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PDF Forms
Advantages and application possibilities of electronic forms in PDF format

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USAGE OF FORMS

Forms provide a standardization of written communication between the involved people, enterprises, institutions and authorities. From the technical point of view they serve the standardized collecting and displaying of data and information. Many contracts are based on forms, for example, the standard automobile commercial contracts, which are offered in the stationery-specialised trade or by the car clubs, or contracts of insurance. Besides, the written communication between a citizen and the state or the administration generally occurs on the basis of forms. So most applications, submitted by a citizen to an institution, are form-based. In the communication with authorities there is a huge amount of official templates or forms, and they should be used to keep to the given form, provided by legal rules.

ELECTRONIC FORMS AND THEIR ADVANTAGES

While the usage of paper forms became usual long ago, electronic forms could gain in importance only since the personal computers began to spread. Electronic forms have a row of advantages compared with paper forms:

- Price reduction – the production expenses for the printing of forms on paper are missing. Modifications and updates of forms cause lower expenses. Transport expenses can be cancelled or reduced to a fraction of the logistics costs for paper forms. Storage and disposal expenses are missing.
- Higher availability – if electronic forms can be accessed online (over the Internet), they are available round-the-clock, everywhere and in any quantity. Restrictions of availability by opening time and office hours of authorities and enterprises are missing.
- Easier usability & avoidance of errors – electronic forms are easier to fill, they make the work easier, for example, by included calculations, validity check, plausibility and completeness of the inputs. Owing to that it is possible to avoid the input errors or absence of entries. Besides, possible input values can be given and integrated into electronic forms for the field-related help in filling.
- Transferability into the "classical" form – electronic forms can be easily printed on paper as empty templates or after they are filled on a computer. And vice versa paper forms can be digitized, though their subsequent processing will have the disadvantages described in the following item.
- Direct processing of data (simpler workflow) – the data entered in electronic forms can be sent directly computer-based to the connected applications (for example, data bases, table calculation programs or e-mail software) or/and from one person to another and be processed there. Manual typing, automatic reading (scanner and OCR software) of the entered data or physical

transfer of the filled forms (for example, by post) – things necessary for the additional digitization of paper forms, are missing. This saves time, eliminates possible sources of errors (read errors, in particular in handwritten entries) and requires no special hardware and software.

♦ <u>Easy usage of available data</u> – in connected applications the available data can be automatically transferred into electronic forms. For example, after the input of a personal number, insurance number or tax number the name and the address information will be entered automatically.

♦ <u>"Offline" or "online" filling</u> - electronic forms can be filled offline (without direct connection to the processing system) and online (with direct connection to the processing system).

♦ <u>No quality loss at copying</u> – the disadvantage of form copies, which often have worse readability, is missing.

♦ <u>Lower loss risk</u>– the risk of loss or mistreatment, which exists on the route of a physical transfer, is missing.

REQUIREMENTS TO THE ELECTRONIC FORMS

♦ Good readability and clarity: electronic forms will be filled on a computer screen. Therefore, the form representation should offer good readability and clarity. Besides, it should be considered that on many usual monitors and resolutions most forms should be scrolled at least vertically (that is paged from top to bottom) to be able to edit them completely, because they are based on the paper format A4.

♦ Field-related assistance at the input.

♦ Check of completeness and plausibility of the input.

♦ Default values and entries to choose.

♦ Ability of printing, that is to convert an electronic form into a paper form.

♦ Saving of the filled form should be possible, to be also able to change the input later.

♦ If several forms with the same basic data (for example, name and address) should be filled, there should be an ability to transfer this basic data comfortably (with few mouse clicks or automatically) into new forms, so that multiple inputs of the same data are not necessary.

♦ If the electronic forms are of a legally binding type, there should be an ability to sign them with a digital signature or print them for a manual signature. Digital signatures confirm the identity of a person who has filled the form and the integrity of the form contents to verify that the form and its contents were not changed.

♦ The application of electronic forms should be available for a highest possible number of users. The forms should be presented in a widespread (technical) format and be set on nearly all-available operating systems.

♦ Format loyalty: electronic forms should always show the same skin (formatting etc.) regardless of the technical equipment of the user and therein fulfill the same requirements as the paper forms.

The necessity to fulfill the two last requirements will offer a format for the document-based electronic communication, established during the last 10 years: the PDF, which was developed by the Adobe Systems company.

