UNITED STATES PATENT AND TRADEMARK OFFICE

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Hewlett Packard Enterprise		KNIGHT, PAUL M
3404 E. Harmony Road		
Mail Stop 79		
Fort Collins, CO 80528	ART UNIT	PAPER NUMBER
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chris.mania@hpe.com
hpe.ip.mail@hpe.com

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte THOMAS A. PHELAN, MICHAEL J. MORETTI,
GUNASEELAN LAKSHMINARAYANAN, and
RAMASWAMI KISHORE

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Appeal 2019-002346
Application 14/483,661
Technology Center 2100

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Before MICHAEL J. STRAUSS, IRVIN E. BRANCH, and
DAVID J. CUTITTA II, *Administrative Patent Judges*.

STRAUSS, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[2] appeals from the

Examiner's decision to reject claims 1, 3, 5, 7, 9, 10, 12, 14, 16, 18–22, and

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[1] We refer to the Specification, filed September 11, 2014 ("Spec."); Final
Office Action, mailed February 22, 2018 ("Final Act."); Appeal Brief, filed
September 24, 2018 ("Appeal Br."); Examiner's Answer, mailed November
30, 2018 ("Ans."); and Reply Brief, filed January 30, 2019 ("Reply Br.").
[2] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R.
§ 1.42. Appellant identifies the real party in interest as BLUEDATA
SOFTWARE, INC. Appeal Br. 2.

24–26. *See* Final Act. 1; Appeal Br. 2. Claims 2, 4, 6, 8, 11, 13, 15, 17, and 23 are canceled. Claims Appendix. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

CLAIMED SUBJECT MATTER

The claims are directed to allocating shared memory for a job based on the quality of service determined for the job. Abstract. Claim 1, reproduced below with claim element labels added in brackets and disputed limitations emphasized in *italics*, is illustrative of the claimed subject matter:

1. A method of providing shared memory in a data processing cluster environment, the data processing cluster environment comprising a plurality of virtual machines executing on one or more host computing systems, the method comprising:

[(i)] identifying a plurality of jobs to be processed by the plurality of virtual machines, wherein the plurality of jobs executes using a distributed data processing framework;

[(ii)] determining a quality of service for each job of the plurality of jobs; and

[(iii)] *assigning each of the plurality of jobs to one or more virtual machines in the plurality of virtual machines based on* the quality of service for each of the plurality of jobs and *a portion size of the shared memory allocated to each of the plurality of virtual machines*,

[(iv)] wherein the plurality of virtual machines is allocated various sized portions of the shared memory used to cache data for the plurality of jobs, and

[(v)] wherein the shared memory comprises memory accessible by the plurality of virtual machines and a cache service shared by the plurality of virtual machines that caches data for processing by the plurality of jobs.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Illikkal et al. ("Illikkal")	US 2009/0006755 A1	Jan. 1, 2009
Konik et al. ("Konik")	US 2014/0173614 A1	June 19, 2014

REJECTION

Claims 1, 3, 5, 7, 9, 10, 12, 14, 16, 18–22, and 24–26 are rejected under 35 U.S.C. § 103 as being unpatentable over Illikkal and Konik. Final Act. 2–14.

STANDARD OF REVIEW

We review the appealed rejection for error based upon the issues identified by Appellant, and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential).

OPINION

The Examiner finds the combination of Illikkal and Konik teaches or suggests the subject matter of claim 1. Final Act. 2–7. The Examiner relies on Illikkal for teaching the preamble and claim elements (i), (ii), (iv), and (v). *Id.* The Examiner relies on the combination of Illikkal and Konik to teach or suggest claim element (iii). *Id.* at 6 ("[T]he combination of [Illikkal and Konik] teaches . . . assigning resources including memory based on [quality of service] (Illikkal) as well as assigning tasks to [a virtual machine] based on the [virtual machine]'s resources including memory (Konik)."). The disputed limitation of claim element (iii) is "assigning each of the plurality of jobs to one or more virtual machines in the plurality of virtual machines based on . . . a portion size of the shared memory allocated to each of the plurality of virtual machines." Appeal Br. 7–8.

Konik's disclosure of "[the] first virtual machine 150 calculates the estimated times using the respective resources that are currently allocated to other virtual machines, . . . [and] selects a selected virtual machine with the smallest estimated time . . . " is found to teach assigning a job to a virtual machine based on the virtual machine's allocated resources. *See* Final Act. 5 (citing Konik ¶ 46). The virtual machine's allocated resources are found by the Examiner to include memory, because Konik discloses "allocat[ing] resources (e.g., processor and/or memory) that will allow . . . to complete the task [] before the expiration time . . . . In an embodiment, the first virtual machine 150 calculates the amount of resources to allocate by searching the history log 158 . . . ." *Id.* (citing ¶ 48) (emphasis omitted). The Examiner cites Konik's Figure 3 (*id.* (reproduced below)), which further teaches the allocated resources for the virtual machines include memories of various sizes. Konik Fig. 3, ¶ 38 ("The allocated memory field 318, in each entry, specifies the amount of the memory 102 that is allocated to the virtual machine 150 identified by the virtual machine identifier field 312.").

