



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. |
|--|-------------|----------------------|---------------------|------------------|
| 12/916,292 | 10/29/2010 | Daniel Juergen Gmach | 82264214 | 9322 |
| 56436 | 7590 | 11/01/2016 | EXAMINER | |
| Hewlett Packard Enterprise 3404 E. Harmony Road Mail Stop 79 Fort Collins, CO 80528 | | | SAXENA, AKASH | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2128 | |
| | | | NOTIFICATION DATE | DELIVERY MODE |
| | | | 11/01/2016 | 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):

hpe.ip.mail@hpe.com
mkraft@hpe.com
chris.mania@hpe.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DANIEL JUERGEN GMACH, CULLEN E. BASH,
JEROME ROLIA, YUAN CHEN,
THOMAS W. CHRISTIAN, AMIP J. SHAH,
RATNESH KUMAR SHARMA, and ZHIKUI WANG

Appeal 2015-006036
Application 12/916,292
Technology Center 2100

Before JOHN F. HORVATH, AMBER L. HAGY, and
KARA L. SZPONDOWSKI, *Administrative Patent Judges*.

SZPONDOWSKI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants¹ appeal 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Appellants identify the real party in interest as Hewlett-Packard Development Company, LP. App. Br. 3.

STATEMENT OF THE CASE

Appellants' invention is directed to generating a resource management plan for an infrastructure. Spec. ¶ 9. Claim 1, reproduced below with the disputed limitations in *italics*, is representative of the claimed subject matter:

1. A method for generating a resource management plan for an infrastructure, said method comprising:
 - a) determining a supply of resources available from a combination of available resource sources;
 - b) simulating, using a processor, an operation of the infrastructure in performing an objective using the determined supply of resources, wherein the simulation is *to simulate resource demand of a plurality of infrastructure components in performing the objective, wherein the resource demand is based at least upon historical demand determinations*;
 - c) determining at least one metric associated with operating the infrastructure based upon the simulation, *wherein the at least one metric comprises a central processing unit (CPU) violation penalty that measures a level of CPU violations based on a number of successive intervals in which a resource demand is not satisfied, and wherein the CPU violation penalty provides a penalty weight for each CPU violation based on an expected impact of each CPU violation on an end user*;
 - d) determining whether the at least one metric satisfies at least one predetermined goal;
 - e) modifying at least one of the resources supplied by the combination of available resource sources and the simulation of the resource demand of the plurality of infrastructure components in response to the at least one metric failing to satisfy the at least one predetermined goal; and
 - f) generating a resource management plan for the infrastructure that includes a mix of the resources supplied and the resource demand

that have been determined to result in the at least one metric satisfying the at least one predetermined goal.

REJECTIONS

Claims 1–6, 9–16, 19, and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Prith Banerjee et. al, *Sustainable Data Centers: Enabled by Supply and Demand Side Management*, ACM, DAC’09 July 26–31, at 884-887 (“Banerjee”), Huberman et al. (US 7,386,537 B2; issued June 10, 2008) (“Huberman”) and Korn et al. (US 2010/0114531 A1; published May 6, 2010) (“Korn”).

Claims 7 and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Banerjee, Huberman, Korn, and Li et al. (US 2011/0144818 A1; published June 16, 2011) (“Li”).

Claims 8 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Banerjee, Huberman, Korn, and Xiaoying Wang et al., *Virtualization-based autonomic resource management for multi-tier Web applications in shared data center*, The Journal of Systems and Software 81 at 1591–1608 (2008) (“Wang”).

ANALYSIS

After considering of each of Appellants’ arguments, we agree with the Examiner. We refer to and adopt the Examiner’s findings and conclusions as set forth in the Examiner’s Answer and in the action from which this appeal was taken. Ans. 3–9; Final Act. 2–14. Our discussions here will be limited to the following points of emphasis.

Issue 1: Did the Examiner err in finding the combination of Banerjee, Huberman, and Korn teaches or suggests “wherein the simulation is to simulate resource demand of a plurality of infrastructure components in performing the objective, wherein the resource demand is based at least upon historical demand determinations,” as recited in independent claim 1, and commensurately recited in independent claims 12 and 20?

Appellants contend “the Examiner has construed the ‘resources’ in Huberman as equivalent to the ‘resources’ recited in independent claim 1[,]” which is improper because the “resources” described in Huberman “pertain to computer systems, whereas the ‘resources’ in independent claim 1 pertain to resources supplied to infrastructure components, such as computer systems.” App. Br. 11; Reply Br. 6. Appellants further contend “the applications discussed in Huberman are not infrastructure components . . . because the applications are not physical components of an infrastructure, but instead, are software executed on computer systems.” App. Br. 10. Appellants argue the Examiner’s construction “would require the supply of computer systems to infrastructure components, which are hardware components In contrast, independent claim 1 recites that an operation of an infrastructure is simulated using a determined supply of resources, such as electricity and cooling resources, available to be supplied to infrastructure components, such as computer systems, servers, etc.” App. Br. 11.

We are not persuaded by Appellants’ arguments. “Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.” *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Thus, Huberman must

“be read, not in isolation,” as Appellants have done, “but for what it fairly teaches in combination with the prior art as a whole.” *Id.* The Examiner relies on Banerjee, not Huberman, to teach the claimed resources and infrastructure components. Final Act. 4–5, citing Banerjee pp. 884–885; Ans. 4. Specifically, Banerjee teaches “resources including IT, power and cooling,” and hardware, power, and cooling infrastructure. Banerjee pp. 884–885; *see* Ans. 4; *see also* Banerjee p. 885, referring to “computing, power, and cooling resources.” The Examiner relies on Huberman to teach the resource demand is based at least upon historical demand determinations. Final Act. 6, citing Huberman Fig. 4; Ans. 4. Thus, Appellants’ arguments, which are substantially directed to Huberman’s disclosure, do not persuasively address the Examiner’s reliance on Banerjee, nor the combination of Huberman with Banerjee as relied upon by the Examiner.

Moreover, Appellants’ arguments are not commensurate with the scope of claim 1 because claim 1 does not recite resources are limited to electricity and cooling resources. Appellants have not explicitly defined “resources” in the Specification. We do not find the Examiner’s construction that resources include IT (hardware and software), power, and cooling to be unreasonable under the broadest reasonable interpretation in light of Appellants’ Specification. *See* Ans. 4–6. Regardless, as described *supra*, Banerjee teaches power and cooling resources (Banerjee p. 884, Abstract), which Appellants do not dispute. *See* App. Br. 11; Reply Br. 7–8. Appellants also do not dispute that Banerjee teaches IT, power, and cooling infrastructures consuming such resources. Reply Br. 7. We therefore agree with the Examiner’s findings that the combination of Banerjee and Huberman teaches the disputed limitation.

Appellants further argue the Examiner's proposed modification to Banerjee "would result in a simulation in which computer systems are supplied to other hardware components, such as computer systems, which is clearly improper." App. Br. 11. Therefore, according to Appellants, the proposed modification would render Banerjee unsatisfactory for its intended purpose. App. Br. 12.

We are not persuaded by Appellants' arguments. "The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. . . . Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Moreover, Appellants' arguments do not persuasively address the Examiner's specific findings. The Examiner finds it would have been obvious to one of ordinary skill in the art to apply the teachings of Huberman to Banerjee because "Huberman teaches [the] importance of incorporating historical data into resource demand estimation and optimizing the resources so they are never in excess or short." Final Act. 7. The Examiner need only provide "some articulated reasoning with some rational underpinning to support [a] legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). We find the Examiner has done so here.

Accordingly, we are not persuaded the Examiner erred in finding the combination of Banerjee, Huberman, and Korn teaches or suggests the disputed limitation.

Issue 2: Did the Examiner err in finding the combination of Huberman, Banerjee, and Korn teaches or suggests “wherein the at least one metric comprises a central processing unit (CPU) violation penalty that measures a level of CPU violations based on a number of successive intervals in which a resource demand is not satisfied,” as recited in independent claim 1, and commensurately recited in independent claims 12 and 20?

The Examiner relies on paragraph 13 and Figures 2 and 3 of Korn to teach or suggest the disputed limitation. Final Act. 7. Appellants contend Korn “fails to disclose that the failure to provide the agreed upon number of CPU cycles is based upon a number of successive intervals in which a resource demand is not satisfied.” App. Br. 13. Appellants also contend “Korn fails to disclose that the CPU cycles are at all based on any interval in which a resource demand is not satisfied.” *Id.* Further, Appellants argue “a time window, e.g., 3 seconds, is merely a single time interval and cannot reasonably construed as a number of successive intervals.” App. Br. 13; *see also* Reply Br. 9. Appellants also argue the “3 seconds” in Korn pertains to the “maximum allowable response time for service requests” and not to the “CPU cycles.” Reply Br. 9.

We are not persuaded by Appellants’ arguments. Paragraph 13 of Korn describes that penalties may be assessed on a service provider for failure to meet service level objectives. Paragraph 13 further states:

In a general sense, the [service level objectives] represent the level of service contracted for by the customer and may include, for instance, the percentage service availability during a specified time window (e.g., 99.95% availability from 8:00 a.m.-11:00 p.m. EST Monday-Friday), the maximum allowable response time for service requests during the time window (e.g.,

3 seconds), etc. Other objectives may include average throughput, CPU cycles, etc.

As noted by the Examiner, Appellants have not defined an interval in the Specification, nor how many successive intervals are required for a violation. *See* Ans. 8. We agree with the Examiner that, under the broadest reasonable interpretation in light of the Specification, the described 3 seconds may be interpreted as “at least 3 successive intervals . . . wherein after that period there is a violation if the response time for a service request is not received.” Ans. 8. Moreover, given the description of a CPU violation penalty in Appellants’ Specification, we are not persuaded by Appellants’ argument that Korn’s 3-second interval does not apply to a CPU violation penalty. *See* Spec. ¶ 51 (“based on the number of successive intervals in which a workload’s demands are not fully satisfied”).

Accordingly, we are not persuaded the Examiner erred in finding the combination of Banerjee, Huberman, and Korn teaches or suggests the disputed limitation.

Issue 3: Did the Examiner err in finding the combination of Banerjee, Huberman, and Korn teaches or suggests “wherein the CPU violation penalty provides a penalty weight for each CPU violation based on an expected impact of each CPU violation on an end user,” as recited in independent claim 1, and commensurately recited in independent claims 12 and 20?

The Examiner relies on Figures 2 and 3 and paragraphs 13 through 17 of Korn to teach or suggest the disputed limitation. Final Act. 7; Ans. 9.² Appellants argue Korn does not “describe how the ‘weighting’ discussed in [paragraph 13] is determined and thus clearly does not disclose that the ‘weighting’ is ‘based on an expected impact of each CPU violation on an end user.’ In fact, Korn does not disclose that the ‘weighting’ is based on a CPU violation at all.” App. Br. 14. Appellants also contend “Korn clearly fails to disclose that an expected impact of each CPU violation on an end user is determined.” Reply Br. 12.

We are not persuaded by Appellants’ arguments. Korn describes that penalties may be assessed for failure to meet service level objectives. Korn ¶ 13. As described *supra*, Korn describes such service level objectives as the maximum allowable response time for service requests during the time window and CPU cycles. Korn ¶ 13. Korn further describes that whether a penalty is imposed, and the size of any imposed penalty, are dependent on the terms set forth in the customer’s service level agreement. Korn ¶ 15. Such terms of the service level agreement may result in more severe penalties for customers that have contracted for a higher level of service. Korn ¶¶ 15–17. We agree with the Examiner that such disclosure teaches or suggests the disputed limitation. *See* Ans. 9. Therefore, we are not persuaded the Examiner erred in finding the combination of Banerjee, Huberman, and Korn teaches or suggests the disputed limitation.

² As Appellants point out (Reply Br. 11–12), the Examiner appears to have mistakenly referred to Huberman, rather than Korn, in certain portions of the Answer in addressing this limitation.

Accordingly, we are not persuaded the Examiner erred in rejecting independent claims 1, 12, and 20 under 35 U.S.C. § 103(a). For the same reasons, we sustain the Examiner's rejection of dependent claims 2–6, 9–11, 13–16, and 19, which were not separately argued.

With respect to dependent claims 7/17 and 8/18, Appellants argue the Examiner erred because the Examiner “merely asserted that it would have been obvious to modify just Banerjee” and such “modification is clearly deficient because any proper modification would necessarily have to be made to the proposed combination of Banerjee, Huberman, and Korn.” App. Br. 17, 18. We are not persuaded by this argument as it fails to persuasively address why the Examiner's proposed modification to Banerjee with the disclosure in Li or Wang is in error. Claims 7/17 and 8/18 depend from independent claims 1 and 12, and thereby incorporate the Examiner's findings with respect to Huberman and Korn.

DECISION

For the above reasons, the Examiner's rejection of claims 1–20 is affirmed.

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)(iv).

AFFIRMED