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Paper: 13
Entered: April 11, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

VALTRUS INNOVATIONS LIMITED,
Patent Owner.

IPR2022-01408
Patent 7,748,005 B2

Before NORMAN H. BEAMER, SHARON FENICK,
and PAUL J. KORNICZKY, *Administrative Patent Judges*.

BEAMER, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

On August 17, 2022, Google LLC ("Petitioner") filed a Petition ("Pet.") pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–20 of U.S. Patent No. 7,748,005 B2 (Ex. 1001, "the '005 patent"). Paper 2. On January 12, 2023, Valtrus Innovations Limited ("Patent Owner") filed a Preliminary Response ("Prelim. Resp."). Paper 9. As authorized by the Board, Petitioner filed a Reply and Patent Owner filed a Sur-Reply, directed to "Patent Owner's [alleged] failure to tell the Board about record evidence contravening Patent Owner's 'virtual machine' arguments"; "Patent Owner's arguments regarding 37 C.F.R. 42.104(b)"; and "Patent Owner's discretionary denial arguments under 35 U.S.C. §§ 314(a) and 325(d)." Ex. 1054; Papers 11, 12.

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless the information presented in the Petition and any preliminary response shows that "there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

For the reasons explained below, we deny the Petition and do not institute an *inter partes* review.

II. BACKGROUND

A. The '005 Patent

The '005 patent, titled "System And Method For Allocating A Plurality Of Resources Between A Plurality Of Computing Domains," was filed on September 10, 2004, issued on June 19, 2010, and is a continuation-in-part of application No. 10/206,594, filed on July 26, 2002, published

February 20, 2003 as publication 10/206,594 (hereafter, the "McCarthy application" or "McCarthy"), now U.S. Patent No. 7,140,020, which is a continuation-in-part of application No. 09/493,753, filed on January 28, 2000, now U.S. Patent No. 7,228,546. Ex. 1001, codes (54), (22), (45), (63); Ex. 1005; Ex. 1006; Ex. 1013, codes (21), (43).

The '005 patent is directed to allocating resources to computing domains. Ex. 1001, 1:19–21. The '005 patent specifically describes two types of resource allocations to computer domains: "allocating physical resources between partitions," and allocating "virtual resources as software constructs" to "virtual machines." *Id.* at 13:37–47. Resource allocation is performed dynamically by the system, in response to changes in workload characteristics in the system, based on performance goals with different priorities defined by an administrator. *Id.* at 3:6–7, 3:14–20, 4:36–40.

For physical partitions, the '005 patent explains that computer systems, which can be "a single small computer . . . a single large computer . . . or a network of larger and/or small computers," can be divided into "protection domains or partitions." Ex. 1001, 3:7–14. "Each partition may have one or more processors and other systems resources, e.g. storage devices, I/O devices, etc." *Id.* at 4:61–63. "Each partition is preferably running its own operating system . . . which provides segregation and survivability between the partitions." *Id.* at 4:63–66.

For virtual machines, the '005 patent explains that:

> [V]irtualization refers to the creation of virtual machines that coexist on one or several physical servers. Virtualization software typically executes in connection with a host operating system of the physical server. The virtualization software creates virtual resources as software constructs. The virtual resources are then assigned to virtual machines used for

> respective servers. Specifically, the virtual resources are used to execute "guest" operating systems that execute on top of the host operating system. The guest operating systems are then used to execute applications. Furthermore, each guest operating system operates independently. A software fault associated with any particular guest operating system and its application(s) may be contained within a given virtual machine.

Ex. 1001, 13:42–55; *see also id.* at 1:37–48.

Figure 1, reproduced below, illustrates a physical partition embodiment of the '005 patent subject matter.

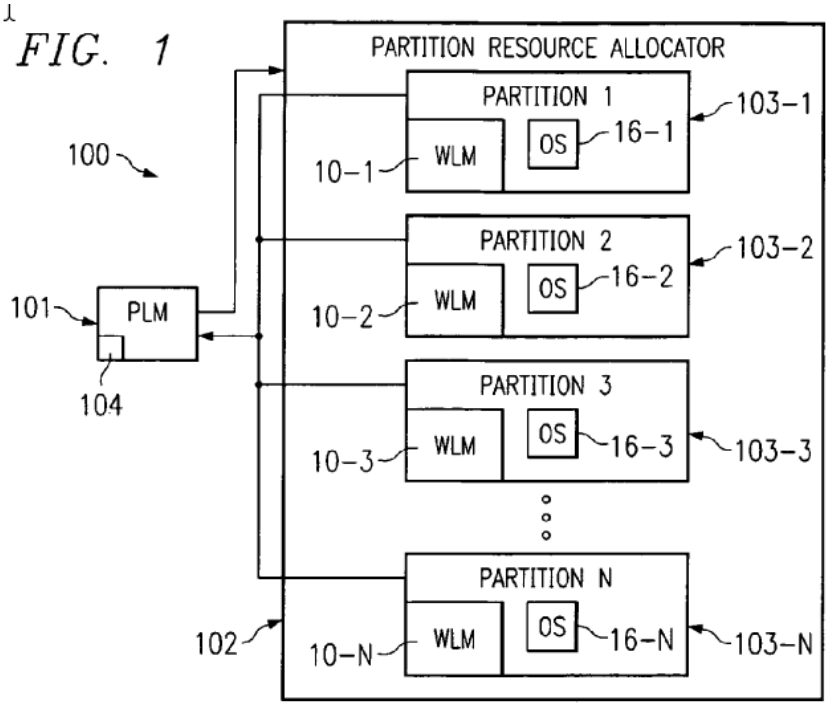

Figure 1 depicts partition load manager (PLM) 101 operating with a plurality of partitions 103-1 through 103-N, with each partition including workload manager (WLM) 10 and operating system (OS) 16. Ex. 1001, 2:52–54, 4:59–66. Although not shown in Figure 1, each partition also includes, *inter alia,* CPUs (processors), applications, a performance monitor, and a goals configuration file containing application goals and priorities. *Id.* at Fig. 2,

6:6–12, 6:30–38. PLM 101 receives resource requests from the partitions, compares the requests with available resources, and allocates resources based on performance goals and priorities, either within a partition among applications, or between partitions. *Id.* at 3:25–31, 3:38–44, 4:21–29, 5:14–16. Although Figure 1 depicts the PLM as separate from the partitions, it may reside in one partition and have access to the other partitions, or reside in each partition, and cooperatively allocate resources amongst themselves. *Id.* at 4:14–19.

Each WLM receives goal and priority information from the goals configuration file (provided by a user or administrator), and receives performance information from the performance monitor, which monitors the performance of the applications and devices within the partition. Ex. 1001, 3:58–59, 6:30–38. The WLM maintains a list of prioritized application goals with an indication of the quantity of each required resource. *Id.* at 4:24–27. The WLM compares the monitored information with the goals and priorities, and based on the comparison sends resource requests to the PLM. *Id.* at 3:65–4:9, 5:23–25, 6:30–38. The PLM receives the requests, and allocates the resources between the different partitions, based on the priorities of the partitions and the resource requests. *Id.* at 4:21–23, 7:13–17. WLM, after receiving information from PLM about its partition resources, then allocates its allotted resources among the applications on its partition. *Id.* at 4:11–13.

Figure 7, reproduced below, illustrates a virtual machine embodiment of the ’005 patent subject matter.

FIG. 7

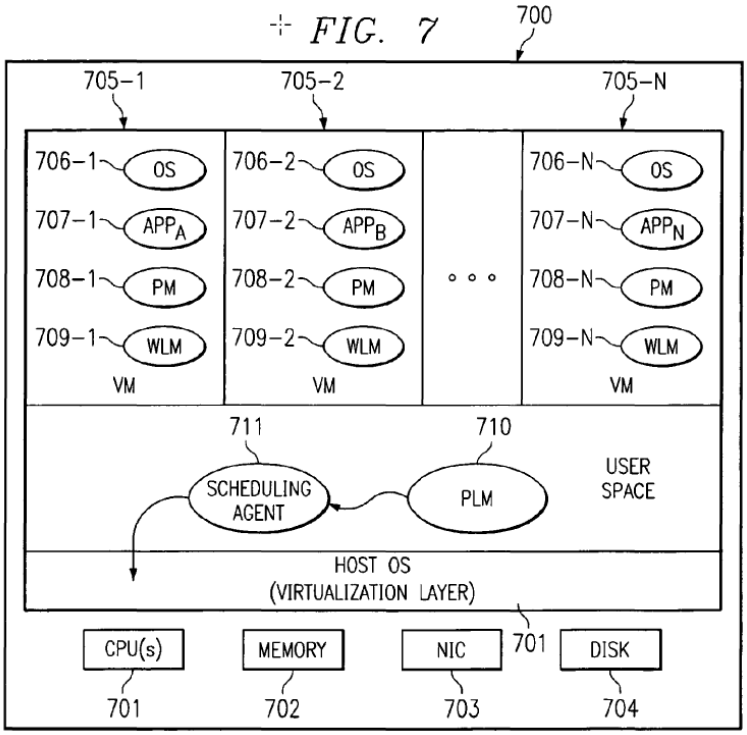

Figure 7 depicts a system that allocates virtual resources, based on underlying physical resources including CPUs 701, memory 702, network interface card (NIC) 703, and disk storage 704, and a host operating system that enables low level access to the physical resources. Ex. 1001, 13:62–67. The host operating system includes a virtualization software layer that virtualizes the physical resources as software constructs, creating virtual machines 705-1 through 705-N. *Id.* at 13:45–48, 13:65–14:5. The virtual machines "appear to software processes executing within the virtual machines to be physical server platforms," and "provide partition and isolation functionality" such that a "software fault within any particular virtual machine 705 may only affect the respective virtual machine 705, while software processes associated with the other virtual machines 705 may continue operations in an ordinary manner." *Id.* at 14:5–13.

Each virtual machine includes guest operating system (OS) 706, applications (APP) 707, performance monitors (PM) 708, and workload manager (WLM) 709. Ex. 1001, 14:13–23. Partition load manager (PLM) 710 and scheduling agent 711 are software processes that operate in the user space associated with the host operating system. *Id.* at 14:27–37. The functional interaction between WLMs and PLM is essentially the same as that described above for the physical partition embodiment: WLM receives performance data related to applications from the performance monitor and compares that to goals and priorities (also referred to as "SLOs," or service level objectives), and when an application is not achieving its goals, WLM requests additional resources from PLM, which reallocates resources as appropriate. *Id.* at 14:21–34. PLM communicates with scheduling agent 711 which, for example, reassigns time slices of processors between virtual machines. *Id.* at 14:37–40.

B. The Prosecution History of the '005 Application

During prosecution of the '005 application, the Examiner rejected the then-pending claims in light of U.S. Patent No. 6,587,938 ("Eilert"); U.S. Patent No. 7,191,440 ("Cota-Robles"); U.S. Patent No. 7,433,951 ("Waldspurger"); U.S. Patent No. 6,922,774 ("Meushaw"); and U.S. Patent No. 6,775,292 ("Kothapally"). Ex. 1002, 47, 52, 54, 57–58. The Examiner relied on Eilert for teaching dynamically distributing CPU resources among logical partitions of a computing environment and measuring performance data. *Id.* at 47–52. For dependent claims that involved "virtual machines" and a "virtualization software layer" (then pending claims 2–4, 9–10, 12, and 16–17), the Examiner cited Cota-Robles. *Id.* at 52–53. The other

references were cited against other features of the dependent claims. *Id.* at 54–59.

