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Datasheet for the decision
of 17 April 2020

Case Number:	T 1739/18 - 3.5.05
Application Number:	13832887.7
Publication Number:	2888838
IPC:	H04L12/28, H04L9/00, G06F9/455, G06F9/50
Language of the proceedings:	EN

Title of invention:
A FRAMEWORK FOR NETWORKING AND SECURITY SERVICES IN VIRTUAL NETWORKS

Applicant:
VMware, Inc.

Headword:
Services in virtual network/WMware

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:

Case Number: **T 1739/18 - 3.5.05**

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 17 April 2020

Appellant: VMware, Inc.
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Representative: Appleyard Lees IP LLP
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted on 9 February 2018 refusing European patent application No. 13832887.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair A. Ritzka
Members: P. Cretaine
D. Prietzel-Funk

Summary of Facts and Submissions

I.   This appeal is against the decision of the examining
        division, posted on 9 February 2018, refusing
        European patent application No. 13832887.7. The
        application was refused for lack of inventive step
        (Article 56 EPC) of a main and an auxiliary request
        over the disclosure of

        D1: US 2011/0022694.

        The following document is cited in the description:

        "Scalable Cloud Networking with CISCO Nexus 1000V
        Series Switches and VXLAN", CISCO, Inc., White Paper,
        2012. This document will be denominated "CISCO paper".

II.   Notice of appeal was received on 6 April 2018 and the
        appeal fee was paid on the same day. The statement
        setting out the grounds of appeal was received on
        18 June 2018. The appellant requested that the decision
        under appeal be set aside and that a patent be granted
        on the basis of the main request or the auxiliary
        request on which the decision was based. It also
        requested oral proceedings as an auxiliary measure.

III.   A summons to oral proceedings was issued on
        2 March 2020. By notification sent on 8 April 2020, the
        board informed the appellant that the oral proceedings
        were cancelled.

IV.   Claim 1 of the main request reads as follows:

        "A virtual infrastructure (102), comprising:

a plurality of hosts (110, 114) each having a virtual
machine (105) executing therein and a virtual switch
(130) in a virtual network (132); and
a virtual machine management server, VMMS (125),
characterised in that the VMMS (125) is configured to:
receive a service definition from a network service
(150) offered for a physical network, the service
definition including information about the network
service (150) and configuration instructions for
configuring a host (110) of the plurality of hosts
(110, 114) to use the network service (150);
create one or more service profiles for the network
service (150) based on the service definition of the
network service (150), each of the one or more service
profiles including the information about the network
service (150) and the configuration instructions, and
including parameters of the network service (150) for
use on a virtual machine (105) of said plurality of
virtual machines (105);
register the network service (150) by adding the one or
more service profiles to a directory (170) of network
services, the directory (170) indicating whether the
service profile is available to the virtual machines
(105); and
in response to receiving a selection of the service
profile from the directory (170) and a selection of one
of the virtual machines (105), enable the network
service (150) for the selected virtual machine (105) by
using the configuration instructions to configure the
virtual switch (130) of the host (110) of the selected
virtual machine (105) with rules and/or filters that
forward packets from the selected virtual machine (105)
to the network service (150) of the selected service
profile."

The main request comprises further independent claims directed to a corresponding computer-readable storage medium (claim 7) and a corresponding method of registering a network service on a virtual network (claim 11).

Due to the outcome of the appeal, there is no need to give details of the claims of the auxiliary request.

Reasons for the Decision

1.   The appeal is admissible (see point II above).

2.   Prior art

2.1   D1 describes a virtual lab (see [0003]) which enables application development and test teams to create and deploy network configurations. D1 addresses, inter alia, the issue that two virtual machines (VMs) should not be instantiated with the same IP address on a local area network (see [0004]). Figure 1 shows hosts 106 supporting VMs 108. The virtual infrastructure 102 is managed by the virtual infrastructure server 104 (see [0022]). A virtual lab server 112 (see [0025]) manages and deploys virtual machine configurations into the hosts 106. Figure 7 shows how the virtual lab configuration 712 is created, by bringing a network template 708, which is a specification of network settings, together with a VM template 710 which specifies information relevant to a particular virtual machine (see [0042] to [0044]). Thus, each VM is configured with proper VM network connectivity, including specifically assigned local IP addresses for each VM, thereby avoiding the resource contention issue

