BESCHWERDEKAMMERN   BOARDS OF APPEAL OF   CHAMBRES DE RECOURS
DES EUROPÄISCHEN   THE EUROPEAN PATENT   DE L'OFFICE EUROPEEN
PATENTAMTS   OFFICE   DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen
(D) [ ] No distribution

Datasheet for the decision
of 7 February 2007

Case Number: T 0472/04 - 3.5.01

Application Number: 00308840.8

Publication Number: 1195679

IPC: G06F 11/14

Language of the proceedings: EN

Title of invention:
Performing operating system recovery from external back-up
media in a headless computer entity

Applicant:
Hewlett-Packard Company

Opponent:
-

Headword:
OS recovery/HP

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - no"

Decisions cited:
-

Catchword:
-

Case Number: T 0472/04 **-** 3.5.01

D E C I S I O N
of the Technical Board of Appeal 3.5.01
of 7 February 2007

Appellant:	Hewlett-Packard Company A Delaware Corporation 3000 Hanover Street Palo Alto, CA 94304 (US)
Representative:	Lawman, Matthew John Mitchell Hewlett-Packard Limited IP Section Building 3 Filton Road Stoke Gifford Bristol BS34 8QZ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted 17 November 2003 refusing European application No. 00308840.8 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman:	R. R. K. Zimmermann
Members:	K. Bumes
	A. Pignatelli

Summary of Facts and Submissions

I.   European patent application 00 308 840.8 (publication
        number EP 1 195 679 A1) filed on 6 October 2000
        concerned methods of performing a recovery operation of
        an operating system for a computer entity and storing a
        back-up operating system of a computer entity to a
        back-up media.

II.   The European search report drawn up in respect of the
        application listed, inter alia, the following two
        documents:

        D1: GB-A-2 346 719   published in August 2000
        D2: EP-A-0 898 225   published in 1999

III.   In a written decision issued by the examining division
        on 17 November 2003, the application was refused on the
        ground that the claimed invention did not meet the
        requirement of inventive step in the light of documents
        D1 and D2. According to the reasons given for the
        decision, the method of claim 1 was distinguished from
        the closest prior art, document D1, by the step of
        copying the operating system to a back-up area
        partition not used for direct running of an operating
        system, and the step of copying user data settings to a
        user settings archive partition area.

        The objective problem solved by these features was seen
        in improved robustness against system failure.
        According to the decision, the claimed invention was
        rendered obvious by document D2 disclosing two separate
        physical sectors of a computer entity, the one for
        storing a so-called basic program, considered to be an

operating system, and the other sector for storing a
new updated version of the basic program.

IV.   The appellant (applicant) lodged an appeal against the
       refusal decision of the examining division on
       23 January 2004 by filing the notice of appeal and
       paying the appeal fee on the same day. On 17 March 2004,
       the appellant filed the written statement setting out
       the grounds of appeal, including three sets of new
       claims titled main, 1st auxiliary, and 2nd auxiliary.
       Claims 1 of these requests read as follows:

       Main request
       "1. A method of performing a recovery operation of an
       operating system for a computer entity (200), said
       computer entity comprising:
       at least one data processor (202), and
       at least one data storage device (204), wherein said
       data storage device is configured into a plurality of
       partition areas (400, 402),
       said method comprising the steps of:
       copying a back-up operating system from a back-up
       source, and resetting said computer entity,
       said method characterised by:
       the step of copying a back-up operating system
       comprising copying a back-up operating system from a
       back-up source onto an operating system back-up area
       partition (413) which is not used for direct running of
       an operating system by said computer entity, and said
       method further including a step of:
       copying a user settings data from said back-up source
       to a user settings archive partition area (411) of said
       data storage device,

wherein said resetting of said computer entity
comprises the steps of:
forcing said computer entity to boot from an emergency
operating system stored on an emergency operating
system partition area of said data storage
device;
overwriting a content of said primary operating system
partition with said back-up operating system stored in
said operating system back-up area partition; and
restoring client and application configuration settings
from said user settings archive partition area."

1st auxiliary request
"1. A method of performing a recovery operation of an
operating system for a headless computer entity (200),
said computer entity comprising:
at least one data processor (202);
at least one data storage device (204), wherein said
data storage device is configured into a plurality of
partition areas (400, 402) and
one or more communication ports (207) for communicating
with a remote computer entity over a network,
said method comprising the steps of:
copying a back-up operating system from a back-up
source, and resetting said computer entity,
said method characterised by:
the step of copying a back-up operating system
comprising copying a back-up operating system from a
back-up source onto an operating system
back-up area partition (413) which is not used for
direct running of an operating system by said computer
entity, and said method further including steps of:
accessing the headless computer entity over the network
via an administration Interface (501);

0541.D

under the control of the administration interface,
copying a back-up operating system from a back-up
source onto an operation system back-up area
partition (413) which is not used for direct running of
an operating system by said computer entity, and
under the control of the administration interface,
copying a user settings data from said back-up source
to a user settings archive partition area (411) of said
data storage device,
wherein said resetting of said computer entity
comprises the steps of:
forcing said computer entity to boot from an emergency
operating system stored on an emergency operating
system partition area of said data storage
device;
overwriting a content of said primary operating system
partition with said back-up operating system stored in
said operating system back-up area partition; and
restoring client and application configuration settings
from said user settings archive partition area."

2nd auxiliary request
"1. A method of performing a recovery operation of an
operating system for a computer entity (200), said
computer entity comprising:
at least one data processor (202), and
at least one data storage device (204), wherein said
data storage device is configured into a plurality of
partition areas (400, 402),
said method comprising the steps of:
copying a back-up operating system from a back-up
source, and resetting said computer entity, said method
characterised by:

the step of copying a back-up operating system
comprising copying a back-up operating system from a
back-up source onto an operating system back-up area
partition (413) which is not used for direct running of
an operating system by said computer entity, and said
method further including steps of:
copying a content of an operating system back up area
partition into a reserved space partition area (412) of
said data storage device;
copying a user settings data from said back-up source
to a user settings archive partition area (411) of said
data storage device; and
if an error occurs in said recovery operation,
restoring a primary operating system to a primary
operating system partition area of said data storage
device reserved for use by said primary operating
system, from a copy of said primary operating system
temporarily stored in the reserved space partition of
said data storage device."

V.   The Board sent a communication together with the
       summons to oral proceedings, indicating its preliminary
       opinion on the allowability of the appeal. In
       preparation of the oral proceedings, the appellant
       filed a new set of claims by letter dated 30 January
       2007, claim 1 of which reads as follows:

       "1. A method of performing a recovery operation of a
       user-configurable operating system for a computer
       entity (200), said computer entity comprising:
       at least one data processor (202), and
       at least one data storage device (204), wherein said
       data storage device is configured into a plurality of
       partition areas, including a primary operating system

partition (403) and an operating system back-up area
partition (413) which is not used for direct running of
an operating system by said computer entity;
said method comprising the steps of:
copying a pristine copy of the operating system from a
back-up source onto the operating system back-up area
partition (413);
copying user settings describing how a user has set up
the operating system from said back-up source to a user
settings archive partition area (411) of said data
storage device;
resetting said computer entity so that the computer
entity is forced to boot from an emergency operating
system;
overwriting a content of said primary operating system
partition with the pristine copy of the operating
system, and
restoring user settings of the computer entity from
said user settings archive partition area."

VI.   Oral proceedings before the Board took place on
       7 February 2007. The matter was discussed with the
       representatives present on behalf of the appellant. At
       the end of the oral proceedings, the decision on the
       appeal was given.

VII.   At the oral proceedings, the appellant submitted the
       following requests: the decision under appeal be set
       aside and a patent be granted on the basis of the
       claims 1 to 15 filed on 30 January 2007 (main request),
       or on the basis of claims 1 to 15 of the main or first
       auxiliary requests or of claims 1 to 10 of the second
       auxiliary request all filed on 17 March 2004 (now first
       to third auxiliary requests).

VIII. The written and oral submissions provided by the appellant to the Board in support of the appeal requests may be summarised as follows:

(a) Regarding claim 1 of the main request, the claimed method was distinguished from the prior art of document D1 by at least three steps:

The pristine copy of the operating system was copied from an (external) back-up source onto an operating system back-up area partition not used for direct running the operating system.

The user settings describing how the user had set up the operating system were copied from said back-up source to a user settings archive partition area of the data storage device of the computer entity.

A content of the primary operating system partition was overwritten with the pristine copy of the operating system.

(b) Document D1 did not teach to copy the pristine copy of the operating system and the user settings into the protected, but separated partitions, namely the operating system back-up area partition and the user settings archive partition area, respectively.

(c) The prior art was not able to recover the operating system if it was seriously corrupted and too late to perform the back-up operations. Compared with this, the present invention allowed to download a pristine copy of the operating system and to reinstall the user

settings even if the primary operating system was corrupted and had to be recovered. The user could then continue using the computer, starting from the state immediately before the system "crashed", instead of having to return to the "as supplied" state as with the prior art of document D1.

(d)   Furthermore, there was no emergency operating system from which the computer system could be forced to boot and to overwrite the operating system with the back-up operating system. Dl rather required a specialised image restore program to be loaded.

(e)   In document Dl, the copying of the whole software image took place only once, before the computer system was sent out to the customer. In contrast, the copying steps of the present application took place when the computer system was used by the end user.

The steps of copying and restoring the user settings should strictly be distinguished from storing the factory and default settings during the factory installation, but also from the step of producing backup copies of other types of data and files.

Although document D1 referred to the back-up of data and files which were not factory installed, it was clear that this was not part of the restoration process itself. The user rather had to exit the restoration utility program to use DOS commands to this end.

(f)   The user settings (such as security, time zone, or language settings) were normally not stored in discrete, easily identifiable files, but were rather hidden and

0541.D

not easily accessible to the end user. Restoring the
user settings manually, if at all possible, was a non-
trivial task and could involve extensive trial and
error and/or reference to technical manuals, which was
tedious and time-consuming.

A general back-up of files and data would normally not
lead to the back-up of the user settings. In the prior
art, the user would just return to the "as supplied"
state, where all user settings made after the factory
installation were lost.

(g)   In the light of document D1, therefore, the objective
        problem solved by the invention could be seen in
        providing a robust recovery system allowing the
        restoration of user settings to the working
        configuration immediately prior to an operating system
        failure.

(h)   Document D2 disclosed a method where a basic program
        was used to execute application programs and to
        download updates of the programs. This "basic program"
        was not a complex, configurable operating system but
        rather a boot routine or a similar simple program.

        The system of document D2 was not configurable by the
        user so that there was no motivation to contemplate
        copying user settings data into any kind of archive
        partition area.

        To safeguard against an incorrect download, two preset
        separate memory areas of a single memory unit were used
        in document D2, the first one to store the basic
        program and the other to store a back-up copy. Compared

to this, the present invention provided a back-up copy of the operating system as well as of the user settings either from the internal hard disk or from an external back-up source.

(i)   Regarding the first auxiliary request, the appellant stated that this request did not differ from the main request, except for some formal amendments regarding the wording of the claim. The arguments submitted in support of the main request held, one-to-one, for the first auxiliary request.

(j)   The second auxiliary request claimed the application of the recovery and back-up method of the invention to headless computer entities. Such an application was not possible with the prior art. Document D1 aimed at a normal computer product, which required a visual display unit and a user interface. The restoration utility program had to be deliberately activated by the user which was not possible with a headless computer entity.

In the prior art disclosed by document D2, the user had no control over non-standard or low level operations of the microprocessor. The restoration process in document D2 was entirely automatic. There was no motivation to add an administration interface in connection with any restoration or recovery process.

(k)   The third auxiliary request dealt with a situation where the recovery process failed. To avoid corruption of the operating system stored in the back-up partition, the primary operating system was restored from a copy

of the primary operating system temporarily stored in
the reserved partition of the data storage device.

Document D1 did not address the problem of restoring
user settings after recovery of the primary operating
system. Neither did it disclose copying a content of an
operating system back-up area partition into a reserved
space partition area which could be used for storing
said primary operating system if an error by occurred
during the recovery operation.

According to document D2, a single back-up copy of the
basic program should be stored, whereas according to
the present invention the operating system contained in
the back-up area was copied into a reserved space
partition. This improves the safeguard and protection
against system failure if compared to document D2.

Reasons for the Decision

1.   The appeal, although admissible, is not allowable since
      the appeal requests submitted seek the grant of a
      patent for subject matter which does not meet the
      requirement of inventive step as set out in
      Articles 52(1) and 56 EPC. Lack of inventive step
      results from the methods defined by the respective
      claims 1 of these requests, which the Board judges
      obvious in the light of prior art documents D1 and D2.

2.   Document D1 relates to the restoration of a hard drive
      of a computer system and may thus serve as an
      appropriate starting point in the prior art for
      assessing inventive step. It was already cited by the

examining division as the closest prior art document, a
view which was not challenged by the appellant, neither
in the first instance nor before the board (see
paragraph no. VIII(a) above).

2.1   Document D1 discloses, in the terminology of the
        present claims, a computer entity (computer system 10,
        figure 1) having the capability of performing a back-up
        and recovery operation (restoring a hard disk drive 16,
        see the abstract and claim 1, for example). The
        computer entity is user-configurable since it allows
        the user to install data files (files/data which were
        not factory installed, see document D1, page 26,
        line 17) and may undergo reformatting and
        repartitioning (see page 12, lines 1 ff.).

        Moreover, it relates to the configuration of a built-
        to-order computer system, which may include a complex
        bundle of an operating system and application software,
        hardware and software drivers, etc. (see page 5, second
        paragraph), all installed as ordered by a customer or
        as needed to support hardware ordered by the customer,
        and customised according to user preferences (see
        document D1, page 3, lines 18 ff. and lines 24 f.). The
        prior art computer entity is hence, also in this sense,
        user-configurable.

2.2   Furthermore, it comprises, as shown in figure 1, a data
        processor (CPU 12), an (internal) storage device (hard
        disk drive 16) and an (external) storage device, which
        is used as a back-up source (other storage devices: CD-
        ROM drive 18 for storing a custom/restoration image, an
        STM CD-ROM, see document D1, page 9, lines 5 ff., and
        page 10, lines 24 to 26).

2.3   The "restore image" or "software restoration image" for
        restoring the hard disk drive to the factory download
        condition is created by downloading and storing a
        pristine copy of the software, including the operating
        system, on a restoration image CD-ROM and/or on a
        protected area of the hard disk, at the factory or
        computer manufacturer prior to shipment to the customer
        (see, for example, document D1, page 8, first paragraph
        and page 14, lines 21 ff.).

2.4   Document D1 explicitly discloses the configuration of
        the hard disk into multiple partitions, whereby the
        operating system resides in the lower address portion
        (see page 1, lines 6 to 16 and page 13, line 25 to
        page 14, line 10). The division of the data storage
        device into multiple separate partitions is thus
        considered to be an optional feature of the prior art
        system, contrary to the arguments advanced by the
        appellant (see paragraph no. VIII (b) above).

        This configuration includes a primary operating system
        partition (the lowest address partition, for example
        the C-drive), and an operating system back-up area
        partition (the highest address partition or partitions,
        for example the E- and D- drives, or the "furthest
        available partition", the "TOP" of the hard disk drive,
        see document D1, page 13, lines 25 ff. and page 14,
        lines 24 ff.). The high address partition (or
        partitions) used for storing the pristine copy of the
        software is, in the address space of the hard disk, far
        above the lowest address partition and thus not used by
        the computer entity for direct running the operating
        system.

2.5   In order to allow complete recovery of the system, the
       software restoration image must include a backup copy
       of the whole bundled software package that the customer
       purchased for the given "built-to-order" computer
       system (see for example document D1, page 28, lines 21
       to 24). Such a complex software bundle can be restored
       successfully only if the user specific settings made at
       the factory are backed up together with the operating
       system, application programs, drivers etc. on the
       restore CD-ROM and/or in the back-up area partition of
       the hard disk and recovered during the restoration. The
       arguments advanced by the appellant to the contrary are
       unpersuasive and not accepted by the Board (see
       paragraph no. VIII(f) above).

2.6   Since user specific settings are backed up together
       with the software restoration image, the prior art must
       provide an area to store them, on the customised CD-ROM
       and/or in the high address partition of the hard disk,
       which may be termed an "archive partition area". It is
       noted that the present claims do not define this term
       so that it encompasses a broader scope of meaning than
       submitted by the appellant in support of the invention
       (see paragraph no. VIII(b) above). The area may indeed
       reside fully within the operating system back-up area
       partition as indicated in the present application (for
       example, as a "sub-partition", see the published
       application, paragraph no. 23 - column 6, line 52 to
       column 7, line 19).

2.7   Although document D1 is silent about what happens when
       the user settings are changed once the system has been
       installed, it explicitly discloses the backup,

0541.D

restoration, and reinstallation of files and data which were not factory installed at the manufacturing stage (see document D1, page 26, second paragraph, and page 27 lines 16 f.).

There are always some user settings which must be created or changed if new files and data are installed; the data of the Windows Registry, for example, used with a Microsoft Windows operating system, to which document D1 explicitly refers (see page 2, last paragraph, or page 27, line 8). This circumstance implies that the actual user settings must always be backed up and stored in an appropriate back-up area if the system is to be able to recover, after a system failure, to a fully operational state. It follows that the backup and the reinstallation of new files and data as disclosed in document D1 (loc.cit.) must include the backup and restoration of at least some of the actual user settings. Otherwise the reinstallation of such files and data would fail.

2.8   In document D1, either the customised restore CD-ROM or the high address partition(s) of the hard disk may be used as a back-up source for recovering the system under the control of the restoration utility program (see document D1, page 27, last paragraph).

According to the second option, the restoration process runs through the following steps:

−   Loading and running the emergency operating system, i.e. the restoration utility programme, which guides the customer through the restore process one step at a time (see document D1, figure 5, step 82).

    — Prompting the customer to back up any files and data
      installed after the initial purchase or which cannot
      be routinely reloaded (see page 24, lines 19 ff.,
      and page 26, second paragraph).

    — Copying the protected restoration software image,
      i.e. the pristine copy of the operating system, from
      its high address location on the hard disk to the
      lower most segment of the hard disk, thereby
      restoring the software image to the "like new"
      factory download condition (see page 27, lines 18
      ff., page 28, lines 3 to 19).

    — Rebooting the system so that the computer entity
      functions as if it were undergoing a power-up for
      the first time after purchase (see page 28, lines 21
      ff.).

2.9 The Board does not share the view held by the appellant
    that the prior art system did not use an emergency
    operating system (see paragraph no. VIII(b) above). The
    restoration utility program in the prior art of
    document D1 fully controls the recovery process, except
    for initiating the booting of the computer system and
    the backup and reinstallation of the files and data
    which are not factory installed. The restoration
    process may be started by any bootable disk which gives
    access to the restoration utility program and which is
    used to start up the computer system (see for example
    document D1, page 23, lines 16 to 27). These are the
    basic functions which an "emergency operating system"
    in terms of the present claims has to provide.

3.   From the above analysis of document D1, it follows that claims 1 of the present requests define essentially three groups of features which distinguish the claimed methods from the prior art.

3.1   The methods of claims 1 of the main and first auxiliary requests are distinguished from the prior art of document D1 as follows:

        (A) A pristine copy of the operating system and a user settings data are copied from the external back-up source onto the operating system back-up area partition and to a user settings archive partition area, respectively, of the data storage device.

3.2   Since the computer entity of document D1 already includes a network interface card NIC (see page 9, lines 7 and 8), only the following features are left in addition to the above feature group A which distinguish the method of claim 1 of the second auxiliary request from the prior art of document D1:

        (B) The computer system on which a recovery operation is performed is a headless computer entity, and the copies of the back-up operating system and the user settings data are downloaded from a remote computer entity via a network under the control of an administration interface.

3.3   Finally, claim 1 of the third auxiliary request defines, in addition to the above feature group A, the following features distinguishing it from prior art document D1:

(C) Copying a content of an operating system back-up area partition into a reserved space partition area of the data storage device, and if in an error occurs in the recovery operation, restoring a primary operating system to a primary operating system by partition area of said data storage device reserved for use by the primary operating system, from a copy of the primary operating system temporarily stored in the reserved space partition of said data storage device.

4.   These three groups of features provide independent technical contributions to the prior art of document D1:

4.1   Compared to the prior art of document D1, the features of group A above define an additional intermediate copying step, in which the copies of the operating system and the user settings are first downloaded from the (external) back-up source to the back-up area and partition, respectively, onto the hard disk before the system is restored, using these downloaded backup copies stored on the hard disk for restoring the primary system.

