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**Datasheet for the decision  
of 26 April 2007**

**Case Number:** T 1578/05 - 3.5.03

**Application Number:** 98300811.1

**Publication Number:** 0866591

**IPC:** H04L 29/06

**Language of the proceedings:** EN

**Title of invention:**

Mechanism for embedding network based control systems in a local network interface device

**Applicant:**

SUN MICROSYSTEMS, INC.

**Opponent:**

-

**Headword:**

Virtual machine network interface device/SUN

**Relevant legal provisions:**

EPC Art. 52(1), 56, 96, 113, 116

EPC R. 67

RPBA Art. 11(3)

**Keyword:**

"Inventive step - yes (2nd auxiliary request)"

"Procedural violation (no)"

"Discretionary powers wrongly exercised by the examining division (no)"

**Decisions cited:**

T 0640/91, T 0682/91, T 0089/93, T 0144/94, T 0712/97,

T 0201/98, J 0018/96

**Catchword:**

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Case Number: T 1578/05 - 3.5.03

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.03  
of 26 April 2007

**Appellant:** SUN MICROSYSTEMS, INC.  
4150 Network Circle  
Santa Clara  
California 95054 (US)

**Representative:** Harris, Ian Richard  
D Young & Co  
120 Holborn  
London EC1N 2DY (GB)

**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 11 July 2005  
refusing European application No. 98300811.1  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** A. S. Clelland  
**Members:** D. H. Rees  
M-B. Tardo-Dino

## Summary of Facts and Submissions

I. This is an appeal against the decision of the examining division, announced at oral proceedings held in the absence of the appellant on 24 May 2005, with written reasons dispatched on 11 July 2005, to refuse patent application number 98 300 811.1, publication number 0 866 591. The appellant had withdrawn its request for oral proceedings in a fax sent on 9 March 2005.

The reason given for the refusal was that the subject-matter of claim 1 did not involve an inventive step with respect to the combination of the disclosures of documents

D1: US 5 548 721 A and

D2: EP 0 718 764 A.

II. Notice of appeal was filed and the appeal fee paid on 5 September 2005. A statement setting out the grounds of the appeal was submitted on 7 November 2005.

III. The board issued a communication giving its preliminary views on the appeal and in particular raised objections of a lack of clarity (Article 84 EPC), a lack of support (Article 84 EPC) and a lack of disclosure how to carry out the invention in its full breadth (Article 83 EPC), a lack of an inventive step in the subject-matter of claim 1 (Articles 52(1) and 56 EPC) and a possible consequential lack of unity of invention (Article 82 EPC). The communication included an indication of subject-matter in the application which

appeared to the board not to be suggested by any of the prior art documents to hand.

IV. In response the appellant filed a new set of claims 1 to 14. In accordance with the appellant's conditional request the board then issued a summons to oral proceedings to take place on 26 April 2007 together with a communication giving the board's preliminary opinion on the new claims. In preparation for the oral proceedings the appellant submitted on 23 March 2007 amended description pages for a first auxiliary request and amended claims for a second auxiliary request. In a further submission dated 19 and received 23 April 2007 the appellant informed the board that it would not be represented at the oral proceedings and made a further request combining the description and drawings of the first auxiliary request and the claims of the second auxiliary request.

V. The sole independent claim of the main request reads as follows:

"A network interface device (401) providing a physical and logical connection between a network station and a network medium utilized by a network (440), said network interface device (401) comprising:

a host bus interface circuit (410) coupled to said network station;

a network interface circuit (416) coupled to said network medium;

and characterised by:

an embedded virtual machine (402) coupled to said network interface circuit (416) and said host bus

interface circuit, said embedded virtual machine providing a secure program execution environment for said network interface device (401), wherein said virtual machine intercepts packets travelling between the host interface circuit and the network interface circuit."

The independent claim of the first auxiliary request is identical with that of the main request - only the description has been changed.