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VIRTUAL MACHINE DATA					
312	*314*	*316*	*318*	*320*	
VIRTUAL MACHINE ID	**EXPIRATION TIME**	**ASSIGNED PROCESSORS**	**ALLOCATED MEMORY**	**AUTOMATIC EXTENSION**	
VM A	5/1/2012; 10:30:22	2.5	.25	TRUE	302
VM B	6/15/2012; 11:46:00	1.5	1.25	FALSE	304
VM C	6/16/2012; 01:22:00	.2	.25	FALSE	306
VM D	6/14/2012; 02:35:36	2.1	0	FALSE	308

FIG. 3

*Examples of Konik's Virtual Machines with Allocated Resources
(Konik Fig. 3)*

Appellant contends "[s]electing a virtual machine based on the estimated time to complete a task[, as taught by Konik,] is neither equivalent nor suggestive to identifying virtual machine(s) for processing jobs based on a memory size allocated to the virtual machine, [as required by claim 1]." Appeal Br. 7–8. Appellant argues "claim 1 is not directed at determining or using processing times for any purpose." *Id.* at 7. In particular, Appellant argues, contrary to claim 1 and according to Konik, "a first virtual machine[,] allocated a large amount of processing resources [and] a smaller portion of cache memory[,]" may be selected over "other virtual machines with a larger portion of cache memory," because the estimated processing time for the first virtual machine may be less. *Id.* at 8. That is, according to Appellant, Konik's selection of a virtual machine may not be determined based exclusively on memory resources but may include additional factors.

The Examiner responds "Konik's teaching of assigning tasks/jobs [to a virtual machine] based on estimated time and estimating time based on allocated memory resources [of the virtual machine] reads on the claimed assigning tasks/jobs [to a virtual machine] based on allocated memory resources [of the virtual machine]." Ans. 3 (emphasis omitted). In response to Appellant's contention that "claim 1 is not directed at determining or using processing times for any purpose" (Appeal Br. 7), the Examiner responds "a claim using 'comprising' as the transitional phrase does not exclude unmentioned items [related to processing time] based on their absence." Ans. 7. That is, although claim 1 does not recite processing time as a factor in assigning jobs, neither does it exclude time as a factor.

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In response to Appellant's argument that Konik fails to teach the contested limitation of "assigning . . . based on . . . a portion size of the shared memory," because Konik does not teach that a larger portion of cache memory allocated to a virtual machine necessarily leads to the virtual machine being selected (*See* Appeal Br. 8), the Examiner finds Appellant's argument is not commensurate in scope with claim 1. *See* Ans. 7–8. In particular, the Examiner finds "Appellant is conflating the claimed job allocation 'based on' allocated memory, with a requirement that more jobs be allocated to a system with more memory in all instances, which is not claimed." *Id.* at 7. The Examiner adds "[t]he claims do not contain language requiring that allocated memory alone be determinative of job allocation." *Id.* at 8 (emphasis omitted).

Appellant replies "[w]hile the Examiner asserts that the memory may play a factor in determining the estimated time in Konik, Konik neither directly nor implicitly indicates that a memory portion size should be used in selecting the virtual machine." Reply Br. 2. In particular, Appellant argues "Konik fails to teach that the quantity of memory would necessarily have any effect on the estimated completion time for a task. In fact, in many computing operations, the memory may not be a limitation for the task." *Id.* at 3.

Appellant further contends for the first time in the Reply Brief that "Konik fails to teach or suggest a requirement [of claim 1] that the virtual machines are allocated *various* sized portions of cache memory." *Id.* (emphasis added). Appellant also raises a new contention that "Konik fails to teach or require that each of the virtual machines are allocated *different* quantities of cache memory." *Id.* (emphasis added.) In particular, Appellant

argues "if each of the virtual machines in Konik were allocated the same amount of memory, a virtual machine may not be selected based on the portion size of shared memory, as required by claim 1." *Id.*