BASIS OF PDF FORMS

Today the electronic forms are widespread as PDF files for several reasons:

10 years ago talks on the openness of the PDF format and an extensively documented specification, and then on the standardization of PDF appeared. Other arguments for PDF were the flexibility of the technical requirements and the possible functionalities. All this is still true and important even today, but, in addition, PDF has matured meanwhile into a de facto-standard. The file format is very popular and well established, which favors its progressive spreading and forces its further propagation. Nowadays one can hardly imagine a computer without PDF software: at least for reading and printing of the documents nearly every computer user uses the PDF format. And this independently of the installed operating system. The number of PDF tools will further grow. Thereby the most important problem of digital documents can be solved - a trouble-free transferability: the contents of a document can be at least read on every computer because of the standardization of the format, and this also long time after its creation.

The technical structure of the PDF format considers the great importance of the transferability of documents:

♦ A large quantity of supported fonts
♦ Functions for the embedding of fonts in a document
♦ Varied compression algorithms, among the rest, special computing methods for images (for example, JPEG with different quality levels or JBIG2 for monochrome pictures)
♦ Support of several color space types (for example, RGB, CMYK)

As files can be embedded in the PDF documents in any format, it is easier to manage images of different types in a document workflow: it is much easier to administer and to keep only one file for a document than several files connected with each other. Besides, XML metadata can be used in a PDF document and can be connected with different objects in the document. This extends the possibilities for the integration of non-visual data in a PDF document.

A lot of attention was paid to the security of the document contents and its proper use in the PDF format. At the work with PDF documents the encryption algorithm can be set by the author of the document and by the software developer, who integrates PDF into his applications. As an alternative to the long-term used RSA algorithm a modern AES algorithm is offered.

The PDF format provides a selection of hash- and sign algorithms as well as the integration of the signature directly into the PDF file. At this point it should be noted that with the possibility of authentication of digital documents by means of a digital signature an important function has appeared, which plays the determining role for the propagation of digital documents on PDF base.

Besides, the use of electronic PDF forms offline as well as online over the Internet is possible. A huge number of programs can perform the creation of PDF forms, and that is not only the software by Adobe, but for example, *Perfect PDF Premium*. Besides, there are some programs, the so-called PDF viewers, which are used not for the creation, but for the displaying and filling of PDF files and forms, for example, *Perfect PDF Reader*.

Basically there is a possibility to convert an available electronic document (for example, a PDF, a Microsoft Word or Excel document) into a PDF form, to scan a paper form and convert it into a PDF form or to create a completely new PDF form.

Static or dynamic forms can be created according to the used PDF software. The latter customize themselves while filling according to the data volume and user's operations. So the size of fields can be customized, for example, according to the number of entries or length of the entered text.

STRUCTURE OF PDF FORMS

As a rule the PDF forms consist of form fields and control elements. Form fields can be seen as a container for the data entered and available in a form. Control elements are the visible correspondence of the form fields in a document. They allow the production of interactive PDF forms. A division into form fields and control elements is necessary because several control elements can be associated with a form field to arrange incorporated alternative selection options in a group. This way, for example, the mutually exclusive alternatives, represented in a document by several selection buttons, can be grouped.

The above-mentioned Perfect PDF 5 Premium at the insertion of a field automatically produces a connection with a control element: when a form field or a control element is added, the other form object type will be also added automatically. Then on the second step a control element can be associated with another form field in the control element properties by changing the field name of the control element. So it is possible

to assign the same field names to several control elements and arrange them into a group. Besides, it is possible to set the view of the visible elements (size, position and other) in the control element properties. The form field properties also determine, for example, whether a form (field) can be filled interactively on a computer or whether a form should be printed and filled by hand.

FORM DESIGN

For form fields and control elements in PDF software mostly the position (the absolute alignment in a form and the relative position to each other) and size as well as the possible types can be selected or placed on the form sheet. The different form field and control element types are explained below.

Moreover, it is possible to set events and actions for all control elements except for signature fields in most PDF programs. "Events and Actions" specify, which action should be executed by which event, enabled by the use of a control element. Events are triggers for actions. So, for example, an event "Click on the sending button and release of the mouse button" triggers an action "Send form" (send certain field contents in a certain sending format to a given Internet address). Also several operations can be associated with an event.

Events can be: released mouse button, pressed mouse button, mouse on/off an object, keystroke, opening/closing of the form page. Then the following actions can be triggered, for example: go to a page, go to a page in a file, go to an Internet address, open an application or a file, execute a JavaScript code (for example, for calculations or validations).

Control element types

Text field
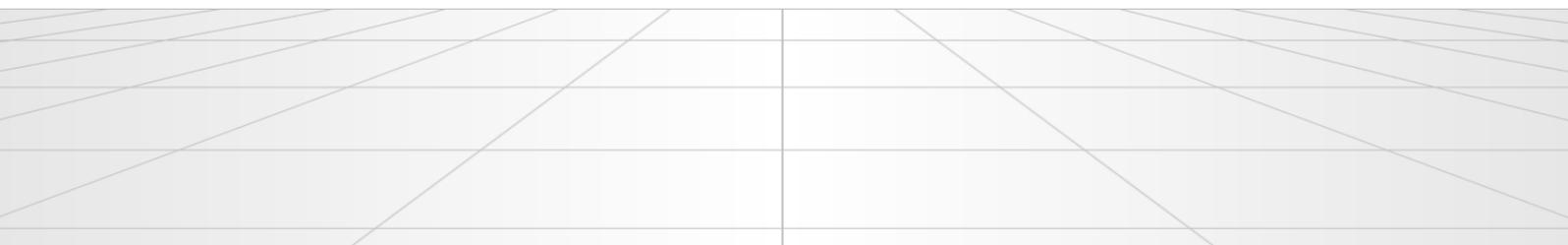
John Smith

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Address

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Postal code   City

In text fields an information as for example a name or an address is entered. It also allows the insertion of texts from the Windows clipboard. Digits, letters or both can be used.

Some possible options for the definition of text fields are: name, standard text (before filling), text length limit, multiline entries, password (entries are shown as asterisks), RTF formatting (bold, italic) allowed or not, spellchecker, design of the text field (color and alignment of text, color of the background, border), font.

<u>Flag</u>

Necessary functionality

Basic functionality of PDF Render Center

✓ Converting into PDF   ☐ Import metainformation from MSOffice
✓ Converting into PDF/A   ✓ Export plain text from PDF
☐ Converting into images   ☐ Render PDF pages as images (TIFF, JPEG, ...)

This control element serves for the activation or deactivation of functions, properties or elements. Several flags in a form are used in contrast to the selection buttons, explained below, and are used as a rule for non-alternative, non-excluding each other selection possibilities. By reason of this any number of them can usually be selected (activated).

Some possible options for the definition of a flag are: name, one is activated by default; design (color, border, icon type, alignment).

<u>Selection button</u>
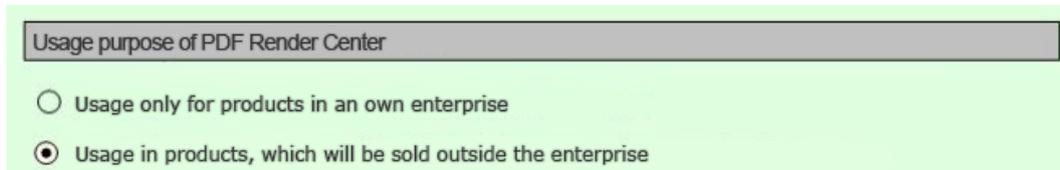
Usage purpose of PDF Render Center

○ Usage only for products in an own enterprise

◉ Usage in products, which will be sold outside the enterprise

Selection buttons or option fields serve for the selection of settings or data from several alternatives. At least one of the options can be (or should be) activated. Selection buttons with the same field name form a group.

Some possible options for the definition of selection buttons are: name, one is activated by default, design (color, border, icon type, alignment), whether one option should be always selected or not.

Combination field
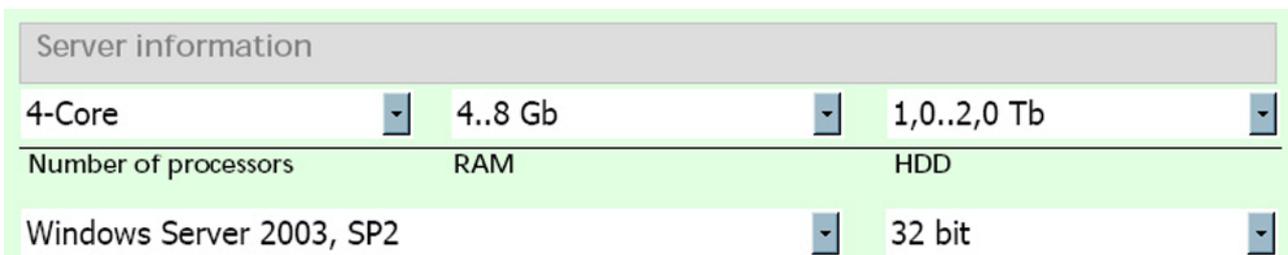
Server information		
4-Core ▾	4..8 Gb ▾	1,0..2,0 Tb ▾
Number of processors	RAM	HDD
Windows Server 2003, SP2 ▾		32 bit ▾

In combination fields a person that is filling a form can select an element from a pop-up menu or enter an own value, provided that at the creation of a form an option was activated for the "free" input.

