



**The Government of the Hong Kong
Special Administrative Region**

PDF e-form Reference document

of

Works Project Information Standard

for the

Development Bureau

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1 Introduction

Under the Works Project Information Standard (WPIS) framework, data files are encoded as ASCII text files in XML format. The resulting WPIS data files are in XML format and can be easily read and parsed as they are merely text files.

However, the WPIS data file does not carry information such as the company logo, directors, address, etc. Take the WPIS data file of WDD-6.0 “Concrete Test Cube Register Message” as an example. Recipient of the said data file would like to have the data printed bearing the logo and other information of the laboratory, which did and reported the testing of which the data are encoded in the WPIS data file. However, the WPIS data file does not have the relevant information encoded.

In order to supplement the non-project related but essential information such as the company logo, etc. during the exchange of the project data, PDF e-form is chosen as data carrier in addition to the XML text file of WPIS data. Moreover, PDF e-form could also serve as the graphical user interface (GUI) for data entry within the Adobe Acrobat application.

This document provides a high level overview and steps for the setup of PDF e-form, and how to carry out the conversion or extraction of data from the PDF e-form to WPIS XML data file format.

The current release and the previous releases of the Release Notes and the Library of PDF e-forms and their associated files will be posted on the WPIS web site, <http://www.wpis.gov.hk>, for free download.

2 Basics of PDF e-form

PDF e-form can be considered as the presentation media for data capturing and display. Once data had been entered into the form, such information is captured in proprietary PDF format and is electronically extractable. In order to provide data that complies with WPIS standard, the proprietary PDF format data must be transformed to WPIS compliant data format of the corresponding data domain.

The data conversion protocol defines the data transformation and mapping rules transferring the PDF data to and from the corresponding WPIS compliant data format. Together with the conversion program in the WPIS software that available free to download for use, data in PDF e-form can be converted to and from WPIS compliant data format conveniently.

The PDF files and their associated data conversion protocol data files will be provided and will be posted on the WPIS web site, <http://www.wpis.gov.hk>, for free download.

3 Preparation of PDF e-form

WPIS PDF e-form is developed using Adobe Acrobat Professional 9.0. Under Adobe Acrobat Professional 9.0 edition, user can enter, open and save the data with the PDF e-form. It is noted that Adobe Acrobat 9.0 reader allows users to enter data, save data with PDF e-form and print the PDF e-form.

Preparation of a PDF e-form for WPIS includes the following procedures::

- (a) Creation of form layout in Acrobat PDF format;
- (b) Creation of form elements in the form for data entry;
- (c) Creation of PDF e-form XML schema; and
- (d) Generation of data conversion protocol data file for converting PDF e-form to WPIS XML data file and vice versa.

3.1 Creation PDF e-form form layout in Acrobat PDF format

There are two ways to create the PDF e-form form layout:

- (a) Scan the original form into PDF format, thereby having a form image of the form layout.
- (b) Create the form layout using Words Processing tools (e.g. Microsoft Words) and then convert the document into PDF format.

The screenshot shows a Microsoft Word document titled "Digital Album for Contract Progress Photo". The form includes the following elements:

- Contract No. (text field)
- Contract Title (text field)
- Contractor (text field)
- Date (text field)
- No. of photos attached (text field)
- A table with two columns: "Photo" and "Description". The table has five rows.
- Remarks (text field)
- Prepared by (text field)
- Description (text field)