Applicants overcame the rejections by amending claims 1 and 8 to add the requirement that the "second manager process maintains a list comprising a plurality of application priority levels for said at least one application and an indication of a quantity of said plurality of resources needed to meet said at least one level of priority." *Id.* at 113–114. Claim 15 was amended to require "an indication of a quantity of resources needed to meet said at least one service level parameter." *Id.* at 115. Ultimately, the claims were allowed with these amendments. *Id.* at 181–192.

C. Illustrative Claim

Independent claim 8 is reproduced below (with Petitioner's identifiers of limitations in brackets).

> 8. A method, comprising:
>
> [8.a] creating a plurality of computing domains;
>
> [8.b] allocating a plurality of resources between said plurality of computing domains by a first manager process;
>
> [8.c] executing at least one application, a second manager process, and a performance monitor process in each of said plurality of computing domains,
>
> [8.d] wherein said second manager process maintains a list comprising a plurality of application priority levels for said at least one application and an indication of a quantity of said plurality of resources needed to meet said at least one level of said application priority levels and

[8.e] wherein said performance monitor process generates performance data related to said at least one application and

[8.f] said second manager process requests additional resources from the first manager process in response to analysis of said performance data in view of at least one service level parameter; and

[8.g] dynamically reallocating said plurality of resources between said plurality of computing domains by the first manager process in response to received requests for additional resources according to service level parameters.

Ex. 1001, 15:46–16:3; Pet. 77.

D. Asserted Challenges to Patentability and Evidence of Record

Petitioner challenges the patentability of claims 1–20 of the '005 patent based on the following references:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1, 8	103[1]	Jones,[2] Agrawal[3]
1–20	103	Jones, Agrawal, Gien[4]

[1] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), included revisions to 35 U.S.C. § 103 that became effective as of March 16, 2013. The application for the '005 patent was filed before March 16, 2013, and therefore we apply the pre-AIA version of 35 U.S.C. § 103.

[2] Jones, et al., U.S. Patent No. 6,282,561 B1 (Ex. 1041, "Jones").

[3] Agrawal, et al., U.S. Patent No. 5,761,091 (Ex. 1042, "Agrawal")

[4] Michel Gien & Lori Grob, "*Micro-kernel Based Operating Systems: Moving UNIX onto Modern System Architectures,"* Proceedings of the UniForum '92 Conference, pp. 45–55 (1992). Ex. 1014, Ex. A, ("Gien").

Pet. 4. In support of its patentability challenge, Petitioner relies on, *inter alia*, the Declaration of Vijay K. Madisetti, Ph.D. Ex. 1003 ("Madisetti Decl.").

E. Real Parties in Interest

Petitioner identifies itself as a real party in interest. Pet. xiii. Patent Owner states:

> Valtrus Innovations Limited ("Valtrus") is the owner of U.S. Patent No. 7,748,005 ("the '005 patent"). Valtrus Innovations Limited is a subsidiary of Key Patent Innovations Limited. Both Key Patent Innovations Limited and Valinvest LLC are financially interested in the outcome of the litigation between Valtrus and Google.

Paper 4, 1.

F. Related Proceedings

The parties identify the following related proceedings: *Valtrus Innovations Ltd. v. Google LLC,* Case No. 3:22-cv-00066 (N.D. Tex.) ("the Texas case"); *Valtrus Innovations Ltd. v. Google LLC*, Case No. 4:22-cv-00020 (N.D. Tex.); *Google LLC v. Valtrus Innovations Limited*, IPR2022-01406 ("IPR1406"); *Unified Patents, LLC v. Valtrus Innovations Limited*, IPR2022-01399 ("IPR1399"). Pet. xiii–xiv; Paper 4, 1–2.

III. ANALYSIS OF PETITIONER'S CHALLENGE

A. Legal Standards

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). "In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is

unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim"). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective indicia of non-obviousness (also called secondary considerations), such as commercial success, long-felt but unsolved needs, and failure of others.[5] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze grounds based on obviousness in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103(a) requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383

[5] No evidence of secondary consideration appears in the record for us to consider at this stage of the proceeding.

U.S. at 17. The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner asserts that a person of ordinary skill in the art as of the September 10, 2004 filing date of the '005 patent:

> would have had at least a Bachelor's degree in Computer Science, Computer Engineering, or related field, with three years of experience in the area of virtualization and distributed computer systems, including performance and/or resource optimizations. . . . A higher level of education may substitute for less experience. . . . A POSA's level of skill would not differ materially between the '005 patent's earliest possible priority date (in 2000) and its filing date (in 2004). . . .

Pet. 7–8 (citing Madisetti Decl. ¶¶ 59–64). Patent Owner does not specifically address the level of ordinary skill in the pertinent art at the time of the invention. *See generally* Prelim. Resp.

Petitioner's proposal is consistent with the level of ordinary skill in the art reflected by the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579. On this record, the level of ordinary skill is neither in dispute nor dispositive of any challenge. For purposes of this Decision, we apply Petitioner's articulation.

C. Claim Construction

The Petition was accorded a filing date of August 17, 2022. Paper 6, 1. In an *inter partes* review for a petition filed on or after November 13, 2018, a

claim "shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b). We apply the claim construction standard from *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Claim terms need only be construed to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

Petitioner maintains that "[c]laim terms do not require an exact outer boundary construction, because the prior art relied upon herein meets the claim terms under any reasonable interpretation. . . ." Pet. 8.

Patent Owner argues that "the petition is either inconsistent with or ignores the proposed constructions the parties have advanced in the [Texas case]," and Petitioner "peppers its petitions with thinly-veiled constructions." Prelim. Resp. 20–21. Nonetheless, Patent Owner asserts that "most of these constructions are not necessary at this stage to address institution." *Id.* at 23.

Nevertheless, in our analysis set forth below, we address certain claim interpretation issues implicitly raised by the parties.

D. Alleged Obviousness of Claims 1 and 8 Over Jones and Agrawal

Petitioner challenges claims 1 and 8 as obvious over the combination of Jones and Agrawal. Pet. 8–37.

1. Jones

Jones, titled "Method And System For Resource Management With Independent Real-Time Applications On A Common Set Of Machines," issued August 28, 2001 from a December 7, 1995 application. Ex. 1041,

codes (54), (45), (22). Jones is directed, *inter alia*, to a resource management mechanism for arbitrating resource requests and resource usage among independent real-time application programs that run simultaneously on a set of machines. *Id.* at 4:9–13. The resource management mechanism is adaptable to installation on a distributed system having separate computer systems by installing the mechanism on each of the computer systems within the distributed system. *Id.* at 4:13–17. Each application has a corresponding "activity," which is "an abstraction that serves as a generalization of a running program and is the unit of abstraction to which resources are allocated and against which resource usage is charged." *Id.* at 4:49–52. Each activity is associated with a single distinct executing program or application. *Id.* at 4:57–58. A "resource" includes CPU time, memory capacity, I/O bus bandwidth, network bandwidth, and devices, such as video frame buffers and sound cards. *Id.* at 4:34–38.

A "resource planner" is a program that arbitrates access to the resources of a machine amongst different activities. Ex. 1041, 4:63–64. Activities reserve resources by requesting the reservation of a resources from the resource planner. *Id.* at 5:12–14. Activities query "resource providers" to determine what resources it needs. *Id.* at 6:3–4. Activities are ranked according to importance, which the resource planer uses to allocate resources. *Id.* at 11:22–29. If an activity has changing resource needs, changes its mode of execution, or other programs begin executing, cease executing or substantially change their resource usage, the resource planner can dynamically renegotiate the allocation of resources. *Id.* at 12:17–42.

As indicated, the resource management system can span multiple computers, as shown in Figure 8 reproduced below.

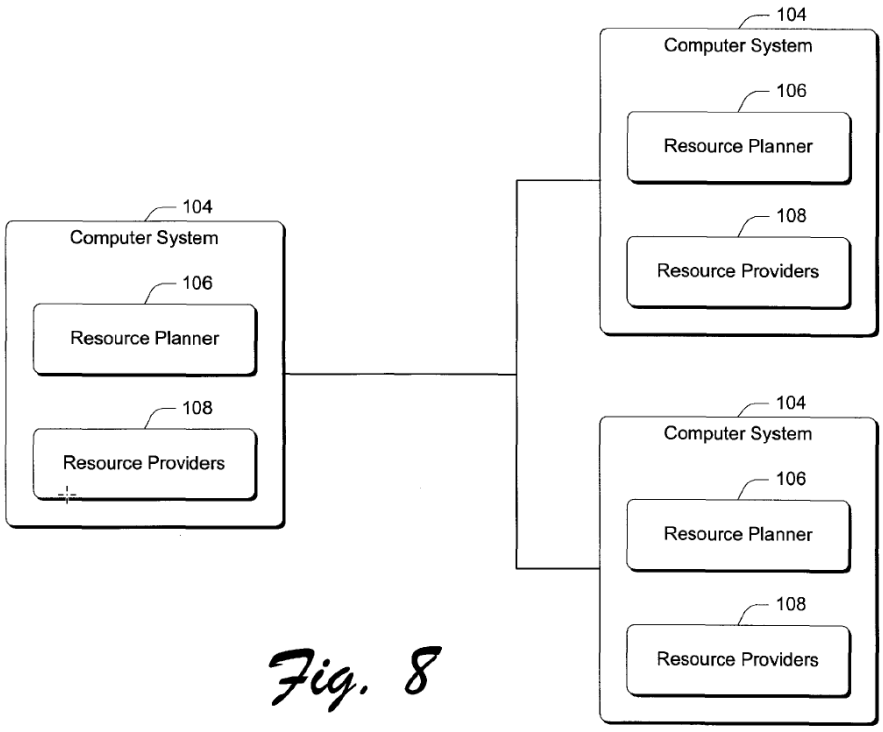

Fig. 8

Figure 8 is a block diagram of a distributed system with multiple computer systems 104, each including resource planner 106, resource providers 108, and applications (not shown). Ex. 1041, Fig. 8, 3:65–66, 13:7–16. Each resource planner is responsible for managing the resources that are local to its computer system. *Id.* at 13:9–11. Local resource provider 108 is associated with local resources and managed by local resource planner 106. *Id.* at 13:11–13. When an activity requests remote resources, the local resource planner receives the request and forwards the request to the remote resource planner for the machine on which the remote resource is found, which processes the request and sends a response back to the local resource planner. *Id.* at Fig. 9, 13:14–30.

Jones characterizes its system as "ensur[ing] that the transmission of data, such as audio data or video data, that have real-time delivery requirements are delivered in a timely fashion." Ex. 1041, 13:33–36.

2. Agrawal

Agrawal is titled "Method And System For Reducing The Errors In The Measurements Of Resource Usage In Computer System Processes And Analyzing Process Data With Subsystem Data," issued January 2, 1998 from a December 10, 1996 application. Ex. 1042, codes (54), (45), (22). Agrawal is directed measuring the resource usage of computer processes. *Id.* at Abstr. As stated in Agrawal:

> The present invention addresses . . . shortcomings in the measurement and analysis of computer system performance data for such purposes as performance analysis, diagnosis, investigation, capacity planning, modeling, and trending. In short, it assists in all forms of computer and application performance management.

Ex. 1042, 3:5–10.

3. The Combination of Jones and Agrawal

Petitioner argues that a person of ordinary skill would have been motivated to incorporate the performance monitoring functionality of Agrawal into the Jones resource allocation system. Pet. 14–20. As Petitioner acknowledges, Jones already provides for the disclosed activities to request a reallocation of resources when their resource needs change, but does not provide details on how a resource need determination is made. *Id.* at 14 (citing Ex. 1041, Fig.7A (step 86), 12:15–36; Madisetti Decl. ¶¶ 108–114, 131–132). But, argues Petitioner, one of ordinary skill would have been motivated to implement Agrawal's methods on each computer running the Jones system to monitor the performance of executing applications so that the activities associated with the applications could use the performance

data to determine when resource changes are needed. *Id.* (citing Madisetti Decl. ¶ 133).

Petitioner argues that the combination would have been motivated because one of ordinary skill would have understood that using Agrawal's performance data would have been a useful way to implement determinations of resource needs. Pet. 15 (citing Ex. 1041, 13:41–42; Madisetti Decl. ¶¶ 136–142). Petitioner argues that a person of ordinary skill would have understood that a conventional and obvious way for the activity to determine that available resources are "acceptable" would have been for the activity to compare a performance goal for its application, with an application performance level that was expected from the quantity of available resources. *Id.* at 17 (citing Madisetti Decl. ¶ 147). Petitioner also argues that using Agrawal's performance monitoring technique would further Jones' goal of using "dynamic feedback" to make the resource management mechanism "self-aware." *Id.* at 18 (citing Ex. 1041, 12:20–22; Madisetti Decl. ¶ 154). Also, Petitioner argues that the use of performance monitoring software was well-known as of the application date of the '005 patent, and one of ordinary skill would have recognized that Agrawal would be useful for that purpose. *Id.* at 19 (citing Ex. 1042, 7:39–45; Madisetti Decl. ¶¶ 155–158). Finally, Petitioner argues that a person of ordinary skill would have had a reasonable expectation of success in combining Jones and Agrawal. *Id.* at 20 (citing Madisetti Decl. ¶¶ 161–162).

Patent Owner argues that Petitioner's support for the combination only cites two lines of the Agrawal disclosure, and that Jones "already discloses an activity determining what resources it needs through the

'information gathering process,' rendering Agrawal entirely unnecessary." Prelim. Resp. 4–5.

We agree with Patent Owner that Agrawal's contribution to the combination is limited, but for purposes of this Decision we accept Petitioner's basic premise for the combination, to the effect that the disclosure of Agrawal confirms that one of ordinary skill would have known to incorporate performance monitoring techniques into the resource allocation system of Jones to the extent not fully disclosed therein. To that extent, for purposes of this Decision, we determine that Petitioner has provided sufficiently articulated reasoning with rational underpinnings for the proffered combination of Jones and Agrawal.

4. Claims 1 and 8

a) Petitioner's Arguments

Following Petitioner's approach, we first consider claim 8, and for economy of presentation refer to the bracketed identifiers applied to the claim limitations by Petitioner (*see* Section II.C above). Pet. 36–45.

For the method preamble of claim 8, Petitioner generally relies on Jones' method for resource management. Pet. 36 (citing Ex. 1041, 3:7–9, 13:54–16:22; Madisetti Decl. ¶¶ 163–164).[6]

For requirement 8.a of claim 8 regarding creation of computer domains, Petitioner argues that an example of computer domains includes ordinary computer systems, and relies on the disclosure in Jones of multiple distributed computer systems. Pet. 21–22 (citing Ex. 1001, 3:10–13, 13:1–

[6] Based on the present record, we make no determination at this stage of the proceeding that the preamble of claim 8 (or of claim 1) is limiting.

13, 13:37–41; Ex. 1041, Figs. 8, 9, 3:7–9, 5:43–46, 13:1–13, 13:31–33; Madisetti Decl. ¶¶ 165–167).

For requirement 8.b of claim 8 regarding allocating resources between computing domains by a first manager process, Petitioner relies on the disclosure in Jones of the resource planners 108, which allocate resources to activities on the computer systems in a distributed system, including using a remote resource planner that allocates resources on one computer system to an activity on another computer system. Pet. 22–24 (citing Ex. 1041, Figs. 2, 8, 9, 4:9–17, 4:35–41, 4:49–52, 4:63–64, 5:4–6, 5:42–58, 7:38–43, 8:41–47, 11:24–29, 13:2–4, 13:14–30, 13:54–55; Madisetti Decl. ¶¶ 168–176).

For requirement 8.c of claim 8 regarding executing applications, a second manager process, and a performance monitor in each domain, Petitioner first relies on the disclosure that each computer in Jones includes execution of applications. Pet. 24–25 (citing Ex. 1041, 1:7–10, 4:9–17, 4:13–17, 13:2–7; Madisetti Decl. ¶¶ 177–179). Petitioner additionally relies on the activities associated with applications as corresponding to the second manager process, because the activities manage resource requests for their associated applications. Pet. 25–26 (citing Ex. 1041, Figs. 2, 7A, 4:48–62, 5:31–46, 6:42–46, 7:38–50, 8:41–58, 9:63–67, 10:1–33, 12:22–34, 13:14–30; Madisetti Decl. ¶¶ 118, 180–185). Finally, Petitioner relies on the Jones/Agrawal combination as providing the performance monitors. Pet. 26 (citing Madisetti Decl. ¶¶ 120–129, 186).

For requirement 8.d of claim 8 regarding the second manager process maintaining a list of priority levels and needed resources, Petitioner first argues that the claim only requires one priority level for one application, despite the requirement that the list comprises "a plurality of application

priority levels for said at least one application," because the claim also refers to "***said at least one level*** of said application priority levels." Pet. 27–28 (citing Madisetti Decl. ¶¶ 187–188). Petitioner asserts that its interpretation is consistent with the '005 specification, which, according to Petitioner, does not disclose multiple priority levels for a single application. *Id.*

Using that interpretation, Petitioner relies on the disclosure in Jones that an "importance" is associated with each activity and its associated application, and the resource planner uses that importance when allocating resources. Pet. 29 (citing Ex. 1041, Fig. 6A, 10:53–11:4, 11:17–29; Madisetti Decl. ¶¶ 192–198). Petitioner argues that the "importance" meets claim requirement 8.d "application priority level" because it provides the relative priority of activity resource requests on behalf of their applications, and plays the same role in prioritizing resource allocations as the "priority level" in the '005 patent. *Id.* (citing Ex. 1041, Fig. 6A, 11:11–12:14; Madisetti Decl. ¶¶ 199–200).

Petitioner also argues that, even if the claim requires multiple priority levels for one application, that would have nevertheless been obvious because Jones teaches that an application's importance (the claimed priority level) can "transition" from one level to another, which "may trigger a resource negotiation." Pet. 32 (citing Ex. 1041, Fig. 2, 5:67–6:1, 10:58–66; Madisetti Decl. ¶¶ 208–209).

For claim requirement 8.d of "an indication of a quantity of said plurality of resources needed to meet said at least one level of said application priority levels," Petitioner relies on the disclosure in Jones that the activities determine application resource needs and quantities through an "information gathering process." Pet. 28 (citing Ex. 1041, Fig. 2, 5:64–6:9;

Madisetti Decl. ¶ 189). In particular, Petitioner relies on the disclosure in Jones of empirically determining resource requirements for an activity, which the activity caches. *Id.* (citing Ex. 1041, 7:13–19, 7:33–37; Madisetti Decl. ¶ 190). Petitioner also relies on the disclosure in Jones of the ability of the activity to query resource providers to determine what resources the activity needs. *Id.* (citing Ex. 1041, 6:2–9; Madisetti Decl. ¶ 191).

Finally, for the specific claim requirement 8.d of maintaining a list, Petitioner argues that the '005 patent does not actually disclose a list that corresponds to the required list of requirement 8.d, and concedes that Jones does not disclose maintaining a list, but argues that the "conventional and obvious way to implement what Jones describes is to have the activity maintain a list of its application's importance and the resources needed to meet that importance because Jones expressly describes the activity as gathering and storing this information." Pet. 30 (citing Madisetti Decl. ¶ 202). Petitioner relies on the disclosure in Jones that the activity caches both estimates of needed resources, and records of actual usage, as implicitly disclosing maintaining a list of needed resources. *Id.* at 30–31 (citing Ex. 1041, 7:17–19, 7:33–37; Madisetti Decl. ¶ 203). As to maintaining a list of priority levels, Petitioner argues that lists were well known, and a person of ordinary skill would have understood that maintaining a list of activity importance was a conventional and obvious implementation. *Id.* at 31–32 (citing Ex. 1019, 171, 215, 252, 312–313, 322; Madisetti Decl. ¶¶ 204–207).

For requirement 8.e of claim 8 regarding performance monitoring, Petitioner relies on the Jones/Agrawal combination which, as discussed in Section III.D.3 above, incorporates performance monitoring. Pet. 32–33 (citing Ex. 1042, 3:49–50; Madisetti Decl. ¶¶ 210–211).

For requirement 8.f of claim 8 regarding the second manager process requesting additional resources in view of service level parameters, Petitioner interprets service level parameters as satisfied by "measurable application goals." Pet. 33–34 (citing Madisetti Decl. ¶¶ 212–217). Petitioner relies on the disclosure in Jones of an activity seeking a resource renegotiation with a remote resource manager and requesting additional resources when the activity's comparison of performance goals to performance information shows lagging performance. *Id.* at 34 (citing Madisetti Decl. ¶ 218).

For requirement 8.g of claim 8 regarding dynamic reallocation of resources by the first manager process, Petitioner relies on the disclosure in Jones of the remote resource planner (first manager process) dynamically reallocating between computer systems in response to the requests it receives for additional resources based on a resource renegotiation. Pet. 35 (citing Ex. 1041, 12:20–24; Madisetti Decl. ¶ 219).

Independent claim 1 is a computing system counterpart to method claim 8, and includes requirements substantially the same as those of claim 8. Ex. 1001, 15:4–25. Petitioner essentially repeats its arguments made for claim 8, and also argues that the conventional and obvious way to implement a software-implemented process was by having a "computer readable storage medium" that stores instructions that, when executed by the processor, perform the claimed functions of the process. Pet. 35–37 (citing Madisetti Decl. ¶¶ 221–230).

b) Patent Owner's Preliminary Response

With respect to requirement 8.b of claim 8, that the first manager process allocate resources between computing domains (and the

commensurate requirement of claim 1), Patent Owner argues that this requirement is not met by the resource planners of Jones (the alleged first manager process) because the resource planners allocate resources to activities, not between pluralities of computing domains as required by the claims. Prelim. Resp. 29–30 (citing Ex. 1041, 4:63–64). Patent Owner argues that an activity can "span address spaces, thread or process boundaries, and even machines . . . so allocating to an activity does not constitute allocating to a computing domain." *Id.* at 30 (citing Ex. 1041, 4:53–62).

With respect to requirement 8.d of claim 8, that the second manager maintains a list of a plurality of application priority levels and needed resources (and the commensurate requirement of claim 1), Patent Owner argues that this requirement is not met by the activities of Jones (the alleged second manager process) because, as Petitioner admits, Jones never discloses that the activities maintain such a list. Prelim. Resp. 31 (citing Pet. 30). Patent Owner argues that Petitioner's assertion that the list requirement was nevertheless obvious is "conclusory . . . without any reasoned analysis." *Id.* at 31.

In particular, Patent Owner argues that Petitioner's reliance on the activity importance level as the required "application priority level" is flawed, because that importance value is used solely by the resource planner of Jones, not the activity, and in any event an activity's "importance" is not equivalent to an application's priority. *Id.* at 32–35 (citing Ex. 1041, Fig. 6A, 1:7–10, 4:49–62, 7:33–37, 10:13–23, 10:43–11:10, 11:11–29). As Patent Owner explains, Petitioner associates the activity of Jones with the claimed second manager process, not the claimed applications, and so the

activity importance of Jones cannot be the claimed ***application*** priority level. *Id.* at 32–33. Also, argues Patent Owner, there is no disclosure in Jones that the activity makes use of its importance — only the resource planner makes use of that value. *Id.* at 33–35. Thus, argues Patent Owner, there is no support for Petitioner's argument that it would have been obvious for an activity of Jones to maintain a list of its own importance, let alone the importance of other activities. *Id.* at 39–41.

Patent Owner also challenges Petitioner's claim construction that requirement 8.d requires only one application priority level for an application. Prelim. Resp. 35–38. Patent Owner points to the plain language of requirement 8.d, requiring "a plurality of application priority levels for said at least one application." *Id.* at 35–36. Patent Owner argues that the separate phrase later in requirement 8.d, "said at least one level of said application priority levels," would have been understood, in light of the prosecution history of the '005 application, to refer back to the claimed plurality of application levels, particularly given that the commensurate language in claim 1 is "said at least one level of ***said plurality of application*** priority ***levels***." *Id.* at 36–37 (citing Ex.1002, 186, 188). Patent Owner also cites portions of the '005 specification to dispute Petitioner's assertion that the specification does not disclose a plurality of application priority levels for an application. *Id.* at 37–38 (citing Ex. 1001, Figs. 4A, 4B, 4:23–29, 7:14–16, 9:28–30, 10:37–39). In addition, Patent Owner challenges, as conclusory and lacking in foundation, Petitioner's backup argument, that even if requirement 8.d required a plurality of application priority levels for an application, Jones discloses such. *Id.* at 38–39.

Further to requirement 8.d of claim 8 that the list comprise "an indication of a quantity of said plurality of resources needed to meet said at least one level of said application priority levels," Patent Owner argues that Petitioner has not shown an activity's information gathering indicates a "quantity" of resources that has any association with activity importance. Prelim. Resp. 41–43. Patent Owner argues that Petitioner's reliance on the disclosure in Jones of the activity querying the needs of resource providers does not relate to an indication of resources needed to meet application priority levels. *Id.* at 41–42 (citing Ex. 1041, Fig. 2, 5:64–6:9). Patent Owner further argues that the disclosure in Jones of caching the results of empirical estimates of resources used by an activity does not store the quantity of resources used and are not associated with any application priority level. *Id.* at 42–43 (citing Ex. 1041, Fig. 2, 4:28–32, 5:59–63, 6:6–9, 7:13–19, 7:33–44). Patent Owner argues that Petitioner's conclusory argument that "lists were known" in other contexts is an insufficient basis for showing obviousness of the subject claim limitation. *Id.* at 43.

With respect to requirement 8.e of claim 8 of a performance monitor (and the commensurate requirement of claim 1), Patent Owner argues that this requirement is not met by the combination of Jones and Agrawal. Prelim. Resp. 46–49. Patent Owner's arguments are summarized in Section III.D.3 above.

With respect to requirement 8.f of claim 8, that the second manager process request additional resources from the first manager process (and the commensurate requirement of claim 1), Patent Owner argues that this requirement is not met by the activities of Jones (the alleged second manager process) because an activity only requests resources from its local resource

planner (the alleged first manager process). Prelim. Resp. 27–29. Patent Owner recognizes that Jones discloses that when an activity requests remote resources, the local resource planner receives the request and forwards the request to the remote resource planner for the machine on which the remote resource is found. *Id.* at 28–29 (citing Ex. 1041, Fig. 9, 13:13–29). But Patent Owner argues this does not satisfy requirement 8.f, because the remote resource planner receives and responds to requests from the local resource planner, not the activity. *Id.*

With respect to requirement 8.g of claim 8, dynamically reallocating resources "according to service level parameters" (and the commensurate requirement of claim 1), Patent Owner argues that this requirement is not met by the "performance goals" of Jones. Prelim. Resp. 44–46. Patent Owner argues that Petitioner's reliance on step 86 of Figure 7A of Jones, which states "Activity resource needs change," does not support the requirement. *Id.* at 45. Patent Owner points out that Petitioner admits that "Jones does not expressly say how the determination is made in step 86 that the activity's resource needs have changed." *Id.* at 45–46 (citing Pet. 14, 17).

c) Analysis

As elaborated below, Petitioner does not show a likelihood of success with respect to its challenges to claims 1 and 8 in light of certain of Patent Owner's arguments.

For claim requirement 8.b, we do not agree with Patent Owner that resource planner of Jones does not allocate resources between computing domains, but rather allocates resources to activities. Because activities can be in different computer systems, the allocation by the resource planner of

resources to activities also allocates resources to different computer systems (the asserted computing domains). For claim requirement 8.e. we agree with Petitioner that the combination of Jones and Agrawal teaches the performance monitor requirement. *See* Sections III.D.3 and III.D.4.a) above. For claim requirement 8.f, we do not agree with Patent Owner that Jones fails to teach this requirement because the remote resource planner receives and responds to requests from the local resource planner, not the activity. As stated in the '005 patent, "the PLM may reside in each partition, and cooperatively allocate resources amongst themselves." Ex. 1001, 4:18–20. Likewise, claim requirement 8.f is satisfied by the coordination of the resource planners — which in Jones correlates to the PLM of the '005 specification — to allocate resources among the computer systems.

On the other hand, we determine that Petitioner does not sufficiently show a likelihood of success with respect to claim requirement 8.d, and the commensurate requirement of claim 1, being taught by the combination of Jones and Agrawal, for the reasons argued by Patent Owner. As discussed above in Section II.B, applicants persuaded the Examiner to allow claims 1 and 8 after amending them to add this requirement. We do not agree with Petitioner that the requirement of "a plurality of application priority levels for said at least one application" only requires one application priority level for an application — that interpretation is contradicted by the plain language of the claim and the prosecution history. Nor do we agree that the '005 patent does not disclose this requirement. For example, the '005 specification provides:

> For example, a first application may be a first database and the user will specify in the configuration file that the characteristic is for a particular type of transaction to be completed within

> two seconds, and have a high priority. The application may also have a second goal for the same characteristic, e.g. the same type of transactions are to be completed within one half of a second, and have a low priority.

Ex. 1001, 6:14–20. Moreover, the "importance level" of Jones, which is the alleged priority level, is only used by the resource planner of Jones (the alleged first manager process), not by the activity of Jones (the alleged second manager process). Therefore, there is no teaching in Jones that the activity maintains a list of importance levels. In addition, there is no basis for a teaching that the activity maintains a list of the quantity of resources needed to meet application priority levels, as required. In sum, Petitioner's assertions, and Petitioner's expert Dr. Madisetti's testimony, is unpersuasive as conclusory and without sufficient foundation.

Likewise, we determine that Petitioner does not show a likelihood of success of proving that Jones teaches the use of dynamically reallocating resources "according to service level parameters," as required by claim requirement 8.g and commensurately by claim 1. Petitioner's reliance on step 86 of Figure 7A of Jones is insufficient.

Accordingly, for the reasons set forth above, we determine that the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that claims 1 and 8 would have been obvious over the combination of Jones and Agrawal.

E. Alleged Obviousness of Claims 1–20 over Jones, Agrawal and Gien

Petitioner challenges claims 1–20 as obvious in light of the combination of Jones, Agrawal and Gien. Pet. 38–68.

1. Independent Claims 1, 8, and 15

In challenging claims 1 and 8 as obvious over the combination of Jones, Agrawal and Gien, Petitioner essentially repeats its arguments made above as to the obviousness of those claims over the Jones/Agrawal combination, except that Petitioner relies on Gien as teaching implementing the computer systems of Jones as virtual machines. Pet. 47–49, 57–58. Even assuming *arguendo* that one of ordinary skill would have been motivated to combine Gien with Jones and Agrawal to incorporate virtual machine technology into the combination, our determination, set forth above, that the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that claims 1 and 8 would have been obvious over the combination of Jones and Agrawal applies equally to the combination of Jones, Agrawal and Gien.

Independent claim 15 is a computer readable storage medium counterpart to method claim 8, and includes requirements substantially the same as those of claim 8, except that it does not require the second manager process to maintain a list comprising a plurality of application priority levels for said at least one application. Ex. 1001, 16:25–46. Instead of the list requirement, claim 15 requires that resource requests are "in response to . . . an indication of a quantity of resources needed to meet said at least one service level parameter" (Ex. 1001, 16:34–40). As discussed above in Section II.B, applicants persuaded the Examiner to allow claim 15 after amending it to add this requirement.

For claim 15, Petitioner essentially repeats applicable arguments made for claim 8, and for claim 1 in regard to requirement for a "computer readable storage medium." Pet. 62–66 (citing Madisetti Decl. ¶¶ 364–372).

For the requirement that resource requests are "in response to . . . an indication of a quantity of resources needed to meet said at least one service level parameter" (at Ex. 1001, 16:34–40), Petitioner again argues that a "service level parameter" is a performance goal and relies on the disclosure in Jones that an activity initiates a resource renegotiation when an analysis of performance data indicates that the associated application performance is below a performance goal. *Id.* at 64 (citing Madisetti Decl. ¶¶ 368–369).

Patent Owner's response, *inter alia*, argues that the asserted combination does not satisfy the requirement that resource requests are "in response to … an indication of a quantity of resources needed to meet said at least one service level parameter." Prelim. Resp. 44–46. As discussed above, Patent Owner argues that Petitioner's reliance on step 86 of Figure 7A of Jones, which states "Activity resource needs change," does not support the requirement of a service level parameter. *Id.* at 45. Patent Owner also argues that there is no clear support for any indication of resources needed to meet a service level parameter. *Id.* at 44–45. As discussed above for claim requirement 8.g, on the present record, Petitioner does not sufficiently show that Jones teaches requesting resources needed to meet service level parameters as required by claim 15. Petitioner's reliance on step 86 of Figure 7A of Jones is insufficient.

Accordingly, we determine that the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that claim 15 would have been obvious over the combination of Jones, Agrawal and Gien.

2. Claims 2–7, 9–14, and 16–20

Given our determination that the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that independent claims 1, 8, and 15 would have been obvious over the combination of Jones, Agrawal and Gien, we likewise determine that the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that dependent claims 2–7, 9–14, and 16–20 would have been obvious over that combination.

IV. DISCRETIONARY DENIAL OF INSTITUTION

Patent Owner argues that we should exercise our discretion to deny institution because "the '005 Patent is the subject of three petitions and nine duplicative grounds based on recycled references filed by two parties who have been coordinating efforts for years to needlessly increase costs to Patent Owners." Prelim. Resp. 24. Patent Owner refers to this proceeding as well as IPR1406, both brought by Petitioner, and IPR1399 brought by Unified Patents. *Id.* Patent Owner argues that the IPRs are "needlessly complicated and duplicative," and that under these circumstances "the Board has 'discretion to deny institution of the petition as a whole . . . even when the petition includes at least one claim subject to a challenge that otherwise meets the criteria for institution.'" *Id.* at 23–24 (citing Trial Practice Guide[7] 64).

[7] Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019), available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

However, because we are denying institution on the merits, it is unnecessary to determine whether it is appropriate to exercise our discretion to deny institution based on multiple petitions.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied and no *inter partes* review is instituted.

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