

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORPORATION,
Petitioner,

v.

EDGE NETWORKING SYSTEMS, LLC,
Patent Owner.

IPR2025-00618
Patent 11,695,823 B1

Before NABEEL U. KHAN, STACY B. MARGOLIES, and
JASON M. REPKO, *Administrative Patent Judges*.

KHAN, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

Microsoft Corporation (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–5, 7, 8, 12–15, 18, and 19 (“the challenged claims”) of U.S. Patent No. 11,695,823 B1 (“the ’823 patent,” Ex. 1001). Edge Networking Systems, LLC (“Patent Owner”) filed a Preliminary Response (Paper 10, “Prelim. Resp.”).

An *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . 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.” 35 U.S.C. § 314(a). Having considered the arguments and evidence presented by Petitioner and Patent Owner, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on at least one of the challenged claims of the ’823 patent. We institute *inter partes* review as to all the challenged claims of the ’823 patent on all the grounds of unpatentability set forth in the Petition.

B. *Related Proceedings*

The parties identify the following pending matters as involving the ’823 patent: *Edge Networking Systems, LLC v. Microsoft Corporation*, No. 1:24-cv-215-DAE (W.D. Tex.) (Feb. 29, 2024); *Edge Networking Systems LLC v. Amazon.Com, Inc.*, et al., No. 2-24-cv-00887 (E.D. Tex) (Nov. 1, 2024). Pet. 80; Paper 3, 1.

C. *The ’823 Patent (Ex. 1001)*

The challenged patent relates to a Distributed Software Defined Network (dSDN). Ex. 1001, Abstract. The dSDN “is an end-to-end architecture that enables secure and flexible programmability across a network with full lifecycle management of services and applications

(fxApp). The dSDN also harmonizes fxAPP deployment across the network independent of the hardware vendor.” *Id.* at 7:57–62. According to the challenged patent, this simplifies the entire deployment lifecycle. *Id.* at 7:62–64.

A high-level overview of a dSDN system is depicted in Figure 3, reproduced below.

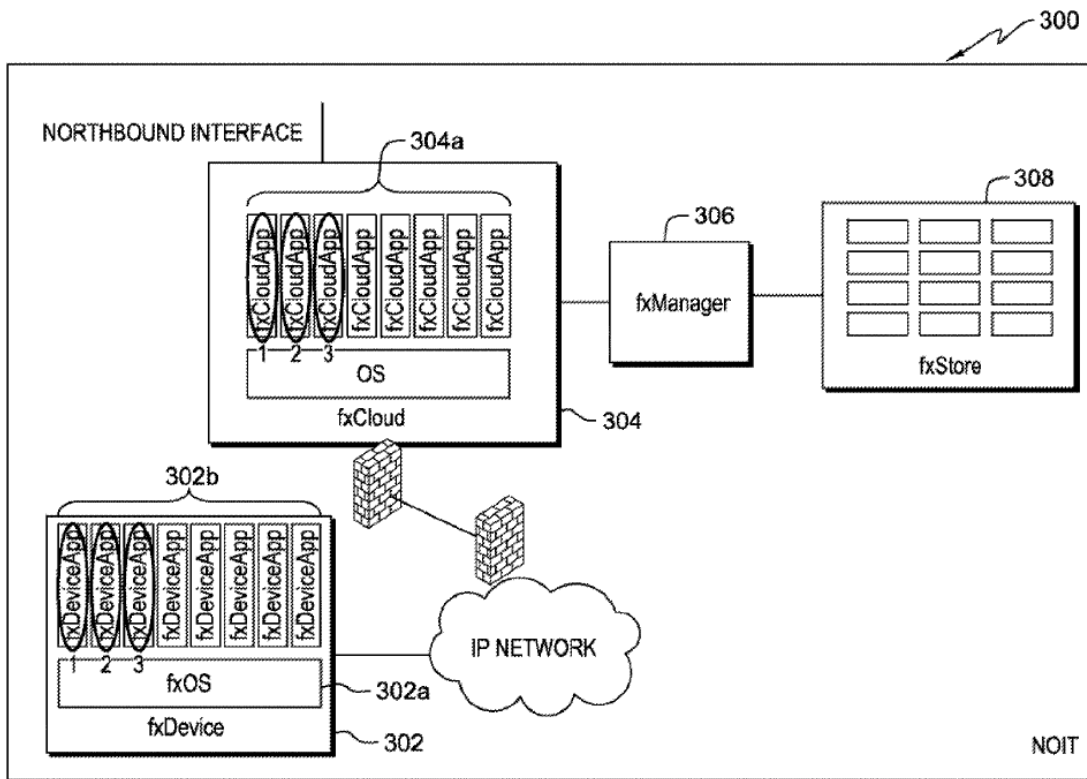


FIG. 3

Figure 3 of the '832 patent, reproduced above, depicts dSDN system 300 consisting of flexible network device (fxDevice) 302, flexible cloud platform (fxCloud) 304, application management portal (fxManager) 306, and infrastructure application market place (fxStore) 308. *Id.* at 10:9–13. The fxDevice may host several independent and securely isolated applications named fxDeviceApp, depicted as elements 302b in Figure 3. *Id.* at 10:21–24. The fxDeviceApp may have a sister app in the cloud

infrastructure referenced as fxCloudApp 304a. *Id.* at 10:25–27. The fxCloudApp is paired with the fxDeviceApp and collectively forms a distributed application. *Id.* at 10:27–31.

D. Illustrative Claims

Claims 1 and 19 are the only independent claims of the '823 patent at issue in this proceeding. Claim 1 is reproduced below with limitation identifiers in brackets corresponding to claim analysis headings in the Petition. *See, e.g.*, Pet. 43–57.

1.[1.0] A system comprising:

[1.1] a programmable network device adapted to host a plurality of network device applications;

[1.2] a programmable cloud device adapted to host a plurality of cloud applications; and

[1.3] wherein the plurality of network device applications and the plurality of cloud applications are in secure communication with each other to form distributed applications; and

[1.4] wherein the plurality of network device applications and plurality of cloud applications device form unified capabilities enabling a plurality of upper layer application programming interfaces (APIs) to program the plurality of network device applications and plurality of cloud applications independent of network device hardware and cloud device hardware.

Ex. 1001, 37:40–37:54.

E. Evidence

The Petition relies on the following references:

Reference	Exhibit No.
US 6,496,575 B1; filed June 7, 1999; issued Dec. 17, 2002 (“Vasell patent”)	1004
Excerpts from A. de Castro Alves, <i>OSGi in Depth</i> , Manning Publications Company (2012)	1008

Reference	Exhibit No.
Excerpts from R. Hall, <i>OSGi in Action - Creating Modular Applications in Java</i> , Manning Publications Company (2011)	1009
J. S. Rellermeyer and S. Bagchi, <i>Dependability as a Cloud Service – a Modular Approach</i> , IEEE/IFIP International Conference on Dependable Systems and Networks Workshops (DSN 2012) 1–6 (2012) ¹	1011
U.S. Provisional Patent Application No. 60/088,437, filed on June 8, 1998, claimed as a priority application by the Vasell patent (“1 st Vasell Provisional”)	1015
U.S. Provisional Patent Application No. 60/123,971, filed on March 12, 1999, claimed as a priority application by the Vasell patent (“2 nd Vasell Provisional”)	1016

Petitioner also relies on the Declaration of Dr. Erez Zadok (Ex. 1003) in support of its arguments. The parties rely on other exhibits as discussed below.

F. Asserted Grounds of Unpatentability

Petitioner sets forth the following challenges (Pet. 22):

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1	1–2, 12–15, 19	103	Vasell, Alves, Rellermeyer
2	3–5, 7–8, 18	103	Vasell, Alves, Rellermeyer, Hall

II. ANALYSIS

A. Principles of Law

Petitioner bears the burden of persuasion to prove unpatentability of the claims challenged in the Petition, and that burden never shifts to Patent

¹ Pet. 22–23 (citing Ex. 1014 ¶¶ 20–43).

Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A patent claim is unpatentable under 35 U.S.C. § 103(a) 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 skill in the art; and (4) any objective evidence of obviousness or non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (internal quotation marks and citation omitted).

Petitioner argues that a person of ordinary skill in the art (POSITA) “would have had a bachelor’s degree in computer science, computer engineering, or equivalent degree, and approximately three years of experience working in the computer science or engineering field.” Pet. 12 (citing Ex. 1003 ¶ 58). Petitioner further argues that “[a]dditional experience might substitute for less education and vice versa” and that “POSITAs in June 2013 would have been knowledgeable about the design and management of networked systems and virtualization technologies, and

familiar with operating/distributed systems and security and privacy techniques.” *Id.* Patent Owner “does not contest Petitioner’s proposed definition” of a POSITA at this stage of the proceeding. Prelim. Resp. 17.

For purposes of this Decision, we adopt Petitioner’s proposed level of ordinary skill because it is consistent with the level of skill in the art at the time of the invention as reflected by the ’823 patent and the cited prior art.

C. Claim Construction

We apply the same claim construction standard used in district court actions under 35 U.S.C. § 282(b), namely that articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b) (2020).

In applying that standard, claim terms generally are given their ordinary and customary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Only claim terms in controversy require express construction, “and only to the extent necessary to resolve the controversy.” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *see also Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

Petitioner “proposes that each claim term in the Challenged Claims be given its plain and ordinary meaning in this proceeding, and that no specific claim construction of any claim term is required.” Pet. 10. Petitioner explains that the parties have proposed “different constructions for various claim terms pending in the Related Litigation” but that the Grounds “render the claims unpatentable under either party’s construction, and any reasonable construction, and thus the Board need not construe any term.” *Id.* at 10–11 (citing Ex. 1003 ¶ 367; Ex. 1070; Ex. 1071).² Patent Owner does not expressly address claim construction in its Preliminary Response.

We determine that, at this stage of the proceeding, no explicit constructions are required to resolve the dispute between the parties. A final determination as to claim construction will be made at the close of the proceeding, after any hearing, based on all the evidence of record. The parties are expected to assert all their claim construction arguments and evidence in the Petition, Patent Owner’s Response, Petitioner’s Reply, Patent Owner’s Sur-reply, or otherwise during trial, as permitted by our rules.

D. Overview of Prior Art

Petitioner relies on Vasell, Alves, Rellermeyer and Hall in its asserted grounds. *See* § I.F. Below we provide an overview of the relies upon references.

² Petitioner addresses one term from dependent claim 12 and one term from dependent claim 7 “to the extent Patent Owner (‘PO’) argues or the Board finds they are governed by means-plus-function” by relying on Patent Owner’s identification of structure for those terms from the parallel litigation. Pet. 11 (citing Ex. 1070, 9–10, 16–19; Ex. 1071, 12–13, 19–20). Patent Owner does not argue that these terms should be construed as means-plus-function terms in this proceeding.

1. Overview of Vasell

Vasell³ describes a distributed-system architecture that Petitioner asserts “was used as the foundational architecture for the first OSGi specification in January 2000.” Pet. 16. Vasell’s Figure 2, below, shows a service gateway system for connectivity based services. Ex. 1004, 4:31–33.

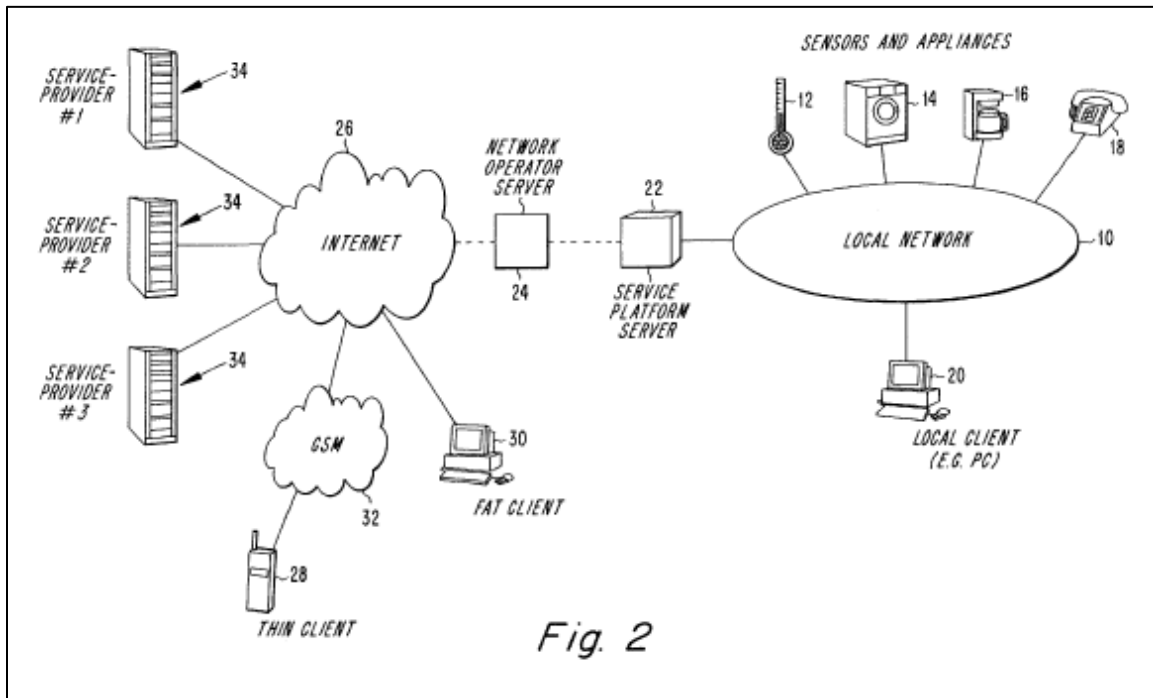


Figure 2 shows local client 20 and household sensors and appliances, including thermostat 12, washing/drying appliance 14, coffee maker 16, and telephone 18. *Id.* at 5:36–60. Service platform server 22 is installed at the user’s location and connected to the user’s local network 10. *Id.* at 5:64–6:4. Service platform server 22 interacts with the local devices to implement connectivity-based services. *Id.* at 6:5–8. For example, telephony services

³ Petitioner collectively refers to the issued Vasell patent (Ex. 1004) and its corresponding provisional applications (Exs. 1015, 1016) as “Vasell.” For purposes of this Decision, we do as well.

may interact with the user's landline or wireless services for billing, special calling plans, voicemail, or Internet protocol (IP) telephony. *Id.* at 6:34–39.

Once the user has been confirmed as a subscriber, network operator server 24 maintains and controls service platform server 22. *Id.* at 8:16–20. Network operator server 24 can install software from service provider equipment 34 to server 22 to enable the user to control the devices in the user's home. *See id.* at 8:16–46, 59–64. This software is distributed with portions of the software residing, for example, on service provider equipment 34, and another portion residing on network operator server 24, while a third portion may reside on service platform server 22. *Id.* at 8:59–66.

The distributed applications are called “service applications.” *Id.* at 12:11–29. Vasell's Figure 6 shows an example implementation of a connectivity-based service. *Id.*

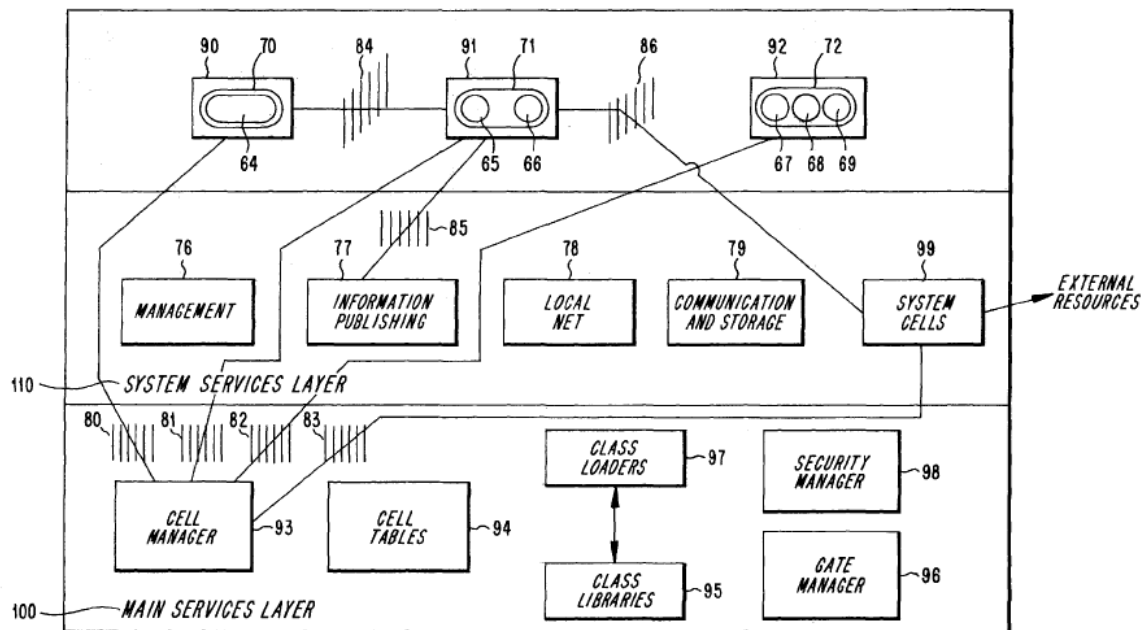


FIG. 6

Figure 6 shows three service applications (70–72) in three cells (90–92) and seven gates (80–86) connecting various system elements across system services layer 110 and main services layer 100. *Id.* at 12:21–23. System services layer 110 includes management system service 76, information publishing system service 77 for publishing or transmitting information for display, and local net 78 system service, among other things. *Id.* at 22:32–53. Service applications 70–72 include boxlets 64–69. *Id.* at 13:28–29. Boxlets 64–69 have software code, programs, subroutines, arguments, or programming logic. *Id.* at 13:29–33. The development of boxlets is not restricted to any particular software language or operating system and the only code specific to development of the boxlets is in class libraries 95, which contain the service application program interfaces for the main services layer and the system services layer. *Id.* at 13:37–43. Cells 90–92 represent available resources to the service applications and contain the boxlets. *Id.* at 13:50–51, 14:45–48. Cells 90–92 are implemented using class loaders 97 and provide encapsulation, protection, and access restrictions for service applications 70–72. *Id.* at 13:64–67. Cells are disabled or enabled by cell manager 93, which is part of the main services layer. *Id.* at 16:55–57; 20:32–34. System services in the system services layer include the management system service which provides an external interface through which the service applications 70–72 may be downloaded, installed, removed, executed, and controlled. *Id.* at 22:32–38.

2. *Overview of Alves, Hall, and Rellermeyer*

According to Petitioner, Alves, Hall, and Rellermeyer describe technical details for implementing Vasell’s teachings. Pet. 36. Alves is an excerpt from a textbook, *OSGi In Depth*, describing, among other things, how to implement OSGi-compatible systems in a cloud environment.

Ex. 1008, 264–66. Similarly, Hall consists of excerpts from a textbook, *OSGI In Action*, describing how the bundles are deployed and how applications are secured. *See* Ex. 1009, 331–34 (describing deployment), 438–39 (describing Java’s security architecture and signing bundles). Rellermeyer describes turning OSGi services into elastic deployment units replicated across multiple cloud nodes. Ex. 1011, 4.

E. Combination of Vasell, Alves, Rellermeyer, and Hall

As explained above, Petitioner contends that the technical implementation details that were intended to implement Vasell’s teachings are described in Alves, Rellermeyer, and Hall. Pet. 36. Petitioner argues, therefore, that the motivation to modify Vasell to include features described in the other references is demonstrated by the references themselves. *Id.* at 36–37 (citing Ex. 1003 ¶¶ 375–376).

