Service Request 100659

Mask Bank Acct Info on Inquiry Screens

Technical Specification

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Information Resources & Communications
Office of the President
University of California
# Version History

<table>
<thead>
<tr>
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<th>Date</th>
<th>Revised By</th>
<th>Reason for Change</th>
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<td>1.0</td>
<td>06/13/2014</td>
<td>Baskar Chitavel</td>
<td>Initial version</td>
</tr>
<tr>
<td>2.0</td>
<td>09/04/2014</td>
<td>Baskar Chitavel</td>
<td>Added more EDB Inquiry System changes</td>
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1 Introduction

Recently, the Chief Information Security Officer at Santa Barbara reported to UCOP ITS a vulnerability issue with PPS Inquiry screens, which display an employee’s entire Bank Routing Number and Bank Account Number.

Following are the CICS and Web EDB inquiry screens displaying bank details, which can allow for possible abuse of this information by authorized and unauthorized individuals:

CICS Inquiry: ICHK, IDCS, IDSP, IDDG, IDCA, and IGNL

Web EDB Inquiry: Pay Disposition

Therefore, PPS should mask the display of the Bank Account details in the above PPS Inquiry screens.

1.1.1 Service Request 100659

SR100659 proposes the following PPS changes:

Mask the display of the Bank Account details in the following PPS Inquiry screens:

Employee’s Bank Account Number:

- From the Fixed PAR (PPPEUD) displayed in the CICS Inquiry screens: ICHK, IDCS, IDSP, and IDCA

Both Bank Route Transit Number and Employee’s Bank Account Number:

- CICS Inquiry screens IGNL and Web EDB Inquiry system
  - From CTL SurePay Bank (PPPSPB) table for Route Transit Number
  - From the EDB Pay Details (PPPPAY) table for Account Number
- CICS Inquiry screens IDDG From the EDB Direct Deposit (PPPDDG) table
2 Overview of System Modifications

SR100659 asks PPS to mask bank account number and route transit number in the inquiry screens of PPS. The unmasked display of employee’s Bank details has been reported as a vulnerability issue by the Chief Information Security Officer at Santa Barbara.

In order to avoid the possibility of abuse, the following changes are needed in PPS for masking Bank Routing and Account Numbers, as required by the SR100659:

1. In the following CICS detail screen processor programs, add the logic to apply mask to all but the last four digits of the Bank Account Number:

<table>
<thead>
<tr>
<th>CICS Screen</th>
<th>PPS Program Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICHK</td>
<td>PPWICHK</td>
</tr>
<tr>
<td>IDCS</td>
<td>PPWIDCS</td>
</tr>
<tr>
<td>IDSP</td>
<td>PPWIDSP</td>
</tr>
<tr>
<td>IDCA</td>
<td>PPWIDCA</td>
</tr>
</tbody>
</table>

2. In the following CICS detail screen processor program, add the logic to apply mask to all but the last four digits of the Bank Account and Route Transit Numbers:

<table>
<thead>
<tr>
<th>CICS Screen</th>
<th>PPS Program Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDDG</td>
<td>PPWIDDG</td>
</tr>
<tr>
<td>IGNL</td>
<td>PPWIGNL</td>
</tr>
</tbody>
</table>

3. Add the logic to apply mask to all but the last four digits of the Bank Account and Route Transit Numbers in the following Web EDB inquiry screen program:

<table>
<thead>
<tr>
<th>EDB Inquiry System Screen</th>
<th>Java Server Page Name</th>
<th>Java Program Name</th>
</tr>
</thead>
</table>
   | Pay Disposition Information | paydisposition_ppwwidsp.jsp | PayDispositionAction.java 
   |                           |                       | DummyEmpDAO.java    |
   |                           |                       | EDBEmployee.java   |
   |                           |                       | MapBackedEBDEmpl.java |
3 Design Considerations

3.1 Assumptions and Dependencies

Following are the assumptions made, while designing the PPS changes to mask employee's bank account details:

- Mask all but the last 4 chars in the display of Bank Account and Transit Number in the CICS and Web EDB Inquiry screens.
- Non-numeric characters, including dashes, are counted towards the length of unmasked Bank Account and Transit numbers.
- For each masked character, a value of ‘X’ is substituted in the display of Account and Transit numbers.
- In the CICS screens, maximum display length of Employee Account Number is 17 characters.
- In the CICS screens, maximum display length of Bank Route Transit Number is 09 characters.
- No changes requested in the CICS Entry and Web EDB Update screens that update Bank Account and Route Transit Number.

