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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOHN MATTHEW HOLT

Appeal 2018-008957
Application 15/027,093[1]
Technology Center 2100

Before JOSEPH L. DIXON, HUNG H. BUI, and JON M. JURGOVAN, *Administrative Patent Judges*.

BUI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant seeks our review under 35 U.S.C. § 134(a) from the Examiner's Final rejection of claims 1–22, which are all the claims pending in the application. Appeal Br. 12–15, Claims App. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.[2]

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. The real party in interest is Waratek Limited. Appeal Br. 3.

[2] Our Decision refers to Appellant's Appeal Brief filed May 29, 2018 ("Appeal Br."); Reply Brief filed September 17, 2018 ("Reply Br."); Examiner's Answer mailed July 16, 2018 ("Ans."); the Final Office Action mailed December 15, 2017 ("Final Act."); and the original Specification filed April 4, 2016 ("Spec.").

STATEMENT OF THE CASE

Appellant's invention is directed to a method and system for "saving computer resources in a multi-tenanted computer environment in which a plurality of tenants operate," by "identif[ying] which tenants or applications of a multi-tenant server are idle, and when a tenant or application is identified as idle . . . reduc[ing] the reserved computational capacity footprint of the application or tenant without shutting down the tenancy or exiting the application." Spec. 4:2–5; Abstract.

Claims 1 and 12 are independent. Independent claim 1, reproduced below, is exemplary of the subject matter on appeal.

> 1. A method of saving computer resources in a multi-tenanted computer environment in which a plurality of tenants operate within a single JAVA virtual machine, or equivalent, said method comprising the steps of:
>
> (i) monitoring predetermined characteristics of the operation of each tenant;
>
> (ii) upon said predetermined characteristics achieving a first predetermined state, or crossing a first predetermined threshold, inactivating the corresponding tenant; and
>
> (iii) upon said predetermined characteristics of an inactivated tenant achieving a second predetermined state, or crossing a second predetermined threshold, re-activating the tenant,
>
> wherein the inactivating includes reducing a reserved heap memory quota of the corresponding tenant to create released memory, and transferring the released memory elsewhere.

Appeal Br. 12 (Claims App.).

Evidence Considered

Name	Reference	Date
Creamer et al. ("Creamer")	US 2005/0065992 A1	Mar. 24, 2005
Vengerov	US 2011/0107050 A1	May 5, 2011
Higuchi	US 2010/0325077 A1	Dec. 23, 2010
Arcese et al. ("Arcese")	US 2012/0137101 A1	May 31, 2012

Examiner's Rejections

(1) Claims 1, 5–7, 12, and 16–18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Creamer and Vengerov. Final Act. 5–12, 24.[3]

(2) Claims 2–4 and 13–15 stand rejected under 35 U.S.C. § 103 as being unpatentable over Creamer, Vengerov, and Higuchi. Final Act. 12–15, 24.

(3) Claims 8–11 and 19–22 stand rejected under 35 U.S.C. § 103 as being unpatentable over Creamer, Vengerov, and Arcese. Final Act. 16–25.

ANALYSIS

In support of the obviousness rejection, the Examiner, among other things, finds Vengerov teaches "inactivating [that] includes reducing a reserved heap memory quota of the corresponding tenant to create released memory, and transferring the released memory elsewhere," as recited in

[3] The Examiner's rejection incorrectly refers to pre-America Invents Act ("pre-AIA") § 103(a) instead of AIA § 103. *See* Final Act. 5. We are aware of no prejudice to Appellant or the Examiner resulting from this error, and thus we consider this to be harmless error.

claim 1. Final Act. 8–9 (citing Vengerov ¶¶ 5, 47–61, 71, Figs. 1–5); Ans. 4–5 (citing Vengerov ¶¶ 2–4, 45). Particularly, the Examiner finds Vengerov teaches "*the allocated/used (i.e. reserved)* heap memory to execute an application is reduced to create released/free memory by performing GC (garbage collection)." Ans. 5 (emphasis added). We do not agree.