Appellant's arguments are unpersuasive of reversible Examiner error. We agree with the Examiner that Konik teaches "assigning tasks/jobs [to a virtual machine] based on estimated time and estimating time based on allocated memory resources [of the virtual machine]." Ans. 3; *cf.* Reply Br. 2–3 ("In particular, Konik teaches determining an estimated time to perform the task using [information about] the resources that are allocated to the first virtual machine, wherein the resources may include processors and memory."). Based on these teachings, we agree with the Examiner that Konik further teaches "assigning tasks/jobs [to a virtual machine] based on allocated memory resources [of the virtual machine]." Ans. 3. Furthermore, Konik's allocated memory resources for virtual machines have various sizes. Konik Fig. 3, ¶ 38 (disclosing memory allocations of .25, 1.25, .25, and 0 to respective virtual machines VM A through VM D). The size/amount of Konik's allocated memories has an effect on the processing time for some tasks. Konik ¶ 48 ("[A]llocate resources (e.g., processor and/or memory) that will allow . . . to complete the task [] before the expiration time . . . . [C]alculate[] the amount of resources to allocate by searching the history log 158 . . . ."). Therefore, Konik teaches or suggests assigning tasks/jobs [to a virtual machine] based on the size of the allocated memory resources, which influences the processing time of a task. Accordingly, we disagree with Appellant's contention that "Konik neither directly nor implicitly indicates that a memory portion size should be used in selecting the virtual machine." Reply Br. 2.

Furthermore, Appellant's argument that "Konik fails to teach that the quantity of memory would necessarily have any effect on the estimated completion time for a task" is unpersuasive. *Id.* at 3. The argument is not commensurate in scope with claim 1. In particular, claim 1 recites "assigning . . . based on . . . a portion size of the shared memory," and it does not require the portion size be solely determinative of the assignment. Similarly unpersuasive is Appellant's argument that Konik does not teach that a larger portion of cache memory assigned to a virtual machine necessarily leads to the virtual machine being selected. *See* Appeal Br. 8. Again, the argument is not commensurate in scope with claim 1. We agree with the Examiner "Appellant is conflating the claimed job allocation 'based on' allocated memory, with a requirement that more jobs be allocated to a system with more memory in all instances, which is not claimed." Ans. 7.

In the Reply Brief, Appellant also argues for the first time that Konik does not teach or suggest "a requirement [by claim 1] that the virtual machines are allocated various sized portions of cache memory." Reply Br. 3. However, Appellant fails to show good cause for these new arguments, and as such, Appellant's belated argument is deemed waived as untimely. 37 C.F.R. § 41.41(b)(2) (2016). *See In re Hyatt*, 211 F.3d 1367, 1373 (Fed. Cir. 2000) (noting that an argument not first raised in the brief to the Board is waived on appeal); *Ex parte Nakashima*, 93 USPQ2d 1834, 1837 (BPAI 2010) (informative) (explaining that arguments and evidence not timely presented in the principal Brief, will not be considered when filed in a Reply Brief, absent a showing of good cause explaining why the argument could not have been presented in the Principal Brief); *Ex parte Borden*, 93 USPQ2d 1473, 1477 (BPAI 2010) (informative) ("[p]roperly

interpreted, the Rules do not require the Board to take up a belated argument that has not been addressed by the Examiner, absent a showing of good cause.").

Nonetheless, Konik teaches various sized portions of the cache memory allocated to a plurality of virtual machines. Konik Fig. 3, ¶ 38. The Examiner also relies on Illikkal to teach "wherein the plurality of virtual machines is allocated various sized portions of the shared memory used to cache data for the plurality of jobs" (Final Act. 6–7), which is not disputed by Appellant. Thus, even if timely presented, Appellant's argument is unpersuasive.

Appellant's additional belatedly presented argument that "Konik fails to teach or require that each of the virtual machines are allocated different quantities of cache memory" (Reply Br. 3) is not commensurate in scope with claim 1. In particular, claim 1 recites "wherein the plurality of virtual machines is allocated various sized portions" and does not require each of the virtual machines be allocated a *different* quantity of cache memory.

For the reasons discussed above, Appellant's arguments are unpersuasive of reversible Examiner error. Accordingly, we sustain the rejection of claim 1 under 35 U.S.C. § 103. For the same reasons, we further sustain the rejections of independent claims 10 and 21 that are argued together with claim 1. Appeal Br. 8 ("Independent claims 10 and 21 contain limitations like those discussed above with respect to claim 1."). Further, we sustain the rejections of dependent claims 3, 5, 7, 9, 12, 14, 16, 18–20, 22, and 24–26, because they are not argued separately with particularity. *See* Appeal Br. 8.

CONCLUSION

We affirm the rejection of claims 1, 3, 5, 7, 9, 10, 12, 14, 16, 18–22, and 24–26 under 35 U.S.C. § 103.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3, 5, 7, 9, 10, 12, 14, 16, 18–22, 24–26	103	Illikkal, Konik	1, 3, 5, 7, 9, 10, 12, 14, 16, 18–22, 24–26	

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). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED