UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/010,316	08/26/2013	Christos KARAMANOLIS	B492	9527

152569 7590 12/31/2019

Patterson + Sheridan, LLP - VMware
24 Greenway Plaza
Suite 1600
Houston, TX 77046

EXAMINER
YEW, CHIE W

ART UNIT	PAPER NUMBER
2131	

NOTIFICATION DATE	DELIVERY MODE
12/31/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ipadmin@vmware.com
psdocketing@pattersonsheridan.com
vmware_admin@pattersonsheridan.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHRISTOS KARAMANOLIS, MANSI SHAH, and NATHAN BURNETT

Appeal 2018-004213[1]
Application 14/010,316
Technology Center 2100

Before MAHSHID D. SAADAT, ERIC S. FRAHM, and JOHN A. EVANS, *Administrative Patent Judges*.

FRAHM, *Administrative Patent Judge*.

DECISION ON APPEAL

---

[1] Throughout this opinion, we refer to: (1) the Final Office Action mailed July 12, 2017 ("Final Act."); (2) the Appeal Brief filed November 30, 2017 ("Appeal Br."); (3) the Examiner's Answer mailed January 12, 2018 ("Ans."); and (4) the Reply Brief filed March 12, 2018 ("Reply Br."). An Oral Hearing for this appeal scheduled for December 6, 2019, was waived.

STATEMENT OF CASE

Introduction

Appellant[2] appeals under 35 U.S.C. § 134(a) from a Final Rejection of claims 1–22. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

Appellant's Disclosed and Claimed Invention

Appellant's disclosed invention pertains to "Virtual Disk Blues for a Virtualized Storage Area Network" (Title), and specifically to a distributed storage system that allows multiple clients to access a pool of shared network resources (*see* Spec. ¶ 2). Appellant's disclosed and claimed invention provides improved mapping of virtual disks using virtual disk blueprints (*see* Spec. ¶¶ 2–5; claims 1, 10, 17).

Exemplary Claim

Exemplary claim 1 under appeal, with bracketed lettering and emphases added to key portions of the claim at issue, reads as follows:

> 1. A method for storing a virtual disk in an object store comprising a plurality of physical storage devices, each physical storage device residing in or directly attached to one of a plurality of host computers, the method comprising:
>
> receiving a profile for creation of the virtual disk, wherein the profile specifies storage properties desired for an intended use of the virtual disk;
>
> [A] *generating <u>a virtual disk blueprint</u> based on the profile, wherein the virtual disk blueprint describes a storage*

[2] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. "The word 'applicant' when used in this title refers to the inventor or all of the joint inventors, or to the person applying for a patent as provided in §§ 1.43, 1.45, or 1.46." 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as VMware, Inc. (Appeal Br. 3).

> *organization for the virtual disk that addresses redundancy or performance requirements corresponding to the profile*;
>
> [B] *creating component objects that are backed by the physical storage devices, according to the virtual disk blueprint*; and
>
> updating metadata associated with the virtual disk to indicate that the component objects are each a part of the virtual disk.

Appeal Br. 18, Claims Appendix (emphases and bracketed lettering added).

The Examiner's Rejections

(1) The Examiner rejected claims 3, 12, and 18 under 35 U.S.C. § 112(d) as failing to further limit the subject matter claimed, i.e., the subject matter recited in independent claim 1. Final Act. 4–5. Because the Examiner has withdrawn the § 112 rejection (Ans. 2, 3), we will not address this rejection or Appellant's arguments (*see* Appeal Br. 10–11) directed thereto.

(2) Claims 1–6, 10–13, and 17–19 are rejected under 35 U.S.C. § 103 as being unpatentable over Burnett et al. (US 2005/0166011 A1; published July 28, 2005) (hereinafter, "Burnett"), Mogi et al. (US 2004/0054648 A1; published March 18, 2004) (hereinafter, "Mogi"), and Emaru et al. (2012/0005435 A1; published January 5, 2012) (hereinafter, "Emaru"). Final Act. 6–27.

(3) Claims 4, 7–9, 14–16, and 20–22 are rejected under 35 U.S.C. § 103 as being unpatentable over the base combination of Burnett, Mogi, and Emaru taken with various tertiary references (*e.g.*, Bailey, Bitner, and/or Rego). Final Act. 27–34.

Appellant's Contentions

Appellant primarily argues the merits of independent claims 1, 10, and 17 as a group (*see* Appeal Br. 12–15; Reply Br. 2–6), and relies on these arguments as to the patentability of all remaining claims 2–9, 11–16, and 18–22 (*see* Appeal Br. 15–17; Reply Br. 6). As to independent claim 1, Appellant contends (Appeal Br. 12–15; Reply Br. 2–6) that the Examiner erred in rejecting claim 1 under 35 U.S.C. § 103, because, *inter alia*, the base combination of Burnett, Mogi, and Emaru fails to disclose, teach, or suggest limitations A and B, as recited in claim 1. Specifically, Appellant argues that (i) Mogi fails to disclose generating a *virtual disk blueprint* as set forth in limitation A of claim 1 (Appeal Br. 13–14; Reply Br. 4–5); and (ii) Emaru fails to disclose creating *component objects* as set forth in limitation B of claim 1 (Appeal Br. 14–15; Reply Br. 2–4). Based on Appellant's arguments, and because claims 2–6, 10–13, and 17–19 contain commensurate limitations, we select claim 1 as representative of claims 1–6, 10–13, and 17–19 rejected over the base combination of Burnett, Mogi, and Emaru. For similar reasons, we decide the outcome of claims 4, 7–9, 14–16, and 20–22, which ultimately depend from independent claims 1, 10, and 17, and the same basis as claim 1.

Principal Issue on Appeal

Based on Appellants' arguments in the Appeal Brief (Appeal Br. 12–17) and the Reply Brief (Reply Br. 2–6), the following principal issue is presented on appeal:

Did the Examiner err in rejecting claims 1–22 as being unpatentable over the base combination of Burnett, Mogi, and Emaru because the combination fails to teach or suggest:

(i) "generating a virtual disk blueprint" as recited in limitation A of claim 1; and/or

(ii) "creating component objects" as recited in limitation B of claim 1?

ANALYSIS

We have reviewed the Examiner's obviousness rejections (Final Act. 6–32) in light of Appellant's arguments in the Appeal Brief (Appeal Br. 12–17) that the Examiner has erred. We disagree with Appellant's arguments. With regard to representative independent claim 1, we adopt as our own (1) the findings and reasons set forth by the Examiner in the action from which this appeal is taken (Final Act. 6–11), and (2) the reasons set forth by the Examiner in the Examiner's Answer (Ans. 3–7) in response to Appellant's Appeal Brief. We concur with the findings and conclusions reached by the Examiner, and we agree with the interpretations and explanations for the meanings of the recited "virtual disk blueprint" (*see* claim 1, limitation A) and "component objects" (*see* claim 1, limitation B) set forth by both Appellant (*see* Reply 2–5) and the Examiner (*see* Final Act. 6, 9–11; Ans. 3–7), with the exception that we do not agree with the Examiner that "the instant specification does not appear to explicitly provide a definition for 'virtual disk blueprint'" (Ans. 3). However, even using Appellant's asserted definition for virtual disk blueprint (Reply Br. 4–5), we find Mogi teaches or suggests a virtual disk blueprint as set forth in limitation A of claim 1. And, using either or both claim interpretations provided by Appellant (Reply Br. 2–4) and the Examiner (Ans. 6–7) for "component objects," we find the combination of Mogi and Emaru teaches

or suggests creating component objects as set forth in limitation B of claim 1. We provide the following for emphasis only.

Claim 1, Limitation A – Generating a Virtual Disk Blueprint

On its face, limitation A in claim 1 requires that a virtual disk blueprint: (i) be based on a profile received for creation of a virtual disk (*see* claim 1); (ii) "describe[] a storage organization for the virtual disk that addresses redundancy or performance requirements corresponding to the profile" (claim 1, limitation A); and (iii) used to "creat[e] component objects" (claim 1, limitation B).

Appellant (Fig. 2, 200; Spec. ¶ 16, 18), Emaru (¶ 4), and Mogi (Fig. 5, 426) all arrange objects in Redundant Array of Independent/Inexpensive Disks (RAID) memories having predetermined data structures. Such RAID arrangements store the same data in different places on multiple disks in order to protect data in case of a drive failure, and can provide redundancy and lower costs in recovering data.

Appellant contends (Reply Br. 4–5) the term "virtual disk blueprint" is defined in paragraph 16 of the Specification, and under that definition Mogi does not disclose generating a virtual disk blueprint as set forth in limitation A of claim 1. Although we agree with Appellant (*see* Reply Br. 5) that the Specification describes a virtual disk blueprint as "metadata describing a storage organization or configuration for the virtual disk (sometimes referred to herein as a virtual disk 'blueprint') that suits the storage requirements or service level agreements (SLAs) in a corresponding storage profile or policy (e.g., capacity availability, IOPs, etc.)" (Spec. ¶ 16), we agree with the Examiner (Final Act. 7–11; Ans. 3–5) that the

combination of Burnett, Mogi, and Emaru teaches or suggests generating such a virtual disk blueprint as recited in claim 1.

Specifically, Mogi controls mirroring by providing a "schema" of the database to system management servers (Mogi ¶ 15), and uses database setting information 450 and structure setting information 420 (which in turn is based on topology information 360, storage unit configuration information 362, and virtualization function management information 366) to control the configuration of the virtual data structure for optimum efficiency while satisfying the required conditions and functions (*see* Mogi ¶¶ 106, 107). The Examiner finds (*see* Final Act. 9; Ans. 3–5), and we agree, that Mogi's schema, database setting information, and structure setting information teach or suggest the recited virtual disk blueprint. And, although we agree with the Examiner that "[i]t is inherent that logical volumes would on the lowest level be backed by physical devices" (Ans. 5, 6; *see also* Final Act. 10), Emaru teaches or suggests storing a virtual disk in an object store having plural physical storage devices as claimed. Specifically, Emaru discloses a pool configured of multiple logical volumes divided into pages and page groups and "based on one or more physical storage devices which the storage apparatus comprises (e.g., RAID (Redundant Array of Independent (or Inexpensive) Disks" (Emaru ¶ 4).

As a result, the Examiner finds (Final Act. 9–10; Ans. 3–5), and we agree, that *the combination* of Burnett, Mogi, and Emaru teaches or suggests generating a virtual disk blueprint as set forth in limitation A of claim 1.

In this light, Appellant's contentions (Appeal Br. 13–14; Reply Br. 5) that Mogi fails to disclose, teach, or suggest generating a virtual disk blueprint are unpersuasive.

Claim 1, Limitation B – Creating Component Objects

On its face, limitation B in claim 1 requires that component objects (i) be created; and be "backed by the physical storage devices, according to the virtual disk blueprint" (*see* claim 1, limitation B).

Appellant contends (Reply Br. 3–4) the term "component object" is defined in paragraphs 16 and 18 of the Specification, and under that definition Emaru does not disclose the component objects set forth in limitation B of claim 1. Although we agree with Appellant (*see* Reply Br. 3) that the Specification (*see* Spec. ¶¶ 16, 18) describes component objects as "stripes" corresponding to data partitions of a virtual disk, we are not persuaded by Appellant's contentions (*see* Appeal Br. 14–15; Reply Br. 3–4) that Emaru's disclosure of a "pool" is not equivalent to the component objects set forth in limitation B of claim 1 (*see* Appeal Br. 14 citing Emaru ¶¶ 4, 132; Reply Br. 3 citing Emaru ¶ 132). Instead, we agree with the Examiner (Final Act. 10–11) that Emaru (*see* ¶¶ 4, 132) discloses a pool configured of multiple logical volumes divided into pages and page groups that is equivalent to Appellant's recited component objects (claim 1, limitation B) containing "stripes" (Spec. ¶ 18).

In this light, Appellant's contentions (Appeal Br. 14–15; Reply Br. 2–4) that Emaru fails to disclose, teach, or suggest component objects, and thus the base combination of Burnett, Mogi, and Emaru fails to teach or suggest creating component objects as set forth in limitation B of claim 1, are unpersuasive.

Summary

Appellant has not shown the Examiner erred in rejecting claims 1–22 as being unpatentable under 35 U.S.C. § 103. In view of the foregoing, we

sustain the obviousness rejection of representative claim 1, as well as claims 2–6, 10–13, and 17–19 grouped therewith as being obvious over the base combination of Burnett, Mogi, and Emaru. For similar reasons, and because (i) Appellant relies on the arguments presented as to claims 1, 10, and 17 in arguing dependent claims 7–9, 14–16, and 20–22; and (ii) claims 7–9, 14–16, and 20–22 ultimately depend from respective ones of claims 1, 10, and 17, we also sustain the remaining three obviousness rejections of claims 7–9, 14–16, and 20–22 over the base combination taken with various additional references.

CONCLUSION

For all of the reasons above, we hold as follows:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed	Withdrawn
3, 12, 18	112(d)	Failure to further limit claims			3, 12, 18
1–6, 10–13, 17–19	102(a)(2)	Burnett, Mogi, Emaru	1–6, 10–13, 17–19		
7, 14, 20	103	Burnett, Mogi, Emaru, Bailey	7, 14, 20		
8, 9, 15, 16, 21, 22	103	Burnett, Mogi, Emaru, Bailey, Bitner	8, 9, 15, 16, 21, 22		
4	103	Burnett, Mogi, Emaru, Rego	4		
Overall Outcome			1–22		

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. §§ 41.50(f), 41.52(b) (2013).

AFFIRMED