We agree with Appellant's arguments that Vengerov does not teach or suggest "reducing a reserved heap memory quota of the corresponding tenant to create released memory," as recited in claim 1. Appeal Br. 5–8; Reply Br. 3–4. As Appellant explains, the claimed term "'*reserved heap memory quota*' refers to a set amount of memory that is dedicated to a particular tenant and not available for use by any other tenant or application." Appeal Br. 7 (emphasis added) (citing Spec. 3:21–25 ("any computational capacity reserved for idle tenants/applications is by definition not available for use by other active tenants/applications"); Emma Shepherd, Martin Trotter, Caroline Maynard, and Matthew Peters, *Don't Forget about Memory: How to Monitor Your Java Applications' Windows Memory Usage*, IBM developerWorks® (November 16, 2004)). Vengerov's memory that is *allocated to* or *used by* an application is the portion of *free memory (memory available for use by all applications)* that is actually *used* when the application is executing on the computing apparatus, however, the application's used memory is not a reserved heap memory quota of the application (tenant) as claimed. Reply Br. 2–3; *see* Vengerov ¶¶ 8, 17, 29, 53, 64–65 (a "[g]arbage collection apparatus 420 is adapted to *recycle memory 412 used by applications and/or other programs executing on the computing apparatus*" and a "[m]emory allocation rate measurement

apparatus 424 is adapted to periodically *measure the amount of free memory* within memory 412, and to *calculate a rate at which the free memory is being allocated*" (emphases added)).

Thus, we do not agree with the Examiner's interpretation of the claimed term "reserved heap memory quota" as being "the allocated/used . . . heap memory to execute an application [in Vengerov]." Ans. 5. We agree with Appellant that Vengerov's "garbage collection is a process of recycling or freeing used memory . . . it is not a process of changing the amount of heap memory which is reserved for a particular tenant" as claimed. Appeal Br. 7; *see also* Reply Br. 2–4.

We further note, although Vengerov also mentions the term *allotted memory* (e.g., Vengerov measures "memory allotted to just one application" and performs "[g]arbage collection . . . for recycling free memory within computing device . . . [which] may operate on . . . memory allotted to a particular application"), Vengerov does not teach *changing an application's allotted memory*; rather, Vengerov *merely cleans* the application's allotted memory (through garbage collection) *without changing the amount of the application's allotted memory*. *See* Vengerov ¶¶ 33, 70–71; Appeal Br. 6–7. In contrast, Appellant's claimed "reducing a reserved heap memory quota of the corresponding tenant to create released memory" *changes (reduces)* an *amount of memory* that is *dedicated (reserved)* to an idle tenant/application and *is unavailable for use by other* idle or active tenants. *See* Spec. 3:21–25; Appeal Br. 6–7.

The Examiner also has not shown that the additional teachings of Creamer, Higuchi, and Arcese make up for the above-noted deficiencies of Vengerov. Creamer (also relied on to reject claim 1) merely describes

inactivating ghost agents (software objects), but does not teach that inactivating is by *reducing a reserved heap memory quota* of a tenant (or ghost agent) as claimed. *See* Creamer ¶¶ 19–20, 24–25.

Thus, for the reasons set forth above, we do not sustain the Examiner's obviousness rejection of independent claim 1, independent claim 12 argued for substantially the same reasons as claim 1, and claims 2–11 and 13–22 dependent therefrom. Appeal Br. 9–10. Because the above-discussed issues are dispositive as to the obviousness rejections of all claims on appeal, we do not reach additional issues raised by Appellant's arguments as to the § 103 rejection of claim 1.

CONCLUSION

On the record before us, we conclude Appellant has demonstrated the Examiner erred in rejecting claims 1–22 under 35 U.S.C. § 103.

DECISION SUMMARY

As such, we REVERSE the Examiner's final rejection of claims 1–22 under 35 U.S.C. § 103.

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 5–7, 12, 16–18	103	Creamer, Vengerov		1, 5–7, 12, 16–18
2–4, 13–15	103	Creamer, Vengerov, Higuchi		2–4, 13–15
8–11, 19–22	103	Creamer, Vengerov, Arcese		8–11, 19–22

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
Overall Outcome				1–22

REVERSED