrong item or items. Quite frequently, this is due to errors in packing, labels being generated incorrectly, accurate labels being placed on the wrong packages, or a mix of the three. Integrating warehouse, shipping, and ordering systems enables companies to automatically generate correct labels and cross-check package contents for a better customer experience.



2. **The ability to shop carriers.** Too often, smaller shippers get saddled with a single carrier for all their shipping. While this might be convenient, there is no carrier that provides the lowest rates and best service for every location and every product. So there are hidden efficiencies to be unearthed in choice of carrier as well. Software for finding the most efficient shipping is not complicated. But it does need the right integrations and the ability to handle real-time data.

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3. **The ability to link with carriers.** Using APIs also opens up the potential for linking to carrier systems directly. This allows quick and easy access to tracking information, proof-of-delivery, and accurate, up-to-date rate information.

4. **Identification of carriers that make invoicing errors.** When you do start carriers, negotiating contracts with them will become a vital exercise. Generating reports on various performance indicators, such as frequency of invoicing errors and number of delayed deliveries, can help companies gauge carriers' reliability and speed, which in turn can help inform rates and contract awards.

The Benefits of Integration: Supply Chain Management

Finally, having integrated systems can simplify management of your supply chain, up to and including receiving and storage. The software can do this by:

1. **Triggering purchase activity.** Customer expectations in regard to item availability and shipping have been very much shaped by Amazon, Zappos, and other online giants. Getting into a backorder situation is no longer an option. Manual data entry is often too slow to prevent this, especially with high-velocity items. With an integrated inventory



management system, appropriate parties can receive alerts when stock is running low, thereby triggering an order. It can also keep track of your products' availability and calculate how much product you need to reorder to minimize wait time while preserving cashflow.

- 2. Reducing error.** Logistics is a game with little tolerance for error. Quantities are precise; SKUs have specific locations and destinations; and so on. Manual data entry makes the process longer and more laborious, and the longer and more laborious a process, the more likely an error (or several) will occur. Orders might be entered incorrectly, or Items might not be appropriately registered in the warehouse, or could get misplaced. Only when there is a single, continuous workflow with the appropriate checks can you contain and mitigate such errors.
- 3. Automating billing.** By syncing critical systems with carriers, shippers, and 3PL partners, companies are automating their billing. This reduces errors and helps ensure timely payments.

The Benefits of Integration: Problem-Solving

A common theme running throughout these arguments for integration is this: **Problem-solving.**

There are numerous ways to tweak a process and coax more efficiency out of it. But no matter how much one plans, problems will arise.

One of the main issues with manual data entry (and the infrequent reporting that results) is that problems take longer to detect. And problems that are not detected quickly can quietly fester, becoming larger and quickly spawning new problems. For example:



- A shopping cart app that is not updated to reflect current stock levels, in real time, can create a host of backorders.
- A spike in sales might fail to trigger a reorder.
- A customer's change of address can result in mis-shipped items, leading to some bad online reviews.

On the other hand, automatic data integration allows for reports daily, or even more frequently. Problems are caught sooner and handled as needed.

How to Achieve Integration

There are two ways to achieve integration: force integration on systems that already exist, or invest in systems that are already designed to achieve integration seamlessly. The latter, of course, is the preferable path.

Finding a best-in-class Warehouse Management System (WMS) with flexible APIs (and extensible using plugins) is proving to be the best solution for organizations seeking massive integration. Such systems can provide the flexibility and scalability needed for operations of any size and can handle changes that come with seasons, promotions, or simply growth.

For more about specific aspects of integration for your business or warehouse, we recommend that you speak to some of our engineers. The engineers at Infoplus have built a system around APIs specifically geared to achieving the highest level of integration, and they are willing to answer specific questions you may have.



Infoplus is a cloud platform to manage your own inventory, orders, warehouse and shipments. It is designed to help businesses simplify their systems, giving them the tools used by larger competitors without the exorbitant cost. The result is more control, more savings, and more customer satisfaction.

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