4 Testing Considerations

- In the CICS and / or Web EDB Inquiry screens, verify the Bank Account Number and Route Transit Number of an employee that are stored in the following EDB / CTL / PAR tables of PPS:

<table>
<thead>
<tr>
<th>CICS / Web Screen Name</th>
<th>Bank Acct# / Database</th>
<th>Bank RTN / Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>CICS / ICHK</td>
<td>PPPEUD / PAR</td>
<td>n/a</td>
</tr>
<tr>
<td>CICS / IDCS</td>
<td>PPPEUD / PAR</td>
<td>n/a</td>
</tr>
<tr>
<td>CICS / IDSP</td>
<td>PPPEUD / PAR</td>
<td>n/a</td>
</tr>
<tr>
<td>CICS / IDCA</td>
<td>PPPEUD / PAR</td>
<td>n/a</td>
</tr>
<tr>
<td>CICS / IGNL</td>
<td>PPPPAY / EDB</td>
<td>PPPSPB / CTL</td>
</tr>
<tr>
<td>Web / Pay Disposition</td>
<td>PPPPAY / EDB</td>
<td>PPPSPB / CTL</td>
</tr>
<tr>
<td>CICS / IDDG</td>
<td>PPPDDG / EDB</td>
<td>PPPDDG / EDB</td>
</tr>
</tbody>
</table>

- Production testing is required.
- Comprehensive QA and UAT testing setup and support are required.
5 Mainframe Design

5.1 EDB Maintenance Changes

5.1.1 COBOL Programs

5.1.1.1 PPWICHK

PPWICHK is the CICS detail screen processor program for the screen ICHK, which is the Simulated Check Stub function that displays PAR details for an employee.

This program will be changed to mask the bank account number information so that it can only display the last four digits of the bank account of an employee.

WORKING-STORAGE

Change the value of WS-REL-NO appropriately.

PROCEDURE DIVISION

In the 4100-MOVE-EUD-TO-SCRN section, which moves the fixed PAR (PPPEUD) table data to the screen fields, mask (with 'X') all but the last four digits of the Bank Account Number field BANK-ACCTNOO.

Snapshot of the exact location of the change is shown below:

```
FWT-CROSSO.
MOVE NET-PAY-AMT OF EUD-ROW TO NET-PAY-AMOUNT.
MOVE BANK-ACCTNO OF EUD-ROW TO BANK-ACCTNOO.
MOVE PAY-CYCLE-END-DATE OF EUD-ROW TO WS-ISO-DATE.
MOVE WS-ISO-YY TO WS-USA-YY.
MOVE WS-ISO-MM TO WS-USA-MM.
MOVE WS-ISO-DD TO WS-USA-DD.
MOVE WS-USA-DATE TO PAY-PERIOD-ENDED-DATE0.
4100-EXIT.
EXIT.
EJECT
4200-MOVE-EAR-TO-SCRN SECTION.
```

Attachment A contains a sample logic to achieve the masking of Bank Account Number.
5.1.1.2 PPWIDCS

PPWIDCS is the CICS detail screen processor program for the screen IDCS, which is the Departmental Simulated Check Stub function that displays PAR details for an employee.

This program will be changed to mask the bank account number information so that it can only display the last four digits of the bank account of an employee.

WORKING-STORAGE

Change the value of WS-REL-NO appropriately.

PROCEDURE DIVISION

In the 4100-MOVE-EUD-TO-SCRN section, which moves the fixed PAR (PPPEUD) table data to the screen fields, mask (with 'X') all but the last four digits of the Bank Account Number field BANK-ACCTNOO.

Snapshot of the exact location of the change is shown below:

```
MOVE FWT-GROSS OF EUD-ROW TO FWT-GROSSO.
MOVE NET-PAY-AMT OF EUD-ROW TO NET-PAY-AMOUNTO.
MOVE BANK-ACCTNO OF EUD-ROW TO BANK-ACCTNOO.
MOVE PAY-CYCLE-END-DATE OF EUD-ROW TO WS-ISO-DATE.
MOVE WS-ISO-YY TO WS-USA-YY.
MOVE WS-ISO-MM TO WS-USA-MM.
MOVE WS-ISO-DD TO WS-USA-DD.
MOVE WS-USA-DATE TO PAY-PERIOD-END-DATEO.
```

4100-EXIT.
EXIT.
4200-MOVE-EAR-TO-SCRN SECTION.

Attachment A contains a sample logic to achieve the masking of Bank Account Number.
5.1.1.3 PPWIDSP

PPWIDSP is the CICS detail screen processor program for the screen IDSP, which is the Check Address function that displays PAR check details for an employee.

This program will be changed to mask the bank account number information so that it can only display the last four digits of the bank account of an employee.

WORKING-STORAGE

Change the value of WS-REL-NO appropriately.

PROCEDURE DIVISION

The 3110-GET-BANK-NAME section obtains the Bank Name from the PPPSPB table and move it to the screen name field.

In addition, 3110-GET-BANK-NAME section moves the Bank Account Number from the fixed PAR (PPPEUD) table data to the screen field BANK-ACCTNUMO.

Mask (with ‘X’) all but the last four digits of the Bank Account Number field BANK-ACCTNUMO.

Snapshot of the exact location of the change is shown below:

```
3110-GET-BANK-NAME SECTION.
*------------------------------------------------------------*
* OBTAIN THE BANK NAME FROM THE SPB TABLE AND MOVE IT TO *
* THE MAP                                                    *
*------------------------------------------------------------*
MOVE BANK-TBL-KEY OF EUD-ROW TO BANK-KEY0
MOVE BANK-ACCTNO OF EUD-ROW TO BANK-ACCTNUMO

IF BANK-TBL-KEY OF EUD-ROW = SPACES
  MOVE MP0024 TO WS-MESSAGE-NO
  PERFORM 8800-GET-OTHER-MESSAGE
  MOVE WS-OTHER-MESSAGE TO BANK-WARN-MSSGO
ELSE
  MOVE BANK-TBL-KEY OF EUD-ROW TO SPB-BANK-NUMBER
  PERFORM 8500-SELECT-SPB
```

Attachment A contains a sample logic to achieve the masking of Bank Account Number.