For example, according to Petitioner, a POSITA would have been motivated to modify Vasell with Alves’ teaching of a centralized application repository for storing its distributed applications to provide increased scalability. *Id.* at 38, 39 (citing Ex. 1008, 263, 266; Ex. 1003 ¶¶ 378–379). Petitioner contends that a POSITA would have been motivated to modify Vasell with Rellermeyer’s management software to provide for load balancing, failover and elastic scalability. *Id.* at 38 (citing Ex. 1003 ¶ 380). Finally, Petitioner argues that a POSITA would have been motivated to modify Vasell with Hall’s management software that requires digital signatures for distributed applications to provide increased security for using third party applications. *Id.* at 38, 39 (citing Ex. 1003 ¶ 381).

Patent Owner does not separately dispute Petitioner’s contention that a POSITA would have been motivated to combine Vasell, Alves, Rellermeyer, and Hall.

We have reviewed Petitioner's contentions regarding the motivation to combine the prior art references and determine that Petitioner has established a reasonable likelihood that a person of ordinary skill in the art would have combined Vasell, Alves, Rellermeyer, and Hall with a reasonable expectation of success for the reasons provided by Petitioner.

F. Ground 1 – Obviousness over Vasell, Alves, and Rellermeyer

Petitioner argues claims 1–2, 12–15, and 19 of the '823 patent are unpatentable as obvious over the combination of Vasell, Alves, and Rellermeyer. Pet. 43–67. Below we analyze Petitioner's contentions in light of Patent Owner's arguments.

1. Analysis of Claim 1

Petitioner challenges claim 1 over the combination of Vasell, Alves and Rellermeyer, arguing that the combination discloses the preamble and limitations 1.1–1.4. Pet. 43–57. Petitioner supports its arguments with citations to the asserted prior art and to the testimony of Dr. Zadok. *Id.* Patent Owner does not separately dispute Petitioner's contentions for the preamble and limitations 1.1–1.3 and instead focuses its arguments on limitation 1.4. Prelim. Resp. 20–34. We determine Petitioner has, for purposes of institution, established a reasonable likelihood that a person of ordinary skill in the art would have combined Vasell, Alves, and Rellermeyer with a reasonable expectation of success and that the combination teaches the preamble⁴ and undisputed limitations 1.1–1.3.

⁴ Because we determine Petitioner has shown sufficiently for purposes of institution that the prior art satisfies the recitation in the preamble, the issue of whether the preamble is limiting need not be resolved at this stage.

a) Preamble and Undisputed Limitations 1.1–1.3

For example, Petitioner contends that Vasell discloses a service gateway system that utilizes distributed processing across various servers. Pet. 43–44 (citing Ex. 1004, Fig. 2). Petitioner contends the recited “programmable network device” of limitation 1.1 is Vasell’s service platform server 22 (Pet. 46 (citing Ex. 1004, 5:61–6:20, 6:45–49, 10:32–41)), the recited “programmable cloud device” of limitation 1.2 are Vasell’s service provider equipment 34 and network operator server 24 (Pet. 47–48 (citing Ex. 1004, 6:45–7:20, 9:25–40, 11:40–46; Ex. 1016, 5–9)), and the recited “network device applications” and “cloud applications” are Vasell’s distributed service applications that are distributed across the service platform server 22, service provider equipment 34, and network operator server 24 (Pet. 45, 46, 48 (citing Ex. 1004, 2:64–3:6, 8:53–9:24)).

Petitioner contends that Vasell discloses that its service applications communicate securely with each other, as required by limitation 1.3, through techniques such as data encryption and through sandboxing which restricts any one application’s access to system resources. Pet. 52–53 (citing Ex. 1004, 11:59–12:10; Ex. 1016, 3, 6).

We have reviewed Petitioner’s contentions and the cited evidence for the preamble and limitations 1.1–1.3 of claim 1 and are persuaded that Petitioner has demonstrated a reasonable likelihood that the combination teaches the preamble and undisputed limitations for the reasons provided in the Petition. Below, we analyze Petitioner’s contentions for disputed limitation 1.4 in light of Patent Owner’s arguments.

b) Disputed Limitation 1.4

Limitation 1.4 of claim 1 recites “wherein the plurality of network device applications and plurality of cloud applications device form unified

capabilities enabling a plurality of upper layer application programming interfaces (APIs) to program the plurality of network device applications and plurality of cloud applications independent of network device hardware and cloud device hardware.” Ex. 1004, 37:48–54. Petitioner contends that Vasell discloses this limitation. Pet. 55. Specifically, Petitioner emphasizes the open nature of Vasell’s service gateway system, which “can be used by several independent service providers” and includes a development environment that follows the “write-once, run-everywhere” maxim. Pet. 55–56 (quoting Ex. 1016, 4, 9) (emphases omitted). Petitioner provides five reasons why a POSITA would have understood Vasell to teach limitation 1.4:

POSITAs understood that Vasell discloses this limitation given that (1) the distributed Java service applications are naturally modular; (2) the respective underlying Java software components, of such distributed service applications, use standardized communication protocols to communicate with each other; (3) standard Java APIs are used for their development; (4) “flexible”, “transparent”, and standards-compatible interfaces are used for their lifecycle management in the service gateway system; and (5) these standard development and management APIs are usable regardless of the respective service platform servers’ hardware and remote (cloud) servers’ hardware on which the respective JVMs run on the respective OSs.

Pet. 56–57 (citing Ex. 1004, 20:45–49, 14:15–17, 20:55–58, 22:49–53, 8:53–58, 9:13–19; Ex. 1003 ¶¶ 466-467)⁵.

⁵ Petitioner has used a color scheme “to annotate the same elements in the ’823 Patent and the prior art.” Pet. 1. In this Decision, we omit Petitioner’s colors in all quotations from the Petition.

Patent Owner argues⁶ that none of the portions of Vasell cited by Petitioner teach upper layer API programming applications. Prelim. Resp. 21–28. Patent Owner also disputes that the five reasons provided by Petitioner (quoted above) demonstrate that Vasell teaches limitation 1.4. *Id.* at 28–31. Finally, Patent Owner takes issue with Petitioner’s reliance on Java’s “write-once, run-everywhere” maxim as providing relevant support for Petitioner’s positions. *Id.* at 31–32.

Having reviewed the record presently before us, we are persuaded by Petitioner’s arguments at this stage of the proceeding. Petitioner argues that Vasell discloses Java service applications that are distributed, modular, standardized, and developed using standard Java APIs, and that standards-

⁶ Patent Owner additionally argues that the “Petition has failed to explain how the disclosures from Vasell—including its provisional application (Ex. 1016)—are anything other than cumulative of the Ven der Merwe reference already considered and rejected during prosecution.” Prelim. Resp. 18; *see also id.* at 18–20 (arguing that Petitioner has failed to show how Vasell is different than Van der Merwe). Patent Owner made the same argument in its Discretionary Denial Brief. *See* Paper 9, 12–25. Whether an asserted prior art reference is cumulative of a reference that was previously before the Office is a discretionary denial consideration presented in the Director’s Memorandum on Interim Processes for PTAB Workload Management (“Process Memorandum”). *See* Process Memorandum at 2 (listing considerations under *Advanced Bionics, LLC v. MED-EL Electromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 (Feb. 13, 2020) (precedential), available at <https://www.uspto.gov/sites/default/files/documents/InterimProcesses-PTABWorkloadMgmt-20250326.pdf> (accessed September 27, 2025)). For this reason, we do not address Patent Owner’s argument. *See* Q.23 of FAQs for Interim Processes for PTAB Workload Management (“Unless otherwise authorized by the Director, the Board panel will not address any discretionary considerations presented in the Process Memorandum.”), available at <https://www.uspto.gov/patents/ptab/faqs/interim-processes-workload-management> (accessed September 27, 2025).

compatible interfaces are used for their lifecycle management in the service gateway system. Pet. 56–57 (citing Ex. 1004, 20:45–49, 14:15–17, 20:55–58, 22:49–53, 8:53–58, 9:13–19; Ex. 1003 ¶¶ 466-467). We agree with Petitioner that this demonstrates a reasonable likelihood that Vasell teaches the recited applications form unified capabilities to enable them to be programmed by upper level APIs in a way that is independent of the hardware of the network and cloud devices.

