

# Missionary Training Center Nametags Payment Process

## Executive Summary

### Business Description

The Missionary Training Center (MTC) facilitates the training of thousands of LDS missionaries each year. Each missionary is issued nametags that are worn on their shirts. Similarly, the employees all wear nametags that identify them. These nametags are purchased through a vendor called Nametags.com. Several departments at the MTC have accounts with this vendor and place orders independently. Once an order is received the packing slip is forwarded to the accounting office.

### Business Issue

These packing slips are delivered to the accounting department sporadically and in fairly large quantities. Because of this, these nametags invoices were normally processed as a batch every Friday. This process resulted in many user errors and approximately 2 hours of time. Previously, the process to pay these nametags went as follows:

- 1) Organize them according to the department from which they originated.
- 2) Log onto the Nametags.com vendor's website and access the appropriate account (each department has a separate Nametags.com account).
- 3) Use "Control-F" to search for the invoice that corresponds to the packing slip number.
- 4) Print the correct invoice
- 5) From the invoice, copy several key pieces of information and manually type it into a spreadsheet that tracks every Nametags.com invoice paid. Key information includes: the packing slip number, invoice number, date, amount, account to be charged, etc.
- 6) Mail the invoices to BYU for final payment.

### Solution

I chose to automate steps 2-5 of the old process. My solution requires the user to simply download all the Nametags.com invoices and by clicking a button the macro will:

- 1) Format the invoice so that the Excel invoice is in an appropriate format for payment
- 2) Prompt the user to input merely the packing slip number
- 3) Find and print the corresponding invoice
- 4) Input all relevant data from the invoice into the spreadsheet that tracks nametags invoices

Since creating this macro the time spent on this activity has been reduced from approximately 2 hours to less than 20 minutes and user error has been drastically reduced.

## Background

The Missionary Training Center (MTC) facilitates the training of tens of thousands of LDS missionaries each year. Each missionary is ordered several nametags to wear on their suits and shirts. Additionally, each employee at the MTC is required to wear a similar nametag. The vendor that supplies these nametags is appropriately named, Nametags.com. Seven departments in the MTC receive their nametags from this vendor with an accompanying sales packing slip. The various departments forward the packing slips to the small accounting department located within the MTC. Since these packing slips come in at random times and in large quantities, the packing slips are processed as a large batch, usually every Friday.



Example of employee nametag

To process the packing slips, the accountants have historically:

- 7) Organized them according to the department from which they originated.
- 8) Logged onto the Nametags.com vendor's website and accessed the appropriate account (each department has a separate Nametags.com account).
- 9) Used "Control-F" to search for the invoice that corresponds to the packing slip number.
- 10) Print the correct invoice
- 11) From the invoice, copied several key pieces of information and manually typed it into a spreadsheet that tracks every Nametags.com invoice paid. Key information includes: the packing slip number, invoice number, date, amount, account to be charged, etc.
- 12) Mail the invoices to BYU for final payment.

Because of the sheer volume of Nametags invoices received, this has proved to be a very laborious and time consuming task for the accounting department. For my project, I have chosen to automate steps 2 through 5. I believe that significant efficiencies in the accounting department will be achieved by the use of VBA to automate this process. Key among these efficiencies will be fewer user mistakes and more time to employ the accountants on other value-added labor.

Missionary Training Center													Process Nametags Invoices		PO # 198824		Format Nametags Excel Document	
Blanket Purchase Order Invoices													Spent to date		\$ 24,352.50		TRUE = \$150,000	
2014																		
R#	Invoice#	Order#	Company	PO#	Date	Amount	Tax	Total	Area	Operating Unit & Account Code	Needs to be Paid?	Date Paid	# if Applicat.	Notes				
1313	1059942	2071815	Nametags	273	3/12/2014	\$ 52.92	\$	\$ 52.92	Scheduling	15568121-6100	TRUE							
1318	1059859	2071809	Nametags	273	1/22/2014	\$ 118.58	\$	\$ 118.58	Scheduling	15568121-6100	TRUE							
1317	1059810	2071871	Nametags	273	11/26/2014	\$ 8.82	\$	\$ 8.82	Scheduling	15568121-6100	TRUE							
1314	1059753	2071893	Nametags	273	11/25/2014	\$ 19.16	\$	\$ 19.16	Scheduling	15568121-6100	TRUE							
1328	1059748	2071873	Nametags	273	11/25/2014	\$ 11.64	\$	\$ 11.64	Scheduling	15568121-6100	TRUE							
1320	1059751	2071872	Nametags	273	11/25/2014	\$ 11.64	\$	\$ 11.64	Scheduling	15568121-6100	TRUE							
1323	1059732	2071875	Nametags	273	11/25/2014	\$ 17.46	\$	\$ 17.46	Scheduling	15568121-6100	TRUE							
1322	1059802	2071930	Nametags	273	11/25/2014	\$ 5.88	\$	\$ 5.88	Scheduling	15568121-6100	TRUE							
1323	1059900	2071990	Nametags	273	2/12/2014	\$ 42.68	\$	\$ 42.68	Scheduling	15568121-6100	TRUE							
1324	1059858	2071988	Nametags	273	1/12/2014	\$ 3.68	\$	\$ 3.68	Scheduling	15568121-6100	TRUE							
1325	1059901	2072030	Nametags	273	2/12/2014	\$ 16.40	\$	\$ 16.40	Scheduling	15568121-6100	TRUE							
1328	1059952	2072028	Nametags	273	3/12/2014	\$ 176.40	\$	\$ 176.40	Scheduling	15568121-6100	TRUE							
1327	1059954	2072033	Nametags	273	3/12/2014	\$ 35.28	\$	\$ 35.28	Scheduling	15568121-6100	TRUE							
1328	1059849	2072093	Nametags	273	3/12/2014	\$ 8.84	\$	\$ 8.84	Scheduling	15568121-6100	TRUE							
1329	1059650	2071782	Nametags	273	11/21/2014	\$ 22.13	\$	\$ 22.13	Student Teacher	15565115-6100	TRUE							
1329	1059980	2071824	Nametags	273	11/24/2014	\$ 16.88	\$	\$ 16.88	Student Teacher	15565115-6100	TRUE							
1331	1059951	2072063	Nametags	273	3/12/2014	\$ 21.41	\$	\$ 21.41	Student Teacher	15565115-6100	TRUE							
1331	1059807	2071999	Nametags	273	11/26/2014	\$ 12.35	\$	\$ 12.35	Student Teacher	15565115-6100	TRUE							
1333	1059511	2071694	Nametags	273	11/20/2014	\$ 2.72	\$	\$ 2.72	Ecclesiastical	15561001-6100	TRUE							
1334	1059700	2071795	Nametags	273	11/24/2014	\$ 2.72	\$	\$ 2.72	Ecclesiastical	15561001-6100	TRUE							
1335	1059758	2071849	Nametags	273	11/25/2014	\$ 2.72	\$	\$ 2.72	Ecclesiastical	15561001-6100	TRUE							
1336	1059982	2071947	Nametags	273	1/12/2014	\$ 13.97	\$	\$ 13.97	CSM	15568121-6100	TRUE							
1337	1059991	2072065	Nametags	273	3/12/2014	\$ 16.44	\$	\$ 16.44	CSM	15568121-6100	TRUE							
1338	1059902	2072004	Nametags	273	2/12/2014	\$ 3.75	\$	\$ 3.75	CSM	15568121-6100	TRUE							
1339	1059899	2072006	Nametags	273	2/12/2014	\$ 3.75	\$	\$ 3.75	CSM	15568121-6100	TRUE							
1340	1059957	2072064	Nametags	273	3/12/2014	\$ 3.50	\$	\$ 3.50	Non-Student Teacher	15565110-6100	TRUE							
1341	1059948	2072096	Nametags	273	3/12/2014	\$ 4.94	\$	\$ 4.94	Non-Student Teacher	15565110-6100	TRUE							
1342	1059995	2072067	Nametags	273	3/12/2014	\$ 8.44	\$	\$ 8.44	Non-Student Teacher	15565110-6100	TRUE							
1343	1059906	2071711	Nametags	273	11/20/2014	\$ 3.50	\$	\$ 3.50	Non-Student Teacher	15565110-6100	TRUE							
1344	1059851	2071780	Nametags	273	11/21/2014	\$ 2.47	\$	\$ 2.47	Non-Student Teacher	15565110-6100	TRUE							
1345	1059791	2071789	Nametags	273	11/24/2014	\$ 2.47	\$	\$ 2.47	Non-Student Teacher	15565110-6100	TRUE							
1346	1059993	2071819	Nametags	273	11/24/2014	\$ 151.30	\$	\$ 151.30	Non-Student Teacher	15565110-6100	TRUE							
1347	1059852	2071781	Nametags	273	11/21/2014	\$ 3.50	\$	\$ 3.50	Non-Student Teacher	15565110-6100	TRUE							
1348	1059709	2071888	Nametags	273	11/25/2014	\$ 7.90	\$	\$ 7.90	Non-Student Teacher	15565110-6100	TRUE							
1349	1059750	2071877	Nametags	273	11/25/2014	\$ 4.94	\$	\$ 4.94	Non-Student Teacher	15565110-6100	TRUE							
1350						\$ -	\$	\$ -		#N/A	TRUE							
1351						\$ -	\$	\$ -		#N/A	TRUE							

## Implementation

### *Automating Step 2 of the Old Process*

The picture above shows the spreadsheet used to track the various nametags purchases. Both macros are initialized from this spreadsheet via the buttons on the right. The MTC uses a lot of macros and all are ran using buttons, so I decided to be consistent with what the other programmers have done at the MTC. Before running the first macro, the user will manually visit Nametags.com and go to all seven different MTC accounts (for each MTC department) and download the PDF file containing the nametags invoices. This PDF will then be manually saved as an excel file. The file is saved as the Nametags.com account number (remember, this account number corresponds to the specific MTC department placing the nametags order) in the folder “Nametags Macro Files” – this folder must be in the same folder as the “2014 BPOs” spreadsheet folder. Because the conversion from PDF to Excel omits the Nametags.com logo and address and slightly shuffles some data, the file needs to be reformatted so the invoice is in an acceptable format for payment.

To reformat each invoice, the Sub FormatNametags() will be used. The code starts by prompting the user to enter the Nametags.com account number. The account number is held in the variable “filePath”. If the user does not enter an account number, then the macro will end immediately.

```
filePath = InputBox("E.g. Scheduling = 42899)", "Enter Nametags Account Number")
If filePath = "" Then Exit Sub
RowNum = 1

Workbooks.Open fileName:= "\\Mtcfileserver\home\Accountant\JONATHAN\2014 Financial\2014 BPOs\Nametags Macro Files\" & filePath & ".xlsx"
Workbooks(filePath & ".xlsx").Activate

lastRow = Range("A65536").End(xlUp).Row
```

After the filePath has been defined, the Macro will open up the appropriate excel file containing all outstanding invoices for the given Nametags.com account. Next, the variable “lastRow” will count the number of invoices in the file and be used as a reference for the loop to end when needed. After the file is opened, the macro uses InStr to find the word “Billing Address” in column 1 which will signal a new invoice is found. From there, the following code applies several different formats to various cells and inserts the Nametags.com logo into the invoice. After making these changes, the excel invoice looks very close to the PDF version from the Nametags.com website.

```
Do Until RowNum > lastRow
    x = InStr(1, Cells(RowNum, 1).Value, "Billing Address", vbTextCompare)

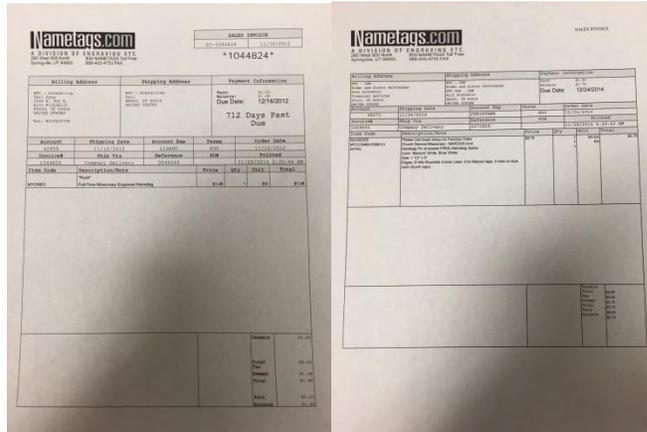
    If x > 0 Then
        Cells(RowNum, 1).Select
        Cells(RowNum, 1).EntireRow.Insert
        Rows(RowNum).RowHeight = 100
        Cells(RowNum, 11).Value = "SALES INVOICE"
        Cells(RowNum, 11).Font.Name = "Times New Roman"
        Cells(RowNum, 11).Font.Size = 12
        ActiveSheet.Pictures.Insert ("\\Mtcfileserver\home\Accountant\JONATHAN\2014 Financial\2014 BPOs\Nametags Macro Files\Nametags.png").Select
        Selection.ShapeRange.ScaleWidth 0.2833673348, msoFalse, msoScaleFromTopLeft
        Rows(RowNum + 2).RowHeight = 57
        Rows(RowNum).ClearFormats
        Cells(RowNum, 1).EntireRow.Insert
        Price = Cells(RowNum + 11, 12).Value
        Cells(RowNum + 11, 12).Value = "" & Chr(10) & Price
        Cells(RowNum + 11, 12).Font.Size = 8
        RowNum = RowNum + 2
        lastRow = lastRow + 2
    End If

    RowNum = RowNum + 1

Loop

ActiveWorkbook.Save
ActiveWorkbook.Close
```

This will process will loop until all invoices have been formatted. Afterwards, it will save the file and close it. The user will then run this for each of the seven Nametags.com accounts that the MTC uses.



PDF Format from Nametags.com

Macro Formatting

### Automating Steps 3 and 4 of the Old Process

The next Sub Procedure titled PrintNametagsInvoice() begins by asking the user to input the account Nametags.com account number. Once the account number is entered, the macro opens the formatted Nametags.com spreadsheet containing all invoices for the given account number.

```
filePath = InputBox("E.g. Scheduling = 42899)", "Enter Nametags Account Number")
If filePath = "" Then Exit Sub
Workbooks.Open fileName:"\\Mtcfileserver\home\Accountant\JONATHAN\2014 Financial\2014 BPOs\Nametags Macro Files\" & filePath & ".xlsx"
```

The next block of code begins a loop that will count the number of rows by going all the way to the bottom of the excel spreadsheet and using xlUp. This will set the upper bound on the number of cells the macro will search to find the specific invoice. Next, the macro will prompt the user to input the packing slip number (from the packing slip that the accountants receive from the various MTC departments). Once again, if the user does not input a packing slip number, the macro will end.

```
Do
Workbooks(filePath & ".xlsx").Activate
RowNum = 1
lastRow = Range("A65536").End(xlUp).Row
PackingSlip = InputBox("PS-", "Enter the Packing Slip Number")
If PackingSlip = "" Then Exit Sub
```

After the user has entered a packing slip number, the macro will locate the corresponding invoice. To locate the correct invoice, a nested Do Loop is used. The macro will compare the packing slip number entered with the value in each cell of column E. If the InStr statement returns a value greater than 0, the correct invoice has been identified. It then selects the entire invoice and fits the selection to a single page and prints only the selection. The macro will then copy the invoice in a tab called "Current Invoice" to the Excel spreadsheet that tracks various pieces of information regarding the nametags invoices. At this point, the macro will call another sub procedure which will replace step 5 of the old manual process. This will be covered in more detail below. After calling the RecordPrintedInvoice sub procedure, the macro will exit the nested do loop. This will prompt the user to enter another packing slip number and

reset the search. If the macro does not find the desired packing slip number it will beep and end the sub procedure.

```
Do Until RowNum > lastRow
  x = InStr(1, Cells(RowNum, 5).Value, PackingSlip, vbTextCompare)
  If x > 0 Then
    Range(Cells(RowNum - 6, 1), Cells(RowNum + 4, 12)).Select
    With Sheets("Table 1").PageSetup
      .PrintArea = Selection
      .Zoom = False
      .FitToPagesTall = 1
      .FitToPagesWide = 1
    End With
    Selection.PrintOut
    Selection.Copy Destination:=Workbooks("2014 BPOs.xlsx").Worksheets("Current Invoice").Range("A1")
    Call RecordPrintedInvoice
  End With
  Exit Do
End If
RowNum = RowNum + 1
If RowNum = lastRow Then Beep
Loop
```

### *Replacing Step 5 of the Old Process*

The Sub Procedure titled RecordPrintedInvoices() will record various details from the sales invoice to an Excel spreadsheet that tracks every nametags invoice paid by the MTC. The sub starts by finding the last row with data entered and pasting the new information in the cells below that row. The macro will grab the invoice number from worksheet titled "Current Invoice" (remember the current invoice we are working with was pasted here in the previous step) located in cell A7 and paste it below all the nametags invoices data. It does the same thing for the packing slip number in E7 and the date in J5. Copying the invoice price from L11 proved to be much more difficult.

```
Workbooks("2014 BPOs.xlsx").Worksheets("BPOs").Activate
lastRow = Range("B65536").End(xlUp).Row

Cells(lastRow + 1, 2) = Sheets("Current Invoice").Range("A7").Value
Cells(lastRow + 1, 3) = Sheets("Current Invoice").Range("E7").Value
Cells(lastRow + 1, 6) = Sheets("Current Invoice").Range("J5").Value
Balance = Sheets("Current Invoice").Range("L11").Value
Balance = Right(Balance, 9)
x = InStr(1, Balance, "$")
Balance = Right(Balance, 9 - x)
Cells(lastRow + 1, 7) = Balance
```

The transfer from PDF to Excel placed all the different amounts and subtotals in a single cell as you can see below. In order to extract the balance figure, a new variable was used called "Balance". The macro uses the Right statement to grab the 9 rightmost characters in cell L11 (these invoices are rarely over \$1,000 and there are several blank spaces in the cells preceding the "\$" sign). Following this, the macro will search (using InStr) the new string for a "\$" symbol and returns what position this symbol is in. Next, the Balance variable is trimmed again using Balance = Right(Balance, 9 - x). This extracts every number on the right hand side of the final "\$" symbol in cell L11. Next the macro places this value on the worksheet that keeps track of all the details of the nametags invoices.

A	B	C	D	E	F	G	H	I	J	K	L	M	N
SALES INVOICE													
Billing Address			Shipping Address			Payment Information							
MTC - HR (Non-Student)			MTC - HR (Non-Student Teachers)			Paid: \$0.00							
Account	Shipping Date		Account Rep	Terms			Order Date						
48373	11/25/2014		DARINLU	N30			11/25/2014						
Invoice #	Ship Via		Reference	PO#			Printed						
1069755	Company Delivery		2071877				12/5/2014 5:41:15 AM						
Item Code	Description/Note			Price		Qty	Unit	Total					
REORDER	Please Use Exact Setup As Previous Order			\$1.75			1	EA EA	\$3.50				
MTCTEACHS155651	MTC S Teacher Nametags Acct# 15565115			\$0.72			2	EA	\$1.44				
0													
											Taxable Total	\$0.00	
											Tax	\$0.00	
											Exempt Total	\$4.94	
											Paid	\$0.00	
											Balance	\$4.94	
1													
2													
3													
4													
5													

After this, there is one final piece of data needed from the nametags invoice. This is one of the more critical pieces of data because it tells the MTC which department to charge the invoice to. If you recall, we had a variable named filePath that was holding the Nametags.com account number. This account number corresponds to an MTC department. Since there are only seven departments possible, a case statement was used.

```

Select Case filePath
  Case 42899
    Cells(lastRow + 1, 10).Value = "Scheduling"
  Case 48370
    Cells(lastRow + 1, 10).Value = "Cafeteria"
  Case 48372
    Cells(lastRow + 1, 10).Value = "Ecclesiastical"
  Case 48373
    Cells(lastRow + 1, 10).Value = "Non-Student Teacher"
  Case 48374
    Cells(lastRow + 1, 10).Value = "Student Teacher"
  Case 48444
    Cells(lastRow + 1, 10).Value = "Mission President Seminar"
  Case 48371
    Cells(lastRow + 1, 10).Value = "CSM"
End Select

```

### Discussion of Learning and Conceptual Difficulties

The VBA project provided a considerable amount of learning and research. One thing I really enjoyed about the project was there always seemed to be a point in the coding where I felt like I was stuck. If I took a break and came back to coding I realized that I was able to think differently about the issue at hand. Thinking about the different ways a particular issue can be resolved definitely helped my analytical skills and problem solving ability. One of the biggest roadblocks I encountered was trying to figure out how I'm going to get the right dollar amount from the invoice into the correct worksheet. Although the solution I settled on seems relatively easy now, it took a great deal of experimentation for me to hammer down an idea that worked. That struggle and the many others I encountered during the project definitely enhanced my learning and provided valuable problem solving experience.

One major implementation difficulty I encountered was automating pulling the data directly from the Nametags.com vendor website. A large part of the difficulty came because I was not able to save the file as an Excel file. Because of this I opted to save the entire PDF (containing all the invoices) as an Excel file on another computer and then once it was in Excel, I was able to manipulate the data on my own work computer. There may have been other workarounds I would have loved to explore that could have made this process even faster.

Overall, I was very pleased with the result of the macro and now a 2 hour task takes 15 to 20 minutes.

### **Assistance**

The macros were coded entirely by me. I received no assistance from anyone on this project.