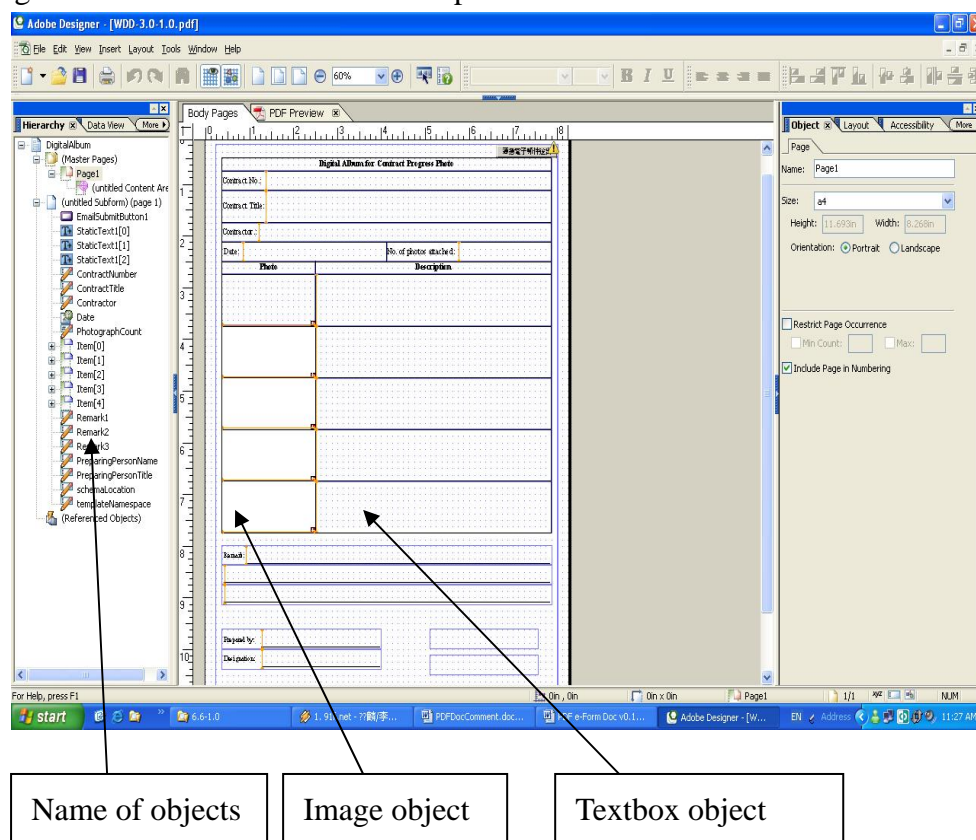
Sample form created using Microsoft Word.

3.2 Creation of form elements in the PDF e-form for data entry

After created the PDF e-form form layout, you need to add in form elements on the PDF e-form for data entry.

Elements in PDF e-form for data entry are created using Adobe LiveCycle Designer ES 8.2. Adobe Designer is an add-on module of Adobe Acrobat Professional 9.0. It is an integrated development environment allowing users to manipulate form elements on the PDF form.

Using Adobe Acrobat Designer, user can insert form elements such as text box (textbox object), image box (image object), combo box, list box and radio button and define properties of the form elements to create paper form data entry elements in the e-form for input, see screen capture below. Graphical pictures such as company logo can also be added to the form but will not be converted during the transformation to WPIS compliance data file.



Naming convention of each element with the WPIS data schema following the naming convention outlined at section 5.5 of OGCIO XML Schema and Management Guide version 1.3 (<http://www.ogcio.gov.hk/eng/infra/download/g55-2.pdf>). It is recommended the form elements in PDF e-form to follow the same naming convention as defined in the WPIS data schemas to ease the task of field matching, between the

PDF e-form XML schema and the corresponding WPIS data schema or UDD data schema, when defining the conversion protocol file using the conversion mapper (see section 5.1).

In defining the WPIS schemas, complex type is widely used to group elements and/or attributes. When creating the PDF e-form of a WPIS data schema, it is essential to use sub-form element in PDF e-form to group elements for matching with the complex type grouping in the WPIS data schemas. Naming of the sub-form should also same naming convention as defined in the WPIS data schemas.

For details on how to create and manipulate the form elements and sub-form with a PDF e-form, please refer to the user manual of Adobe LiveCycle Designer ES 8.2.

3.2.1 Create two hidden fields on the form to enable automation with WPIS Software

For the purpose automating WPIS and the PDF e-form, it is mandatory to create two hidden fields within each PDF e-form for identifying the PDF e-form's schema location and the name of the PDF e-form template. These two identifiers will be used by the WPIS software during the conversion process.

Details of the two hidden fields are as follows:

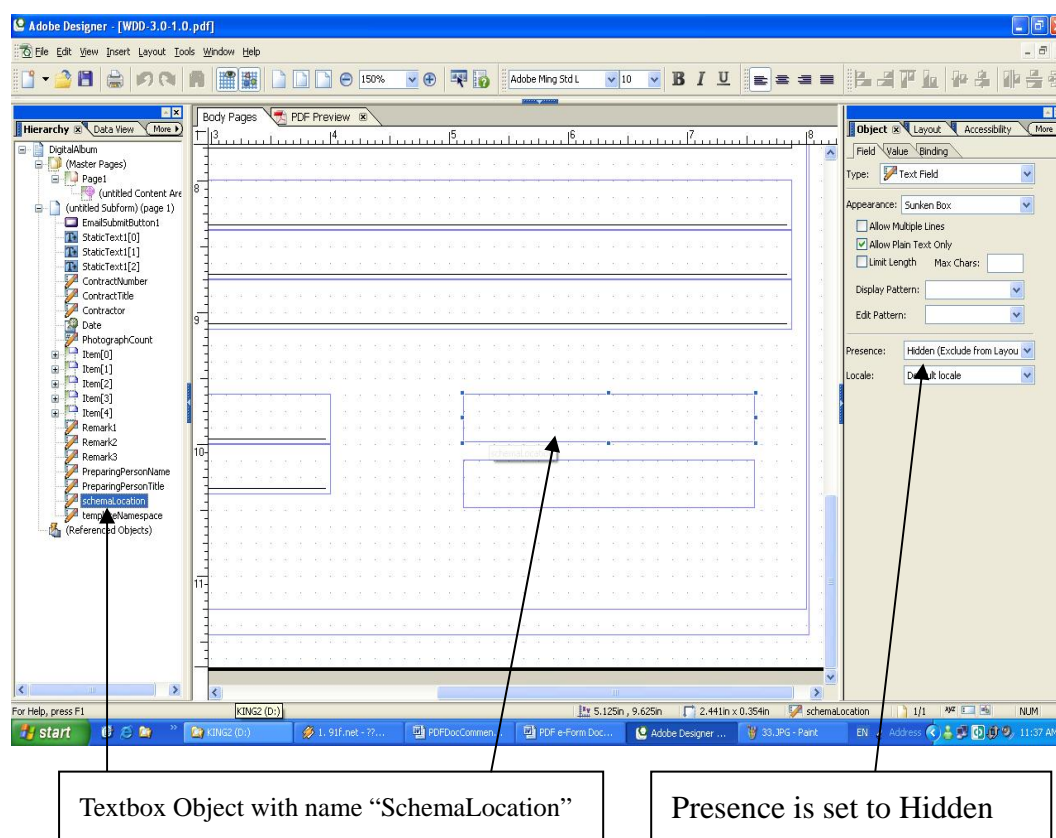
1. Create a textbox object with name "SchemaLocation". This textbox object is used to store the path of the corresponding PDF e-form XML schema;
2. Create a textbox object for "TemplateNamespace". This textbox object is used to store the path and name of the corresponding PDF e-form template;
3. Set both text box objects "Presence" properties to Hidden;
4. Set both textboxes to be a hidden field.

The values should point to the location of respective files of schema and template location, normally these should be under wpis/eform directory. Example content of the two hidden fields are shown below:

Field Name	Description
------------	-------------

schemaLocation	It defines the PDF e-form template's corresponding XML schema filename and location. (The naming convention of pdf e-form refers to section 6.) Example content set inside the value tab: http://www.wpis.gov.hk/wpis/eform/v1.0/EFORM-1.1-1.0.xsd
templateNamespace	It defines the PDF e-form template filename and location. Example content set inside the value tab: http://www.wpis.gov.hk/wpis/eform/v1.0/WDD-1.1-1.0.pdf

The screen capture below shows the schemaLocation object.



4 Creation of PDF e-form XML Schema

The PDF e-form XML schema defines the definitions of the data objects in the PDF e-form in XML format. The PDF e-form XML schema will be used by the WPIS software to perform mapping between the PDF e-form schema to WPIS WDD schema or UDD schema to generate the data conversion protocol data file.

The schema file for the PDF e-form has to be created manually using any third party schema creation software or text editor. Alternatively, the WPIS File Composer's schema editor can be used to create a schema file of the PDF e-form.

The WPIS File Composer and WPIS File Reader software can be freely downloaded from the WPIS web site <http://www.wpis.gov.hk>

5 Generation of Data Conversion Protocol Data File

The electronic data contained in the PDF e-form are extractable for re-use and sharing. Normally, the non-project related information, e.g. company logo, will not be extractable.

The data conversion protocol data file provides the conversion information that facilitates the extraction of WPIS data from a PDF e-form or insert WPIS data in to a PDF e-form.

The PDF e-form data conversion protocol data file comprises of three mandatory sections and an optional section:

- the source information section,
- the eXtensible Stylesheet Language Transformations (XSLT) section,
- the target information section,
- And the Optional - MapperInfo section.

Appendix A shows an Example of a PDF e-form data conversion protocol data file.

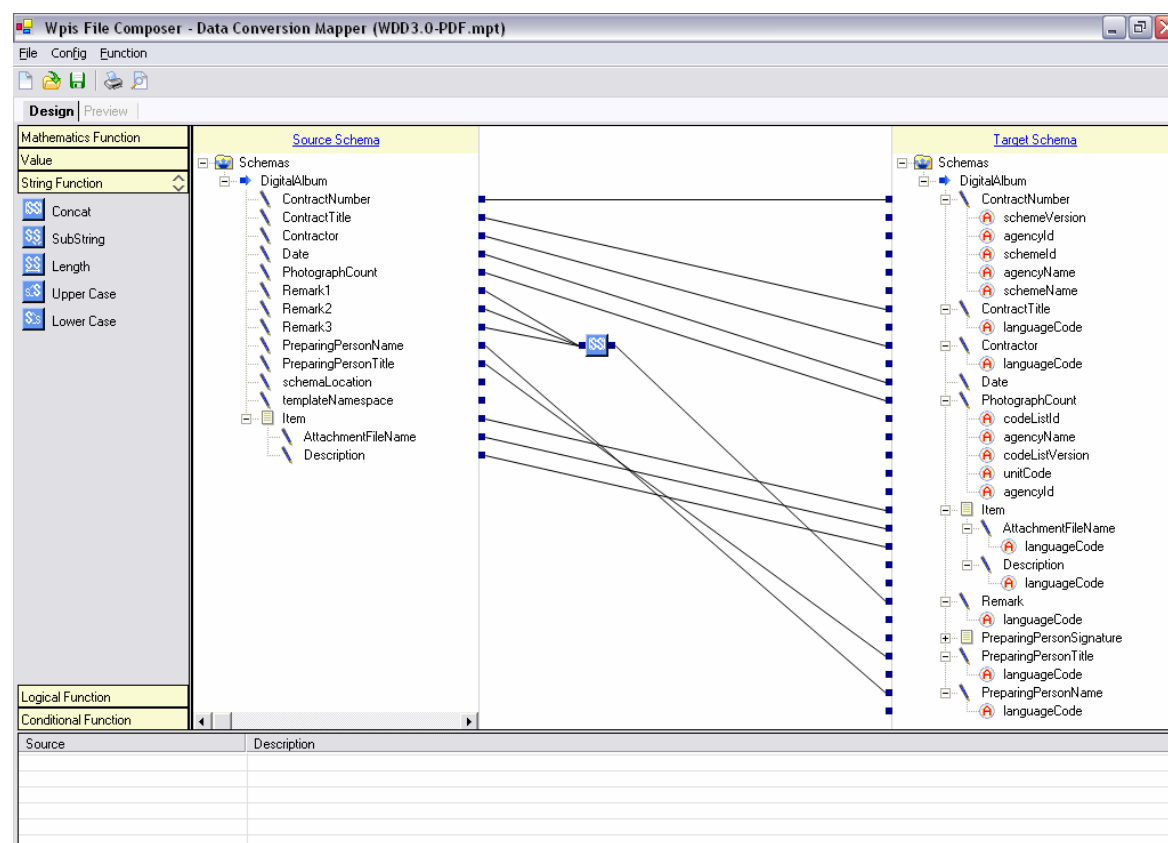
The WPIS File Composer/the WPIS File Reader software will use the PDF e-form data conversion protocol data file to extract data from or to insert data into the PDF e-form or the WPIS data file.