Note for Attachment A:

Bank Account number field name in the screen is BANK-ACCTNUMO (not BANK-ACCTNOO).
5.1.1.4 PPWIDCA

PPWIDCA is the CICS detail screen processor program for the screen IDCA, which is the Departmental Check Address function that displays PAR check details for an employee.

This program will be changed to mask the bank account number information so that it can only display the last four digits of the bank account of an employee.

WORKING-STORAGE

Change the value of WS-REL-NO appropriately.

PROCEDURE DIVISION

The 3110-GET-BANK-NAME section obtains the Bank Name from the PPPSPB table and move it to the screen name field.

In addition, 3110-GET-BANK-NAME section moves the Bank Account Number from the fixed PAR (PPPEUD) table data to the screen field BANK-ACCTNUMO.

Mask (with ‘X’) all but the last four digits of the Bank Account Number field BANK-ACCTNUMO.

Snapshot of the exact location of the change is shown below:

```
3110-GET-BANK-NAME SECTION.
******************************************************************************
* OBTAIN THE BANK NAME FROM THE SPB TABLE AND MOVE IT TO *
* THE MAP               *
******************************************************************************

MOVE BANK-TBL-KEY OF EUD-ROW TO BANK-KEYO
MOVE BANK-ACCTNO OF EUD-ROW TO BANK-ACCTNUMO

IF BANK-TBL-KEY OF EUD-ROW = SPACES
  MOVE MP0024 TO WS-MESSAGE-NO
  PERFORM 8800-GET-OTHER-MESSAGE
  MOVE WS-OTHER-MESSAGE TO BANK-WARN-MSSCO
ELSE
  MOVE BANK-TBL-KEY OF EUD-ROW TO SPB-BANK-NUMBER
  PERFORM 8500-SELECT-SPB
```

Attachment A contains a sample logic to achieve the masking of Bank Account Number.

Note for Attachment A:

Bank Account number field name in the screen is BANK-ACCTNUMO (not BANK-ACCTNOO).
5.1.1.5 PPWIDDG

PPWIDDG is the CICS detail screen processor program for the screen IDDG, which is the Inquiry of Direct Deposit GTN function that displays EDB details for an employee.

This program will be changed to mask the bank account number and route transit number information so that they can only display the last four digits.

WORKING-STORAGE

Change the value of WS-REL-NO appropriately.

PROCEDURE DIVISION

In the 7100-MOVE-DDG-TO-SCRN section, Bank Route Transit Number (DDG-TRANSIT-NUM) and Account Number (DDG-ACCT-NUM), from the EDB table PPPDDG, are moved to the following screen name fields:

Bank Route Transit Number  (DDG-TRANSIT-NUM of PPPDDG) → DE0782-TRANSIT-NBRO
Bank Account Number  (DDG-ACCT-NUM of PPPDDG) → DE0783-ACCT-NUMERO

Mask (with ‘X’) all but the last four digits of the above Bank Account Number and Bank Transit Number screen fields.

Snapshot of the exact location of the change is shown below:

```
7100-MOVE-DDG-TO-SCRN SECTION.
* MOVE DDG INFO TO SCREEN *
MOVE DDG-CTN-NUMBER TO DE0780-CTN-NUMO (WS-LINE-SUB).
MOVE DDG-TRANSIT-NUM TO DE0782-TRANSIT-NBRO (WS-LINE-SUB).
MOVE DDG-ACCT-TYPE TO DE0784-ACCT-TYPEO (WS-LINE-SUB).
MOVE DDG-ACCT-NUM TO DE0783-ACCT-NUMERO (WS-LINE-SUB).
MOVE DDG-SP8-BANK-KEY TO DE0785-BANK-ACCTO (WS-LINE-SUB).
PERFORM 7500-GTN-DESCRIPTION.
```

Attachment A contains a sample logic to achieve the masking of Bank Account Number.

Note for Attachment A:
Bank Account number field name in the screen is DE0783-ACCT-NUMERO (not BANK-ACCTN00).

Attachment B contains a sample logic to achieve the masking of Bank Route Transit Number.
5.1.1.6 PPWIGNL

PPWIGNL is the CICS detail screen processor program for the screen IGNL, which is the Inquiry of General Information function that displays employee details.

This program will be changed to mask the bank account number and route transit number information so that they can only display the last four digits.

WORKING-STORAGE

Change the value of WS-REL-NO appropriately.

PROCEDURE DIVISION

In the 3100-GET-PAYROLL-DATA section, the Employee Bank Account Number (SURE-ACCTNUM) from the EDB table PPPPAY is moved to the screen name field SURE-ACCTNUMO.

Mask (with ‘X’) all but the last four digits of the Bank Account Number screen field (SURE-ACCTNUMO).

