Send, Receive, and Process Interactive Forms via Email in AS ABAP.

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Introduction

Creating Interactive Forms in AS ABAP

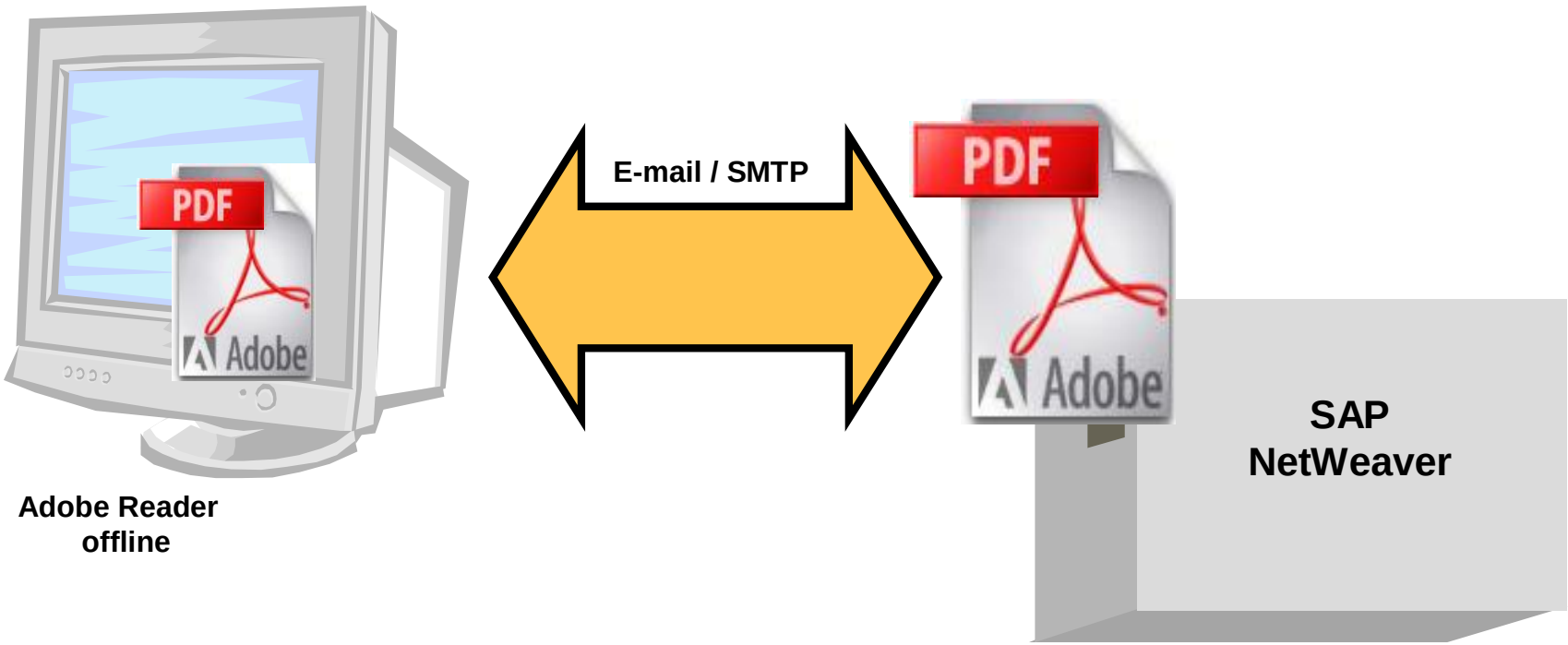
SMTP in AS ABAP

Sending Email with attached Interactive Forms

Processing Inbound Emails

Processing Interactive Forms

Interactive Form Offline Scenario



- **User fills out form offline, submits form via email when online.**
- **No direct SAP access needed.**
  - **Client email program needed to send and receive emails with attachments.**

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Creating Interface & Form

To create an Interactive Form you must create the form interface and then the form itself in transaction SFP.

Form Interface

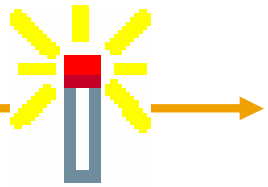
- **Represents the data structures you wish to display or have the user enter on the Interactive Form.**
- **Can be simple types, structures or tables.**

Form

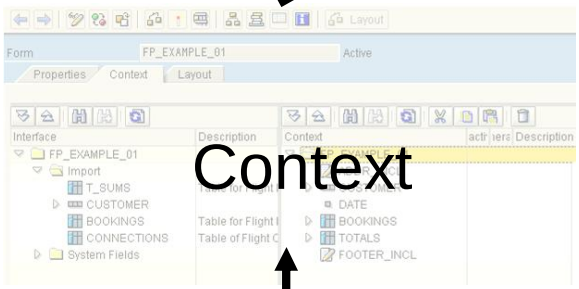
- **Create a form and assign the form interface to it. Data elements in the form interface can then be used in the form.**
- **LiveCycle Designer is displayed in the “Layout” mode of the form.**

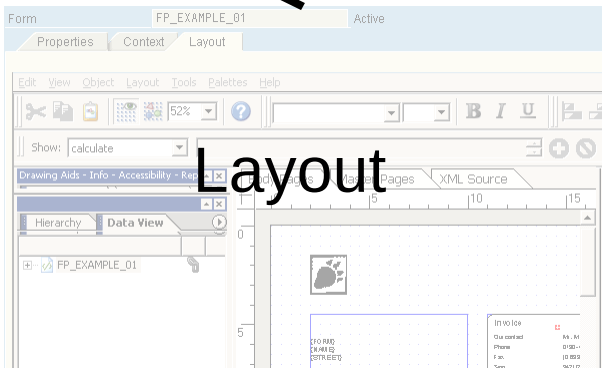
The Tools Involved (Design Time)