The appellant contended (see paragraph VIII(c) above) that these steps increased the security and stability of the recovery process. The Board disagrees with this assertion for the following reasons: document D1 discloses the backup of data in a separate protected partition of the hard disk and/or on the customised CD-ROM. The additional steps of copying back-up copies onto the hard disk require - if compared with the prior art of document D1 - an additional data transfer, which principally increases the risk that the data involved in the transfer are becoming corrupted.

According to document D1, the pristine copy of the
operating system is copied, at the factory, to the high
address partition of the hard disk and/or to the
customised restore CD-ROM, whereby both storage devices
may be used either alternately or in succession. If the
corruption of data, or the other disadvantages
mentioned in document D1, are of no concern, it is a
trifling alternative to repeat, during the use of the
computer system, what has been done at the factory,
namely to download a pristine copy of the software
image (e.g. from a customised restore CD-ROM) to the
high address partition of the hard disk - which is
clearly possible at any time after the installation -
and to restore the system from this high address
partition if any serious system failure occurs. There
is nothing gained by such an additional copying step
since the high address partition is protected and
normally uncorrupted; such a step does not provide any
inventive technical contribution over the prior art.

4.2   The features added by the second auxiliary request
         (group B of features, see above) define a "headless
         computer entity". According to the present application
         (see for example, column 1, lines 16 ff.), this is a
         computer entity without user interfaces, allowing only
         limited access to the computer entity for maintenance.
         The scope of the term "headless", however, should not
         be understood too narrowly since figure 1 of the
         present application shows, as headless, a computer
         entity which comprises a small display screen 103 as
         well as a data entry means 104.

Furthermore, it is undisputed and also acknowledged in the application (see paragraph no. 2) that such type of device is generally known in the prior art.

In fact, document D2 discloses a device of the headless type, since the information-processing apparatus disclosed therein lacks any interface for direct user interaction, but instead comprises an administration interface (system monitoring circuit 7 and peripheral apparatus in 11, see document D2, figure 1 and description, paragraphs 20 ff.) for accessing the device over the network connection for updating or maintaining the system.

Document D1 does not expressly refer to the headless type of computers. But there's nothing in the prior art which hinders the skilled person to consider such an application of the teaching of document D1. On the contrary, the prior art of document D1 lends itself to the application with headless computer systems since only an internal hard disk and a minimum of user interaction are required. Hence, a skilled person would consider it obvious to use the administration interface and network disclosed in document D2, for downloading the pristine copy of the operating system and the copy of the user settings onto the internal data storage device of the headless computer entity. For these reasons, the technical contribution provided by the second auxiliary request (see group B above) is not inventive either.

4.3   Claim 1 of the third auxiliary request (see group C above) defines a solution to a different technical problem, namely how to preserve downloaded data if the

download fails. This problem has already been addressed
in the prior art (see document D2, page 2, paragraph
no. 6). The essential solution proposed by document D2
is the partitioning of the physical memory into two
sections ("two storing units"), one used as an active
section and the other as a protected reserve section.
In the case of an error, the uncorrupted version of the
operating system -- the old version of the "basic
program" loaded into the RAM (see figures 6 and 7) --
is copied from the reserve section to the RAM (see
document D2, paragraph no. 46 f.).

The application of this concept to the data transfer in
the back-up and recovery process of document D1 is
obvious to a skilled person considering to improve the
safeguard of the system against failed downloads.

4.4   In summary, the methods of the respective claims 1 of
the present requests result in different technical
contributions to the prior art, which however are all
not inventive. Moreover, these individual contributions
are, in the judgement of the Board, independent from
each other, regarding the technical problem solved and
the technical meaning of the features which are
essential to the respective solution. The combination
of feature groups A and B according to the second
auxiliary request and the combination of feature groups
A and C according to the third auxiliary request do
thus not add anything to the prior art beyond these
individual contributions. Hence, the claimed methods as
a whole lack inventive step so that none of the appeal
requests for grant of a patent can be allowed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

R. Schumacher   R. R. K. Zimmermann

Order

0541.D