of two VMs having the same local IP address. A default
gateway (see [0034], 802 in Figure 8) is an element of
network information which is derived from the relevant
VM template 710 for each VM 108 (see [0034]). The
default gateway is determined by the primary Network
Interface Controller NIC setting for the virtual
machine and ais identified by the public IP address
10.6.1 in Figure 8. The default gateway is thus a
network configuration of the virtual machine, and not a
configuration of the host, that makes it possible to
allow the virtual machine to reach a wider network,
e.g. the internet.

2.2   The CISCO paper discloses a further development of the
        VLAN standard IEEE802.1Q, denominated "VXLAN", aimed at
        expanding the scalability of a virtual network beyond
        the limit imposed by the 12-bit VLAN ID. In this
        scheme, the original packet issued by a virtual
        machine, i.e. the original Ethernet frame, is
        encapsulated with an additional outer wrapper (see
        VXLAN Encapsulation in Figure 1). For VXLAN traffic to
        use network services on physical devices, such as a
        physical firewall, the traffic needs to go through a
        VXLAN gateway, as shown in Figure 4. However, the
        original destination and source addresses (Inner MAC DA
        and Inner MAC SA, respectively, in Figure 1) are now
        hidden within the original Ethernet frame and obscured
        by the encapsulation layer. Inspecting the presented
        outer destination and source addresses (Outer MAC DA
        and Outer MAC SA, respectively, in Figure 1) thus does
        not reveal the original inner destination or source
        addresses. As a result, the packet may pass through the
        network according to the outer addresses of the
        encapsulation and, in doing so, it bypasses the network
        services on the underlying physical network.
        Conversely, the virtual machines in the virtual network

may be unaware of the existence of the network services
because the network services are not addressable by the
VXLAN encapsulation and thus not visible for the
virtual machines.

3.   Inventive step

3.1   D1 was considered as the closest prior art in the
        impugned decision.

        The constitutive elements of the virtual infrastructure
        defined in the preamble of claim 1 were read onto the
        elements of the virtual lab of D1, shown in Figure 1.
        In particular, the hosts of claim 1 were read into the
        hosts 108 of D1, the virtual machine of claim 1 was
        read into a virtual machine 108 of D1, and the virtual
        machine management server (VMMS) was read onto the
        virtual lab server 112 of D1.

        The board agrees with the appellant that none of the
        characterising features of claim 1 is disclosed in D1.
        These features specify that the virtual machine
        management server is configured to:

        (a) receive a service definition from a network service
        offered for a physical network, the service definition
        including information about the network service and
        configuration instructions for configuring a host of
        the plurality of hosts to use the network service;

        (b) create one or more service profiles for the network
        service based on the service definition of the network
        service, each of the one or more service profiles
        including the information about the network service and
        the configuration instructions, and including

parameters of the network service for use on a virtual
machine of the plurality of virtual machines;

(c) register the network service by adding the one or
more service profiles to a directory of network
services, the directory indicating whether the service
profile is available to the virtual machines; and

(d) in response to receiving a selection of the service
profile from the directory and a selection of one of
the virtual machines, enable the network service for
the selected virtual machine by using the configuration
instructions to configure the virtual switch of the
host of the selected virtual machine with rules and/or
filters that forward packets from the selected virtual
machine to the network service of the selected service
profile.

The impugned decision interpreted the gateway, also
denominated "default gateway", mentioned in D1 in
paragraphs [0034], [0041], [0050], [0059] and [0062]
and shown in Figures 7 and 8, as a network service.
However, the board shares the view of the appellant
that the default gateway does not represent a network
service in the context of the whole application.
Indeed, it was common knowledge at the priority date of
the application in 2012 that every network device with
access to the outside world is configured with a
gateway address. In a VLAN, the gateway is the "next
hop" address of a router for packets with destination
addresses outside the local network segment, so that a
virtual machine can send packets to the gateway router,
which then forwards them and makes it possible for them
to be routed out to the wider network, such as the
internet. On the other hand, a network service is a
functionality provided by an entity in the network to

computers which have access to the network, for
instance through a gateway. This common understanding
is used throughout the disclosure of the application,
wherein a non-exhaustive list of examples consisting in
load balancers, firewalls and virus scanners is
recurrently mentioned in the description.

