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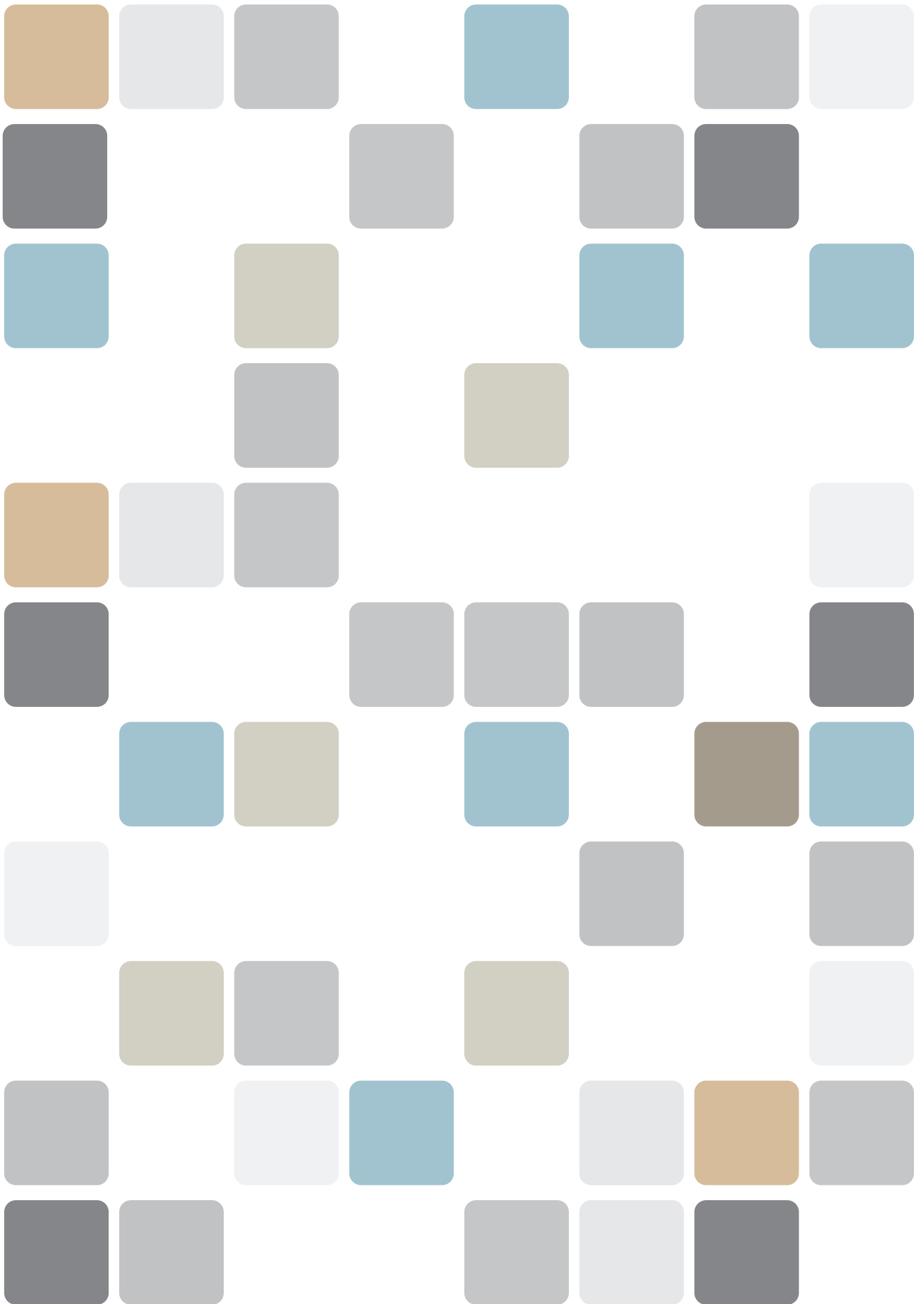
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STRATEGIES FOR ENTERPRISE LABELING

WHITE PAPER



Executive summary

By implementing enterprise labeling software that intelligently prints variable data based on business rules, companies can dramatically reduce the number of labeling files they manage. With a centrally managed system of label templates whose data fields are populated via connections to external data sources, a company can deploy label changes throughout the enterprise in minutes, thereby improving accuracy and reducing data storage and management costs.

Introduction

A carefully planned labeling software deployment that includes good data management practices can create enterprise-wide efficiencies that save time, resources and money. But few companies leverage the full power of their labeling software in this way. Instead, companies often create expensive, unsustainable — and completely avoidable — complexities.

One of the key advantages of a well-deployed enterprise labeling system is its ability to significantly reduce the number of label files a company uses. There are several reasons that label files proliferate in an organization, and each is related to poor data management practices.

1,200 CIOs named their top technology priorities

46%

Improving existing business processes

37%

Reducing IT costs and driving efficiency

37%

Assisting in business innovation — developing new products and services

32%

Developing / improving the organization’s digital capacity

29%

Maintaining availability and performance of IT systems

23%

Simplifying IT infrastructure and applications

Source: 2015 Global CIO Survey, Deloitte

How NOT to deploy enterprise labeling software

These common errors in labeling practice build complexities and waste into an enterprise labeling system:

- ▶ Housing data in the label instead of in a database.
- ▶ Decentralizing label storage and access.
- ▶ Producing product labels independently from each other.
- ▶ Not anticipating organizational changes.

Error:

House data in the label instead of in a database

True enterprise label software can connect a company's label files to its existing data sources and then use business logic to intelligently print the right variable data on the right label at the right time.

However, many organizations leverage only the design component of their labeling software, so when they need to create a new label, they open an existing label file, substitute the appropriate data, and then save the result as a new label file.

This method treats the label file itself as the data repository, which leads to exponential and unnecessary growth in data storage, and associated costs and security problems. For companies that create a different label for each SKU, shelf tag or shipping address, the result is an ever-growing — and ultimately unmanageable — library of thousands of static label designs and formats.

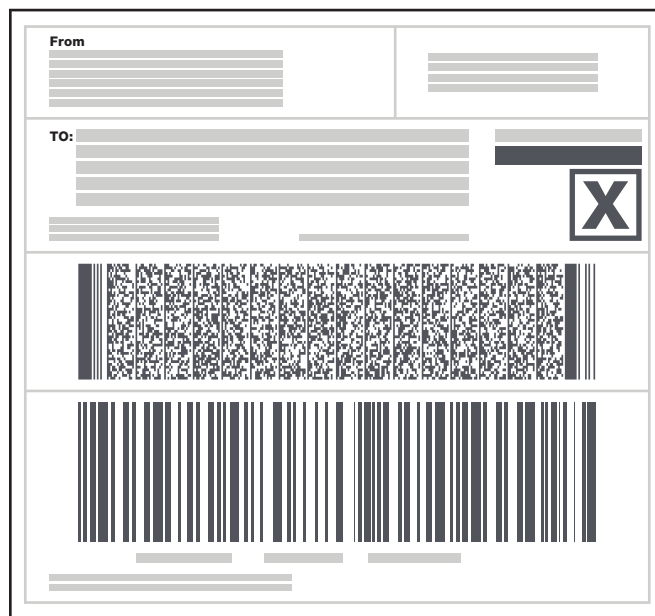
This approach also builds complexities and waste into the system by needlessly duplicating data, making it impossible to implement a single-source-of-truth data strategy. When data changes, every individual label in which that data resides must be located, opened, updated and saved, instead of easily disseminating the changed data throughout the organization by simply updating the data source.

Error:

Decentralize label storage and access

Regulated industries require security, visibility and traceability throughout the supply chain, including completely auditable labeling processes. When requested by a regulating agency, companies must supply records of who printed a label, when it was printed, how many copies were produced, and in some cases, an exact image of the label. A company that leverages an enterprise labeling system with role-based access, encryption and centralized control can meet those needs.

But when new label files are created by making copies of previous files, when they are stored in shared folders or on individual employee hard drives, when they are distributed and shared via email, and when static and even serialized labels are preprinted and stored until production time, then auditing is difficult at best, if not downright impossible. Companies that are subject to industry regulation become exposed to penalties, and those that engage in internal process efficiency initiatives such as Lean and Six Sigma cannot meet their goals.



Generating an item's product, case, pallet and shipping labels from a single data source increases labeling accuracy.

Error:

Produce product labels independently from each other

Pallet-level, case-level and item-level labels often contain identical data — production information, package size, SKU and so on — but in a different format for each application. For example, the retail sector is moving toward branded, data-rich labeling that includes features like color coding and product imagery on each level of packaging, and even on shipping labels. With the trend toward globalization of trade, the ability to visually identify a product through pictures and colors as it travels through the value chain will become a standard practice in retail manufacturing.

Ideally, companies would produce such labels by connecting each level together, tying them to the same data sources, and applying conditional printing logic to produce them at the same time. But instead, many companies replicate and store data in each of a product's associated labels, and they print and store the labels separately. This practice taxes a company's data storage and management resources, opens the door to human error, and makes it almost inevitable that conflicting data will at some point appear on different levels of packaging.

Error:

Don't anticipate organizational changes

As technologies and organizations change over time, the responsibility for label design and management passes through the hands of many different employees, resulting in libraries full of labels that no one in the organization explicitly owns, monitors or manages.

How to create a lean enterprise labeling system

The good news is that you can maximize the process and financial benefits of your company's investment in enterprise labeling software by leveraging its powerful features instead of bypassing them. The place to start is a carefully planned labeling system deployment in which you:

- ▶ Inventory and assess your existing labels.
- ▶ Use trusted data sources for variable data.
- ▶ Leverage design layers for conditional printing.
- ▶ Group associated label formats.
- ▶ Centralize label management.
- ▶ Engage with professional services.

Inventory and assess existing labels

The first step in a best-practices enterprise labeling deployment is to find and inventory all your label files. A team or individual should catalog network contents, ask current and former label users to search their hard drives, browse company intranets, and search for attachments in Outlook or other email clients. Don't be surprised by the number of labels and the diversity of their locations.

Once you have collected all the labels, you should assess what kinds of data they contain, the sizes of the labels, and if any special label media are required. Look for redundancies that can be reduced by creating one document or template for similar labels and then applying business rules and process controls to define the data printed on each label.

Use trusted data sources for variable data

Rather than storing static data in each label file and managing one label format for each SKU, shipping address or production date, you can instead design each of your labels with variable data fields that are linked to virtually any data source, including ERP systems (such as SAP or Oracle), local spreadsheets and text files, system calendars or clocks, or even weighing scales. The enterprise label software will automatically insert the correct information into the label fields at print time based on your own business rules.

You can find a simple, everyday illustration of this practice at your grocery store deli department. Each product sold needs its own label, with the product's SKU, its specific weight and expiration date. Using a static label would be impossible given all the variables. Instead, the label file contains data fields that are calculated and filled from different data sources using business rules:

- ▶ The product's weight is pulled from the electronic weighing scale.
- ▶ Its per-pound or per-kilogram price is pulled from the product database.
- ▶ Business logic in the label multiplies these numbers, populates the human-readable price field, and generates the barcode that will be scanned at the register.
- ▶ Finally, the label file calculates the product's use-by date by accessing the labeling system's current date and then adding days based on perishability information in the product database.

This is a relatively simple scenario in a single location. Enterprise label software can take this idea and extend it across many data sources and geographic locations at full production speed.



Leverage design layers and conditional printing

If your enterprise labeling software includes design layers, you can use them to hold different kinds of information and variable data, and then either include or hide each layer based on user-defined conditions when a label is printed. By using design layers and conditional printing thoughtfully, you can dramatically reduce the number of label files you need to create and manage.

For example, one chemical manufacturer needed its hazard labeling to comply with the regulations of eight different countries. Instead of building and maintaining eight individual label formats, they built a single format in which each country's data fields and layout were stored on a separate layer. At print time, a rule in the label populated the fields on the appropriate layer and printed only that layer.

Group associated label formats

You can also simplify label management and improve data accuracy by consolidating different but related formats into one label file or template.

Think about this common scenario: you need to create pallet, case, item and shipping labels for a product. If you store these different labels in one label file, you can easily tie all the data fields to the same data sources. When a data source changes, all the labels change. And when it's time to print, the system only needs to call one file, not four different label files, and conditional printing rules can ensure that the correct number of each label are printed.

Centralize label management

A streamlined and efficient labeling process requires centralized management of label access, editing and printing. When you store your labels in one place where they can be accessed throughout the enterprise — a “single-source-of-label” strategy — you can make changes to the central data source and automatically cascade them throughout the entire organization immediately.

Centralized control also enables a complete audit trail by defining user roles and allowing only designated users to “check out” and “check in” labels, alter designs, edit data, or print labels. This also reduces the risk of unauthorized label changes. In addition, by including a version management system, you can roll back any unauthorized or errant changes to a previous, correct version.

A centralized system eliminates the proliferation of label formats that occurs when labels are duplicated and shared, and it helps ensure you are always using the right label with the right data.

Engage professional services

Once you have catalogued all your existing labels and decided which can be eliminated, consolidated or grouped, it's a good time to engage professional services to help build your new labels. Enterprises understand their business needs, but most lack the necessary skills to build label formats and templates using best practices. Bringing in experts to design and deploy the new labels saves time and resources.

The diagram illustrates how a single label design can be leveraged to create multiple labels for different products and regions by using design layers and conditional printing. It shows a central template with various fields and a table of data, surrounded by six example labels for different products and regions.

PRODUCT NAME		PICTOGRAMS
IDENTIFIER 1		
SIGNAL WORD		
HAZARD STATEMENTS		
PRECAUTIONARY STATEMENTS		SUPPLEMENTAL INFORMATION
SUPPLIER ID		

The example labels shown are:

- Chlorine (Gas)**: DANGER, XYZ CHEM
- Calcium Chloride**: WARNING, XYZ CHEM
- Sodium Hypochlorite 12.5%**: DANGER, XYZ CHEM
- 氯气**: 危险, ABC CHEM
- 次氯酸钠 12.5%**: 危险, XYZ CHEM
- Chlorine (Gas)**: DANGER, ABC CHEM
- Calcium Chloride**: WARNING, ABC CHEM
- Sodium Hypochlorite 12.5%**: DANGER, ABC CHEM

By leveraging layers and conditional printing, one label design can create countless labels.

Choosing the right labeling software

Not all labeling software is built to support the complexities of enterprise-scale deployments. Here’s what you should ask before making a purchasing decision.

Does the software offer centralized control and compliance enablement?

Your labeling software should offer the agility to perform and immediately deploy design, data and format changes throughout the enterprise. The ability to rapidly react to fluctuations in supply and demand dynamics and inventory turns can reduce throughput times and associated costs.

Governing your system’s labeling processes and workflows from a central site enables single-source-of-truth data and resource management. Controlling access to label design and modification, database setup, audit trail capture, document saving and printing from a central location onsite — or at a facility on the other side of the world — can improve labeling accuracy, system security and regulatory compliance.

Does the software integrate with existing business systems?

Your enterprise labeling software should be able to scale and adapt to fluctuating business needs. Do you house your data in an ERP? A database? A spreadsheet? Your software should be able to connect to any and all, minimizing print-time data entry.

Leveraging your existing resources makes sense. If your company uses an ERP system, such as Oracle, SAP, Epicor, High Jump, Infor, Sage, Microsoft Dynamics, IBM WebSphere — or even several different ERPs — it’s important that your enterprise labeling software offers simple, direct and seamless integration. The software should be able to:

- ▶ Initiate printing automatically at “trigger” events, such as sending/receiving web services, a saved file, or modifications made to records within a database table or view.
- ▶ Connect to and communicate with clients via TCP/IP, UDP or HTTP.
- ▶ Perform basic file operations, such as move, rename, delete or copy.

Does the software provide adjustable levels of security?

Your company should be able to choose from a complete spectrum of configurable security options in your enterprise labeling software, ranging from simple print-only access to complex role-based permissions, contingent on site and application needs. The software’s ability to apply encryption to any of the levels of security provides a powerful layer of protection.

Is the software proven in demanding enterprise environments?

Ensure that the labeling software you choose has been used successfully in enterprise-scale applications. If you’re a global, multi-site company, look to existing customers and deployments to determine if the labeling software you are considering has a proven track record in environments like yours.

Does the software provide multiple ways to manage variable data without additional programming?

Enterprise labeling software should provide different approaches to managing variable data — not all strategies will work in all situations, and the more choices the software offers, the more complex the business rules managing the variable data can be.

Visual Basic scripting can be used with most enterprise labeling software to add different ways to handle variable data, but the most powerful enterprise labeling software products have these capabilities already built-in, with no additional programming required to add conditional printing via templates, layers or even individual objects. Rules can be based on a single data source or database field, or based on multiple conditions.

By leveraging the conditional printing capabilities of enterprise labeling software to create multiple labels from a single label design, the number of label files managed is reduced, creating a lean, secure, economical system.

Does the software offer browser-based interfaces?

By giving users access via web browser to label designs, print-time data forms and print job launching, your labeling software can extend your printing infrastructure beyond your company’s firewall to virtually any printer on the internet — in the field, at another company location, or even at a supplier’s facility.

Are all features included in the software at no additional cost?

Know what you’re getting. Not all enterprise labeling software packages are upfront about cost of deployment. Be sure that you know what features are included for the market price. Will there be additional charges for things like database integration capabilities, centralized control of printing, audit trail capture, security, and label designing? Understand the cost of adding features if needed at a later date.

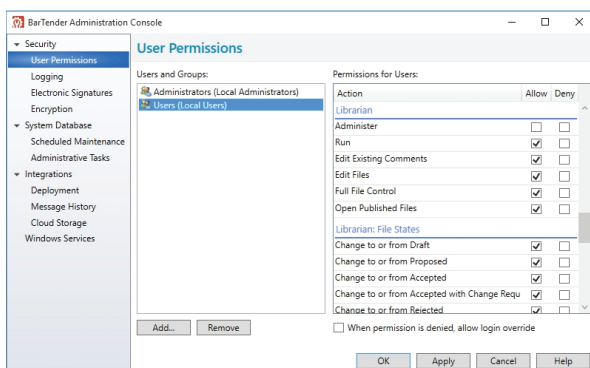
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Run IT like a business	Transform the network
CENTRALIZE, STANDARDIZE & CONSOLIDATE	Migrate to cloud services for e-mail & collaboration
	Transform processes
	Consolidate suppliers & contacts
Source smarter	Realize benefits
Rationalize applications	
Manage by portfolio	



Source: Accenture’s 12 actions toward cost-efficient IT, Accenture

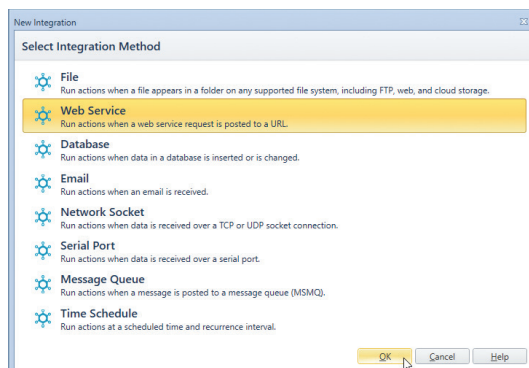
Why choose BarTender for enterprise labeling?



Centralized control and compliance

BarTender's comprehensive control features enable enterprises to centrally monitor, manage and secure design and printing operations across sites and continents:

- ▶ Rapidly deploy label design, data and format changes enterprise-wide in response to shifting business needs — and maintain data integrity.
- ▶ Consolidate management of your system's labeling processes and workflows, deploying the business rules and process controls that create value while reducing redundant and duplicated activities.
- ▶ Connect your business data with a wide variety of output devices, including printers, RFID encoders, marking devices.
- ▶ Standardize formats, symbologies and security features throughout the enterprise.
- ▶ Support regional differences such as languages, regulations and units of measure, whether you have one device at a single site or thousands at facilities around the world.
- ▶ Share global data fields such as incrementing serial numbers among all documents.

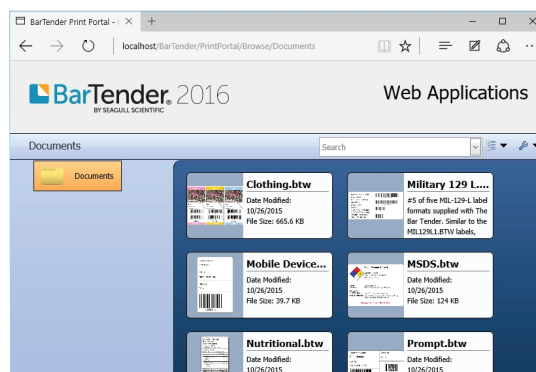


Integration with existing business systems

BarTender's seamless integration with ERP systems like Oracle, SAP, HighJump, Epicor, Sage, Infor and IBM WebSphere enables automation at the enterprise level, providing proper support for mission-critical processes, increasing labeling accuracy and improving efficiencies throughout the supply chain.

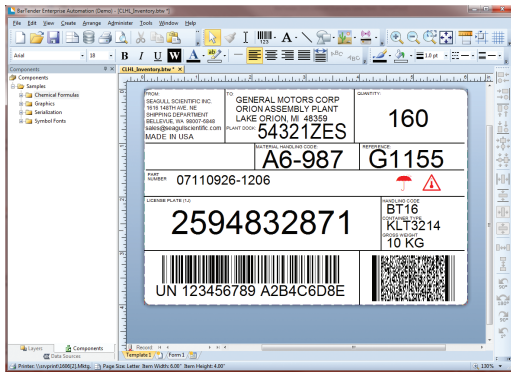
BarTender's native integration platform, Integration Builder, makes it easy to create integration files from scratch, no custom coding required. Capabilities include:

- ▶ Initiating printing automatically at "trigger" events, such as the arrival of an e-mail, a saved file or a modified database.
- ▶ Connecting to and communicating with clients via TCP/IP, UDP or HTTP.
- ▶ Performing basic file operations, such as move, rename, delete or copy.
- ▶ Integrating with ERP systems with support for direct connectivity.



Browser-based printing from anywhere

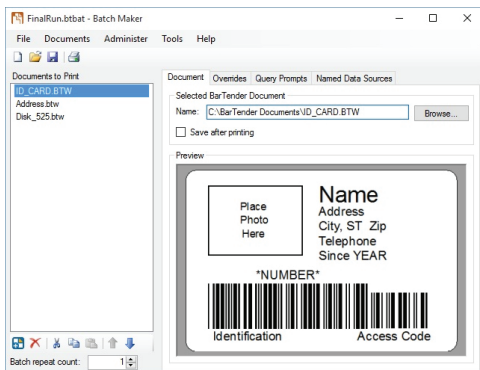
Print labels anywhere in the world where there's an internet connection. BarTender enables verified users to choose designs, complete print-time data forms and launch print jobs to any printer on the internet with just a few clicks in a browser or the BarTender Print Portal app.



Trusted to run the world's largest supply chains

BarTender is the difference between a successful labeling system that simplifies the supply chain and a complicated one that creates costs.

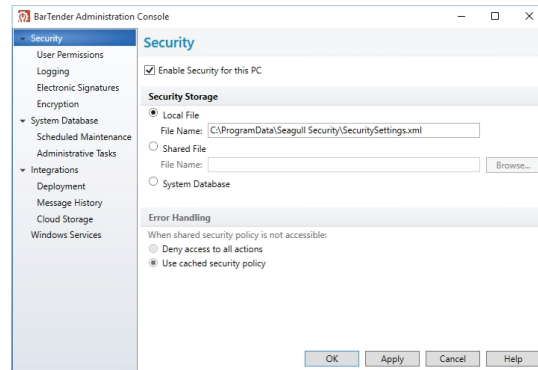
Built to support the complexities of enterprise-scale deployments, BarTender has long been the labeling software choice of the world's most dynamic supply chains in industries like aerospace, automotive, chemical, pharmaceutical, food and beverage, retail and medical device manufacturing. BarTender enables regulatory compliance and supply chain velocity with superior traceability, transparency and interoperability.



Powerful design and data management with Intelligent Templates™

BarTender's Intelligent Templates provide unmatched versatility and control over label design and automation:

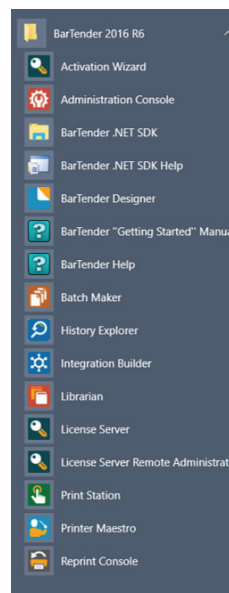
- ▶ Reduce the maintenance of hundreds of individual label designs to just a handful of flexible documents.
- ▶ Automatically trigger the printing of design layers and even individual objects based on a single data source, database field, or multiple conditions — all without custom scripting.



A spectrum of configurable security options

BarTender offers layers of security options, ranging from simple Print-Only mode to complex role-based permissions, configurable to meet every business need:

- ▶ Control access to label design and modification, database setup, document saving, printing and more from a central location onsite — or at a facility on the other side of the world.
- ▶ Apply label format encryption to any of the security levels, providing an additional layer of protection against unauthorized use.
- ▶ Password-protect individual layers to prevent unauthorized edits.
- ▶ Combine BarTender's electronic signature feature and comprehensive data logging to bring full audit trail accountability to the entire labeling process, enabling compliance with high security standards, including the 21 CFR Part 11 guidelines and GMP Annex 11.



Everything you need for enterprise labeling

Unlike other enterprise labeling software, the BarTender Enterprise Automation Edition comes complete with all features and companion applications, giving you database and ERP integration, centralized print control, audit trail capture, security and label design at no additional cost.

Case study: Label format consolidation and centralization in an FDA-regulated environment

Challenge

A pharmaceutical company administered, shared and printed over 5,000 individual label files. To print a product label at the company's main plant, line operators browsed through server files and folders to find the correct label format by file name. The operator then opened the label design file in maintenance mode, manually entered data values such as lot and production numbers and expiration date directly on the label template, printed the label, and finally saved it as a new file in a folder on the local server. When a remote plant needed a label, administrators at the main facility sent it by email, and so the remote plant collected its own library of labels that were managed in the same way. With each new label, the number of individual files increased.

The system relied heavily on the expertise and accuracy of each user, and the lack of controls presented multiple windows for error. It required the creator of each new and updated label to store it in the correct place in the production folder, and it required each labeling operator to remember that location. Auditability was compromised by sharing files via email, with label files stored on local servers rather than in a central repository. There was also no protocol to ensure proper file backups were performed, and the system wasn't scalable to future needs.

Solution

The pharmaceutical company contracted with a BarTender partner to improve its labeling processes. All its label templates and data are now maintained separately in a secure, version-controlled database. BarTender populates variable data fields such as lot number, expiration date and serial number from external, validated sources at print time, instead of being individually keyed in by the print operator, who now easily initiates the label printing process through BarTender's print-time forms interface. BarTender merges the variable data with the appropriate, approved version of the label template, prints the label, and captures a comprehensive audit trail.

The company was able to reduce its 5,000 label files to just 60 label templates, which are automatically populated from a secure, auditable, central database of label content.

Benefits

The pharmaceutical company is now agile in the face of changing business needs — BarTender's centralized file management means that label changes can be implemented across the enterprise in a matter of seconds. By making a change in a database field or the label template, instead of to individual labels, the change is applied to all relevant records and label templates. BarTender's built-in business rules have streamlined labeling processes, realizing cost savings for the company, and BarTender's built-in regulatory compliance structures are reducing corporate risk. BarTender is easily scalable across the enterprise, and adaptable to meet future serialization, e-pedigree and other traceability requirements as they are implemented.



Case study: Simplifying label production during merger and acquisition activity

Challenge

A specialty chemical manufacturer acquired nine other companies in a short time span, with many redundant product lines sold under different brand names. The company anticipated continued M&A activity and growth. As more product data would need to be integrated into its labeling systems, the company sought a simplified, consistent system that would scale across all its business units.

The company's print methodology was complex. There was a label for every single product and SKU, totaling more than 9,000 label files in the system. Because of the way the label formats and product data were stored, the print operator needed to access four different software systems just to print a set of labels for one product. In addition, label stock preprinted with static as well as variable information, such as DOT hazard diamonds, was used and often led to user error.

As they folded in new product lines, many of the formulas they sold under different brand names were actually identical in composition — the same ingredients, the same processing — and required the same product information to appear on the label, but under different brand names. Some products also required different labeling based on their customers' industries.

Solution

The company initially estimated that a new labeling system could slash their 9,000 label files to 70 or 80 — a reduction of more than 99%. But by maximizing the variable data management and conditional printing features of BarTender, including using layers to house brand information and other product data, the company was able to label all their products and brands with only 24 label formats.

BarTender's simple, graphical interface allows centralized control of the company's data and labeling. The operator simply enters a job number — either by scanning a barcode or entering it at a keyboard — triggering the system to gather data from various data sources, populate the label's data fields, and send the print job to any of several different printer types, sizes and brands at any of the company's online facilities. Entering one job number into BarTender will typically produce two to four different labels, on up to four different printing devices.

BarTender houses images required for industry certification, regulatory, product and branding information in the label file's layers. Data gathered after the scanning of a job number or SKU triggers BarTender to turn on the appropriate layers for printing. The data retrieved includes all information required for customer and regulatory requirements, as well the names and folder locations of all variable graphic elements.

Benefits

Because only a small number of templates are now required to print thousands of different labels, and since the operator now creates the label out of existing, centrally managed product information through BarTender's forms-based, point-and-click interface, the new process is simple, secure, scalable and agile. As the company acquires and folds in new product lines, the reduced effort required to manage formats and create new product labeling saves time and money.





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