Some possible options for the definition of combination fields are: spellchecker, user may enter own texts (not only given texts can be selected), define list elements, that is specify the elements, which a person that is filling a form should find in the pop-up menu as selection alternatives, design (color, border, alignment, font).

Selection list
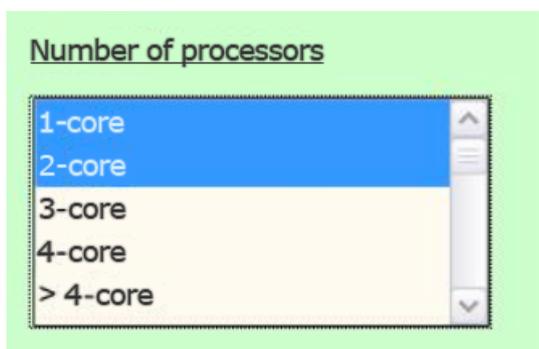
Number of processors

1-core
2-core
3-core
4-core
> 4-core

This control element indicates a list of options for the selection. It resembles combination fields. However, the following properties are valid especially for the selection lists:

- ♦ The elements of a selection list are available to the user in an always-visible list and it is not necessary to activate them in a pop-up menu.
- ♦ A user cannot change selection lists by the input of own texts.
- ♦ Additional property "Multiple selection": a person that is filling a form can select several list elements in selection lists at the same time, if this option was activated at the creation of a form.

Button

If buttons are integrated into forms, they allow the user an interaction, which is performed by pure filling in the narrower sense. Pressing the buttons can be linked with a row of actions, so, for example, with opening of any file, with the playback of a sound file or video file or with the sending of data to a web server. Besides, buttons can be provided with pictures, text and visual modifications on a mouse movement and according to its state (among the rest, "pressed" or "not pressed"). Some possible options for the definition of buttons are: name, design (color, border, alignment, font), and text on a button.

Signature field

With a signature field the users can sign a PDF form – either with a digital signature or with a classical signature by hand. In the second case an area intended for that, a signature line or a signature box will be simply included into the form.

FDF (FORMS DATA FORMAT)

FDF is one of the file formats, developed by Adobe and introduced in the PDF specification[1] 1.2, which is based on the PDF format, but has an easier file structure than PDF. It is used for interactive form data within a PDF file. With FDF the form data from a PDF file can be sent to a web server, update information can be received and pasted into the form. Besides, the form data will be saved separately from the PDF

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[1] Currently the specification 1.7 is valid with some extensions. Details to the PDF specification and the specification itself can be found on the Adobe web site on http://www.adobe.com/devnet/pdf/pdf_reference.html.

document, in a FDF file. At that the PDF document (form file) will not be modified. So, for example, PDF documents with name and address data can be personalized without having to create an own new PDF document for every data record. Besides, in the PDF specification 1.3 a possibility was introduced to define a separate container for comments with FDF, which exists separately from the real PDF document.

XFA FORMS

In the PDF specification 1.5 the support of interactive forms in PDF was introduced, which are based on the XML architecture. XFA (XML Forms Architecture) contains the information about the form in an XML data stream. The essential contents are: the form template (among the rest, fields, calculations, validations, formatting), the form data as well as information about the configuration, which controls the cooperation of the form template and the linked data. XFA was developed by the Canadian enterprise JetForm in particular for the use in web forms. Adobe acquired the enterprise in 2002 and introduced XFA later in the PDF specification and in the Acrobat versions 6 and 7 based on it.

FILLING AND USAGE OF FORMS

Filling of PDF forms usually occurs in simple, free PDF viewer programs like *Adobe Reader* or *Perfect PDF Reader* (freeware). Note, that in the actual *Adobe Reader*, unlike in *Perfect PDF Reader*, filled forms cannot be saved with filled in contents.

In PDF software, which also allows creation and modification of PDF files and forms, the ready forms are mostly displayed, filled and printed in a special PDF reader view. However, the requirements for filling on the display and the following printing are that this is not excluded by the author in the security options of the PDF file, which can force or prevent, for example, printing and filling on paper according to the purpose.

EXAMPLE OF A PDF FORM

In the upper part under the "Customer data" this form page contains several text fields, in the area "Server equipment" you can find combination fields, flags and below another text field can be found. The entire form can be downloaded and viewed here.