(1) *Hardware Independence of Vasell’s Service Applications*

Vasell teaches that its development environment for its distributed application software “must follow the ‘write-once, run-everywhere’ maxim” and that its e-service infrastructure “must be flexible, open and modular.” Ex. 1016, 4. Dr. Zadok testifies that the “‘open’ nature of the service gateway system” demonstrates the importance of the service applications being hardware-independent as does the “write-once, run-everywhere” maxim. Ex. 1003 ¶¶ 455, 458.

Patent Owner argues that Vasell’s “write-once, run-everywhere” maxim is irrelevant and “simply reflects the commonplace notion that Java bytecode can execute on any Java Virtual Machine.” Prelim. Resp. 31–32.

We determine that the aforementioned disclosure from Vasell and testimony from Dr. Zadok support Petitioner’s contention that Vasell teaches programming of its distributed applications in a manner that was “independent of network device hardware and cloud device hardware” as recited in claim 1. We determine, contrary to Patent Owner’s argument, that the “write-once, run-everywhere” maxim disclosed in Vasell is relevant evidence of the device-independent nature of the service applications described by Vasell. Ex. 1003 ¶ 458.

(2) *Plurality of Upper Level APIs to Program the Plurality of Network Device Applications and Plurality of Cloud Applications*

Vasell teaches that its service applications are developed using standard Java APIs and also certain APIs that are specific to the development of boxlets. For example, Vasell explains that the distributed applications will interact with Vasell's e-service infrastructure through Java application program interfaces (API) that comply with mainstream Java development. Ex. 1016, 4. Vasell also discloses that "[b]oxlets are created using a standard Java development environment, [such as] the Java development kit (JDK) . . . as well as other development environments." *Id.* at 8. Vasell further explains that its service applications include boxlets, which consist of code that implements the service associated with the service application. Ex. 1004, 13:28–33. These boxlets have code that is specific to their development "in class libraries 95 which contain the *service application 70–72 program interfaces* for the main services layer 100 and the system services layer 110." *Id.* at 13:39–43 (emphasis added); *see also* Ex. 1016, 8 ("The only parts that are specific to boxlet development are the libraries that contain APIs for the main services and system services layers."). At this stage of the proceeding, we determine these disclosures teach the "plurality of upper layer application programming interfaces (APIs) to program the plurality of network device applications and plurality of cloud applications" recited in limitation 1.4.

Patent Owner disputes that Vasell's disclosure of standard Java APIs and APIs specific to the development of boxlets teach the recited APIs. Prelim. Resp. 20–31. We address Patent Owner's arguments below.

Patent Owner argues that Petitioner's reliance on standard Java APIs "misses the point entirely" because claim 1 "is not concerned with general-

purpose programming language constructs.” Prelim. Resp. 30. We determine there is insufficient evidence supporting Patent Owner’s argument. At this stage of the proceeding and based on the evidence and arguments presently before us, we decline to limit the scope of the claimed “upper layer application programming interfaces (APIs)” to exclude standard Java APIs, as Patent Owner’s argument implies. To the extent Patent Owner’s arguments for patentability depend on the scope of the term “upper layer application programming interfaces (APIs),” Patent Owner should assert its claim construction arguments and evidence in its Patent Owner Response or otherwise during trial, as permitted by our rules.

Patent Owner argues that the passages from Vasell discussing code specific to the development of boxlets “discuss class libraries, rather than APIs, to develop boxlets.” