

Integrating Label Printing with Label Gallery

White Paper

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1 Executive Summary

Label printing is part of a tracking or identification process that can range from a simple label printing application to an advanced database-driven bar code and RFID label printing solution. The advanced features can involve complex warehouse management and enterprise resource planning (ERP) systems. As companies grow, many are looking to incorporate label printing capabilities in their current IT environment in an easy-to-use, maintenance friendly and cost effective way. However, the challenge remains how to integrate any label printing functionality to current IT systems and applications without adding another layer of legacy or off-the-shelf software products that require heavy implementation and customization fees.

When deploying automatic identification and data collection (AIDC) software solutions, companies look for solutions that address the following requirements:

- Bar code and RFID label printing integration with existing applications, host systems and legacy software applications.
- Bar code and RFID label printing software with multi-lingual user interfaces and Unicode compliance.
- Centralized bar code and RFID label printing replacing stand alone design and printing.
- Standardized label development and deployment within a company.
- Printer driver support including multi-lingual printing, Unicode support and wizard-based driver installation.

The following white paper discusses how you can use Label Gallery to integrate bar code and RFID label printing into your current IT infrastructure and meet all the requirements above and more. Label Gallery is only used as a design tool giving you the option to print labels from a third party application, Web service or external device. You can summarize the label printing integration options with the Label Gallery software family in the following three ways:

1. API integration method: change the programming structure of your existing application.
2. Integration middleware method: add printing functionalities to existing applications using GalleryWatch as an integration middleware server.
3. Direct printing method: export label files to third party applications, printers, Windows mobile devices and SAP R/3 system.

To learn more about different label printing integration methods with Label Gallery and the Label Gallery Product range in general, see the literature referenced in section five of this white paper or visit the Label Gallery Web site at www.satoworldwide.com.

2 Integration Challenges

As companies have production and distribution sites on multiple locations and interact with customers all over the world, they face new challenges with their information system. Software applications and IT systems grow and companies add new applications to meet specific requirements. However, simply adding software over time leads to a complex IT system that combines legacy, off-the-shelf and customized applications. To better control the growth of their IT system, companies increasingly require integrated solutions.

When you want to deploy an automatic identification and data collection (AIDC) software solution, you do not want to use any off-the-shelf bar code and RFID labeling software but pursue a more customized or integrated label printing approach. However, you might face the following challenges:

- How to combine data collection and label printing to thermal printers if you have a data collection application software that does not print bar codes or RFID labels complying with your customers' requirements?
- How to integrate bar code and RFID label printing in your Enterprise Resource Planning (ERP) system if your current ERP system does not have label printing support for bar code and RFID labels and does not have any or easy-to-use label design option?
- How to print labels if you want to retrieve data from a host application using SQL, Microsoft Access, Oracle, DB2 and other databases?
- How to print labels to any kind of thermal or laser printer in your company directly or through your company network or the Internet?
- How to print labels automatically without operator intervention?
- How to export labels to third party software applications, Windows CE mobile devices or your SAP R3/ system that execute label printing?
- How to print labels with data provided by external devices such as scale weights and bar code readers?

In many cases, label printing jobs throughout your company use data that has already been collected and stored somewhere in your IT system. You might have to add a separate label design application but you want to integrate label printing operations to your existing IT system and applications that users are already familiar with and are using on a daily basis. The label printing operations should run automatically so that end users and operators are practically unaware of the label printing application running beneath the third party application or host system. All these challenges should be resolved with an easy-to-use, maintenance friendly and cost effective label printing solution.

3 Label Printing Integration Methods

The Label Gallery software family offers several integration options for label printing that can be summarized in the following three groups:

1. Change the programming structure of your existing application (API Integration method).
2. Add printing functionalities to existing applications using an integration middleware server (Integration Middleware method using GalleryWatch).
3. Export label files to third party applications, printers, Windows mobile devices and SAP R/3 system (Direct Printing method).

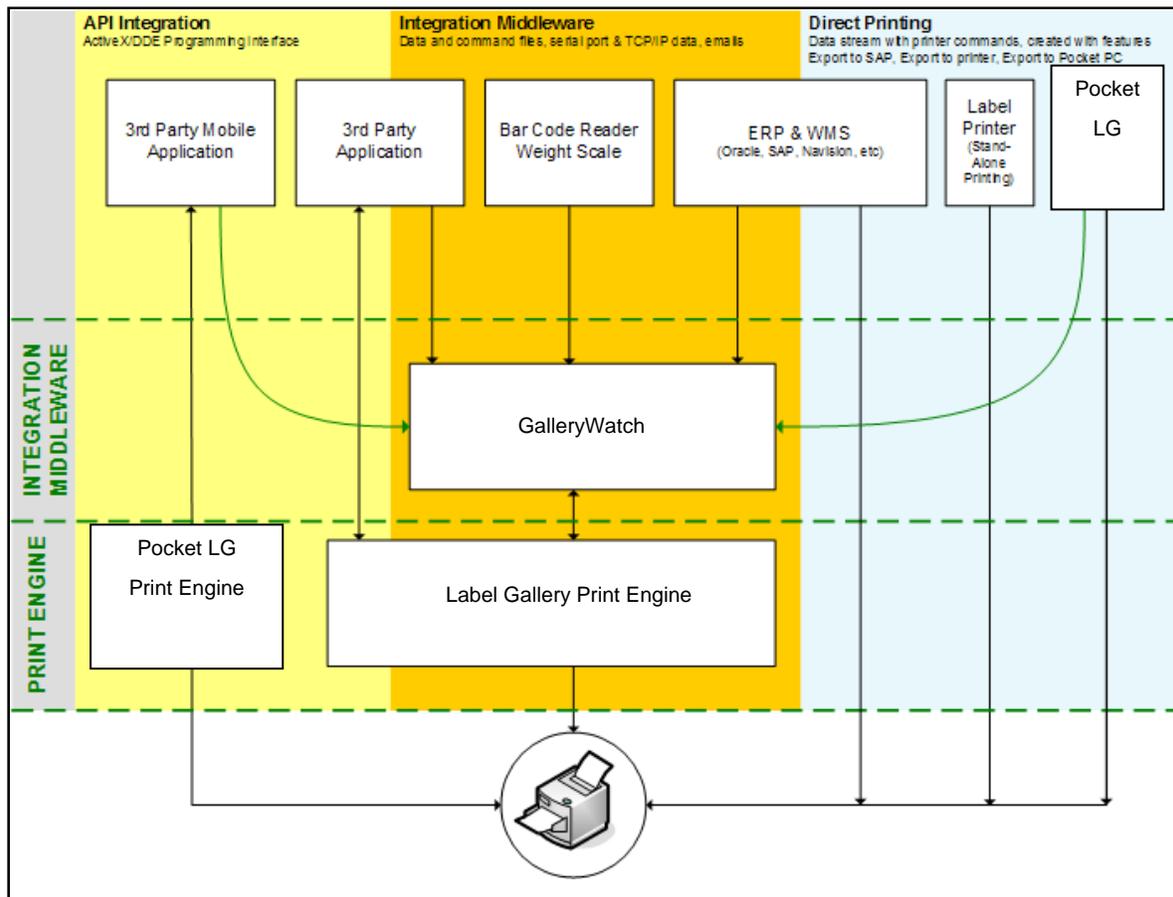


Figure 1: Label Printing Integration Methods

Integrating label printing into your existing software application or IT system means that Label Gallery itself does not initiate printing the label. You can only use Label Gallery as the design tool to create the label. Label printing itself is initiated through a third party application, ERP system, Web service, Windows mobile device, stand alone printer or other external devices. The following sections discuss each integration method in detail.

3.1 API Integration Method (Programming Method)

Windows operating systems provide different methods of communication between applications. Label Gallery supports Windows connectivity features like ActiveX Automation, Dynamic Data Exchange (DDE) and other mechanisms that allow other applications to take full control of Label Gallery. Label Gallery shares its label processing and printing power with an external application through its print engine. Using the programming method and the Label Gallery print engine enables you to integrate label printing capabilities to your software application or printing labels across company networks or the Internet. Your software application or Web service control the label printing process, leaving the end user unaware of the labeling application running beneath your application or Web service.

The Label Gallery Programming options for label printing integration include the following:

- ActiveX Automation for desktop and mobile applications
- Active Server Page on the Web
- .NET integration
- Dynamic Data Exchange (DDE)

API integration is the most complex but most powerful label printing integration method. Using ActiveX programming you enjoy flexibility and deployment options that are only limited to your imagination and programming skills.

3.1.1 ActiveX Automation

The integration process is often referred to as COM, ActiveX and OLE Automation. The ActiveX Automation interface can be understood as a simple call of a function within your own program. The only difference is that the function is located in another program or .DLL file and not within your own program code.

You can use different editions of the Label Gallery software to integrate the Label Gallery print engine to your application: Label Gallery TruePro, Label Gallery TruePro Print Only, Label Gallery Plus, Label Gallery Plus Print Only, Label Gallery SDK and Pocket Label Gallery. All these editions include the printing functionality of Label Gallery software and can be integrated to other Windows based applications through the .NET or ActiveX (OLE Automation) programming interfaces.

```

var
  LabelID: integer ;
  Err, Det: string ;

Begin
  LabelID := Nice.LabelOpen ('label.lbl') ;
  If (LabelID < 0) then begin
    Err := Nice.ErrorMessage ;
    Det := Nice.DetailedMessage ;
    If Err <> '' then
      Application.MessageBox (Err, 'Error', MB_OK);
    End else begin
      Nice.LabelSetVar (LabelID, 'Product',
        'Label Gallery', -9999, -9999) ;
      Nice.LabelPrint (LabelID, '1') ;
      Nice.LabelClose (LabelID) ;
    End ;
  End ;
End ;

```

- Open the label
- Display the error message, if the error occurred when opening label
- Set the value for variable 'Product' and print one copy of the label
- Close the label

Figure 2: Sample ActiveX Integration from Borland Delphi

For further information, see the *ActiveX and DDE Programming Guide* available for download from the Label Gallery Web site at www.satoworldwide.com.

3.1.2 Active Server Page on the Web

You can also use the ActiveX programming interface to integrate label printing with Label Gallery to your Active Server Pages. This allows you to print labels across Intranets and the Internet using Label Gallery Plus and its print engine in the background. A Web page could look like the figure below. Your Web server must support ASP scripting; and you must install the Label Gallery software on your server because the Label Gallery COM objects have to be connected with the Label Gallery print engine.

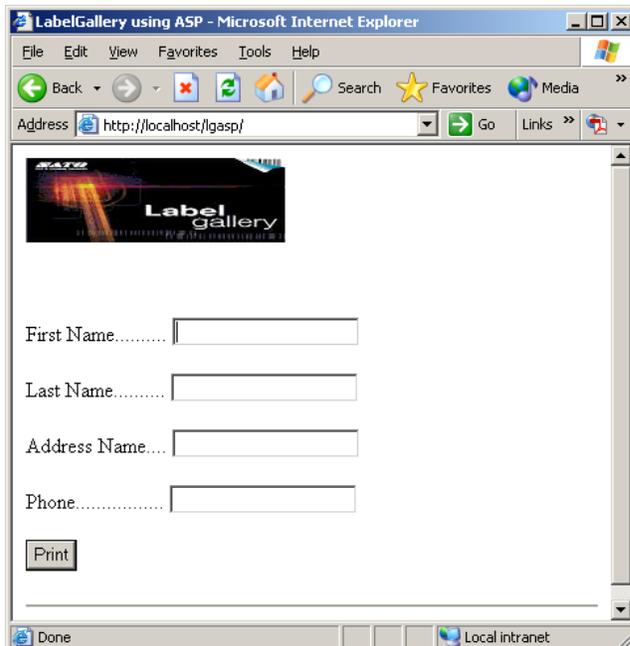


Figure 3: Active Server Web Page

The code to connect to Label Gallery and print the required label could look like the sample below. First, include this code directly into your main ASP application on the Web or save it as file LABEL GALLERY.ASP. Second, recall the code from your main ASP application.

```
<HTML>
<BODY>
<%
Dim ID, Result, LG
Dim vfname, vlname, vaddress, vphone

vfname = Request.form("fname")
vlname = Request.form("lname")
vphone = Request.form("phone")
vaddress = Request.form("address")

Set LG = CreateObject("LabelGalleryPlus2WR.LGApp")

ID = LG.LabelOpen("D:\6_ActiveX_ASP\ASP\Label.lbl")
Result = LG.LabelSetVar(ID, "Name", vfname, -9999, -9999)
Result = LG.LabelSetVar(ID, "Surname", vlname, -9999, -9999)
Result = LG.LabelSetVar(ID, "Address", vaddress, -9999, -9999)
Result = LG.LabelSetVar(ID, "Phone", vphone, -9999, -9999)

Result = LG.LabelPrint(ID, 1)
```

Figure 4: Active Server Page Sample Code

Before you can print the labels from the Web site, connect the application to the Label Gallery software using the following command:

```
Set LG = CreateObject("LabelGalleryPlus2WR.LGApp")
```

The procedure call connects your application to Label Gallery Plus and its print engine. Create a label with Label Gallery Plus and a form with a print button on your Web page where users enter the values for the variables on the label (see figure 3 above). When users click on the print button of your Web form, the script above will execute printing the label with the entered variables.

For further information, see the *Programming Guide SDK* available for download from the Label Gallery Web site at http://www.satoworldwide.com/labelgallery/LG3/dl_labelsamples.htm .

3.1.3 .Net Integration

The Label Gallery ActiveX interface can also be used for integration to .NET applications. The add-on Label Gallery wrapper handles proper data interchange between the Label Gallery ActiveX and .NET interfaces. Using the Label Gallery wrapper allows you to use early binding to Label Gallery's ActiveX interface, which improves the execution speed. The Label Gallery .NET wrapper comes with the Label Gallery software.

The sample code shows the following: open a label, retrieve a label variable by name and set its value, use a specific printer and print five (5) labels.

```

'Instantiate Label Gallery Application and Label objects
Dim nlApp As New LabelGalleryPlus2WR.LGApp
Dim nlLabel As New LabelGalleryPlus2WR.LGLabel =
nlApp.LabelOpenEx("C:\Sample.lbl")

'Get collection of variables from label
Dim nlVarList As LabelGalleryPlus2WR.VariableList = nlLabel.Variables
'Set values for specific variables
Dim tmpVar As LabelGalleryPlus2WR.WRVar
tmpVar = nlVarList.FindByName("TestVar1")
tmpVar.SetValue("Test Data")

'Set printer and print 5 labels
nlLabel.PrinterName = "CL408e"
nlLabel.Print("5")
nlApp.Quit

```

Figure 5: Microsoft Visual Basic.NET Sample

3.1.4 Dynamic Data Exchange (DDE)

You can use a DDE connection to print labels from your Windows applications that are developed in standard programming environments such as Microsoft Visual Basic, Borland Delphi, C, or Microsoft Access.

To create the DDE communication, the client application must use the following DDE parameters:

```

Service = Label Gallery
Topic = LINE or JOB

```

When you use topic 'JOB', the content is the name of the command file that should be run. When you use topic 'LINE', the content is one of the Label Gallery Commands.

The figure below shows a sample code that will open and print the 'dde.lbl' label file using values for the label variables from a Microsoft Access application.

| | | |
|--|---|--|
| <pre> DDEExecute channel:=chan, Command:="label "c:\Program Files\SATO\Gallery 3\Samples\Labels\sample3.lbl" " </pre> | } | Connect to Label Gallery |
| <pre> DDEExecute channel:=chan, Command:="set "Bar Code"=123456789012" </pre> | } | Open the label |
| <pre> DDEExecute channel:=chan, Command:="set Product=" + Chr\$(34) + "Product Name" + Chr\$(34) </pre> | } | Set the variables 'Product', 'Quantity' and 'Bar code' |
| <pre> qty\$ = InputBox\$("Input quantity of labels:", "MS Word & LabelGallery software: Printing sample3.lbl", "1") </pre> | | |
| <pre> DDEExecute channel:=chan, Command:="set Quantity=" + qty\$ </pre> | | |
| <pre> DDEExecute channel:=chan, Command:="print 1" </pre> | } | Print one label |

Figure 6: Dynamic Data Exchange Sample with Microsoft Access

For further information, see the *ActiveX and DDE Programming Guide* available for download from the Label Gallery Web site at www.satoworldwide.com and the samples in folder C:\Program

Files\SATO\Gallery 3\Samples\Integration if you have installed Label Gallery on your desktop computer.

3.2 Integration Middleware Method Using GalleryWatch

In many organizations, the ERP system often runs on mainframe computers that may or may not use a Windows operating system. However, integrating label printing to the ERP system by changing the source code might be very expensive to implement or simply not possible. In addition, enterprises may have their facilities located all over the world and use TCP/IP communication and email to send data and print labels from a centralized location to any kind of printer throughout the network.

GalleryWatch is a module within Label Gallery TruePro that is a complete software solution for label design and printing. GalleryWatch is a powerful but easy-to-implement integration middleware server that supports the following features:

- Automated bar code and RFID label printing on the ERP system initiated through pre-defined trigger events.
- Bar code label printing to an unlimited number of printers on your enterprise-wide network.
- Bar code and RFID label printing to a network computer initiated by a Windows CE mobile device.
- Parse and map data from incoming structured or non-structured data streams (for example invoice file) to label variables.
- Import XML data from Oracle WMS and MSCA and print bar code and RFID label formats throughout the enterprise.

GalleryWatch provides a true real-time, on-demand and automated label printing solution for any IT environment.

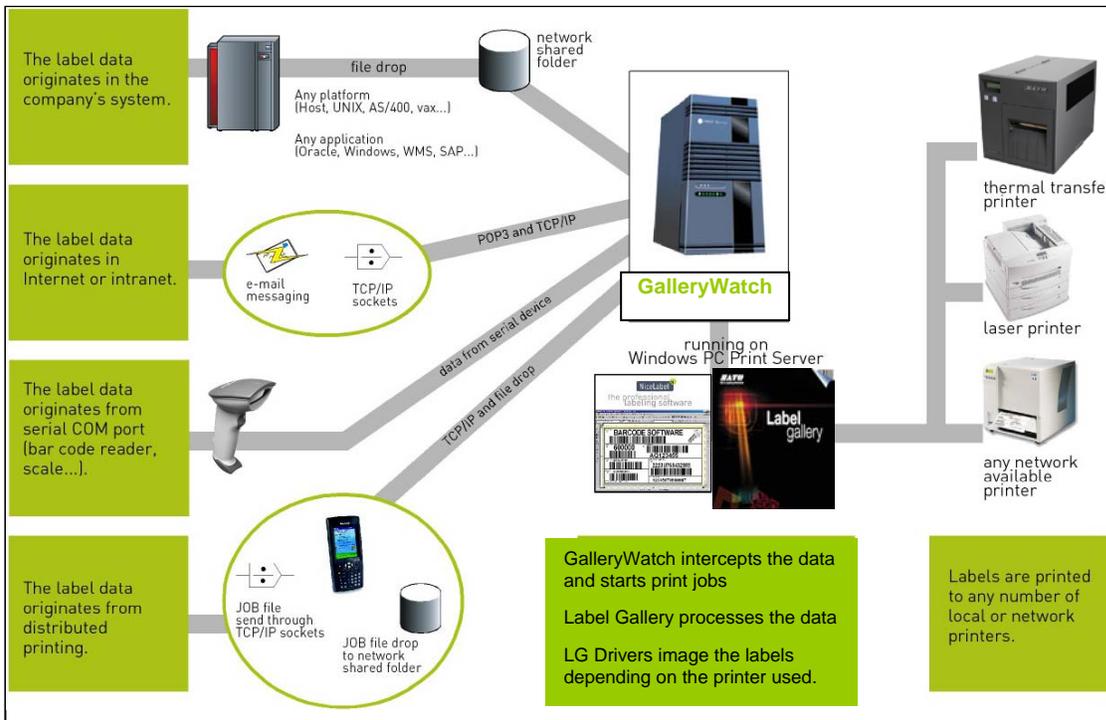


Figure 7: GalleryWatch Integration Middleware

Setting up the GalleryWatch middleware tool as a print server to initiate label printing does not require any programming skills or changes in your IT systems. You only need to setup the GalleryWatch server and define the following features:

- Event Triggers
- Trigger Actions
- Mapping Data Filters (optional)
- GalleryCommands (optional)

3.2.1 Event Triggers

GalleryWatch is an event-based application and monitors different system events. When GalleryWatch detects a change in an event, predefined actions are triggered. The data that triggers the action can be used to start the label printing process alone or can contain the values for the label variables.

GalleryWatch offers four (4) trigger options:

File Trigger: A file trigger event occurs when a monitored file or a file in a monitored folder changes (the file modification timestamp changes). For example, the computer running Label Gallery is connected to the same network as the enterprise ERP server that runs the main corporate database. When a label needs to be printed, the ERP application on the server exports the part of a database that holds the required label data. Those data fields are stored in an ASCII text file on a disk that is shared on the network. GalleryWatch detects the new file or the change of the file and initiates label printing. Variable values are extracted from the text file and transferred to the label where they are used at print-time.

The monitored trigger file can be the following:

1. 'Dummy' file containing no data that only starts a defined action.
2. Text file containing structured text database or XML data.
3. Text file containing unstructured data.
4. .JOB file containing GalleryCommands.

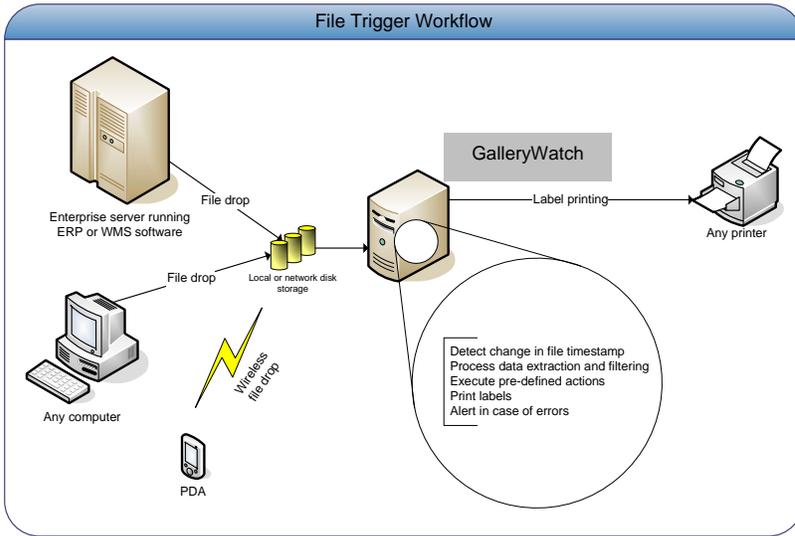


Figure 8: File Trigger Workflow

COM Port Trigger: GalleryWatch captures data received from a COM (serial) port and triggers an action. GalleryWatch can receive different formats of incoming data. For example, a bar code scanner attached to the serial port scans the bar code for data. GalleryWatch accepts the input data and initiates label printing. Label Gallery Plus opens the label and pulls a specific record from a database that complies with the scanned input data. A similar scenario is also valid for other types of serial port devices such as weight scales.

GalleryWatch can also communicate with a serial device through Visual Basic script functions. The received data can be parsed using a filter or further manipulated by using Visual Basic.

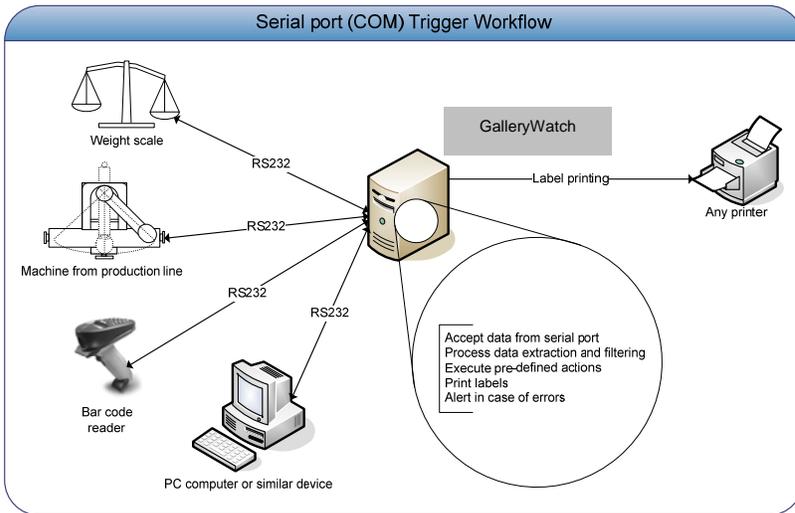


Figure 9: Serial port Trigger Workflow

Email Trigger:

GalleryWatch checks an email on any POP3 mail server. When an email is received, an email event is triggered and pre-defined actions are executed. The subject of the email message determines if the event should be triggered or not. The body of the message can hold both the data for variable values and GalleryCommands that specify label printing procedures in detail.

The email trigger is an effective way for two or more locations not connected by a Virtual Private Network (VPN) to safely and easily send the data to each other in order to print labels remotely. Firewall concerns are eliminated with a plain text-based email message.

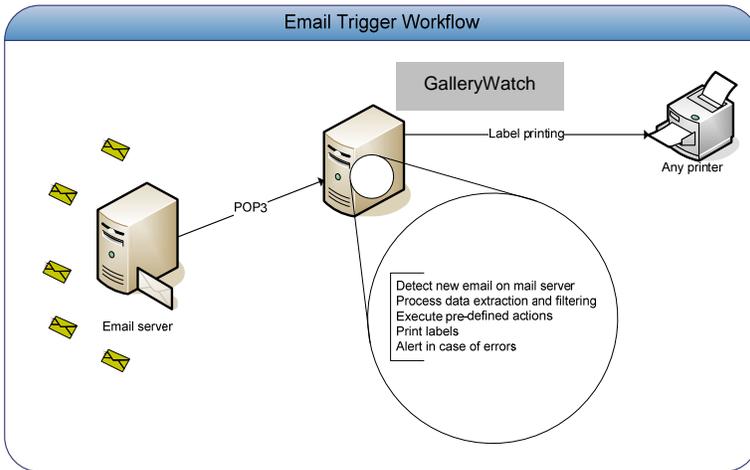


Figure 10: Email Trigger Workflow

TCP/IP Trigger:

The command for starting label printing or the label data itself can be received over any specified TCP/IP port number. Mobile devices that are performing real-time data collection can send label requests over the same wireless infrastructure and print labels to any printer on your enterprise network.

For example, a portable handheld computer is used in the company's warehouse for data collection. The handheld has a built-in bar code scanner. The bar code is scanned to Pocket Label Gallery which processes the label data, prepares a batch command file (.JOB file) and transmits the data over TCP/IP protocol to GalleryWatch running on the server. Based on the data scanned from the bar code Label Gallery queries the enterprise database and prints the label with the specified data.

The TCP/IP socket trigger enables mobile wireless data collection devices or UNIX applications to send label requests to GalleryWatch. UNIX applications do not need to use FTP or Telnet to drop a file to a Windows server in order to trigger a label printing event.

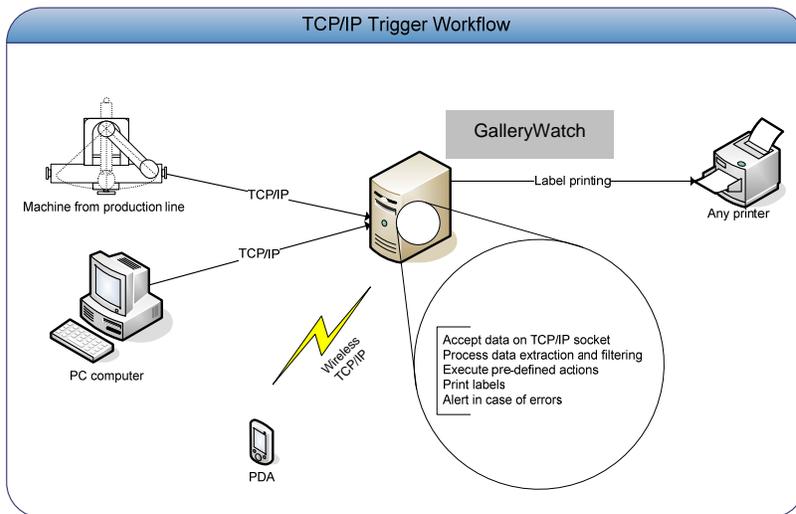


Figure 11: TCP/IP Trigger Workflow

3.2.2 Trigger Actions

Every event must have a defined action. When an event occurs (file drop, COM port, email or TCP/IP communication) the trigger actions tell GalleryWatch what to do. Actions include commands like the following:

- 'open the label'
- 'set the variable on the label to some value'
- 'select printer for printing'
- 'print the required amount of labels'

If an action cannot be executed, GalleryWatch records an error description in the log file that helps to identify and resolve the problem.

3.2.3 Mapping Data Filters

GalleryWatch includes powerful filter capabilities to parse input data, extract required data fields regarding your criteria and map them to the variables defined in the label. If the data you have received from your trigger (file, COM, email or TCP/IP) cannot be used immediately in GalleryWatch, you have to use filter options in GalleryWatch to extract only the portions of the data that you need to print the labels. Mapping data filters is an optional function that you only need to set up if the data from your trigger cannot be used immediately to print the label.

GalleryWatch offers three (3) filter types to process data in unstructured and structured text files:

- Document analysis of unstructured text files
- Text database analysis of structured text and database files
- XML database analysis of XML files

Document analysis

Parses an unstructured text file for data that you want to print on your label. **Unstructured text files** are for example reports, invoices or printer data stream files. 'Unstructured' refers to unformatted data structure with data not organized in a table-like format. The data is not organized in rows and columns that are separated with a character like a comma or have fixed column width. GalleryWatch can extract specific data items within an unstructured file that you want to assign to certain variables.

The invoice below shows the highlighted data that you want to print on your label. Usually, you extract the lines with the data and then use the data fields individually on the label.

```

Invoice
One Portals Way, Twin Points WA 98156
Phone: 1-206-555-4756

Date: 20-feb-2005

Ship To:                               Bill To:
SPAR Supermarkt                       Richter Supermarkt
Starenweg 5                            Grenzacherweg 237
Geneve 1204                             Geneve 1203
Switzerland                             Switzerland

Order Customer Salesperson Order Date Required Date Ship Via
11075 RICSU Laura Callahan 06-may-1998 03-jun-1998 United Package

Product ID Product Name Quantity Unit Price Discount Extended
-----
      2 Chang           1      €190,00    15%      €161,50
     46 Spegesild      1      €120,00    15%      €102,00
     76 Lakkalikoori  2       €18,00    15%       €30,60

Subtotal: €294,10
Freight:   €55,00
Total:    €349,10
    
```

Figure 12: Unstructured Data Text File

The column 'Quantity' in the invoice above determines the amount of labels that GalleryWatch will trigger to print (a total of four (4) labels). See figure below.

| | |
|--|--|
| Report Label | Report Label |
| Ship To: SPAR Supermarkt Bill To: Richter Supermarkt ID: 2 Product name: Chang Quantity: 1 Price: €190,00 Total: €349,11 | Ship To: SPAR Supermarkt Bill To: Richter Supermarkt ID: 46 Product name: Spegesild Quantity: 1 Price: €120,00 Total: €349,11 |
| Report Label | Report Label |
| Ship To: SPAR Supermarkt Bill To: Richter Supermarkt ID: 76 Product name: Lakkalikoori Quantity: 2 Price: €18,00 Total: €349,11 | Ship To: SPAR Supermarkt Bill To: Richter Supermarkt ID: 76 Product name: Lakkalikoori Quantity: 2 Price: €18,00 Total: €349,11 |

Figure 13: Unstructured File: Printed Labels from GalleryWatch

The figure below shows another type of unstructured document (printer stream file) that you parse with the Document analysis filter. GalleryWatch extracts the highlighted data fields and maps them to the variables on the label. Data fields from one printer's data stream can be printed on some other printer.

```

^XA~TA000~JSO^LT0^MMT^MNV^MTT^PON^PMN^LH0,0^JMA^PR6,6^MD0^JUS^LRN^CI0^XZ
^XA^LL0480
^PW719
^FT399,171^A0N,28,28^FH\^FDRichter Supermarkt^FS
^FT52,171^A0N,28,28^FH\^FDSPAR Supermarkt^FS
^FT294,231^A0N,28,28^FH\^FD2^FS
^FT294,268^A0N,28,28^FH\^FDChang^FS
^FT294,305^A0N,28,28^FH\^FD1^FS
^FT295,380^A0N,28,28^FH\^FD€349,10^FS
^FT294,343^A0N,28,28^FH\^FD€190,00^FS
^FT152,89^A0N,68,67^FH\^FDReport Label^FS
^FT397,140^A0N,28,28^FH\^FDBill To:^FS
^FT52,140^A0N,28,28^FH\^FDShip To:^FS
^FT52,231^A0N,28,28^FH\^FDID:^FS
^FT52,268^A0N,28,28^FH\^FDProduct name:^FS
^FT52,305^A0N,28,28^FH\^FDQuantity^FS
^FT52,343^A0N,28,28^FH\^FDPrice:^FS
^FT52,380^A0N,28,28^FH\^FDTotal:^FS
^PQ10,0,1,Y^XZ
  
```

Figure 14: Unstructured File: Print Stream Data File

The parsing and mapping filter technology works with any kind of unstructured file that you want to use as a source of variable data on your labels. The GalleryWatch filter allows you to easily automate the extraction of the required data fields and print them on the label.

Text database analysis

Parses a structured text file for data that you want to print on your label. **Structured text files** are ASCII text files with label data, text files with label data and optional label and printer information, or XML files. 'Structured' refers to formatted data structure with data organized in a table-like format, using a fixed width of data fields or data fields separated with a certain character. See the sample figures below.

The samples below show a text database with fixed length of the fields that are formatted in columns and a text database using commas to separate the data fields. Each line in the file contains a record with data fields for a single label. Each column provides data for one variable on the label. If the trigger data is available in a structured form, GalleryWatch can use the data immediately for variable fields on the label without performing additional configuration steps.

```
1161890-03 1161890 378 67871130 HALTER
1162008-03 1162008 884 67871350 FUSSRASTENPL
1162132-03 1162132 150 67871125 BREMSHEBEL
1162212-03 1162212 105 67871134 LAGERBOCK
```

Figure 15: Structured File: ASCII Text Database

```
Test,200,2
Software,101,1
Printing,55,3
```

Figure 16: Structured File: Comma-Separated Data Fields

XML database analysis

Parses an XML file for data that you want to print on your label. The sample below shows the unstructured file (invoice) example from above as an XML file output from Oracle. GalleryWatch parses the file and triggers printing the values on a label (same output as 'Report Label' above). The XML structure provides the elements, attributes and the name of the variables that are printed on the label.

```

<?xml version="1.0" standalone="no"?>
<!DOCTYPE labels SYSTEM "label.dtd">
<labels _FORMAT="C:\My Documents\My Labels\xmlinvoice.lbl"
_JOBNAME="SampleJob001" _QUANTITY="2" _PRINTERNAME="SATO CL408e">
  <ShipTo>SPAR Supermarkt</ShipTo>
  <BillTo>Richter Supermarkt</BillTo>
  <label>
    <variable name="ID">2</variable>
    <variable name="ProdName">Chang</variable>
    <variable name="Quantity">1</variable>
    <variable name="Price">€190,00</variable>
  </label>
  <label>
    <variable name="ID">46</variable>
    <variable name="ProdName">Spegesild</variable>
    <variable name="Quantity">1</variable>
    <variable name="Price">€120,00</variable>
  </label>
  <label>
    <variable name="ID">76</variable>
    <variable name="ProdName">Lakkalikoori</variable>
    <variable name="Quantity">2</variable>
    <variable name="Price">€18,00</variable>
  </label>
  <TotalPrice>€349,10</TotalPrice>
</labels>

```

Figure 17: Structured File: Oracle XML File

For further information, see the *GalleryWatch User Guide* available for download from the Label Gallery Web site at www.satoworldwide.com.

3.2.4 GalleryCommands

GalleryCommands enable you to initiate label printing from .JOB files, DDE communication, GalleryWatch and GalleryForm. Every GalleryCommand starts in a new line and all GalleryCommands are executed one by one from the beginning until the end of a file. Typical GalleryCommands are the following:

- LABEL – to open the label file
- SET – to set value for variable
- PRINT – to print label in selected quantity

GalleryCommands are usually used in JOB files printed from GalleryWatch. A .JOB file is a simple text document containing GalleryCommands. See a .JOB file sample below.

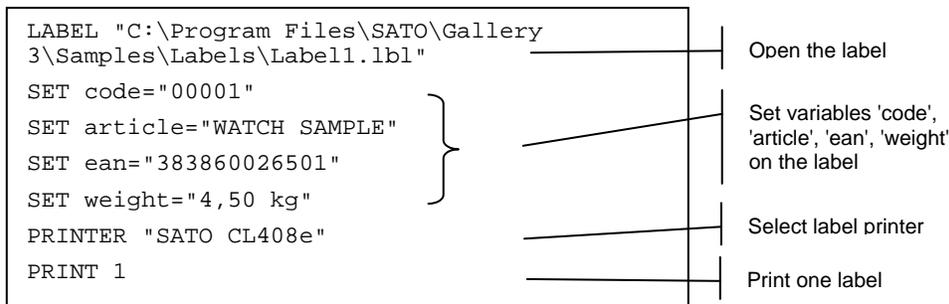


Figure 18: JOB file containing GalleryCommands

3.3 Direct Printing Method (Exporting Labels)

The direct printing method applies to software applications or devices that print labels but do not have a user-friendly label design tool. You can export labels designed with Label Gallery Plus to third party applications from which you want to print the label. For example, if your SAP R/3 system does not have a user-friendly label design tool, you can design the label with Label Gallery Plus and export the label to your SAP R/3 system to print the label. Other export options are available for third party software applications, stand alone printer or Windows mobile devices. You only need a user-friendly label design tool like Label Gallery Plus that can export the label to your application, printer, mobile device or SAP R/3 system. The exported label is processed in the third party application or downloaded to a printer for printing. Label Gallery Plus functions only as the label design tool and is not part of the label printing process.

The exported label file is a print command file similar to a print file generated when you use the *Print to file* option in the *Print dialog box* of any Windows software. The exported label file contains hooks that are a sequence of specially formatted characters within the data stream describing where the values for variable objects must be inserted in the label when you print the label. Hooks provide the information about the variable object that is encoded in the file and what data format is expected for that object. During the final label-processing phase the external application replaces all the hooks with actual data before the label is sent to the printer.

Label Gallery Plus provides a label design tool with export options to

- Windows CE Mobile Device (Pocket PC)
- Stand-alone Printer
- SAP R/3 (only with Label Gallery TruePro edition)

3.3.1 Exporting Labels to Mobile Device

Pocket Label Gallery is a print-only solution and enables mobile label printing from any supported Windows CE mobile device. You design the label with Label Gallery Plus on a Windows desktop computer and export the label to your mobile device using the command *Export to Pocket PC*. Some label design restrictions apply for label printing from your mobile device; for example, you can only use native (printer resident) fonts for variable objects on the label unless you use GalleryMemMaster to download true type fonts to your printer. Pocket Label Gallery does not support all the advanced functions of the Label Gallery software.

The figures below show an exported label to a Windows CE mobile device and the corresponding .PNL file with printer commands.



Figure 19: Label exported to Mobile Device

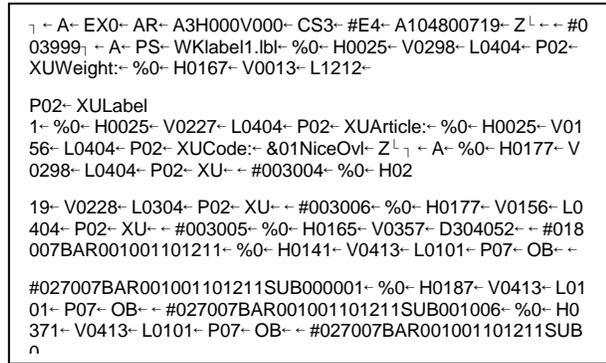


Figure 20: Exported Label (.PNL) File with Printer

For further information, see the white paper *Mobile Label Printing with Pocket Label Gallery* and the *Pocket Label Gallery Quick Start Guide* available for download from the Label Gallery Web site at www.satoworldwide.com.

3.3.2 Exporting Labels to Stand-alone Printer and Smart Keyboard

Label Gallery can also be used as a label design tool for many stand-alone printing solutions that do not require an active PC computer present at print time. You design the label with Label Gallery Plus on a Windows desktop computer and export the label to your stand-alone printer (using the command *Export to Printer*) or smart keyboard (using the application Smart Keyboard Downloader). The complete label printing process runs on the printer autonomously without the Label Gallery software being present at print time.

Some label design restrictions apply for label printing from a stand-alone printer; for example, you can only use native (printer resident) fonts for variable objects on the label and not all the advanced functions of the Label Gallery software are supported.

If your printer does not have stand-alone printing capabilities, you can still enjoy the benefits of offline printing by adding a special smart keyboard between your computer and the printer. The keyboard imitates the stand-alone printing capabilities. The labels are stored into the internal RAM of the Smart Keyboard and then sent to the printer when necessary. Label Gallery offers the support for Smart Keyboard with the application Smart Keyboard Downloader that is available in Label Gallery Plus and TruePro additions.

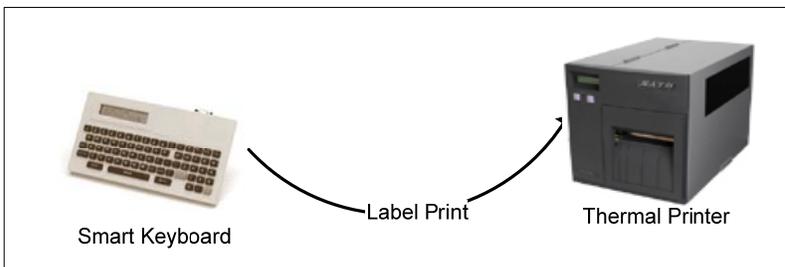


Figure 21: Label printed from Smart Keyboard

For further information, see the white paper *Using Smart Keyboard Downloader* available for download from the Label Gallery Web site at www.satoworldwide.com.

3.3.3 Exporting Labels to SAP R/3

Label Gallery Plus supports label template design with SAP Script for SAP R/3. You can select what SAP variables will be used for a certain variable field on the label. You design the label with Label Gallery Plus on a Windows desktop computer, save the file in the .ITF format and export the label to your SAP R/3 system using the command *Export to SAP*. Label data is retrieved from the SAP system that prints the label directly to a thermal printer. You need the Label Gallery TruePro edition in order to use the option *Export to SAP* in Label Gallery Plus.

Instead of exporting a label as an .ITF file you can use the GalleryWatch integration middleware. If you export a SAP data file to a .TXT file, GalleryWatch will recognize the exported .TXT file from the SAP system as a trigger for predefined actions. GalleryWatch itself does not recognize an .ITF file. The GalleryWatch integration middleware enables Label Gallery to process the label using all available Label Gallery functions and options, such as VB script and other advanced data processing that are not available with .ITF files. The SAP R/3 software prints the label on the thermal printer with either option.

For further information, see the white paper *Printing Labels to Thermal Printers from SAP R/3* available for download from the Label Gallery Web site at http://www.satoworldwide.com/labelgallery/LG3/dl_wp.htm

4 Label Gallery Integration Solutions

4.1 Label Gallery TruePro

Label Gallery TruePro is the premier label printing solution for both desktop and mobile label printing. Label Gallery TruePro offers a wide range of label printing integration options for desktop, server and mobile printing applications. The Label Gallery TruePro software offers the following modules (among others) that you can use to integrate your label printing solution:

- **Label Gallery Plus:** Full-featured label design and printing software that you use to create and print label (.LBL) files with your desktop computer. Includes all integration features from Label Gallery Plus edition plus export option to SAP/R3.
- **GalleryWatch:** An integration middleware to automate label printing operations to any printer on your network. GalleryWatch accepts a print request from any JOB file, mobile, desktop, ERP or WMS application to automate label printing without user intervention.
- **Pocket Label Gallery:** A mobile client that executes the label and form designs that were created on a desktop PC.

The Label Gallery software family offers non-programmers the ability to develop a solution for any label printing environment. Using Label Gallery Plus, you have an interface similar to Windows Office that makes label and form design easy for your desktop, server and mobile printing application.

4.2 Label Gallery Plus

Label Gallery Plus is labeling software for professional label design and printing. Label Gallery Plus is an easy-to-use, wizard-driven tool for any labeling requirement and includes complete database support, full integration capabilities, RFID smart labeling, compliance labeling, Unicode and multi-language labeling and more.

Integration Options:

- .NET/ ActiveX programmer's interface, DDE interface, Command Line
- Export to Windows CE Mobile Devices (Pocket PC)¹
- Export to Stand-alone Printer
- JOB file²

4.3 Label Gallery SDK

Label Gallery SDK is an affordable solution when software publishers want to integrate bar code label printing into their Windows applications. Label Gallery SDK provides an opportunity to

¹ Mobile device support only with Label Gallery TruePro.

² Automatic printing of JOB file only supported with GalleryWatch in Label Gallery TruePro.

software publishers who are looking for a way to reduce their label printing development costs and who want to add additional value to their products.

The Label Gallery SDK edition enables you to integrate label printing functionality into your custom application. Label Gallery can be used as a "print-engine" that runs in the background of your application and is invisible to the end user. Using Label Gallery SDK you can develop label printing solutions for desktop, enterprise and mobile applications.

Label Gallery SDK supports ActiveX Automation to allow other applications to take full control of Label Gallery label design and printing. You can integrate the Label Gallery software to other Windows based applications through the .NET or ActiveX (OLE Automation) programming interfaces.

The Label Gallery SDK offers the following additional integration features:

- **Label Gallery Engine:** Label Gallery shares its label processing and printing power with an external application through its print engine that enables label printing in 3rd party applications, across the company network or the Internet. Your software application or Web service control the label printing process, leaving the end user unaware of the labeling application running beneath your application or Web service.

Installation is a collection of Label Gallery printing DLLs that are bundled with the install package of the 3rd party application for a truly "silent" installation and existence of the print engine.
- **Label Gallery Wrapper:** The Label Gallery wrapper provides proper data interchange between the Label Gallery ActiveX and .NET interfaces. Using the Label Gallery wrapper allows you to use early binding to Label Gallery's ActiveX interface, which improves execution speed.

4.4 Pocket Label Gallery

Pocket Label Gallery enables you to integrate label printing functionality into your custom application for Windows CE mobile devices. The Pocket GalleryEngine (PNE) is a COM object that allows other applications on the Mobile Device to control label printing functions. Pocket Label Gallery offers a .DLL file that can be embedded into your application.

The Windows mobile device can print labels using Label Gallery as the print engine that will process printing of labels to printers on TCP/IP, IR, Bluetooth and COM (serial) ports. Pocket GalleryEngine, which is embedded in Pocket Label Gallery, functions as an integrated print engine for any data collection application on your Mobile Device. Pocket Label Gallery's ActiveX Programming Interface (API) enables you to learn and deploy one interface for your mobile label printing application, giving your application the flexibility to print to SATO thermal printers.

4.5 Comparison Table: Label Gallery Editions

Label Gallery software editions support the following label printing integration methods:

| Integration Method: | Integration Middleware | API Integration | Direct Printing |
|------------------------|------------------------|-----------------------|--------------------|
| Label Gallery Edition: | (GalleryWatch) | (ActiveX Programming) | (Exporting Labels) |
| Label Gallery TruePro | x | x | x |
| Label Gallery Plus | | x | x ³ |
| Label Gallery SDK | | x | |
| Pocket Label Gallery | x ⁴ | x | x |

4.6 Comparison Table: Label Gallery Integration Support

Label Gallery supports label printing from the following environments:

| Integration Method: | Integration Middleware | API Integration | Direct Printing |
|--|------------------------|-----------------------|--------------------|
| Support for: | (GalleryWatch) | (ActiveX Programming) | (Exporting Labels) |
| 3 rd Party Application | x | x | |
| 3 rd Party Mobile Application | x | x | |
| Bar Code Reader and Weight Scale | x | | |
| ERP & WMS (Oracle, SAP, etc.) | x | | x |
| JOB Files | x | x | |
| Mobile Device | x | x | x |

Integrating label printing into your existing software application or IT system means that Label Gallery itself does not initiate printing the label. You use Label Gallery as the design tool to create the label. Using Label Gallery Plus as the design tool for your label offers support for any SATO printers, RFID smart label printing, multi-language labeling and full Unicode compliance. Label printing itself is initiated through a third party application, ERP system, Web service, Windows mobile device, stand alone printer or other external devices.

5 Label Gallery Literature

To learn more about Label Gallery and how to integrate bar code and RFID label design and printing into your IT system and Windows application, see the following list of Label Gallery

³ Exporting to SAP/R3 requires Label Gallery TruePro edition.

⁴ GalleryWatch integration middleware support requires Pocket Label Gallery with the Label Gallery TruePro edition.

literature and documentation. You will find the documents on your Label Gallery CD ROM or at www.satoworldwide.com:

| | |
|--------------------------------------|--|
| GalleryWatch Integration Middleware: | <ul style="list-style-type: none"> ▪ GalleryWatch User Guide ▪ GalleryWatch Offline Help |
| ActiveX Programming: | <ul style="list-style-type: none"> ▪ ActiveX and DDE Programming Guide ▪ Pocket Label Gallery Programming Guide ▪ Code Samples in folder C:\Program Files\SATO\Gallery 2\Samples\Integration if you have installed Label Gallery 2 on your desktop computer |
| Exporting Labels: | <ul style="list-style-type: none"> ▪ White Paper: Printing labels to thermal printers from SAP R/3 ▪ White Paper: Using Smart Keyboard Downloader ▪ Label Gallery Offline Help |
| Pocket Label Gallery Mobile Devices: | <ul style="list-style-type: none"> ▪ White Paper: Mobile Wireless Printing using Pocket Label Gallery ▪ Pocket Label Gallery Quick Start Guide |
| Label Gallery Plus: | <ul style="list-style-type: none"> ▪ Label Gallery Quick Start Guide ▪ Label Gallery Plus User Guide ▪ White Paper: Multi-lingual label printing with Unicode ▪ White Paper: Label Gallery RFID Technology ▪ Label Gallery Offline Help |
| Label Gallery Software: | <ul style="list-style-type: none"> ▪ Integrating Label Printing ▪ Label Gallery Overview & Specifications ▪ White Paper: Using Label Gallery software with Windows 2000 Terminal Services and Citrix Metaframe |

6 Conclusion

The Label Gallery software family offers integration solutions for bar code and RFID smart label printing in any kind of desktop, mobile and network environment. The API integration, integration middleware (GalleryWatch) and direct printing methods provide flexibility that is unmatched in the automatic identification and data collection industry.

If you want to learn more about the different label printing integration methods with Label Gallery and the Label Gallery Product range in general, see the literature referenced in section 5 of this white paper, visit the Label Gallery Web site at

<http://www.satoworldwide.com/labelgallery/LG3/index.htm> or contact one of our offices
http://www.satoworldwide.com/labelgallery/LG3/support_sales.htm.

7 Glossary⁵

| | |
|------------------------------|---|
| ActiveX | <p>A type of COM component that is also known as an "ActiveX control". In addition to COM objects, an ActiveX control usually also implements some of the standard interfaces for embedding, user interface, methods, properties, events, and persistence.</p> <p>Because ActiveX components can support the OLE embedding interfaces, they can be included in web pages. ActiveX components can be used from languages such as Visual Basic, Visual C++, Java, VBScript.</p> |
| Borland Delphi | <p>Borland Delphi is a software package for development of integrated desktop and database applications. Delphi 2006 now supports Delphi programming language, Delphi .NET language, C++ and C#.</p> |
| Component Object Model (COM) | <p>Microsoft COM (Component Object Model) technology in the Microsoft Windows-family of Operating Systems enables software components to communicate. COM is used by developers to create re-usable software components, link components together to build applications, and take advantage of Windows services. The family of COM technologies includes COM+, Distributed COM (DCOM) and ActiveX® Controls.</p> |
| Dynamic Data Exchange (DDE) | <p>A method that allows application programs to communicate with each other. For example, DDE enables multiple applications to have access to the same data, such as a word processor having data from a spreadsheet pasted into it. Changes made in either application to the data are reflected in the main document.</p> |
| Early Binding | <p>A method to implement OLE Automation to communicate with another application. Using the early binding method you set the connections between two applications early in the process, i.e. during design time. In late binding, the application looks for the connection during run time. In general, early binding is the preferred method.</p> |
| ERP System | <p>Enterprise Resource Planning (ERP) systems are accounting-oriented information systems for identifying and planning the enterprise-wide resources needed to take, make, distribute, and account for customer orders. ERP use relational databases, object oriented programming language, computer aided software engineering tools in development,</p> |

⁵ Information for this glossary retrieved from the following sources:

[Hyperdictionary.com](http://www.hyperdictionary.com). 2000-2005. 05 Jan. 2006. <www.hyperdictionary.com>.

[Microsoft Corporation](http://www.microsoft.com). 2006. 05 Jan. 2006. <www.microsoft.com>.

[TheTechDictionary.com](http://www.thetechdictionary.com). 2004. 05 Jan. 2006. <www.thetechdictionary.com>.

[Wikipedia](http://en.wikipedia.org). 2006. 05 Jan. 2006. <http://en.wikipedia.org>.

| | |
|--------------------------------|---|
| | client/server architecture and open system portability. |
| Event Trigger | GalleryWatch is an event-based application for label printing that monitors different system events. If a file drop, COM port, email or TCP/IP triggers an event, predefined actions will take place. Actions can be 'open label,' 'set variable,' 'set printer' and 'print label.' Event triggers and trigger actions enable GalleryWatch to perform true real-time, on-demand and automated label printing. |
| .LVR File | When you export a label created with Label Gallery Plus to a mobile device, Label Gallery will generate two (2) files: a .PNL and a .LVR file. The .LVR file includes information about all the variables on the label. The .PNL file is the print file that includes the commands to control the printer and to handle the variables. |
| OLE Automation | Object Linking and Embedding (OLE) is a distributed object system and protocol developed by Microsoft. OLE allows an editor to "farm out" part of a document to another editor and then re-import it. OLE uses a master file that can have changed data that will take effect in the referenced document. The primary use was for managing compound documents, but it was also used for transferring data between different applications using drag and drop and clipboard operations. |
| Oracle WMS | <p>Oracle Warehouse Management System (WMS) is an advanced, real time warehouse management technology for warehousing and supply chain solutions. Oracle WMS addresses the complete supply chain including inbound logistics, manufacturing systems integration, outbound logistics, material status tracking and reverse logistics.</p> <p>Oracle WMS is part of the Oracle E-Business TruePro, an integrated set of applications that connects and automates the entire flow of business processes across the supply chain. The Oracle WMS supports directed put-away, bar coding, directed picking, customer labeling compliance and shipment cartonization and consolidation.</p> |
| Oracle MSCA | The Oracle Mobile Supply Chain Applications (MSCA) component uses the radio frequency technology (RF) so that users can complete distribution and manufacturing transactions from anywhere inside or outside the facility, |
| GalleryCommands | Simple text commands that enable third party applications to control automatic label printing with Label Gallery. A .JOB file is a text document that contains GalleryCommands. |
| Parsing | A computer process of analyzing data in a file to determine a data structure that is suitable for later processing. |
| .PNL File | See .LVR File. |
| Software Development Kit (SDK) | A set of development tools that allows a software engineer to create applications for a certain software package, software framework, hardware platform, computer system, operating system or similar. |

| | |
|-----------------------------------|--|
| Structured File | GalleryWatch can parse data from .TXT and .XML files and map them to defined variable on a label. Structured (text) files are ASCII files that have label data structured in a table-like format, using fixed width of data fields or data fields separated with a certain character. |
| Unstructured File | GalleryWatch can parse data from unstructured files like invoices or reports and map them to defined variable on a label. 'Unstructured' refers to unformatted data that is not organized in a table-like format. |
| Warehouse Management System (WMS) | Warehouse Management System (WMS) is part of the supply chain and provides directed stock rotation, intelligent picking directives, automatic consolidation and cross-docking to maximize the use of valuable warehouse space. WMS utilizes Auto ID Data Capture technology, such as barcode scanners, mobile computers, wireless LANs and RFID to efficiently monitor the flow of products. Many warehouse management systems are interfaced with an Enterprise Resource Planning system (ERP). |
| Virtual Private Network (VPN) | Virtual Private Network (VPN) is a private communications network usually used within a company, or by several different companies or organizations, to communicate over a public network. VPN message traffic runs on public networking infrastructure (e.g. the Internet) guarded by well defined Service Level Agreement (SLA) between the VPN customer and the VPN service provider. |
| XML | Extensible Markup Language (XML) is a general-purpose markup language for creating special-purpose markup languages, capable of describing many different kinds of data. XML is a simplified subset of SGML with its primary purpose to facilitate the sharing of data across different systems, particularly systems connected via the Internet. |

Appendix

Label Gallery Product Overview

Label Gallery is the most advanced professional labeling software for desktop and enterprise users. Label Gallery offers an easy-to-use interface and meets any label design and printing requirement for efficient label printing solutions to users in retail, logistics, health care, chemical, automotive and other industries.

Label Gallery TruePro: Complete software solution for any kind of label design and print requirement. Multiple connectivity options allow users to perform stand-alone printing or integrate label printing into any network environment.

Label Gallery TruePro provides you with interactive label printing capabilities such as integrating label printing to existing applications (ActiveX) or non-programming embedding of label printing to existing systems (Gallery Watch).

Label Gallery Plus: Full-featured software designed for professional label design and printing, including complete database support and ActiveX integration possibilities. A wide range of features and options makes Label Gallery Plus a perfect and easy-to-use tool for any labeling requirement.

Label Gallery Easy: Wizard-based software meeting basic barcode labeling needs. The entry-level software includes many design elements of the Pro edition with the emphasis on simplified user interaction.

Label Gallery Plus Print Only: Label Gallery Plus Print Only offers printing of pre-designed labels but cannot be used to design and alter existing labels. Advanced settings for changing the labels are not available.

Label Gallery TruePro Print Only: Label Gallery TruePro Print Only offers printing of pre-designed labels, using pre-designed forms and automatic printing from pre-designed trigger actions. Label Gallery TruePro Print Only cannot be used to design and alter existing labels, forms and trigger configuration. Advanced settings for changing the labels are not available.

Pocket Label Gallery: Pocket Label Gallery is a program package for Windows CE that brings the power of label printing to portable Windows CE computers (Windows Mobile Device). Pocket Label Gallery is part of the editions Label Gallery TruePro.

Label Gallery Developer Series:

- **Label Gallery SDK :** Label Gallery SDK is an ActiveX integrator edition of Label Gallery software developed for software publishers who needs label printing capabilities in their software.
- **Pocket Label Gallery SDK:** Pocket Label Gallery SDK is an ActiveX integrator edition of Label Gallery software developed for software publishers who needs label printing capabilities in their software under mobile devices.