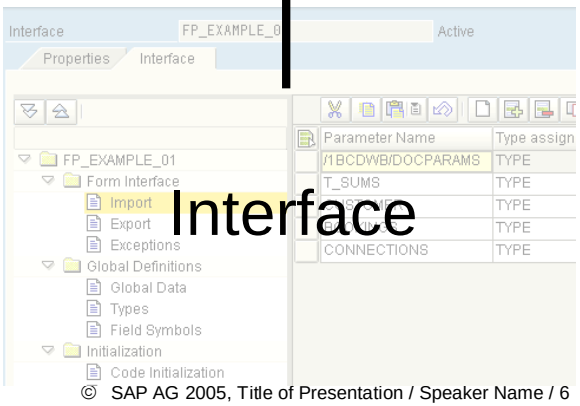
Form Template



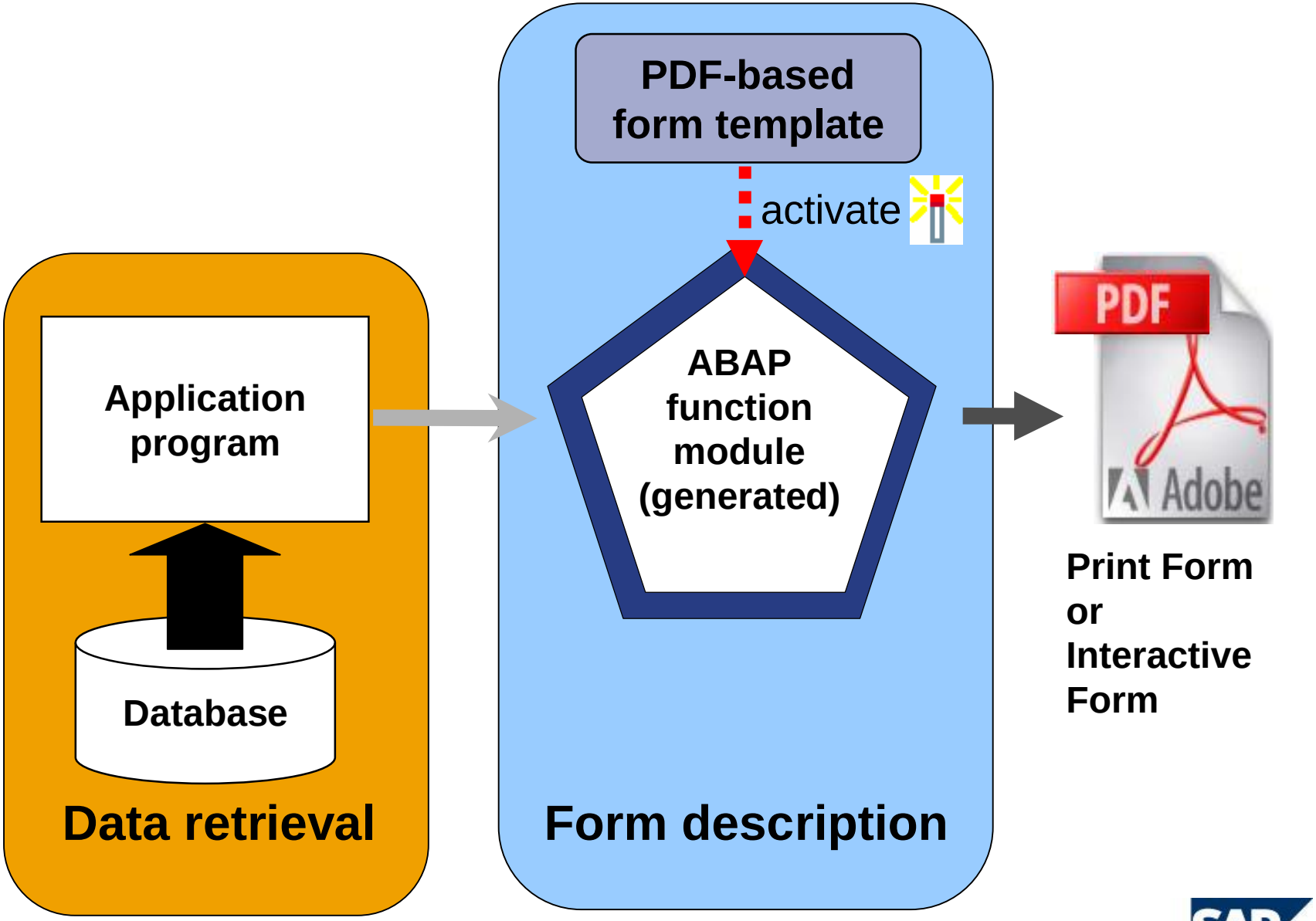
```
FUNCTION
/1BCDWB/SM00000001.
DATA: %OUTPAR TYPE
SFPOUTPAR,
%DOCPAR TYPE
SFPDOCPAR,
...
```



