

Why ESL- Easy?



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General

During the digitalization of our environment, a change is taking place from paper labeling to an electronic or digital version. With the introduction of "*e-paper*" technology, it is now possible to create an wireless electronic (price) label with battery-operated electronic "*screens*" that can display information permanently readable over a long period of time (*minimal 5 years, depending on the number of updates per day even longer*) without changing the batteries.

This technology was first used by large companies (super and hypermarkets) for price identification on shelves. Due to this application the name **ESL (Electronic Shelf Label)** was introduced, which is now the common name world wide for this technology that uses "e-paper".

With the development of the necessary hardware (different size ESL's), the appropriate software was written by also large corporations in order to "automatically" update prices (information) , that was previously presented on printed paper. Introducing this "*intelligent*" way of updating (pricing) information led to the fact to connect large quantities of electronic labels (ESL's) to an " Enterprise Resource Planning" or ERP system.. The main purpose of this software is to receive data from connected (external) systems (*e.g. an ERP system*) and output it according to the customer's needs and requirements on the various ESL labels installed. In order to combine this data with the graphical specification, which is usually designed by marketing departments, all systems rely on "template control". A template (the part of the ESL that holds and displays information) describes the graphical output on an ESL label. A placeholder is inserted at the points where the data coming from the connected system is to be used. If an ESL label is updated, the placeholders are replaced by the corresponding data. This then results in the image for the display, which is transferred to the ESL label.

In order for an ESL system to know which ESL label to update when new data is supplied by the connected external system, a link is created, e.g. between an article and an ESL label ID. This linking is usually carried out directly on the floor (*customer's store*) on the shelf with a mobile device. This means that the ESL labels can be used flexible and can be used again and again (*an ESL label can be linked to another product at any time and will always be updated from this point on if something changes in the data on the product*).

This basic requirement is provided by all software systems currently on the market. The main task of these systems lies with the "*data supplier*" such as an ERP system. This system must hand over all necessary changes to the ESL software at the right time so that ESL label content and, for example, a price at the checkout coincide always and without errors. Usually, an update time can also be transferred, in which case the update of an ESL label is only carried out at the specified time, which decouples the data transfer in time.

Depending on the performance of the template system, the ESL software can evaluate the transferred data during the generation of the image for the ESL label. This allows data to influence the presentation. For example, the background color of the ESL label can be controlled by means of a data field (*e.g. the background can be displayed in red for an item on sale*). All ESL software available on the market has its own philosophy or technology (*In ESL-Easy you have -almost- unlimited possibilities to work with the data provided, to evaluate it and to react to its content. You can outsource part of the business logic to ESL-Easy*).

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Another task of the ESL software is the administration and monitoring of the ESL labels used. For example, it manages the battery level and informs an appropriate office in the event of a necessary battery change. It also provides information on the type of label, resolution, quality of the wireless connection, last radio transmission and much more information for the user, who can then integrate this information into his management concept.

All these described functionalities are more or less fulfilled by all ESL software systems currently on the market.

Until now, it has only ever been possible to address a manufacturer's ESL hardware with software (*e.g. the software offered by the manufacturer*). With ESL-Easy, there is now an ESL system that supports different ESL manufacturers at the same time in one installation. This gives customers a high level of security over their investment. If a manufacturer goes bankrupt, the customer can continue to address his existing hardware with ESL-Easy and use new labels from another manufacturer (*e.g. equip new stores with them*) without changing anything in his software solution. ESL-Easy currently supports the ESL manufacturers **ZKong, Ontime, Century, Yalatech, E-Ink Smart** and **Hanshow** (*as of 03-2025*) without being dependent on a server from the manufacturer! Other ESL hardware and manufacturers can be integrated into ESL-Easy.

ESL-Easy

The development of ESL-Easy software was based a pilot project (ESL's) in a large cooperation. The ESL software was written by an IT firm and did not comply with the day-to-day practice of the end-user.. In the course of this project, problems arose that showed that the use of this technology is rather reserved for larger companies with a corresponding IT infrastructure. Although the project could be implemented in a technically usable way, the effort, costs and maintenance of the system meant that the project did not go beyond a pilot phase.

In order to avoid all these experiences and stumbling blocks for future projects, ESL-Easy software was introduced. Years and years of practical knowhow and expertise were used and utilized in order to create a powerful ESL Software currently known as ESL Easy. Obviously, ESL-Easy software contains and offers all the functionalities listed above, but we would like to introduce you to its **strengths** and **advantages** over what our "competitors" are offering.

ESL-Easy was developed independently of an ESL provider (hardware). For this reason, ESL-Easy also takes care of all steps up to the finished layout (*illustration*) for the ESL label internally independently and thus independently of manufacturers. We only use the software from the manufacture for data transfer (*similar to a printer driver*), to which the finished image is then transferred for a label for transmission and output.

We only use the communication platform of the manufacturer's software to transmit our rendered content (the finished image) and to receive information about the ESL labels on the way back.

For hardware from **Ontime**, we were able to work with the manufacturer to develop a solution that **does not require any external software**. The control of Ontime ESL labels is **natively** integrated into

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ESL-Easy, which makes handling much easier and keeps the requirements for the installation and hardware of the PC very low. You can get an ESL Easy-OnTime system up and running in just a few minutes. Only Microsoft Windows is required (no *JAVA*, no *drivers*, etc.)

Almost all systems available on the market have been designed for use in retail. Therefore, the item number, EAN code and branch is almost always used. Even though we also like to use these terms internally (a *customer from retail can do something with them right away*), ESL-Easy basically follows a different approach. We don't just serve retailers, we have many solutions for the use of ESL technology:

- We bring name tags to the office, which is particularly interesting for flexible workplaces. Here, the name tag follows the employee who is currently sitting at this workplace.
- At conference rooms, the current occupancy plan can be read out from Outlook and thus synchronized fully automatically. All employees can immediately see if a conference room is occupied.
- In logistics, we can fill picking stations with changing check digits, which makes it impossible for the picker to memorize check digits and increase the picking error rate through "routine". As a side effect, the current occupancy of a storage location in a "chaotically" managed warehouse can also be displayed.
- For events, we create and manage electronic name badges for guests.
- We mark exhibits in showcases in order to pass on information to the visitor. Especially in the case of changing exhibits (*e.g. in galleries where buying and selling takes place*), this saves printing on paper and equipping a stand. This will save time, energy and therefore money.
- On a buffet, the description of the food, (*also with ingredients*) can be done directly from a central location.
- In research, we show current progress in test series that are always up-to-date with the background systems. This eliminates the need for printouts and manual updates on paper lists.
- On bell systems and mailboxes, we display the names of the tenants, which can be managed from a central location.
- and so on...

Therefore, there is no fixed data structure in ESL-Easy that forces you, for example, to organize your data in stores, shelves, aisles or places. You determine what you want to display with which data and how. ESL-Easy adapts flexibly to your needs.

Easy installation

ESL-Easy was developed under Microsoft **DotNet** system (*specifically in C#*). Therefore, it can be used on any Windows system that supports DotNet 4.8 (*from Windows 7 all versions*). In addition, the software is required by the ESL manufacturer, which takes over the communication with the ESL labels (*not required by the manufacturer OnTime*). By default, **Firebird** is used as the database (*other SQL*

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servers are supported, see Database), so that a professional SQL database is available for which **no license costs are incurred**.

ESL-Easy can be installed on a regular PC, cash register or laptop. It then does its job in the background, the PC is still available for other tasks. However, this type of installation is reserved for rather small application.

For larger installations, extensive installation options are available. ESL-Easy is divided into different modules that communicate with each other via TCP/IP in the network. This allows distributed systems to be set up in order to be able to implement optimal performance for large installations. ESL-Easy supports load balancing in the generation of ESL label content (*rendering*). If necessary, additional instances can simply be started (*even on different machines*) to increase the rendering speed.

ESL-Easy can run **locally, centrally** or in a **cloud** environment, from which all locations are supplied. In this configuration, only access points are required at the locations that have a connection (*e.g. via VPN or via the Internet*) to the head office or cloud server.

It is also possible to use ESL-Easy per location. A central data supply is guaranteed in both cases.

This means that there is basically no restriction in projects in the ESL Easy system. Whether only a few ESL labels are to be controlled locally (*e.g. via our event system for managing guests and issuing name badges*) or an installation is to be carried out in a network with a large number of branch offices (*e.g. a branch chain*), ESL-Easy can be configured according to these requirements.

Free transfer to labels

ESL-Easy makes it possible to send any content to an ESL label at any time, even if an electronic background process is active for an automatic workflow. It allows the user to "*quickly fill a few labels*" with any content that would not be possible via the standard process. For example, displays can be created that provide a customer with temporary information (*e.g. information on the current COVID-19 situation in a store or additional information about a product in the specialist department*).

Flexible connection of external data

The complexity of ESL projects usually results from the connection of external systems in order to connect data from there with the presentation on the ESL labels. Each manufacturer has developed its own solution, so there is no uniformity or standard. For this reason, we have developed ESL-Easy as flexibly as possible in order to offer many possibilities for data connection even in the standard version. In addition, there is a separate gateway module, which enables a customer-specific system connection without having to adapt ESL-Easy in the core.

Import from data files

ESL-Easy was already designed in the planning phase in such a way that it can handle as much data as possible that a customer has available. It should be emphasized that there is no specification in the structure of the data on the part of ESL-Easy. In the simplest case, the customer has a CSV export from his ERP system at his disposal, the content structure of which he cannot change. ESL-Easy has only one requirement for such data files: the names of the data fields must be specified in the first line of the file, which corresponds to the standard in a CSV file. If this information does not exist in the CSV file

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either, the structure of the file can also be defined in an external description file. When processing such a file, all column names are read in as data fields, so that the data can be accessed under this name for display on the ESL labels – **it couldn't be easier**. The data can also be provided in the same way as an EXCEL spreadsheet. In order to influence the data provided during the import, it is still possible to work flexible with the data in a configuration file for the import. For example, it is possible to adjust the names of the data fields or to skip certain data during import. This one-time configuration is created in a few minutes and is applied immediately on the next import.

The Import Helper

In ESL-Easy, we provide a tool that greatly simplifies the configuration of the data import. You can see in real time what the current data import looks like and use the mouse to select the fields you need in ESL-Easy. Here you can also specify which fields contain general data, which fields contain special data for locations (*branches*) and which fields identify a data record (*e.g. EAN, GTIN*). After that, you have a description file that allows the data to be processed correctly for all subsequent data imports. You don't have to change anything about the source data (*the ERP export*).

Location based data

Do you need certain parameters for different locations (*stores*) to influence the display on the ESL labels (*e.g. to display data in the local language of the store*)? This is easily possible in ESL-Easy. You can assign your own data fields to each location, which are then available to you in the template for evaluation and display. Then the display automatically adapts to the location for which an update is triggered.

Active connection to an external system

Importing data is a process that is often required in practice when there is no other way to access the external system. In addition to this proven approach in practice, ESL-Easy offers you another option.

The strength of ESL-Easy is an active connection to an external system, which we were able to break down to a minimum of requirements. ESL-Easy requires **ONLY 2 functions** that an external system has to provide in order to implement the best-case connection!

Real time transmission from an external system

The first possibility of an active connection results from the fact that an external system actively reports every known data change to ESL-Easy. Various options are available here, in practice a **REST** service (*web request*) is usually used here, which works in real time (*ESL-Easy has an integrated REST server, no external system such as a web server is required*). If ESL-Easy is notified that, for example, the price of an item has changed, updates are generated for all ESL labels associated with this item. Obviously, only those associated ESL labels for which this data set is relevant will be updated. If, for example, a certain price is only valid in one store (*location*), only this label will be updated, even if many other ESL labels are linked to this item.

However, there is a slight “disadvantage” with this type of connection: The system always transfers the data that is currently valid in the external system. This means that only data transfers that are to be executed immediately make sense. However, if an external system transfers a data set that is not to be displayed on the ESL sign for a few days, there is a risk that there will be changes to the data up to this point in time that were not yet available in the transferred data (*e.g. the price will be changed*

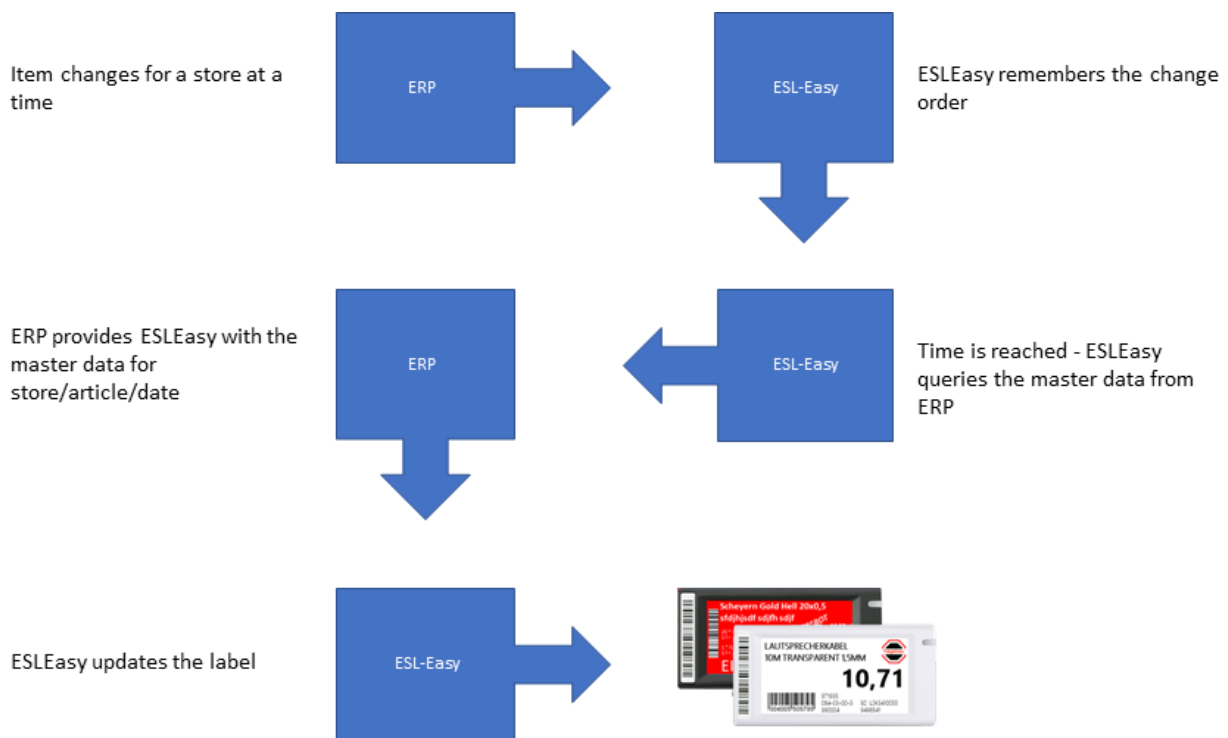
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again until the time of display). Now it is of course possible to send the data set to ESL-Easy again. ESL-Easy checks if there is still a pending order and deletes it if a current order replaces it.

Best case connection to external systems

ESL-Easy supports a much more elegant way that solves the problem of data timeliness just described. This **best-case** solution should be favored if implementation is possible.



In the event of a data change, an external system actively informs ESL-Easy that there is a change, e.g. for an article. It only reports the article number to ESL-Easy, if necessary, the branch (*location*) and the time from which this change becomes valid. ESL-Easy now remembers this upcoming change (*in its own scheduler*). When the time comes, ESL-Easy now actively retrieves the current data by accessing the external system and uses it to carry out the ESL label updates. **This connection strategy results in follow-up possibilities that often cannot be mapped in an external system.**

For example, an item is reduced in price during an advertising period. The new price is expected to come into effect next Monday. From Wednesday, the previous price will apply again. Normally, the external system would have to transmit two update information, the first change of the price reduction and the change to the old price. In practice, we have repeatedly encountered the problem that this second change cannot be easily provided by external systems. That's why we have designed ESL-Easy in such a way that you can not only give each change transfer the **valid date**, but also an **end date**. If there is an **end date**, ESL-Easy makes a note of both times and carries out the respective update with the then valid dates independently. In this case, a transfer from the external system with a **validity period** is sufficient to automatically reset the price at the end of its validity.

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Enquiry to an ERP system

Is your ERP system unable to provide ESL-Easy with changed master data on its own? We have integrated a tool into ESL-Easy, which enables you to regularly address an external system independently and thus get to the data changes. The tool can be flexibly customized.

Asynchronous balanced mode

One of the great strengths of ESL-Easy is the flexible handling of data and the possibility of connecting different data sources with each other. For example, there may be a request from an individual store to mark certain items with information that is only needed there, e.g. for product cleanup or reordering. If such a request cannot be made by a connected central system, it is possible to enter the affected articles, e.g. in an EXCEL spreadsheet, and to equip them with additional data in new columns. Then import this table into ESL-Easy, the additional data is then immediately available for the affected articles (*or ESL labels*). You can then use the EXCEL spreadsheet to update all affected ESL labels. In this way, information on inventories, discontinued items or, in the case of an inventory, the items that have already been recorded can be marked for the employee without influencing the central data. For the customer, such additional information does not bother, as he cannot interpret its meaning. It is therefore possible to flexibly bring information to the ESL labels beyond the standard interface. Used correctly, this can greatly simplify workflows and save a lot of working time and therefore money. Depending on what is allowed (*authorization concept*), the locations can quickly and easily use ESL-Easy for additional tasks without consulting the head office and any necessary adaptation of the system.

Database

ESL-Easy, like all ESL Software systems available on the market, requires an SQL server on which it can store the large amount of data on labels and their link to products. In practice, we repeatedly encounter the requirement to be able to use an existing SQL server of the customer in order to keep the administrative effort for the customer in his IT department as low as possible. Smaller customers usually do not have their own employees who can take care of the administration of databases. In order to meet these many requirements for different systems, ESL-Easy was designed from the outset to work with different database systems. ESL-Easy relies on a very lean table structure that can be mapped with any available SQL system. All SQL accesses are encapsulated in separate modules for each database system, which makes it very easy to connect to another SQL system. We decided to use **Firebird** as standard. **Firebird** not only provides a very powerful and professional SQL system, which can be found worldwide in all conceivable sizes, it is also free for commercial use. This is particularly interesting for small and medium size companies, as there is no expensive database license for ESL-Easy. Furthermore, we deliver the interface to the Microsoft SQL Server from version 2008, if you use this SQL system in your company. We have additional connections in under development, so we can quickly and easily integrate e.g. **DB2** or **MySql**. A connection to another SQL system can usually be implemented within a few hours, since only specific adaptations of the SQL commands of ESL-Easy to the dialect of the SQL system have to be made. The only requirement is that there is a way to access this database under DotNet (*if necessary, also via **ODBC**, better always natively*), which should be possible with all available SQL systems without any problems. ESL-Easy can therefore be used extremely flexible.

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If **Firebird** is used in the standard version, ESL-Easy automatically takes care of backups, performs restores independently, deletes old database entries, log files, old import files and backs up all necessary data to restore a system within a few minutes. **In short, ESL-Easy is self-supporting and does not require any support in normal operation.**

Information database

In practice, we have repeatedly come across the requests that the customer wants to display more information on the ESL labels than his connected system provides. In retail, for example, this is additional product information that cannot be stored in the ERP system. Let's take the example of the sale of wines. All business data is provided by the ERP system. But what if further information such as type of wine, country of origin, drinking temperature and food recommendations should also be displayed on the ESL label? This is not a problem in ESL-Easy. We have integrated an information database into ESL-Easy, which can be filled with any data (*in the form of **data designation** / **data content***). If, for example, this data is stored under the article number that is also used in the external system, ESL-Easy recognizes this connection and combines all available data into a large data set as if they had come together from one system. This merging of all available data during an ESL update is a basic functionality in ESL-Easy and is always automatically available in all areas. There are no limits to the presentation of data. Such additional information can also be imported from other sources (*e.g. a supplier may provide such information electronically*). As an additional functionality, ESL-Easy also makes this additional data available to external systems, so that an information database built up in ESL-Easy can be used everywhere (*e.g. for presentation on a web page*) where this data is needed. The data is provided by ESL-Easy in real time via a **REST-API** service. Also, an external system can directly access the table in the database to work with the data in the information database.

If you do not want to connect an external system to ESL-Easy, no problem, then store all data exclusively in the ESL-Easy information database. What you capture is available for output on the ESL labels. Even the data structure can be completely different for each data set.

Since the approach of the information database is **object-oriented**, ESL-Easy does not give you any data structure or any length restrictions (*except those of the database itself, but this limit is likely to be very difficult to achieve 😊*). Also, theoretically, each data set (*or each article*) can receive individual information. This allows you to mix articles and room labels together in the information database if you wish. Whatever you capture on a dataset is available for output on the ESL label. If a required field is not available to a record, then nothing crashes or runs into an error, missing fields are simply considered an empty field and therefore not displayed on the ESL label.

Templates

We decided to integrate a graphical template editor directly into ESL-Easy. We do not integrate an external system for this purpose but have developed the editor ourselves. It provides both employees with little experience in such systems, who want to create a layout purely graphically, as well as experienced users with programming knowledge, a tool to quickly achieve the desired result. Whether you move an object with the mouse or change the position in the source code, the change always affects everywhere (*move into object, the source code changes, and vice versa*). There are already extensive commands to meet all requirements for the presentation of the data. **New ideas and wishes from customers continuously lead to the expansion of the possibilities in ESL-Easy.** We are confident

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that there is nothing that **we cannot solve** simply and easily with our system, only the appropriate data must be available or recorded! We are therefore not limited to the possibilities of the manufacturer of the ESL hardware and its software (*e.g. we do not use the manufacturer's template system, which would limit us to its functionalities*).

Linking multiple products to an ESL label

Be it for cost reasons, or because you don't have the space on the shelf. It happens again and again in practice that several products must be displayed on an ESL label. In ESL-Easy, this is basically no problem. It is always possible to link one or more articles (*in ESL-Easy internally we call this DataID, since it does not always have to be an article that is linked to an ESL label*) with an ESL label. There is no limit to this, but of course there must be enough space available for the output of the large amount of data on the label.



Normally, an external system must now be aware of this. If, for example, a price of an article changes, the information for the second article must also be sent for the new generation of the content of the ESL label (*even if it has not changed at all*), otherwise the label cannot be recreated in its entirety (*the information of the second article is then missing*).

ESL-Easy makes the whole process much easier for you if an external system is actively connected (*see best case*). In this case, it is sufficient for the external system to report the price change of one item to ESL-Easy as normal. ESL-Easy knows from the link that it has to retrieve two articles from the external system to recreate the ESL-Labels content and carries out everything necessary fully automatically. The external system doesn't need to know about any of this...

If no external system is directly connected, ESL-Easy takes all the required data from the imported data.

In any case, the display on the ESL label is always carried out with the currently available data, even if only one DataID (*only one of the displayed products*) has changed.

Mobile application

ESL-Easy provides a mobile application that can be used to work directly on the product on the shop floor (*in the store*). Here, ESL labels can be addressed (*scanned*) via their barcode (*label ID*). Articles can be retrieved and displayed, e.g. by scanning the EAN code. The most important functionality, however, is the linking of an article to an ESL label. For this purpose, the product is linked to an ESL label in the current location. No matter where the label will be located in the future, it will always

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display the current data on the linked product. In addition to this basic functionality, **our mobile system offers other extensive possibilities.**

The application is not only available as an **Android** and **iOS** version, as is common today, but we also support **Windows CE** devices, such as the Honeywell 6000 series or the Datalogic Skorpion series. In practice, our customers have many more devices from previous installations than one might assume during current developments. However, proven systems are rarely exchanged just because there is a "new trend". Therefore, our customers can also use existing devices with Windows CE, Windows Mobile and Windows Pocket PC for ESL-Easy.

The mobile devices must be connected to the network via Wi-Fi and have a connection to the ESL Easy server. No other special software is needed, the application is simply launched on the device.

Our Android and iOS app can be obtained from the manufacturers' stores. For Android, it is also possible to play the application directly on the devices without the Google store. With this method (*sideload*), ESL-Easy's own update system is also available when there is a new version of the app (*can be controlled by the customer*).



We are also pleased to offer/deliver fully configured Android-based PDA devices that have an integrated scanner and are therefore ideally suited for professional practical use.

If the software is used on mobile phones (*smartphones*), the integrated camera can be used as a barcode scanner. It is better to use a Bluetooth-connected handheld scanner (*e.g. a ring scanner*), whose scan engine can easily recognize the barcodes even in low light conditions. Our app can work with all available scanners that connect to the mobile device as an external HID device (*i.e. any Bluetooth scanner currently on the market*). The app automatically recognizes what has been scanned, just like with the integrated scanner of an PDA device!

All mobile devices can be managed and configured centrally via ESL-Easy. If desired, devices will not be approved until they are released. ESL-Easy provides an overview of the registered devices at any time.

The configuration of the app can be done via a QR code. For example, an existing device in a store can configure a new device by providing a QR code with a scan without having to manually go into setup.

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Our app automatically detects the current location via the current network in which the device is currently working. This means that devices can be used at different locations without any configuration adjustments, and the correct branch number (*location*) is then automatically used. In this way, you avoid an employee accidentally linking a label to the wrong store number (*location*) because he forgot to adjust the store number on site.

ESL label specific information

In practice, the desire quickly arose to output not only the centrally provided data on the ESL label, but also other information that is only available for this label at this location. As an example, let's take the requirement to issue an arrow on the ESL label, which shows the placement of the goods in relation to the price tag.



This information cannot be managed centrally, it is always an individual specification that must be flexible specified by the operator when linking. ESL-Easy has the option of capturing and storing exactly such information in the app. In this case, this information is stored for the ESL label and not for the linked product. This means that several ESL labels can be linked to the same product, but the arrow is still displayed in the same way as it is needed at the place of use. The one with the arrow is just an example, ESL-Easy basically offers the possibility to enter and store any additional information (*even several*) in the app (*you determine which data this should be*).

The user can also be given the possible selections, in our case these would be e.g. "*do not show*", "*up*", "*down*", "*left*" and "*right*" for the arrow. Each template can receive its own additional information, so there are no technical limits in the display requirements.

In extreme cases, all data for display can also be entered manually in the app and sent to the ESL label. Then ESL-Easy does not require any internal or external data at all.

Queue

Like all systems on the market, all ESL updates are first placed in a queue and then the updates are created from there. Our queue also provides information about all activities that are currently taking place for a data record. The current image, which appears on the ESL label, as well as a preview can also be retrieved and displayed. The queue also tells you if a label is not reachable, errors have occurred, etc. If desired, this information can be used to inform external systems about the progress, as global monitoring systems are used in many companies.

All tasks in the queue are distributed to the started rendering instances (*ESL-Easy-Client*). In larger installations, the tasks at hand are processed in parallel (*load balancing*).

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System status and events

ESL labels communicate with their access points at regular intervals and provide information about their current state. All this information (*regardless of an ESL-Easy specification, all data provided by the manufacturer's ESL system is processed*) is collected and evaluated by ESL-Easy. Triggers (*also called comparison values*) can be defined that trigger an action on certain values in the supplied data. These triggers can be stored flexibly. For example, an action can be executed if the battery level of a label falls below a specified value. If this event occurs, ESL-Easy forwards this information to a gateway (*ESLEasy_UniversalGateway*). Here you can then configure what should happen to the customer with this information. For example, the gateway can enter this information into a customer SQL table or start an external program that receives the event information via parameters. It is also possible to send an e-mail. The *ESLEasy_UniversalGateway* can be flexibly adapted to customer needs. If desired, a customer-specific system can also be addressed from ESL-Easy, which is why the gateway was outsourced to a separate process.

Inventory

ESL-Easy knows every ESL label used by the customer. All information from the last data transfer to an ESL label is thus available in ESL-Easy. From this data, ESL-Easy manages the current stock of available ESL labels. ESL-Easy knows at all times how many ESL labels are available in total, how many of them are already in use (*linked*) and how many labels are still available for linking. In this way, ESL-Easy prevents the fact that employees from the stores request new ESL labels (*consumables*) from the head office, even though ESL labels are still unlinked in the store.

If ESL labels are "*lost*", ESL-Easy also knows about them, as these labels no longer report and an event can be triggered after a period of time. For example, an employee knows that he needs to replace a certain price tag without noticing its absence by walking through the store itself.

Transport tracking

The ESL labels can be used to track the transportation of goods. ESL-Easy knows the whereabouts of an ESL label. If it is sent on its way and registers after arrival at the new location via an access point installed there, ESL-Easy registers this and reports the event, e.g. to an ERP system, which can then trigger the electronic goods receipt. This happens even before an employee has entered the delivery note in the goods receipt. Logistics chains can thus be tracked electronically, eliminating the need for RFID capture or manual scanning of a transport EAN.

Product advisor

Would you like to provide your customers with a product advisor? We can connect ESL-Easy and a product advisor. We don't want to withhold a practical example from you: Advise your customers electronically via a product advisor. Once a customer has found a product, we can show them where it is on the shelf. We then flash the ESL label, triggered by the product advisor, so that the customer can find the product quickly. Virtually all ESL labels include a multi-color LED, which we can control according to your wishes.

NFC

Most ESL labels have a built-in **NFC** chip that we can program with your desired data. The label then gives information to the customer if he has a mobile phone (*smartphone*) with an integrated NFC

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reader (*all current mobile phones have such a reader built in*). The customer can then hold his mobile phone to the ESL label and is redirected, for example, directly to the product page of your website.

Of course, you can also use this internally to open further possibilities for employees via the NFC function.

Digital-Signage

ESL-Easy is not limited to the control of ESL labels. In the same way, you can also feed advertising monitors with information. For this purpose, we have a ready-made application available with our **ESL-Easy digital signage** system, which, together with a small box on a display, ensures the desired presentation. It is also possible to control video walls (*multi-monitor*). Since monitors have more options due to the system (*colors, resolution, display of animations and movies, sound output*), you also have more options available here. We are also happy to control your outdoor advertising via **LED** boards.

Of course, all displays can be centrally controlled, time-limited and even triggered event-driven. We will be happy to present all the possibilities to you personally.

Electronic Shelf Displays

Narrow elongated electronic displays are becoming more and more popular on the shelves. These are called **Electronic Shelf Displays**. These monitors are very wide and only a few inches high. This allows them to be attached to the shelf like price tags. Our ESL-Easy digital signage system also runs on this hardware, so that we can display prices, images and advertising here.



If the shelf displays are equipped with touch, ESL-Easy can react to this and, for example, display additional information when a price tag is touched.

Summary

As you noticed above, **ESL-Easy goes far beyond the functionality of replacing paper with an electronic representation**. In practice, we are constantly encountering new areas of application and requirements. We are a team of experienced employees who have been working in this field for decades and therefore understand the processes. This is what makes us so flexible with our product, as short distances and practical understanding quickly lead to solutions in our systems. We don't have long lead times and endless meetings, which ultimately has a strong impact on costs.

ESL-Easy can be used in a local environment directly at the customer's site. This distinguishes us from other providers and provides an important independence for a customer. The use of cloud systems from one provider is tempting, but it raises questions that need to be carefully examined:

- How is the transmitted data protected?
- Where is the server installed and operated from?

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- How is it ensured that no other customer could access my data?
- What happens if the provider shuts down its cloud server?
- How does the system react if the cloud server is unreachable?

We have not come up with any horror scenarios, but show you questions that have arisen from real customer projects.

Conclusion: We are proud of the fact that we have not yet come across any requirement that could not be implemented with ESL-Easy. You should definitely take a look at the product. Our goal is to fully convince them that they have found the right partner for an ESL project.

EWS ESL-Easy-Team Germany