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title not checked by the International Searching Authority*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HYBRID DIGITAL SIGNATURES

(57) Abstract:



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Hybrid digital signatures

The invention relates to a computer-implemented method for document processing.

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The method and system can be used within a computer landscape such as an enterprise resource planning system (ERP). Business processes within enterprises are often controlled using computer-implemented systems
10 such as ERP (Enterprise Resource Planning) systems. An example of such an ERP system is the integrated business solution mySAP.com made by SAP AG. Within such a system a number of business processes can be controlled, for example human resources, finance,
15 controlling, purchases, sales, production, and planning. Typically implementations of business processes involve workflows, i.e. sequences of subsequent steps for completing a specific business process.

20

ERP systems are less efficient however when business processes require contact with external parties that do not have business systems that can communicate directly with an ERP system, such as for example private
25 persons, and small businesses.

It is an object of the invention to provide a method that improves the efficiency of business processes supporting computer systems. To achieve this goal the
30 invention provides for a method according to claim 1. By providing a document with a digital signature using fully computer integrated workflows, that can be recognised and verified by the recipient without the need for direct communication with the originating
35 business processes supporting computer system.

Further embodiments of the invention are the subject of the dependent claims.

Further objects, aspects and advantages of the invention will be better understood from the following
5 detailed description of a preferred embodiment of the invention with reference to the drawing, in which:

Fig. 1 shows schematically an example of an embodiment of the invention.

10

Provided is a business processes supporting computer system, embodied in this example as an ERP system 10. Within the ERP system 10 a text file 200 is generated, for example automatic or manually. The text file 200
15 exists within the ERP system in digital form. The text document 200 can have any required content, for example billing, orders, invoices, contracts, etc. Within the ERP environment, the text file 200 is sent through a workflow system to an approver, authorised to validate
20 the text file 200 for further processing. The approver validates the text file 200 by attaching his personal digital validation code 100 to the text file 200. Methods and systems for digitally validating digitally stored files are known per se, for example using
25 digital signatures and watermarks.

Within the ERP system the now validated text file 200 is guided through the respective workflow, schematically indicated with arrow 20 towards a
30 printing step 30, during which a physical copy of the text file is produced, for example by means of printing. The physical copy or printout 400 comprises the text as contained in the text file 200; further a human readable mark 300 of the validation code. In this
35 example, the human readable mark comprises a signature image 310 (for example a bit map) of the respective approver and a control code 320 such as for example a

bar code or a number printed in Arabic numbers. The signature image of the approver is stored in a repository within the ERP system, and is for example retrieved during the printing process.

5

A human recipient of the document can read the signature image 310 of the approver, and can verify its authenticity using the control code 320. In case the control code is not in a for human readable code, such
10 as for example a two dimensional bar code, the recipient can use a machine reading device, such as for example a bar scanner or OCR scanner, most devices which are readily available.

15 The control code can for example be generated once for a specific signature or any time again uniquely for a specific document. The control code can be stored in an ERP repository. In case the control code is generated uniquely for each document, the control code can also
20 be used for validating the content of the document.

In one example of an embodiment of the invention, a portal for the ERP system is provided in which the recipient of the document can enter the validation code
25 and retrieve the identity of the approver. Further the recipient can validate the authenticity of the document printed if the control number uniquely identifies the specific document.

30 In the following example an embodiment of the invention is shown. A workflow for the preparation of a labour contract is given as an example.

In a first step a work contract is prepared as an
35 electronic document by the HR department. In a workflow step within for example an HR module of an ERP system the HR department forwards the electronic contract to

the relevant manager for approval. The manager receives in his workflow system the contract in electronic form. After review the manager signs the contract electronically by using a digital signature and sends
5 the now signed electronic document in a workflow step back to the HR department.

In a next workflow step the HR department produces a physical copy of the electronically signed document,
10 for example by printing the contract on paper. The print of the document includes the text of the contract, as well as a printed signature of the manager in human-readable form. Further the digital signature of the manager is printed on the document, for example
15 as a number or bar code that includes the digital signature. The code can be printed for example on the backside of each page of the document).

The HR department sends out the printed contract to a
20 recipient, in this example the future employee for signing. The future employee signs the contract on paper (preferably after checking the validity of the signature using the control number) and sends it back to the HR department. The HR department then confirms
25 the contract as signed and proceeds with the workflow accordingly.

Although the example shown relates to an application within Human Resources, the invention is not limited to
30 this application. The invention can be implemented in any part of a business processes supporting computer system where verifiable physical documents have to be produced, for example in applications and workflows related to for example sales, invoices, reporting,
35 finance, production, and planning.

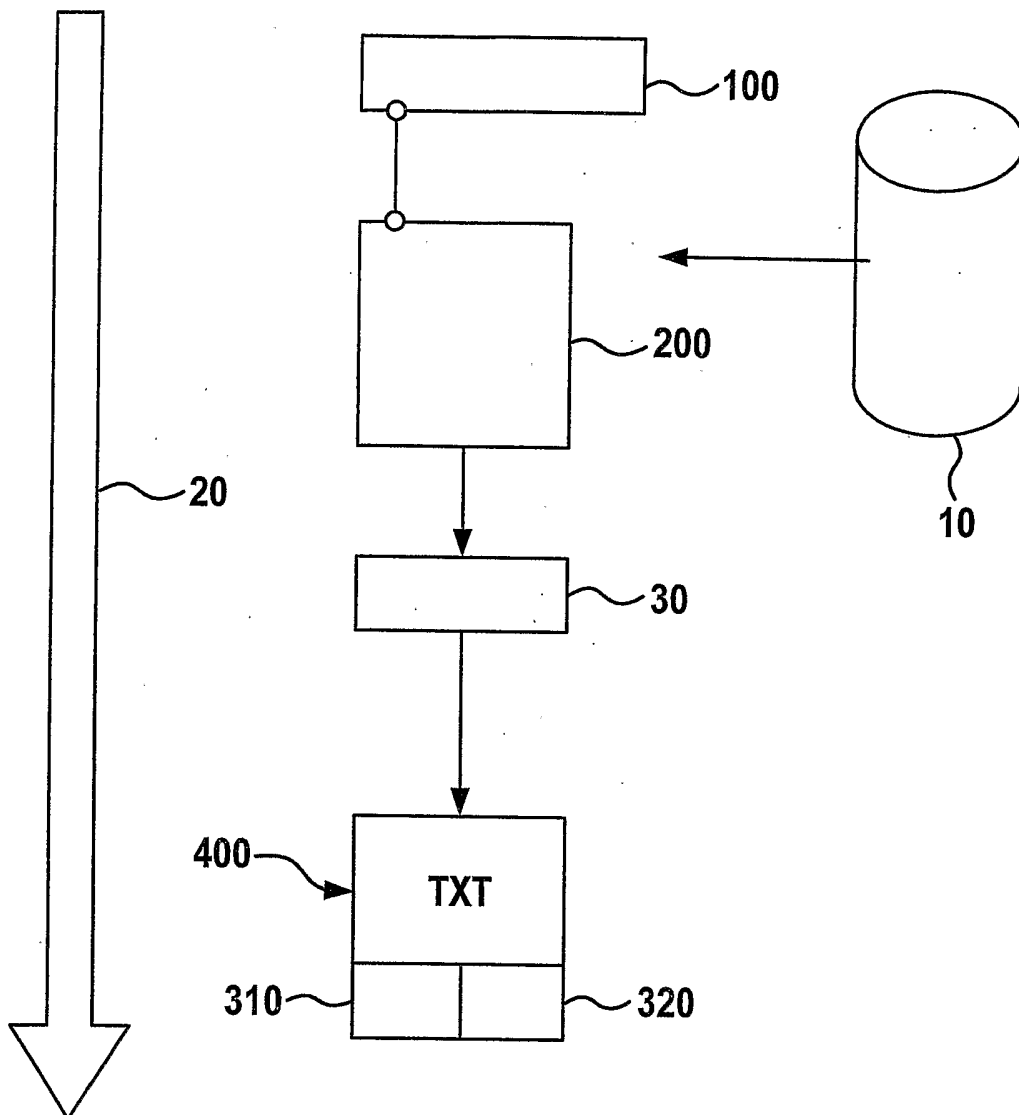
The invention is not limited to the implementation shown in the example within the context of an ERP system; the invention can be implemented in any computer system or computer landscape that supports the processing of business processes. In a further example of an embodiment of the invention, a computer implemented word processor can be used to generate the text and macros within the word processor can be used to perform the tasks of generating the validation code and the human readable mark.

The invention further relates to a program storage device readable by a computer system, embodying a program of instructions executable by the computer system to perform any method according to the invention. As this invention may be embodied in several forms without departing from the spirit of essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, since the scope of the invention is defined by the appended claims rather than by the description preceding them, and all changes that fall within the metes and bounds of the claims, or equivalence of such metes and bounds thereof are therefore intended to be embraced by the claims.

Claims

1. Computer implemented method for document
5 processing, comprising generating a document (200)
in a business processes supporting computer system
(10),
generating a validation code (100) associated with
the document in the business processes supporting
10 computer system (10),
generating a human readable mark (300) for said
validation code, and
creating a physical document (400), comprising at
least said human readable mark (300).
15
2. Method according to claim 1, wherein generating a
human readable mark (300) comprises retrieving a
signature image (310) from a repository within
said business processes supporting computer system
20 (10) associated with said validation code and
generating a control code (320) for said human
readable mark (300).
3. Method according any of the preceding claims,
25 wherein the validation code is a digital
signature.
4. Method according to any of the preceding claims,
wherein said control code comprises a number
30 expressed in Arabic numbers.
5. Method according to any of the preceding claims,
wherein said control code comprises a bar code.
- 35 6. Program storage device readable by a computer
system, embodying a program of instructions

executable by the computer system to perform a method according to any of claims 1-5.



PATENT COOPERATION TREATY

PCT

DECLARATION OF NON-ESTABLISHMENT OF INTERNATIONAL SEARCH REPORT

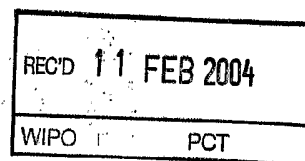
(PCT Article 17(2)(a), Rules 13ter.1(c) and Rule 39)

Applicant's or agent's file reference 2002P00240WO	IMPORTANT DECLARATION	Date of mailing(day/month/year) 11/02/2004
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International Patent Classification (IPC) or both national classification and IPC G06F17/60		
Applicant SAP AKTIENGESELLSCHAFT		

This International Searching Authority hereby declares, according to Article 17(2)(a), that **no international search report will be established** on the international application for the reasons indicated below

1. ☒ The subject matter of the international application relates to:

- a. ☐ scientific theories.
- b. ☐ mathematical theories
- c. ☐ plant varieties.
- d. ☐ animal varieties.
- e. ☐ essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes.
- f. ☒ schemes, rules or methods of doing business.
- g. ☐ schemes, rules or methods of performing purely mental acts.
- h. ☐ schemes, rules or methods of playing games.
- i. ☐ methods for treatment of the human body by surgery or therapy.
- j. ☐ methods for treatment of the animal body by surgery or therapy.
- k. ☐ diagnostic methods practised on the human or animal body.
- l. ☐ mere presentations of information.
- m. ☐ computer programs for which this International Searching Authority is not equipped to search prior art.



2. ☐ The failure of the following parts of the international application to comply with prescribed requirements prevents a meaningful search from being carried out:

- ☐ the description ☐ the claims ☐ the drawings

3. ☐ The failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions prevents a meaningful search from being carried out:

- ☐ the written form has not been furnished or does not comply with the standard.
- ☐ the computer readable form has not been furnished or does not comply with the standard.

4. Further comments:

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Olga Benitez
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 203

The claims 1-6 relate to subject matter for which no search is required according to Rule 39 PCT. Given that the claims are formulated in terms of such subject matter or merely specify commonplace features relating to its technological implementation, the search examiner could not establish any technical problem which might potentially have required an inventive step to overcome. Hence it was not possible to carry out a meaningful search into the state of the art (Art. 17(2)(a)(i) and (ii) PCT; see Guidelines Part B Chapter VIII, 1-6).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.