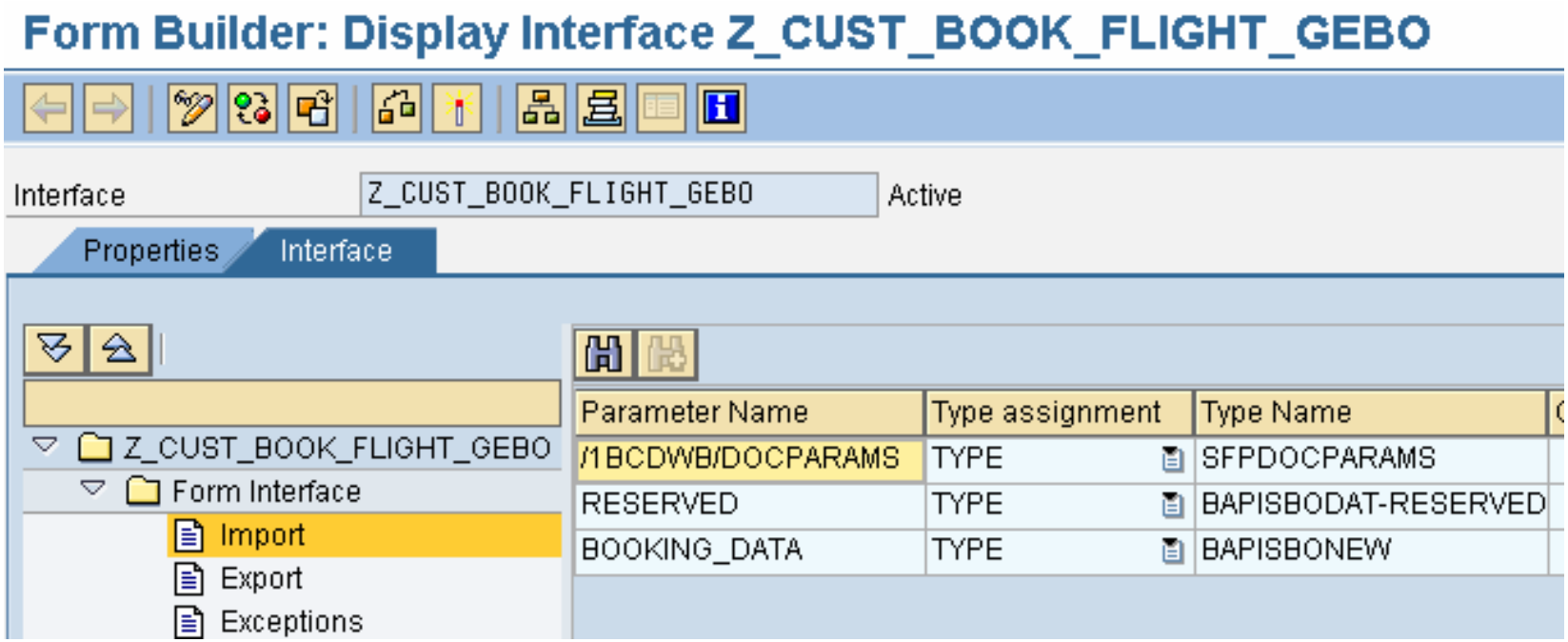




What Happens at Run Time

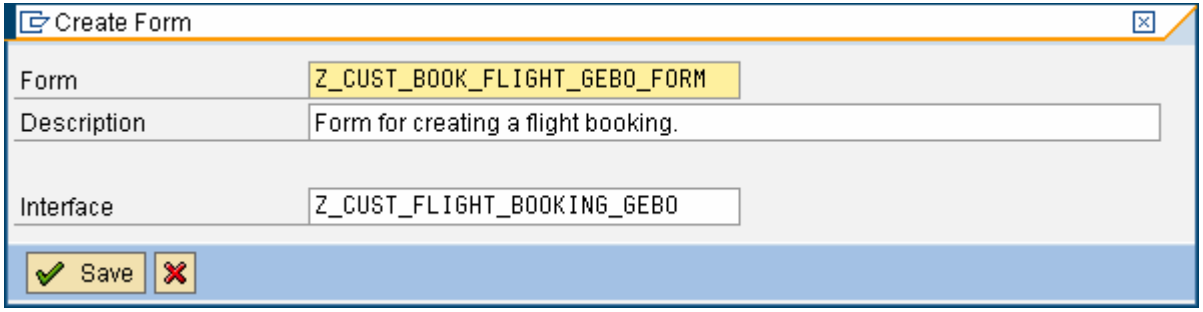


Form Interface Example

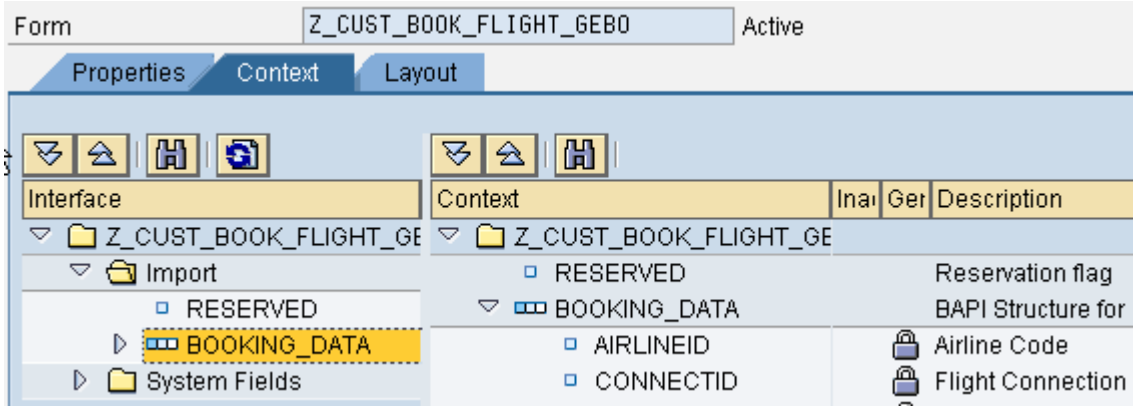


- **Use transaction SFP to create/modify/view Form Interfaces.**
- **Add your data elements to the Import parameter list.**

Creating Forms



- **When creating a form you must assign it an interface.**

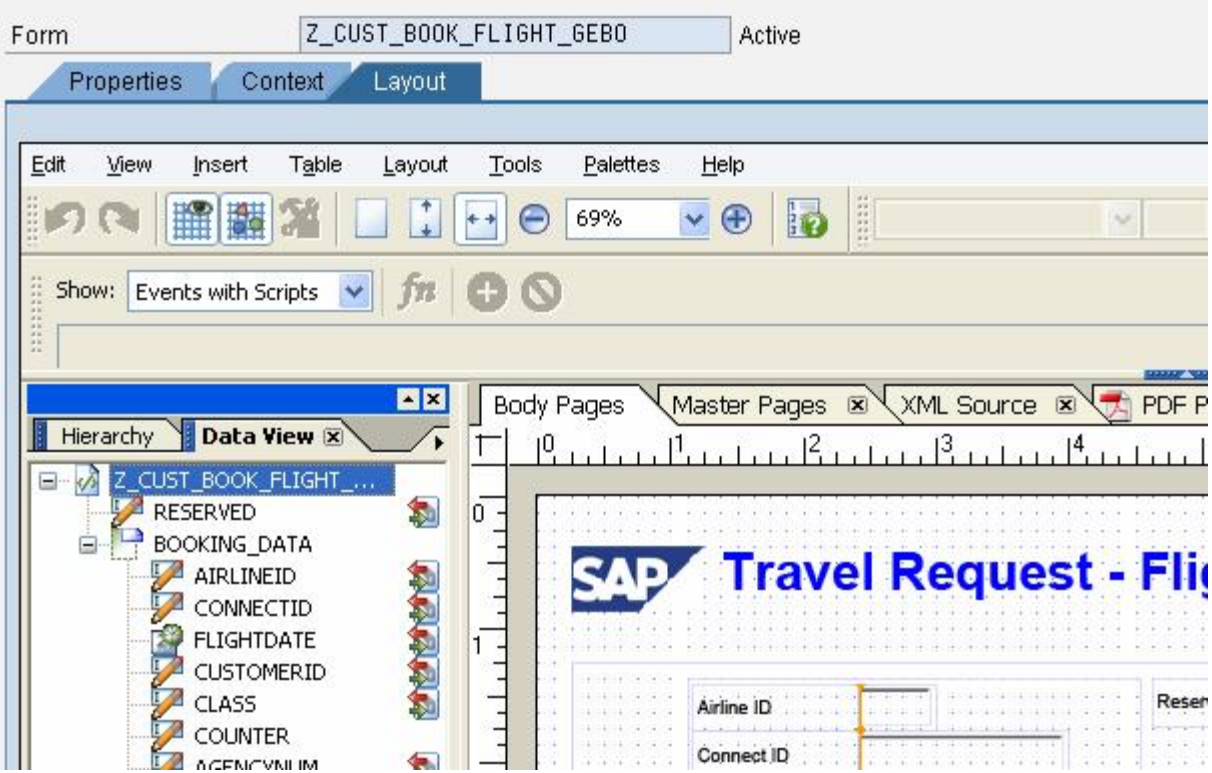


- **Create the forms context by dragging and dropping the interface's import elements to the forms context.**

- **These context elements can then be bound to input fields on the form.**

Designing Forms

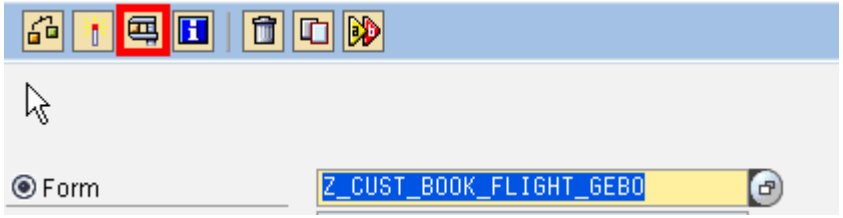
Select the Layout tab of the Form Builder, this will start the LiveCycle Designer.



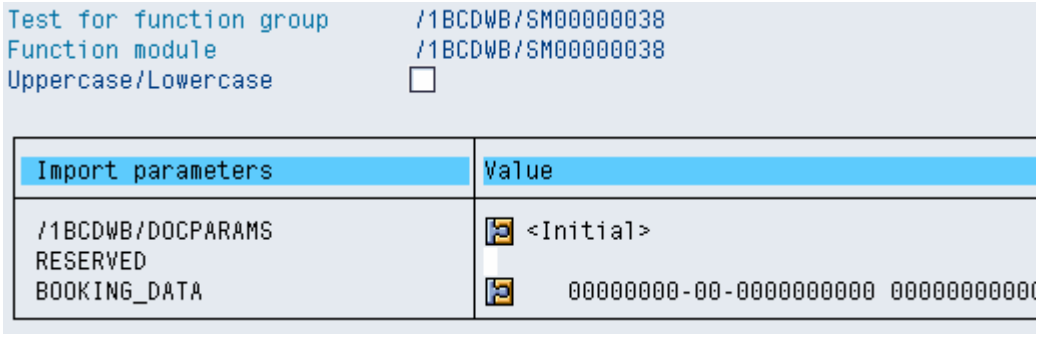
Design your form as you would a standard print form. Just make sure not to set the input fields to read only!

Testing Forms

You can test your form by clicking the test icon.



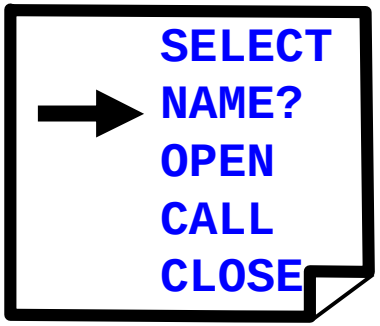
This will display a function module that contains the same input parameters as the form's interface – just enter data into the data elements.



Sections of the Application Program

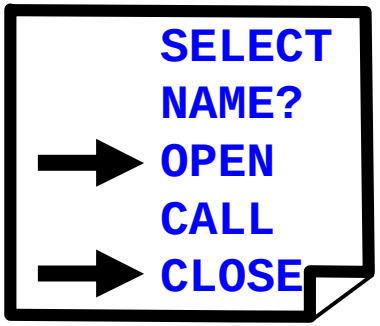
```
* (1) Data retrieval and processing
SELECT ... FROM ...
...

* (2) Find out name of generated function module

CALL FUNCTION 'FP_FUNCTION_MODULE_NAME'...

* (3) Start form processing

CALL FUNCTION 'FP_JOB_OPEN'...

LOOP AT ...
* (4) Call function module dynamically
   CALL FUNCTION <generated function module> ...
ENDLOOP.

* (5) End form processing
CALL FUNCTION 'FP_JOB_CLOSE'...
```

FP_FUNCTION_MODULE_NAME



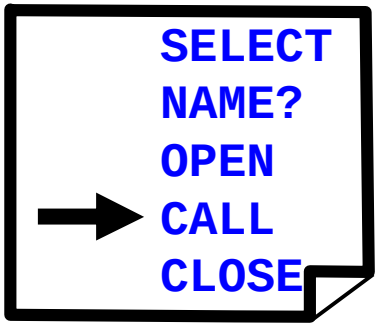

```
DATA:
   form                TYPE fpwbformname,
   fm_name             TYPE funcname.

* (2) Find out name of generated function module
CALL FUNCTION 'FP_FUNCTION_MODULE_NAME'
   EXPORTING i_name    = form
   IMPORTING
      e_funcname       = fm_name.
```

Starting and Ending Form Processing




```
DATA:
   fp_outputparams   TYPE sfpoutputparams
   fp_outputparams-getpdf = 'X'.
...

* (3) Start form processing
CALL FUNCTION 'FP_JOB_OPEN'...
* set output parameters like printer, preview...
   CHANGING ie_outputparams = fp_outputparams ...


...

* (5) End form processing
CALL FUNCTION 'FP_JOB_CLOSE'...
```

Calling the Generated Function Module




```
DATA:
   fp_docparams   TYPE sfpdocparams,
   fm_name        TYPE funcname,
   fp_result      TYPE TYPE fpformoutput, ...

   fp_docparams-fillable = 'X'.
   fp_docparams-langu = customer_language.

* (4) Call function module dynamically
    CALL FUNCTION fm_name
       EXPORTING
         /1bcdwb/docparams  = fp_docparams
         bookings  = it_bookings
       IMPORTING
       /1bcdwb/formoutput = fp_result
       EXCEPTIONS
         OTHERS             = 1.

   data: pdf type fpformoutput-pdf.
   pdf = fp_result-pdf.
```

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SMTP Plug-in

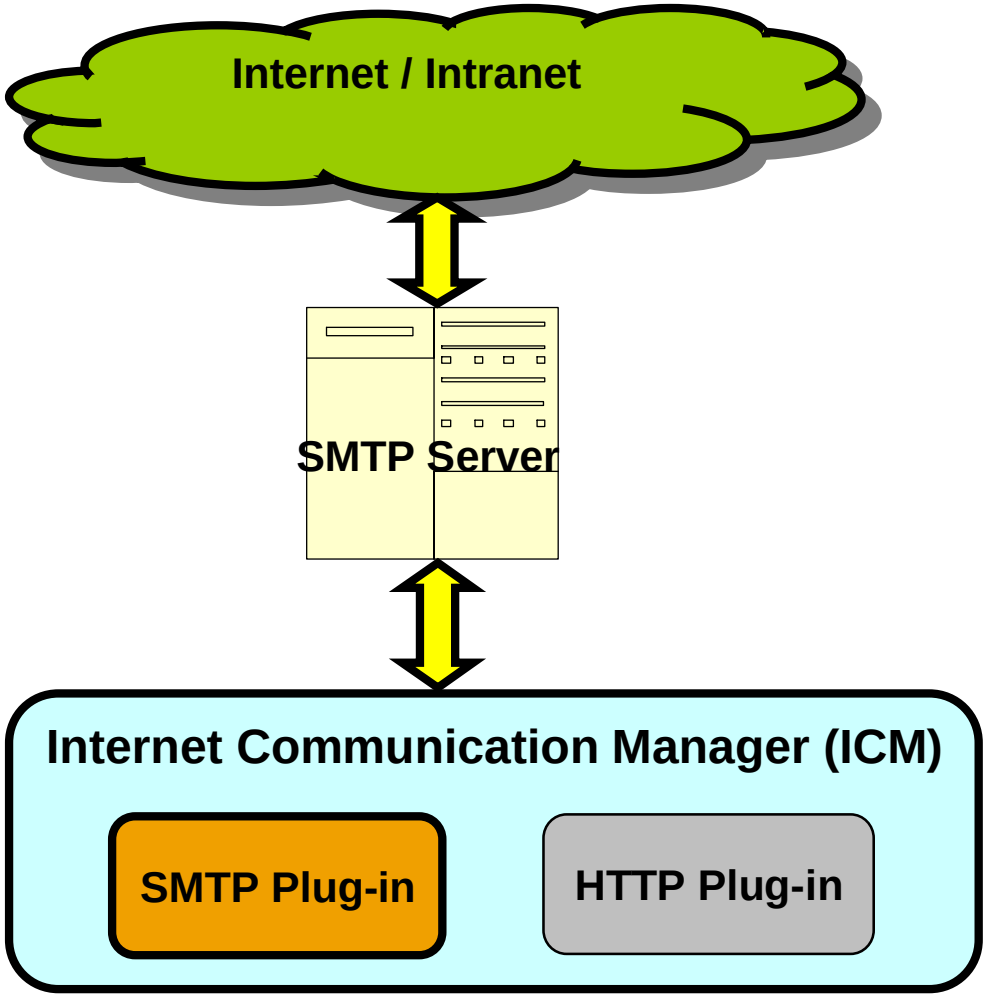
ICM handles communication protocols via Plug-Ins.

- **Currently there are plug-ins for SMTP and HTTP. This can be easily extended in the future for new protocols.**