The data conversion protocol data file for conversion of the WPIS data into the PDF e-form is not the same as the data conversion protocol data file for conversion of PDF e-form data to the WPIS data file. Therefore, normally for each PDF e-form there will be two data conversion protocol data files.

5.1 WPIS Tool to Generate the PDF e-form Data Conversion Protocol Data File

To assist the generation of the PDF e-form data conversion protocol data file, DEVB has made available a Conversion Mapper function embedded within the WPIS File Composer and the WPIS File Reader.

The Data Conversion Mapper is a graphical tool that takes the schema files as input, and allows the user to map fields from one to the other. The following diagram shows a snapshot of the Conversion Mapper. The Data Conversion Mapper allows the user to select a Source Schema and a Target Schema; these can be the PDF e-form schema file, UDD schema files and the WDD schema file. After selected the schema files, a list of elements of the schema for source and target will be displayed. User can draw lines from one to the other for straight one to one mapping. If some transformation is required user can drag the required functions into the middle pane and map the line through the function. After completed the mapping, user can validate and generate the data conversion protocol file in XML format. The listing of the resulting data conversion protocol data file is shown in Appendix A.



6 Version and Naming Convention

6.1 The versioning control of PDF e-form and its associated files (the PDF e-form XML schema and the conversion protocol data files) follow the versioning control of the WDDs. Thus, the version of the PDF e-forms and their associated files and the corresponding library of WDDs will bear the same version no. for uniformity.

6.2 Naming Convention

The suggested naming convention of the PDF e-form files are as follows:

Naming Convention	Syntax	File Extension (Mandatory)
PDF e-form	WDD-[WDD-ID]-[VER][e-form name]	.pdf
PDF e-form Schema	WDD-[WDD-ID]-[VER][e-form name]	.xsd
Conversion Protocol Data File	AA-BBB-CCC-XXX	.cnv

Code	Type	Format
AA	Country code	<ul style="list-style-type: none"> Optional. 2 characters fixed sized. (Standard ISO 3166 Code lists, the list can be found at ISO web site http://www.iso.org/iso/en/prods-services/iso3166ma/02iso-3166-code-lists/list-en1.html)
BBB	ARC code	<ul style="list-style-type: none"> Optional. 3 Character fixed sized. The list of the Agent Responsible Codes can be downloaded from the DEVB web site www.devb-wb.gov.hk/cswp.
CCC	Project ID	<ul style="list-style-type: none"> Optional. Variable sized. To be assigned by the user.
WDD-ID	WPIS Data Domain ID	<ul style="list-style-type: none"> Mandatory. Variable sized. Refers to the master WDD identifier
VER	Version ID	<ul style="list-style-type: none"> Mandatory. Variable sized. Refers to the version number of the data schema files of the library of the WPIS Schemas and Templates.
e-form	Arbitrary file	Optional.

name	name	Variable sized. To be assigned by the user. Suggested use first character of form title.
XXX	Arbitrary file name	Mandatory. Variable sized. To be assigned by the user. Suggested arbitrary file name for conversion from WDD to PDF = “WDDToPDF” Suggested arbitrary file name for conversion from PDF to WDD = “PDFToWDD”

7 Folder Structure

7.1 All the data files, schema files related to PDF e-form resides within the WPIS folder structure. The “eForm” sub-folder is used for storing the PDF e-forms, and their schema files. The “Conversion” sub-folder is used for storing the PDF e-form data conversion protocol data files.

- ❖ *Vn.m*: This directory under respective file types hold different version of the WPIS release. The “n” and “m” are the version release number, e.g V1.0

	Level	Name	Description
<pre> graph TD WPIS --> Conversion WPIS --> eform WPIS --> WDD WPIS --> UDD WPIS --> Template Conversion --> Vn.m1[Vn.m] eform --> Vn.m2[Vn.m] WDD --> Vn.m3[Vn.m] UDD --> Vn.m4[Vn.m] Template --> Vn.m5[Vn.m] </pre>	1	\WPIS	The root folder of the library of the WPIS Schemas and Templates, i.e. Level 1 of the WPIS folder structure.
	2		Different file types of WPIS library are organized in sub-folders of the root folder, i.e. Level 2 of the WPIS folder structure.
		.\conversion	Data conversion protocol data files will be stored in the respective “Vn.m” sub-folder of the “conversion” folder.
		.\eform	PDF e-form and related files are stored in the respective “Vn.m” sub-folder of the “eform” folder.
		.\wdd	The WDD data schema files and their associated files will be stored in the respective “Vn.m” sub-folder of the “wdd” folder.
		.\udd	The UDD data schema files and their associated files are recommended to be stored in the respective “Vn.m” sub-folder of the “udd” folder for easy and systematic retrieval.
		.\template	The data file templates of WDDs will be stored in the respective “Vn.m” sub-folder of the “template” folder.
	3	.\Vn.m	The folders of different versions of the concerned files, i.e. Level 3 of the WPIS folder structure.

8 Library of PDF e-forms

- 8.1** The library of the WDDs may be updated; hence the corresponding PDF e-forms and their associated data conversion files would be subjected to updates and changes. To facilitate the promulgation of the PDF e-forms together with the library of WDDs, the PDF e-forms and their associated files will be packed in a library with the same version number as the corresponding library of WDDs.
- 8.2** In each release of the library of the PDF e-forms, there will be a Release Notes covering the catalogue of PDF e-forms of the release, explanatory notes and semantics of the PDF e-forms. Also included in the release will be their associated files (i.e. PDF e-form template files, the PDF e-form XML schema files, the data conversion protocol data files for converting PDF e-form to WPIS data domain XML data file and vice versa).
- 8.3** The current release and the previous releases of the Release Notes and the library of PDF e-forms and their associated files will be posted on the WPIS web site, <http://www.wpis.gov.hk>, for free download.
- 8.4** Users may define their own PDF e-forms to work with the WDD or UDD on specific projects. Similarly, if the WDD or UDD are updated the corresponding PDF e-forms and the associated data conversion files would also be subjected to update and changes. Users will need to maintain the updates.

Appendix A - Conversion Protocol Data File

Detailed below is an example of core parts of a Conversion Protocol Data File.

Tag to identify this is a Conversion file.

<Conversion>

1st Section is the Input section, provides the type of input, name of source schema file, and the template file location.

<Input> “ This section defines the input information, this c

<Pdf>

<SchemaLocation>http://www.wpis.gov.hk/wpis/eform/v1.0/EFORM-3.0-1.0.xsd</SchemaLocation>

<Templatelocation>http://www.wpis.gov.hk/wpis/eform/v1.0/WDD-3.0-1.0.pdf</Templatelocation>

</Pdf>

</Input>

2nd section is the transformation section, coded using XSLT version 1.0, sample shown below

<Mapping><![CDATA[<?xml version="1.0" encoding="utf-16"?>

<xsl:stylesheet version="1.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

<xsl:template match="/DigitalAlbum">

<xsl:variable name="Schemas_DigitalAlbum" select="." />

<DigitalAlbum xmlns="http://www.wpis.gov.hk/wpis/v1.0">

<xsl:attribute

name="xsi:schemaLocation">http://www.wpis.gov.hk/wpis/wdd/v1.0/WDD-3.0-1.0.xsd</xsl:attribute>

<xsl:for-each select="\$Schemas_DigitalAlbum/ContractNumber">

<ContractNumber>

<xsl:value-of select="." />

</ContractNumber>

</xsl:for-each>

.....

</xsl:template>

</xsl:stylesheet>]]></Mapping>

3rd Section is the Output section, provides the type of output.

<Output>

<Xml>

</Xml>

</Output>

4th Section is an optional section, and it is use by Mapper application to store application information, it is not use for data conversion.

<MapperInfo>(This section is not use for data conversion. This section is for the internal use of

Mapper application. The data structure is in proprietary Mapper application format. Do not modify manually.)

.....

</Mapper>

</Conversion>