The independent claim of the second auxiliary request adds the following final feature:

"and wherein said virtual machine allows the network interface device to safely and reliably contain state information or code from said network."

The independent claim of the third auxiliary request is identical with that of the second auxiliary request - again only the description has been changed.

VI. The appellant requests that the decision under appeal be set aside and a patent be granted on the basis of

claims 1 to 14 of the main and first auxiliary request filed on 15 September 2006 or alternatively, for the second and third auxiliary requests, claims 1 and 2 filed on 23 March 2007 and claims 3 to 14 filed on 15 September 2006;

description

page 4 filed with a letter dated 10 and received 14 January 2002,

pages 1 to 3 and 5 to 29 as originally filed for the main and second auxiliary request, or alternatively for the first and third auxiliary requests pages 8 and 9 filed on 23 March 2007 and pages 1 to 3, 5 to 7 and 10 to 29 as originally filed;

drawing sheets 1 to 10 filed with a letter dated 23 and received 26 February 1998,

In the alternative the appellant requests that the case be remitted to the examining division for further prosecution.

The appellant also requests refund of the appeal fee in accordance with Rule 67 EPC.

VII. The appellant was not represented at the oral proceedings, during which the board deliberated and the chairman announced the decision taken.

## **Reasons for the Decision**

1. *Reasons for holding the oral proceedings in the appellant's absence*

1.1 According to Article 116(1) EPC, oral proceedings shall take place either at the instance of the European Patent Office if it considers this to be expedient or at the request of any party to the proceedings. Oral proceedings are an effective way to discuss cases mature for decision, since the appellant is given the opportunity to present its concluding comments on the outstanding issues (Article 113(1) EPC), and a decision

can be made at the end of the oral proceedings  
(Rule 68(1) EPC).

1.2 The need for procedural economy dictates that the board should reach its decision as quickly as possible while giving the appellant a fair chance to argue its case. In the present appeal the holding of oral proceedings was considered by the board to meet both these requirements. The appellant had also made a conditional request for oral proceedings. A summons was therefore issued.

1.3 In accordance with Article 11(3) of the Rules of Procedure of the Boards of Appeal the board shall not be obliged to delay any step in the proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned who may then be treated as relying on its written case. The board considered that, despite the appellant's announced intention not to attend, the twin requirements of fairness and procedural economy were still best served by holding the oral proceedings as scheduled.

1.4 The board considers that its reasons for coming to its decision do not constitute a departure from grounds or evidence previously put forward, requiring that the appellant be given a further opportunity to comment. The board concludes that Article 113(1) EPC has been satisfied and it was therefore in a position to make its decision at the oral proceedings.

2. *The main and first auxiliary request - inventive step*

2.1 Since the board's reasoning applies equally to the main and the first auxiliary requests they will be dealt with together. The wording of the independent claim of each of these requests is identical; the description of the first auxiliary request has been amended to exclude the possibility that the instructions may be performed directly by the processing unit, i.e. without an interpreter, as specified in column 4, lines 42 to 45 of the published application.

2.2 The appellant did not attempt to rebut the board's view, given in its communication of 15 May 2006 at points 6.1 and 6.2 that document D1 discloses a network interface device, namely a secure network access port (SNAP) together with a modem or LAN interface circuit, satisfying the requirements of the pre-characterising portion of claim 1. The board further considers the feature of "intercept[ing] packets travelling between the host interface circuit and the network interface circuit," to be intrinsic to any network interface device, since it has to reformat data between the formats required for communication with the host and communication over the network.

2.3 It is clear that any network device which can accept and execute commands (whether from the host or the network is immaterial at this point) must include means for interpreting and executing those commands. The network interface device of D1 can interpret and execute commands - see e.g. D1 column 4, lines 52 to 55. Moreover D1 emphasises that it is concerned with



carrying out operations securely (column 1, lines 8 to 15).

- 2.4 The skilled person is faced with the problem of how to provide the means for interpreting and executing the commands, as well as for carrying out other intrinsic functions of a network interface device such as formatting packets appropriately to be carried by the network and giving those messages to the network interface. In a system for carrying out secure operations, such as D1, it is clear that the skilled person must seek ways to make sure these means behave securely. It almost goes without saying that the skilled person will consider a digital processor executing programs as implementation means. The skilled person is clearly also aware that there are plural ways of executing programs, including interpreters. D2 offers a kind of interpreter, a "virtual machine" in the terms of the present application (compare e.g. column 6, lines 28 to 32 of the published application and D2 page 8, lines 26 to 29), which is particularly aimed at ensuring that the programs execute securely - see D2, page 2, lines 25 and 26, where it is stated that "it is virtually impossible using prior art tools to determine whether the downloaded program 103 will underflow or overflow its stack, or whether the downloaded program 103 will violate files and other resources on the user's computer." D2 is aimed at overcoming this problem. It is true that D2 is specifically concerned with the problem of ensuring the security of executing programs which have been received from a remote source, but that would not stop the skilled person from recognising this document's relevance to any environment in which the secure

execution of programs is of importance, and in particular to the network interface device of D1. Thus the skilled person would be motivated to use the virtual machine of D2 in the network interface device of D1.

2.5 The term "embedded", used in claim 1, merely means pre-loaded (for example in ROM or Flash memory), as compared to e.g. loaded from disk on device start-up. It is usual for the programs which execute the functions of peripheral devices such as network interface devices, which in this case would include the virtual machine of D2, to be "embedded".

2.6 The appellant has argued (see sections 5 and 6 of the appellant's submission of 23 March 2007) that the skilled person would not combine D1 and D2 and in particular not in a way which would lead to the claimed subject-matter. It is argued that the "SNAP" of D1 does not employ an interpreter in the sense that that word is used in the application. However the board considers, for the reasons given in point 2.4 above, that the skilled person would be motivated to replace the means for executing programs in D1, whatever they are, by the interpreter and other elements of the virtual machine disclosed in D2. Thus it is of no significance that D1 does not disclose an interpreter in the sense of the application.

The appellant further argues that D2 does not use the term "secure" for its interpreter and that its teaching is limited to solving problems of stack overflow and underflow rather than any general improvement in overall security. However the appellant also concedes

that stack overflow and underflow is a security issue; the board considers that the skilled person would recognise this and therefore also recognise the relevance of the teaching of D2 to D1.

The appellant also suggests that stack over- and underflow is not a problem in D1 (points 6.2 and 8 of the appellant's submission). The board does not follow this argument; even if the programs which run in the network interface device of D1 come from an absolutely trusted source there is always the danger of insecure behaviour as a result of software bugs and the skilled person is only too aware of this.

It is further mentioned that D2 concerns programs downloaded over a network. The board has already given its reasons for considering that this is not relevant (point 2.4 above).

2.7 Hence the subject-matter of the independent claim of both the main and the first auxiliary request does not involve an inventive step and these requests are in consequence not allowable.

### 3. *The second auxiliary request*

3.1 Added subject-matter (Article 123(2) EPC)

3.1.1 The subject-matter of the present independent claim is disclosed by claim 1 as originally filed in combination with Fig. 4, column 6, lines 40 to 49, column 7, lines 2 to 12 and column 8, lines 45 to 56 of the application as published. The board notes that the term "virtual machine" appears only to be used in the

application as filed in combination with "Java". However it considers that the reference at column 7, lines 4 to 12 to the use of other "robust environments" for the implementation of the invention would be understood by the skilled person as meaning that it encompassed other virtual machines.

3.1.2 The dependent claims are based directly on original claims with amendments to make the terminology compatible with claim 1 (see the "manuscript copy" filed on 15 September 2006).

3.1.3 The only amendments to the original description are an acknowledgement of the cited prior art and a statement of invention brought into line with the claims.

3.1.4 The board concludes that the requirements of Article 123(2) EPC are satisfied.

### 3.2 Clarity

3.2.1 Claim 1 of this request includes, as do the independent claim of all requests, a "virtual machine". The skilled person would understand a virtual machine to be a self-contained operating environment within a computer which behaves as if it were a separate computer. However the description includes the possibility that the downloaded instructions may be performed directly by the processing unit (column 4, lines 44 and 45) and also that the "virtual machine" may be implemented by "JavaOS", an operating system, running on a "Sun Java chip" (column 7, lines 30 to 35). These passages imply that in at least some cases the "virtual machine" is in

fact the real machine with an appropriate operating system.

The board considers that the idea of designing processors to execute directly code which is normally interpreted, such as Pascal p-code (a spiritual ancestor of Java byte-code) or Forth, is an old one. The skilled person would therefore be aware that the use of the expression "virtual machine" would not normally be intended to exclude an implementation as a "real" machine. This feature of the claims is therefore clear.

3.2.2 The terms "secure", "safe" and "reliable" are relative; absolute security, safety or reliability is a mirage. The skilled person would understand these terms in their context to relate to a system in which special steps of whatever kind have been taken to improve these qualities as compared to a system in which no such steps have been taken. The board therefore considers the use of these terms to be clear in this particular case.

3.2.3 Further objections of lack of clarity which were raised during the appeal procedure do not apply to the present claims. The board therefore considers that the requirement of Article 84 for clarity is satisfied.

3.3 Novelty and inventive step

3.3.1 A conventional network interface device as known to the skilled person at the present priority date would contain programs to execute a limited set of commands given to it by its host network station or received

over the network (connection requests for example), and to carry out the normal network interface functions of formatting and dispatching data, etc.. These programs would normally be stored in read-only or non-volatile memory ("firmware"). They would either not be modifiable at all in normal use (which would probably be the case in D1, given that the requirement for security extends to misuse by the network station user), or at most they would be modifiable in the form of an upgrade initiated by and under control of the host.

3.3.2 Independent claim 1 includes the feature, "wherein said virtual machine allows the network interface to safely and reliably contain state information or code from said network." The present invention thus allows the behaviour of the network interface device to be modified directly over the network, without the host being involved, by giving it state information or code from a remote source. In the board's view the skilled person would not in general consider such a possibility; if presented with it in the context of a conventional network interface device without special security features, the dangers would immediately be apparent, and it would be rejected as a practical course of action. The invention overcomes the potential dangers (at least to some extent) by its use of security features for "secure program execution".

3.3.3 Thus while a combination of D1 and D2 would make the invention possible, in the board's view it would not occur to the skilled person to configure this combination "to safely and reliably contain state information or code from said network," because it would be alien to the way in which he or she would

normally consider the function of a network interface device. In other words the skilled person would be technically prejudiced against the claimed subject-matter.

3.3.4 The board therefore concludes that the subject-matter claimed is novel and involves an inventive step.

3.4 No other objections which would apply to this request have been raised, nor are any apparent to the board. The board concludes that this request is allowable.

4. Since the second auxiliary request is allowable it is not necessary to discuss the third auxiliary request.

5. *Refund of the appeal fee*

5.1 The appellant alleged that several procedural violations took place during examination, the circumstances of which can be summarised as follows.

5.1.1 According to the appellant's statement of grounds of appeal the examining division failed to comply with the requirements of Rule 51(3) EPC by making significant changes in its position without acknowledgement or justification in its second and third communications, by dismissing without proper consideration important arguments raised by the appellant in the second communication and by linking the inventive step requirement (Article 56 EPC) with Rule 27(1)(b) EPC in a manner completely contrary to EPO law and practice. It further submitted that the oral proceedings held by the examining division even though the appellant had withdrawn its request had no legal basis.

- 5.1.2 In its submissions dated 23 March 2007 the appellant further stated that contrary to the assumptions of the board as set out in its communication of 15 May 2006 the appellant's arguments did not concern a violation of Article 113 EPC but rather violation of Articles 125, 96 and 116 EPC. More precisely it contested on two specific issues the preliminary opinion expressed by the board that no procedural violation had taken place.
- 5.1.3 Firstly the fact that the examining division did not identify the relevant passages in D2 deprived the appellant of a complete knowledge of the case and generated uncertainty which caused additional work and expense. In the appellant's view this would have resulted in a violation of Article 113 EPC if the examining division had relied on these "more relevant" parts in the oral proceedings but since it did not the issue rather amounted to a breach of Article 125 EPC insofar as there was a lack of compliance with the general principle that a party was entitled to hear the complete case against it.
- 5.1.4 Secondly the appellant submitted that the examining division had changed its reasoning dramatically in the summons to oral proceedings. In such circumstances the division should not have appointed oral proceedings at that stage but rather issued a new communication pursuant to Article 96 EPC. The opportunity for an applicant to comment on and answer new reasoning during oral proceedings does not offer the same advantages as a written communication, this opportunity being potentially limited by the provisions of Rule 71a(2) EPC.



5.1.5 The appellant further paraphrased the board's view as being that "a procedural violation is not 'substantial' if the applicant does not suffer significant damage as a result of this particular violation," (appellant's submission of 23 March 2007, point 13.1). It was submitted that this view must be incorrect because such a principle would leave it to the discretion of the EPO whether or not to follow the procedure set out in the EPC as long as the decision reached was correct.

5.2 According to Rule 67 EPC reimbursement of the appeal fee shall be ordered where the board deems an appeal to be allowable, if such reimbursement is equitable by reason of a substantial procedural violation.

5.2.1 In its final written submissions the appellant argued that it had not heard the full case against it because the examining division mentioned passages in D2 without specifying which and changed its reasoning in the summons to oral proceedings without issuing a further communication pursuant to Article 96 EPC. In the appellant's view this is not a violation of Article 113 EPC but of Articles 125 and 96 EPC and, to put it in a more general way, the department of first instance did not abide by the procedural law of the EPC.

First the board notes that Article 125 EPC *per se* does not provide any direct provision but refers to "principles of procedural law generally recognised in the Contracting States," to be taken into account "in the absence of procedural provisions in [the EPC]." The principle explicitly mentioned by the appellant, the right to hear the full case against it, seems to the

board to be nothing other than the principle enshrined in Article 113 EPC, according to which "decisions of the European Patent Office may only be based on grounds or evidence on which the parties concerned have had an opportunity to present their comments." As the appellant concedes this principle was not violated since the examining division did not use any previously unquoted passages of document D2 in its decision. Rather the actual complaint of the appellant concerns the way in which the examining division acted and exercised its discretionary powers, allegedly making it difficult for the appellant to make its case, thus causing the appellant considerable additional work and expense.

Article 96 EPC requires from the department of first instance that it offers the applicant the opportunity to comment on its observations "as often as necessary". However this article and Rule 51 EPC leave the examining division discretion to assess when such an opportunity is "necessary". Thus the "right" or "wrong" application of this provision depends on the context of the case. According to the established case law (see for example T 201/98, not published, at point 1 of the Reasons, or T 640/91, OJ 1994, 918, at point 4) a board of appeal should overrule the way in which the department of first instance has exercised its discretion in a decision in a particular case if the board comes to the conclusion that the department of first instance did so according to the wrong principles, without taking into account the right principles, or in an unreasonable way.

Among these principles compliance with Article 113 EPC is by far the most important. However, ceding that this principle was complied with, the appellant is reduced to a complaint that it faced additional work and expense, without showing that any such additional work was so unusual or exaggerated that it could be said to cause damage. The appellant, in the clear expectation that the application would be refused, chose not to attend the oral proceedings appointed by the examining division - see the appellant's fax of 9 March 2005. Whether the refusal would subsequently be based on the arguments put forward in the communication accompanying the summons to oral proceedings, as they in fact were, or on other considerations was immaterial at that stage since the appellant chose not to attend. Equally in preparing grounds of appeal it was clearly unnecessary for the purposes of overcoming the reasons for the decision to refuse the application even to mention the fact that at one stage in the procedure passages of document D2 had been referred to without being identified. The decision to raise this point and to do any additional work involved was that of the appellant alone. Thus there is no concrete fact which can lead the board to conclude that there was an unreasonable or wrong exercise of discretion on the part of the examining division.

- 5.2.2 Turning now to the question of whether and when the examining division considers it expedient to hold oral proceedings and put an end to the written phase of the procedure, the appellant argues that since it had changed its reasoning the department of first instance should not have issued a summons to oral proceedings but rather have issued a new communication with a time

limit for written response. In the present case, even if the board agrees that the examining division's arguments in the communication accompanying the summons to oral proceedings represented a fundamental change in the reasons for rejecting the application, it notes that the appellant maintained its previous arguments in its written response to the summons, simply adding its conviction that the Board of Appeal would follow them. When it withdrew its request for oral proceedings two other courses of action were possible. On the one hand the appellant might have been of the opinion that the interval between the issuance of the summons and the date set according to Rule 71a(1) EPC was too short for the preparation of a proper response. If the appellant believed this to be the case it had the right to draw the examining division's attention to the fact that it needed more time to file appropriate requests and arguments to overcome the new objections. Nobody can now say what would have happened if the appellant had followed this course of action. If on the other hand, as seems more likely, there was enough time to prepare a detailed response, it was still possible to attempt to overcome the deficiencies standing in the way of grant of a patent. The appellant chose neither of these options, preferring to make its case first in appeal. Thus, referring to the established case law, the appellant made no serious attempt to overcome the objections which had been raised (see for example T 89/93, not published, at point 9). In the absence of reaction at that stage, the appellant cannot argue that it was not in a position to hear the full case against it.

5.2.3 As to the second alleged procedural violation, the examining division's choice to hold the oral proceedings despite its changed arguments and the appellant's withdrawal of its request, the appellant argued that there was no legal basis for holding the oral proceedings under these circumstances.

In response it is sufficient to note that Article 116 EPC provides that oral proceedings may be initiated by the EPO when it is expedient to do so and to cite point 3) of the communication dated 8 February 2005 accompanying the summons to oral proceedings, where the examining division explained that it considered it expedient to schedule oral proceedings at that stage ("The examining division considers it procedurally efficient in this case to issue a summons to Oral Proceedings in order to conclude the proceedings.") Maintaining the date for oral proceedings was a course of action taken by the examining division within the discretion conferred upon it by the EPC. The choice of the appellant not to file new arguments or requests makes it impossible to conclude now that the examining division misused that discretion.

5.2.4 For the sake of completeness, even if the board had concluded that there was a procedural violation it would not have ordered a refund of the appeal fee since Rule 67 EPC requires that the refund must be equitable by reason of a substantial procedural violation. The course of action taken by the examining division was not detrimental to the case of the appellant and had no effect upon the decision - see, in the same line, decisions T 712/97 at point 2 and T 682/91 at point 4, neither published. In addition the reimbursement would

not be equitable because the appellant made no serious attempt to overcome the objections raised in the summons to oral proceedings and did not use the opportunities available to exercise fully its right to be heard; hence it contributed to the alleged procedural violation - see for instance J 18/96, OJ 1998, 403.

5.2.5 As to the other complaints set out in the grounds of appeal, they all concern the assessment of substantive issues by the examining division. Such issues are not a matter of procedural violation but rather a proper matter for appeal against the findings of the decision (for instance T 144/94, unpublished, at point 4).

5.3 For these reasons the request for refund of the appeal fee is refused.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The request for reimbursement of the appeal fee is refused.
3. The case is remitted to the department of first instance with the order to grant a patent on the basis of the second auxiliary request.

The Registrar

The Chairman

D. Magliano

A. S. Clelland