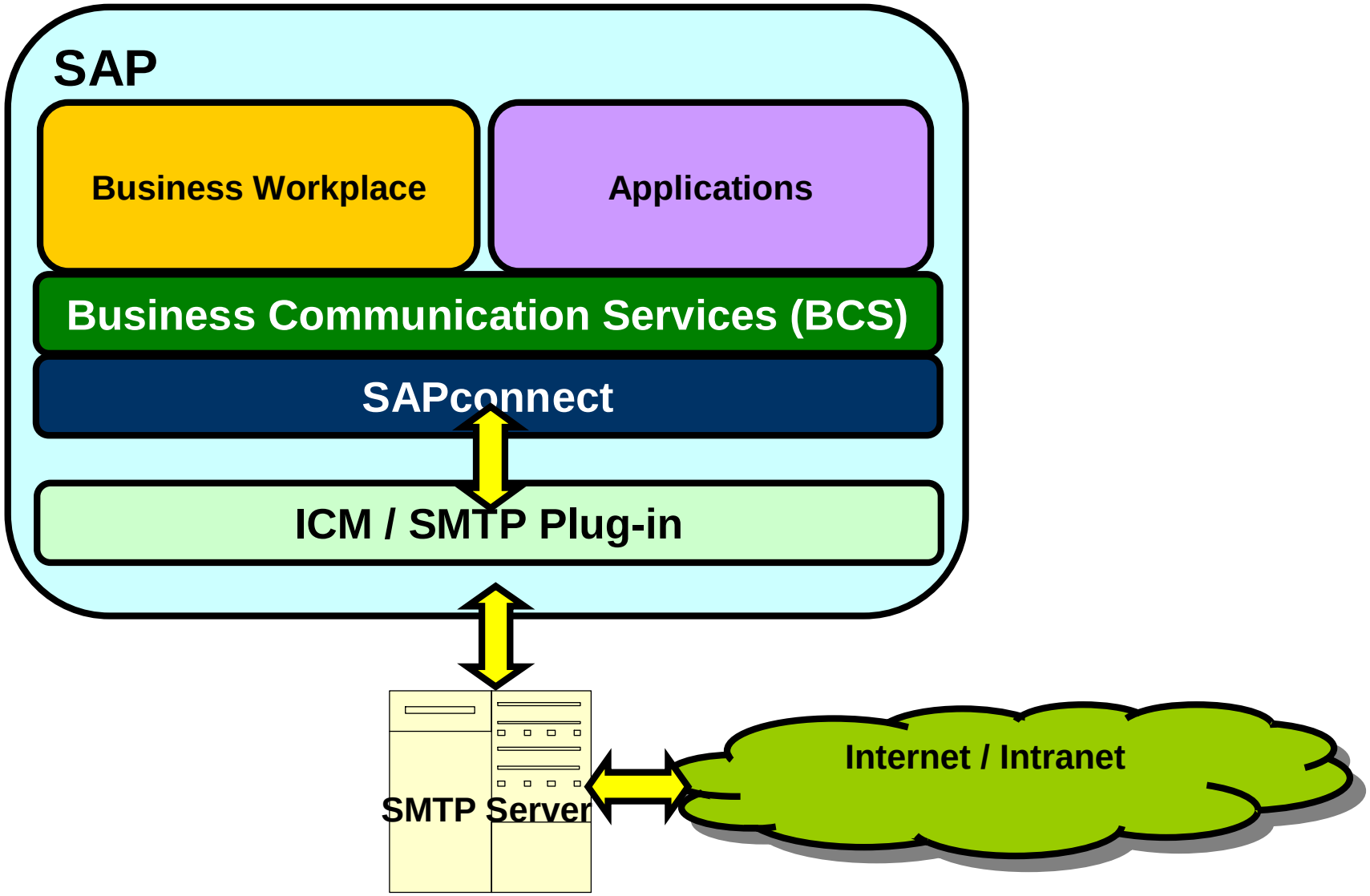
- **Configure SMTP plug-in with profile parameters:**

icm/server_port_<*> = PROT=SMTP,PORT=<port>

is/SMTP/virt_host_0 = *:*;



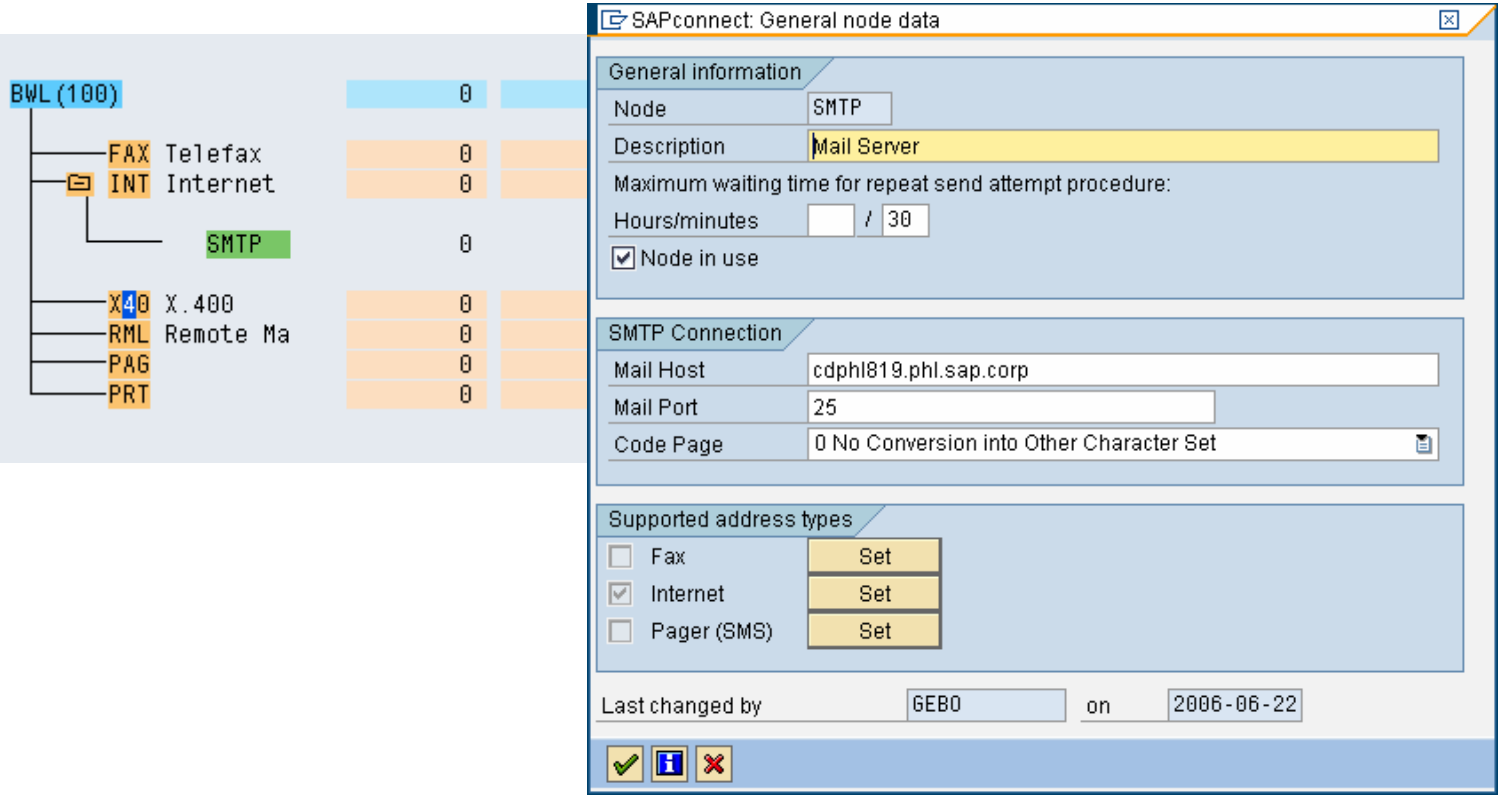
SAPconnect – Connecting SAP to the Outside World



SAPconnect – Configuring SMTP

To configure SAPconnect for receiving and sending emails, you must have a 3rd Party SMTP server already installed (example: Microsoft Exchange).

- **Transaction SCOT is where you can configure and monitor SAPconnect's SMTP connection to the SMTP server.**



Business Communication Services (BCS)

Business Communication Services are tools for interacting with email and workflow.

- **The Business Workplace can be accessed to view / send email and workflow items.**
- **More importantly for this class, there is a number of BCS classes that make it easy for use to Send email, and process received emails.**
  - **These classes include CL_BCS and CL_DOCUMENT_BCS which are heavily used to send and receive email.**

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Business Communication Services Classes

The Business Communication Services includes classes that can be used to create and send emails with attachments.

Classes that will be used:

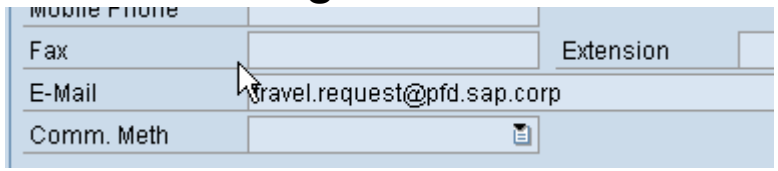
CL_BCS – class that actually send the email.

CL_DOCUMENT_BCS – class that represents the email document, and it's attachments.

CL_CAM_ADDRESS_BCS – used to create an email internet address of type IF_RECIPIENT_BCS.

CL_SAPUSER_BCS – class used to get the email address of an SAP user.

- **Note: All SAP users that will be used to send and receive email via SMTP must be given an email address.**



Programming Steps for Sending Email with Attachment

```
* (1) Create email subject and body
...
* (2) Create the email document object

...
* (3) Add Interactive Form/PDF attachment.

...
* (4) Create CL_BCS object used to send the email
...
* (5) Set the sender and recipient on the CL_BCS object
...
* (6) Send the email
...
```

* (1) Create email subject and body

```
* (1) Create email subject and body
  data: l_subject type so_obj_des,
        lt_bodytext type BCSY_TEXT,
        l_bodytext_row type soli.

  l_subject = 'Trip Creation Form'.

  concatenate 'Please fill out the form and return it to:'
              'travel.request@pdf.sap.corp'
              into l_bodytext_row.
  append l_bodytext_row to lt_bodytext.
```

* (2) Create the email document object

```
* (2) Create the email document object
  data: document TYPE REF TO cl_document_bcs,
        num_rows type i,
        textlength type so_obj_len.


  describe table l_mailtext lines num_rows.
  num_rows = num_rows * 255.
  move num_rows to textlength.

  document = cl_document_bcs=>create_document(
               i_type    = 'RAW'
               i_text    = l_mailtext
               i_length  = textlength
               i_subject = l_subject ).
```

* (3) Add Interactive Form/PDF attachment.

```
* Add attachment
data: attdoctype type soodk-objtp,
      atttitle   type SOOD-OBJDES,
      attsize    type SOOD-OBJLEN,
      pdftab     type SOLIX_TAB.

  attdoctype = 'pdf'.
  atttitle = 'CreateFlight'.
  attsize = xstrlen( pdf ).

  pdftab = cl_document_bcs=>xstring_to_solix(
             ip_xstring = pdf ).

  document->add_attachment( exporting I_ATTACHMENT_TYPE = attdoctype
                                      I_ATTACHMENT_SUBJECT = atttitle
                                      I_ATTACHMENT_SIZE = attsize
                                      I_ATTACHMENT_LANGUAGE = sy-langu
                                      I_ATT_CONTENT_HEX = pdftab ).
```

* (4) Create CL_BCS object used to send the email

```
* Create persistent send request
  data:send_request TYPE REF TO cl_bcs.
  send_request = cl_bcs=>create_persistent( ).

* Add document to send request
  send_request->set_document( document ).
```

* (5) Set the sender and recipient on the CL_BCS object

```
* Get sender object
  data: sender TYPE REF TO cl_sapuser_bcs.
  sender = cl_sapuser_bcs=>create( 'TRAVELREQ' ).

* Add sender
  CALL METHOD send_request->set_sender
    EXPORTING i_sender = sender.

* Create recipient.
  data: recipient TYPE REF TO if_recipient_bcs.
  recipient = cl_cam_address_bcs=>create_internet_address(
                                              p_addr ).

* Add recipient with its respective attributes to send request
  send_request->add_recipient( exporting i_recipient = recipient ).
```

* (6) Send the email

```
* Set send immediately
  send_request->set_send_immediately( 'X' ).

* Send document
  send_request->send( ).

  COMMIT WORK.
```

Catch the BCS Exceptions

The BCS classes throw exceptions, make sure place the BCS class interaction in a try/catch block:

```
* Create and send the email.

data: bcs_exception type ref to cx_bcs.

try.

* Enter your email code here!

catch cx_bcs into bcs_exception.

  data: ex_msg type string.

  ex_msg = bcs_exception->get_text( ).

  write: 'Caught exception.', ex_msg.

endtry.
```

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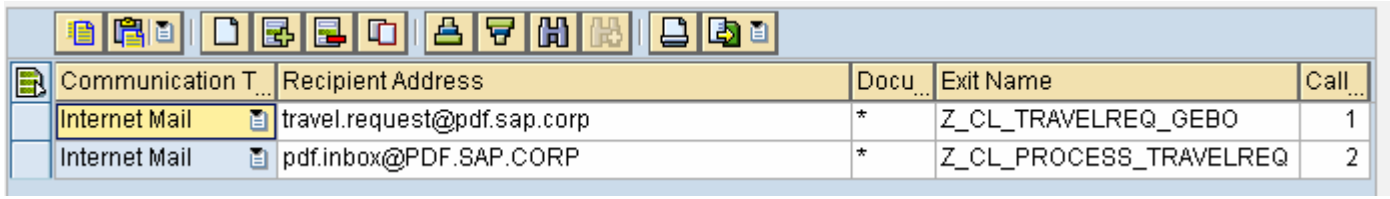
SAPconnect – Processing Inbound Email

SAPconnect allows the configuration of Inbound Processing rules.

- **If a rule is true for an incoming email, an Inbound Exit class can be executed to process the email and any attachments it may have.**
- **Rules are made up of communication type, recipient address, and document type.**
- **Multiple rules can be configured, each rule must be given a call sequence (a number). Inbound emails are checked against the lowest call sequence first (1, then 2, etc…).**
- **To create/modify/view rules, go to transaction SCOT, then menu path Settings > Inbound Processing.**



Communication T...	Recipient Address	Docu...	Exit Name	Call...
Internet Mail	travel.request@pdf.sap.corp	*	Z_CL_TRAVELREQ_GEBO	1
Internet Mail	pdf.inbox@PDF.SAP.CORP	*	Z_CL_PROCESS_TRAVELREQ	2

Inbound Process Classes

Inbound Exit classes are singleton classes that must implement the IF_INBOUND_EXIT_BCS interface.

- **Must implement the two methods defined on this interface.**
  - **CREATE_INSTANCE – contains code to create the singleton instance.**
    - **Must set the returning parameter RO_REF to the instance of the class.**
  - **PROCESS_INBOUND – contains code to process the inbound email.**
    - **Import parameter: IO_SREQ type ref to CL_SEND_REQUEST_BCS**
      - **Contains inbound email document class CL_DOCUMENT_BCS**
      - **Can be used to create reply emails.**
    - **Import parameter: IT_RECIPIENTS type BCSY_SMTPA – list of SMTP recipients.**
    - **Import parameter: IT_DOCTYPES type BCSY_SODOC – list of documents types make up the email.**
    - **Exporting parameter: E_RETCODE – used to control processing of other Inbound Exit processes in the call sequence.**
    - **Exporting parameter: ES_T100MSG – used to store T100 messages that can be written to a log.**

CREATE_INSTANCE Implementation

The CREATE_INSTANCE method is used to get a reference to the singleton instance of the class – if it does not exist it should create it:

```
* Check if the singleton instance has already
* been created.
  IF instance IS INITIAL.
    CREATE OBJECT instance.
  ENDIF.

* Return the instance.
  ro_ref = instance.
```

PROCESS_INBOUND Implementation

The PROCESS_INBOUND method is executed for every inbound email. You must place code here to do the email processing that is desired:

```
* Get the email document that was sent.

  data: document type ref to if_document_bcs.

  document = io_sreq->get_document( ).


* Get the interactive form attachment.

  data: pdf_table type BCSS_DBPC.

  pdf_table = document->get_body_part_content( 2 ).
```

Converting attachment type BCSS_DBPC to xstring

The attachment if returned from the CL_DOCUMENT_BCS object as a table of type BCSS_DBPC – to process an Interactive Form attachment it must be converted into an xstring type:

```
* Convert the pdf table into an xstring.

  data: pdf_xstring type xstring,

      pdf_line type solix.

  clear pdf_xstring.

  loop at pdf_table-cont_hex into pdf_line.

    concatenate pdf_xstring pdf_line-line into pdf_xstring
      in byte mode.

  endloop.
```

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The processing of Interactive Forms is made up of two parts:

1. **Get the form data from the Interactive Form PDF document using the CL_FP_PDF_OBJECT class.**
   - **The form data is returned as an XML documnet.**
2. **Parsing the XML document using the iXML classes.**
   - **Once the form data is parsed from the XML document it can be used in your business processing (call a BAPI to create a flight booking for instance).**

Retrieving Form Data from Interactive Form (1)

```
* Get a reference to the form processing class.
  data: l_fp type ref to if_fp.
  l_fp = cl_fp=>get_reference( ).

* Get a reference to the PDF Object class.
  data: l_pdfobj type ref to if_fp_pdf_object.
  l_pdfobj = l_fp->create_pdf_object( ).

* Set the pdf in the PDF Object.
  l_pdfobj->set_document( pdfdata = pdf_xstring ).

* Set the PDF Object to extract data the Form data.
  l_pdfobj->set_extractdata( ).

* Execute call to ADS
  l_pdfobj->execute( ).
```

Retrieving Form Data from Interactive Form (2)

```
* Get the PDF Form data.

  data: pdf_form_data type xstring.

  l_pdfobj->get_data( importing formdata =
      pdf_form_data ).


* Convert the xstring form data to string so it can be
* processed using the iXML classes.

  data: converter type ref to cl_abap_conv_in_ce.


  converter = CL_ABAP_CONV_IN_CE=>CREATE( input =
      pdf_form_data ).

  converter->READ( importing data = formxml ).
```

Parsing the XML Document Using the iXML classes(1)

```
* Pull in the iXML type group.
  type-pools: ixml.

* Get a reference to iXML object.
  data: l_ixml type ref to IF_IXML.
  l_ixml = cl_ixml=>create( ).

* Get iStream object from StreamFactory
  data: streamFactory type ref to if_ixml_stream_factory.
  data: iStream type ref to if_ixml_istream.

  streamFactory = l_ixml->create_stream_factory( ).

  iStream =
      streamFactory->create_istream_string( formxml ).
```

Parsing the XML Document Using the iXML classes(2)

```
* Create an XML Document class that will be used to process the XML
  data: document type ref to if_ixml_document.
  document = l_ixml->create_document( ).

* Create the Parser class
  data: parser type ref to if_ixml_parser.
  parser = l_ixml->create_parser( stream_factory = streamFactory
                                  istream        = iStream
                                  document       = document ).
* Parse the XML
  parser->parse( ).
```

Parsing the XML Document Using the iXML classes(3)

```
* Define XML Node type object
  data: node type ref to if_ixml_node.

* Get the RESERVED Data Node and value.
  data: strChecked type string.
  node = document->find_from_name( name = 'RESERVED' ).
  strChecked = node->get_value( ).

* Look up the rest of the nodes and values.
  data: custbook type BAPISBONEW.
  node = document->find_from_name( name = 'AIRLINEID' ).
  custbook-airlineid = node->get_value( ).
  ...
```

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