On the contrary, the default gateway in D1 is a
configuration of the virtual machine - not a
configuration of the host computer - which allows the
virtual machine to reach a wider network. The default
gateway is clearly defined in paragraph [0034] of D1 as
an element of network information which is determined
by the primary NIC setting for the virtual machine and
identified by a public IP address.

Therefore, the presence of a network service which
announces its own existence itself to the virtual
machine management server of the virtual network, as
defined in feature (a), is not disclosed in D1. Also,
neither the creation of service profiles nor their
registration in a directory by the virtual machine
management server, as defined in features (b) and (c),
are to be found in D1. Given that there is no directory
of network services in D1, there can be no selection
from it as defined in feature (d).

3.2   The technical effect of the characterising features (a)
        to (d) of claim 1 is that the network services offered
        on the physical network are now made available in a
        uniform manner for use by the virtual machines of the
        virtual network, and vice versa, and are managed by the
        VMMS 125 in relation to the ability and configuration
        of those services and to the needs of the VMs.

        The objective technical problem can therefore be

formulated as how to modify the system of D1 to include
a uniform method of allowing virtual machines in a
virtual network to consume network services
originally offered to physical networks.

D1 contains no explicit or implicit disclosure relating
to how network services originally offered to physical
networks could be enabled for use by VMs. As detailed
above, D1 only contains disclosures relating to
configuring VMs with specific network hardware-related
information, such as which primary NIC a particular VM
should use, and has no teaching relating to software
network services. The skilled person would thus find no
pointer in D1 towards the claimed solution.

For these reasons, the board holds that the subject-
matter of claim 1 involves an inventive step over the
disclosure of D1 (Article 56 EPC).

3.3   The CISCO paper, which was not addressed in the
       impugned decision, describes that some services are
       able to communicate with virtual networks of the VXLAN
       type, e.g. through the VXLAN Gateway mentioned in
       relation to Figure 4. However, this document does not
       provide a method for uniformly introducing and
       consuming network services within virtual networks,
       comprising, in particular, the announcement by a
       network service of its own existence itself to the
       virtual network management server, the creation of
       service profiles, their registration in a directory,
       and the configuration of the virtual switch of the host
       of the virtual machine by the virtual network
       management server, as defined by the characterising
       features of claim 1. The appellant plausibly argued
       that the virtual infrastructure defined in claim 1,
       when applied to a VXLAN network, additionally solves

the "visibility" problem that, due to the encapsulation
of the Ethernet frame, the virtual network may be
unaware of services existing in the physical network.

For these reasons, the board holds that the subject-
matter of claim 1 also involves an inventive step over
the disclosure of the CISCO paper (Article 56 EPC).

3.4   Independent claims 7 and 11 contain the same features
       as claim 1 but expressed in terms of a computer-
       readable storage medium and a method, respectively.
       Therefore, these claims also meet the requirements of
       Article 56 EPC. Claims 2 to 6, 8 to 10 and 12 are
       dependent claims and, as such, also meet the
       requirements of Article 56 EPC.

Order

For these reasons it is decided that:

1.   The decision under appeal is set aside.

2.   The case is remitted to the examining division with the
        order to grant a patent on the basis of the following
        documents:
        - Claims 1 to 12, filed as the main request by letter
          dated 11 December 2017;
        - Description:
          -   pages 5 and 7 to 9 as originally filed;
          -   pages 1 to 4, 6 and 10 as filed by letter dated
              11 December 2017;
        - Drawing sheets 1/2 to 2/2 as originally filed.

The Registrar: The Chair:

C. Rodriguez Rodriguez   A. Ritzka

Decision electronically authenticated