Snapshot of the exact location of the change is shown below:

```
3100-GET-PAYROLL-DATA SECTION.
******************************************************************************
* SELECT PAY AND BANK TABLE DATA AND MOVE TO MAP *
******************************************************************************
PERFORM 8100-SELECT-PAY.
MOVE 'Y' TO WS-DATA-FLAG
PERFORM 3150-OBTAINT-BANK-DATA

MOVE SURE-BANK-KEY OF PAY-ROW TO SURE-BANK-KEYO
MOVE SURE-PRENOTE-STAT OF PAY-ROW TO SURE-PRENOTE-STATO
MOVE SURE-PRENOTE-CYCLE OF PAY-ROW TO SURE-PRENOTE-CYCLEO
MOVE SURE-TYPEIND OF PAY-ROW TO SURE-TYPEINDO
MOVE SURE-ACCTNUM OF PAY-ROW TO SURE-ACCTNUMO
```

Attachment A contains a sample logic to achieve the masking of Bank Account Number.

Note for Attachment A:

Bank Account number field name in the screen is SURE-ACCTNUMO (not BANK-ACCTNOO).
In the 3150-OBTAIN-BANK-DATA section, the Bank Route Transit Number (SPB-TRANSIT-RTE-NO) from the CTL table PPPSPB is moved to the screen name field TRANSITO.

Mask (with ‘X’) all but the last four digits of the Bank Route Transit Number screen field (TRANSITO).

Snapshot of the exact location of the change is shown below:

```
3150-OBTAIN-BANK-DATA  SECTION.
*******************************************************************************
*    SELECT BNK TABLE DATA AND MOVE TO MAP                                *
*******************************************************************************

IF SURE-BANK-KEY = SPACES
   MOVE SPACES TO BANK-NAME
       TRANSITO
ELSE
   PERFORM 8300-SELECT-BNK
   IF SQLCODE = ZERO
       MOVE SPB-BANK-NAME TO BANK-NAME
       MOVE SPB-TRANSIT-RTE-NO TO TRANSITO
   ELSE
```

Attachment B contains a sample logic to achieve the masking of Bank Route Transit Number.

Note for Attachment B:

Bank Route Transit number field name in the screen is TRANSITO (not DE0782-TRANSIT-NBR).

The input Bank Route Transit Number (SPB-TRANSIT-RTE-NO) is from the CTL table PPPSPB (not DDG-TRANSIT-NUM).
6 Web Design

6.1 EDB Inquiry Changes

6.1.1 JAVA Programs

6.1.1.1 PayDispositionAction.java

In the PPS Web EDB Inquiry System, the employee inquiry of Pay Disposition screen has the unmasked display of Bank Routing and Account Numbers, as highlighted below:
Employee bank details, which are displayed in the Pay Disposition screen of the Web EDB Inquiry System of PPS, should be masked in order to avoid the possibility of abuse using this information by the authorized or unauthorized users of the Pay Disposition screen.

Add the mask logic in the Java Program PayDispositionAction.java so that the bank details are displayed in the Pay Disposition Information Screen (Java Server Page → paydisposition_ppwidsp.jsp) of the Web EDB inquiry system.

To take care of the PPS vulnerability issue, mask the bank route transit number and account number information to display only the last four digits of the account and routing numbers.

Mask Bank Account Number

In the EDBInquiry system, in the paydisposition_ppwidsp.jsp page for the Pay Disposition Information screen, the Bank Account Number of employee is displayed after the label "Account Number:"

The value of Bank Account Number is accessed from the field directDepositBankAcctNumber0225. Therefore, we should apply the masking logic to this field to display only the last 4 digits of the Bank Account Number.

In the Java Server Page (JSP) paydisposition_ppwidsp.jsp, change the field to directDepositBankAcctNumber0225Formatted (from directDepositBankAcctNumber0225), which is displayed after the label "Account Number:"

The changed value is displayed here in the JSP page paydisposition_ppwidsp.jsp, as below:

```jsp
<%-- -----------------------------------------
*** Don't show the bank account number for version 1
*** Otherwise, show it
----------------------------------------- --%>
<cff if test="${sessionScope.screen_level_version_map.PPWWIDSP lt '1'}">
  <tr>
    <td width="20%" align="RIGHT" class="ROWLABEL">Account Number:</td>
    <td colspan="5" align="LEFT" class="DATA">${employeeInfo_directDepositBankAcctNumber0225Formatted}</td>
  </tr>
</cff>
```
Currently, `employeeInfo.directDepositBankAcctNumber0225` is displayed in the Pay Disposition Information Screen (Java Server Page `paydisposition_ppwwidsp.jsp`) of the Web EDB inquiry system, which will be changed to display the field reserved for formatting of the account number `directDepositBankAcctNumber0225Formatted`. So, `employeeInfo.directDepositBankAcctNumber0225` should be accessed, formatted in the `PayDispositionAction.java` program, and moved to the formatted field display `directDepositBankAcctNumber0225Formatted`.

The steps of the sample mask logic for the field `directDepositBankAcctNumber0225Formatted` in the Java Program `PayDispositionAction.java` are listed below:

1. In `PayDispositionAction.java`, declare a variable `directDepositBankAcctNumber0225` of type String.
2. From the EDB Employee Object, get the value to this newly defined field `directDepositBankAcctNumber0225`.

The exact location of the above steps are below:

```java
private void formatData(EDBEmployee employeeInfo) {
    EDBBusinessDelegate bd = new EDBBusinessDelegate();
    String checkDispCode0201;
    String onlineEarningsIndicator1124;
    String directDepositCheckOrSave0226;
    String directDepositPromoteInd0227;
    String directDepositPromoteWait0228;
    String directDepositPromoteCycle0229;
    String directDepositBankKey0230;
    String directDepositBankTransitRoutingNumber0230;
    String directDepositBankAcctNumber0225;

    // get screen data from EDB employee object
    onlineEarningsIndicator1124 = employeeInfo.getOnlineEarningsIndicator1124();
    checkDispCode0201 = employeeInfo.getCheckDispCode0201();
    directDepositCheckOrSave0226 = employeeInfo.getDirectDepositCheckOrSave0226();
    directDepositPromoteInd0227 = employeeInfo.getDirectDepositPromoteInd0227();
    directDepositPromoteWait0228 = employeeInfo.getDirectDepositPromoteWait0228();
    directDepositPromoteCycle0229 = employeeInfo.getDirectDepositPromoteCycle0229();
    directDepositBankKey0230 = employeeInfo.getDirectDepositBankKey0230();
    directDepositBankAcctNumber0225 = employeeInfo.getDirectDepositBankAcctNumber0225();
}```
Now, apply the sample mask logic that formats the newly defined working field `directDepositBankAcctNumber0225` and moves to the display field `employeeInfo.directDepositBankAcctNumber0225Formatted`, as below:

```java
if (onlineEarningsIndicator1124 != null) {
    onlineEarningsIndicator1124 = onlineEarningsIndicator1124 + " - " + bd.performTranslation("EDB", "1124", onlineEarningsIndicator1124.trim(), 20);
    employeeInfo.setOnlineEarningsIndicator1124Formatted(onlineEarningsIndicator1124);
}

if (directDepositBankAcctNumber0225 != null) {
    directDepositBankAcctNumber0225 = "XXXX" + directDepositBankAcctNumber0225.substring(Math.max(0, directDepositBankAcctNumber0225.length() - 4));
    employeeInfo.setDirectDepositBankAcctNumber0225Formatted(directDepositBankAcctNumber0225);
}
```

**Note:**

In devising the java code using the above logic for the formatting of the field `directDepositBankAcctNumber0225`, consider the following:

1. 8 is the number of characters assumed in the field `directDepositBankAcctNumber0225`

2. Instead of the "XXXX" hardcode in the above logic, devise a logic that can substitute as many number of 'X' that is equal to 4 less than the number of initial characters in `directDepositBankAcctNumber0225`.

   i.e. the number value returned by the below function:

   ```java
   Number of initial 'X' needed = Math.max(0, directDepositBankAcctNumber0225.length() - 4)
   ```
Mask Bank Route Transit Number

In the EDBInquiry system, in the `paydisposition_ppwwidsp.jsp` page for the Pay Disposition Information screen, the Route Transit Number of employee's Bank is displayed after the label “Bank Transit Routing:”.

The value of Bank’s Route Transit Number is accessed from the field `directDepositBankKey0230TransitRoutingNumber`. Therefore, we should apply the masking logic to this field to display only the last 4 digits of the Route Transit Number.

In the Java Server Page (JSP) `paydisposition_ppwwidsp.jsp`, the field `directDepositBankKey0230TransitRoutingNumber` is displayed after the label “Bank Transit Routing:,” as below:

```html
<table border="0" cellspacing="0" width="100%">
  <tr>
    <td width="209" align="RIGHT" class="ROWLABEL">Bank</td>
    <td width="80" align="LEFT" class="DATA">$employeeInfo.directDepositBankKey0230TransitRoutingNumber$</td>
  </tr>
  <tr>
    <td width="209" align="RIGHT" class="ROWLABEL">Bank Transit Routing</td>
    <td width="80" align="LEFT" class="DATA">$employeeInfo.directDepositBankKey0230TransitRoutingNumber$</td>
  </tr>
  <tr>
    <td width="209" align="RIGHT" class="ROWLABEL">Account Type</td>
    <td width="80" align="LEFT" class="DATA">$employeeInfo.directDepositCheckOrSavings0226Formated$</td>
  </tr>

  <--- *******************************************************************************
  *** Don't show the bank account number for version 1
  *** Otherwise, show it.
  ******************************************************************************* -->
```
In the Java Program PayDispositionAction.java, add the mask logic to the display field `directDepositBankKey0230TransitRoutingNumber`, so that the masked bank Route Transit Number is visible through the display in the Pay Disposition Information Screen (Java Server Page → paydisposition_ppwwidsp.jsp) of the Web EDB inquiry system.

The exact location of the mask logic for the field `directDepositBankKey0230TransitRoutingNumber` in the Java Program PayDispositionAction.java is below:

```java
if (directDepositBankKey0230 != null) {
    ArrayList<String> bankData = new ArrayList<String> ();
    bankData = bd.performBankNumberTranslation(directDepositBankKey0230);
    directDepositBankKey0230 = directDepositBankKey0230 + " - " + bankData.get(0).trim();
    employeeInfo.setDirectDepositBankKey0230Formatted(directDepositBankKey0230);
    employeeInfo.setDirectDepositBankKey0230TransitRoutingNumber(directDepositBankTransitRoutingNumber0230);
}
```

Note:

For masking `directDepositBankTransitRoutingNumber0230` field, follow the masking logic of Bank Account Number field `directDepositBankAcctNumber0225`, before the below line of code:

`employeeInfo.setDirectDepositBankKey0230TransitRoutingNumber(directDepositBankTransitRoutingNumber0230);`

In order to provide the associated declarations and implementations needed for the above changes to program PayDispositionAction.java, the following java files should be modified as well:

- `DummyEmpDAO.java`
- `EDBEmployee.java`
- `MapBackedEDBEmpl.java`
7 Mask Bank Acct Info on Inquiry Screens – Unit Testing Requirements

Load a test EDB from Base.

Load a test CTL from Base.

Load a test PAR from Base.

Install the changed batch / dual programs into the test region.

7.1.1 CICS Screen Changes

ICHK Screen:

Find and/or setup employee(s) with the following PPPEUD (fixed PAR) details:

- Recent PAY_CYCLE_END_DATE (sorted in descending order)
- Bank Account Number (PPPEUD.BANK_ACCTNO) is not blank

Enter the ICHK function in the CICS screen for the test employee.
Verify the ICHK screen for the following details:

1. Release Number at the top left corner for the screen should be changed to release number in the program PPWICHK.

2. Bank Account number should display
   
   - Only the last 4 characters (including digits and any special characters)
   
   - All the remaining (initial) characters should be masked with ‘X’
   
   - The total length (all ‘X’ characters + 4) of the masked bank account number should be the same length of the original employee Bank Account Number.

<table>
<thead>
<tr>
<th>Empl ID</th>
<th>PE Date</th>
<th>DSP</th>
<th>Chk No</th>
<th>State Fed</th>
<th>Begin</th>
<th>Accrued</th>
<th>Taken</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>7775555030</td>
<td>04/30/14</td>
<td>8</td>
<td>S000</td>
<td>S000 Vac</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>JELLO, JERRY 0</td>
<td>04/30/14</td>
<td>Comp</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C/Y Grs Ern</th>
<th>C/Y Tax Ern</th>
<th>C/Y Taxes</th>
<th>Retirement</th>
<th>Other Deductions</th>
<th>Net Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>7,275.00</td>
<td>7,325.56</td>
<td>2,526.83</td>
<td>453.88</td>
<td>270.87</td>
<td>4,023.62</td>
</tr>
<tr>
<td>36,375.00</td>
<td>36,608.80</td>
<td>12,627.45</td>
<td>Bank Acct: 0234-567890</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type Pay</th>
<th>Hrs/Pct</th>
<th>Amt</th>
<th>Type Deduction</th>
<th>Amt</th>
<th>Year to Date</th>
<th>Amt</th>
</tr>
</thead>
</table>
### IDCS Screen:

Follow the same procedure (can use the same employee) as ICHK and verify the details as above for IDCS screen.

<table>
<thead>
<tr>
<th>IDCS Employee</th>
<th>Departmental Inquiry</th>
<th>Simulated Check Stub</th>
<th>Userid: PAYBCC</th>
<th>Pay Cycle: MO</th>
<th>Processed In: 04/30/14</th>
<th>Check Date: 05/01/14</th>
<th>Page 1 of 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empl ID</td>
<td>PE Date DSP</td>
<td>Chk No State Fed</td>
<td>Begin Accrued Taken End</td>
<td>C/Y Grs Earn C/Y Tax Earn C/Y Taxes Retirement Other Deductions Net Pay</td>
<td>7,275.00 7,325.56 2,526.83 453.88 270.67 4,023.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JELLO, JERRY 0</td>
<td>000 04/30</td>
<td>Sick</td>
<td>0.00 0.00 0.00 0.00</td>
<td>12,627.45 Bank Acct: 0234-567890</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### IDSP Screen:

Follow the same procedure (can use the same employee) as ICHK and verify the details as above for IDSP screen.

<table>
<thead>
<tr>
<th>IDSP Employee</th>
<th>PAR Inquiry</th>
<th>Check Address</th>
<th>Userid: PAYBCC</th>
<th>Pay Cycle: MO</th>
<th>Processed In: 04/30/14</th>
<th>Check Date: 05/01/14</th>
<th>Page 1 of 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID: 7775550030</td>
<td>Name: JELLO, JERRY 0</td>
<td>Hm Dept: 804918</td>
<td>CHAN OFFICE</td>
<td>Disp: 8 Emplmt Status: A</td>
<td>Total Gross: 7275.00</td>
<td>Total Deductions: 3251.38</td>
<td>Net Pay: 4023.62</td>
</tr>
<tr>
<td>Check No:</td>
<td>Type: CUR-ACTIVITY</td>
<td>PAR Control No: 284</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Online Earnings Statement: N

Check Address:

Bank Key: WELLS WELLS FARGO

Bank Acct: 0234-567890

Chk Disp was Direct Deposit-Pay sent directly to bank
IDCA Screen:

Follow the same procedure (can use the same employee) as ICHK and verify the details as above for IDCA screen.

IDDG Screen:

Find and/or setup employee(s) with the following PPPDDG (employee Direct Deposit) details:

- Bank Route Transit Number (PPPDDG.DDG_TRANSIT_NUM) is not blank
- Bank Account Number (PPPDDG.DDG_ACCT_NUM) is not blank

Enter the IDDG function in the CICS screen for the test employee.
Verify the IDDG screen for the following details:

1. Release Number at the top left corner for the screen should be changed to release number in the program PPWIDDG.

2. Bank Account number should display
   - Only the last 4 characters (including digits and any special characters)
   - All the remaining (initial) characters should be masked with ‘X’
   - The total length (all ‘X’ characters + 4) of the masked bank account number should be the same length of the original employee Bank Account Number.

3. Bank Route Transit number should display
   - Only the last 4 characters (including digits and any special characters)
   - All the remaining (initial) characters should be masked with ‘X’
   - The total length (all ‘X’ characters + 4) of the masked bank route transit number should be the same length of the original Bank Route Transit Number.
IGNL Screen:

Find and/or setup employee(s) with the following PPPPAY (EDB table) details:

- Sure Pay Bank Table Key (PPPPAY.SURE_BANK_KEY) is not blank
  
  Using the employee Sure Pay Bank Table Key, in the PPPSPB (CTL table) Sure Pay Bank table, locate the non-blank Bank Route Transit Number (PPPSPB.SPB_TRANSIT_RTE_NO).

- Bank Account Number (PPPPAY.SURE_ACCTNUM) is not blank

Enter the IGNL function in the CICS screen for the test employee.

Verify the IGNL screen for the following details:

1. Release Number at the top left corner for the screen should be changed to release number in the program PPWIGNL.

2. Bank Account number should display

   - Only the last 4 characters (including digits and any special characters)
   - All the remaining (initial) characters should be masked with ‘X’
   - The total length (all ‘X’ characters + 4) of the masked bank account number should be the same length of the original employee Bank Account Number.

3. Bank Route Transit number should display

   - Only the last 4 characters (including digits and any special characters)
   - All the remaining (initial) characters should be masked with ‘X’
   - The total length (all ‘X’ characters + 4) of the masked bank route transit number should be the same length of the original Bank Route Transit Number.
7.1.2 Web EDB Inquiry Programs

**Pay Disposition Screen:**

In the region, where the EDB Inquiry System is deployed for testing, load the database tables as done for CICS testing.

Load a test EDB from Base.

Load a test CTL from Base.

Load a test PAR from Base.

Deploy the changed java programs for testing into the above test region.

As followed for IGNL CICS screen testing, find and/or setup employee(s) with the following PPPPAY (EDB table) details:

- Sure Pay Bank Table Key (PPPPAY.SURE_BANK_KEY) is not blank
  Using the employee Sure Pay Bank Table Key, in the PPPSPB (CTL table) Sure Pay Bank table, locate the non-blank Bank Route Transit Number (PPPSPB.SP_TRANSIT_RTE_NO).

- Bank Account Number (PPPPAY.SURE_ACCTNUM) is not blank

Bring up the Web EDB Inquiry System and browse the test employee.

Click on the Pay Disposition tab for this employee and verify the screen for the following details:

1. **Bank Account number should display**
   - Only the last 4 characters (including digits and any special characters)
   - All the remaining (initial) characters should be masked with ‘X’
   - The total length (all ‘X’ characters + 4) of the masked bank account number should be the same length of the original employee Bank Account Number.

2. **Bank Route Transit number should display**
   - Only the last 4 characters (including digits and any special characters)
   - All the remaining (initial) characters should be masked with ‘X’
   - The total length (all ‘X’ characters + 4) of the masked bank route transit number should be the same length of the original Bank Route Transit Number.
### Pay Disposition Information

- **Pay Disposition Code:** D - Direct Deposit
  - **Online Earnings:** N - No
  - **Statement:** N - No

### Direct Deposit Information

- **Bank:** A0250 - AMERICAN SECURITY BANK
  - **Bank Transit Routing:** 0512000051
  - **Account Type:** 0 - Checking
  - **Account Number:** 03322222222
  - **Prenote Status:** 2 - Waiting period has passed
  - **Surepay Activation:** 03/01/00
  - **Prenote Cycle:** MO - Monthly current
Attachment A – Display only the last 4 characters of Account Number

Mask everything but last 4 characters of the Bank Account Number

Recommended (Sample) Logic:

Based on the masking logic for BANK-ACCTNO OF EUD-ROW in Berkeley’s PPWICHK program, which masks the last 4 characters, we are devising our logic of masking everything but the last 4 characters.

Below is the recommended logic to achieve the masking of Bank Account Number:

WORKING-STORAGE

Declare the following working storage variables:

05 WK-SUREPAY-ACCT             PIC X(17) VALUE SPACES.
05 WK-SUREPAY-ACCT-RDF  REDEFINES WK-SUREPAY-ACCT.
10 WK-SUREPAY-ACCT-CHR  OCCURS 17  PIC X.
05 TOTAL-NO-OF-CHARS          PIC 9(03) VALUE ZERO.
05 NO-OF-MASK-CHARS           PIC 9(03) VALUE ZERO.
05 QUICK-X                    PIC S9(04) COMP VALUE ZERO.
05 ONE-SPACE                  PIC X(01) VALUE SPACES.

PROCEDURE DIVISION

Move fixed PAR details to the ICHK screen:

In the 4100-MOVE-EUD-TO-SCRN section, which moves the fixed PAR (PPPEUD) table data to the screen fields, comment out the move of Bank Account number (BANK-ACCTNO) of PPPEUD row to the ICHK screen field BANK-ACCTNO.

Now, use the new working storage field WK-SUREPAY-ACCT to temporarily hold the Bank Account number (BANK-ACCTNO) of PPPEUD row and apply the masking logic, before moving the masked value to the ICHK screen field BANK-ACCTNO.
Mask (with ‘X’) all but the last four digits of the Bank Account Number field BANK-ACCTNOO, as below:

4100-MOVE-EUD-TO-SCRN SECTION.
******************************************************************************************
* MOVE EUD TABLE DATA TO THE MAP *
******************************************************************************************
MOVE CHK-DISP-CODE OF EUD-ROW TO CHECK-DISP-CODEO.
.

**** MOVE BANK-ACCTNO OF EUD-ROW TO **** BANK-ACCTNOO.
MOVE BANK-ACCTNO OF EUD-ROW TO WK-SUREPAY-ACCT
MOVE ZERGES TO TOTAL-NO-OF-CHARS
INSPECT WK-SUREPAY-ACCT TALLYING TOTAL-NO-OF-CHARS FOR CHARACTERS BEFORE ONE-SPACE
COMPUTE NO-OF-MASK-CHARS = TOTAL-NO-OF-CHARS - 4
IF NO-OF-MASK-CHARS > 0
   PERFORM VARYING QUICK-X FROM 1 BY 1
   UNTIL QUICK-X > NO-OF-MASK-CHARS
   MOVE 'X' TO WK-SUREPAY-ACCT-CHR (QUICK-X)
END-PERFORM
END-IF
MOVE WK-SUREPAY-ACCT TO BANK-ACCTNOO.

MOVE PAY-CYCLE-END-DATE OF EUD-ROW TO WS-ISO-DATE.
.

4100-EXIT.
EXIT.
Attachment B – Display only the last 4 characters of Route Transit Number

Mask everything but last 4 characters of the Bank Route Transit Number

Recommended (Sample) Logic:

Based on the masking logic for BANK-ACCTNO OF EUD-ROW in Berkeley's PPWICHK program, which masks the last 4 characters, we are devising our logic of masking everything but the last 4 characters.

Below is the recommended logic to achieve the masking of Bank Route Transit Number:

WORKING-STORAGE

Declare the following working storage variables:

```
05 WK-TRANSIT-NUM          PIC X(09) VALUE SPACES.
05 WK-TRANSIT-NUM-RDF      REDEFINES WK-TRANSIT-NUM.
   10 WK-TRANSIT-NUM-CHR    OCCURS 09 PIC X.
```

PROCEDURE DIVISION

Move DDG information to the IDDG screen:

In the 7100-MOVE-DDG-TO-SCRN section, which moves the PPPDDG table data to the screen fields, comment out the move of Bank Transit number (DDG-TRANSIT-NUM) to the IDDG screen field DE0782-TRANSIT-NBRO.

Now, use the new working storage field WK-TRANSIT-NUM to temporarily hold the Bank Transit number (DDG-TRANSIT-NUM) and apply the masking logic, before moving the masked value to the IDDG screen field DE0782-TRANSIT-NBRO.
Mask (with ‘X’) all but the last four digits of the Bank Transit Number field DE0782-TRANSIT-NBRO, as below:

7100-MOVE-DDG-TO-SCRN SECTION.
************************************************************
* MOVE DDG INFO TO SCREEN *
************************************************************

MOVE DDG-GTN-NUMBER TO DE0780-GTN-NUMO (WS-LINE-SUB).
**** MOVE DDG-TRANSIT-NUM TO DE0782-TRANSIT-NBRO (WS-LINE-SUB).

MOVE DDG-TRANSIT-NUM TO WK-TRANSIT-NUM
MOVE ZEROES TO TOTAL-NO-OF-CHARS
INSPECT WK-TRANSIT-NUM TALLYING TOTAL-NO-OF-CHARS
   FOR CHARACTERS BEFORE ONE-SPACE
   COMPUTE NO-OF-MASK-CHARS = TOTAL-NO-OF-CHARS - 4
IF NO-OF-MASK-CHARS > 0
   PERFORM VARYING QUICK-X FROM 1 BY 1
   UNTIL QUICK-X > NO-OF-MASK-CHARS
   MOVE 'X' TO WK-TRANSIT-NUM-CHR (QUICK-X)
END-PERFORM
END-IF

MOVE WK-TRANSIT-NUM TO DE0782-TRANSIT-NBRO (WS-LINE-SUB).

MOVE DDG-ACCT-TYPE TO DE0784-ACCT-TYPEO (WS-LINE-SUB).
**** MOVE DDG-ACCT-NUM TO DE0783-ACCT-NUMERO (WS-LINE-SUB).

   → apply the masking logic for Bank Account Number using Attachment A above.

MOVE DDG-SPB-BANK-KEY TO DE0785-BANK-ACCTO (WS-LINE-SUB).

PERFORM 7500-GTN-DESCRIPTION.

7100-EXIT.
EXIT.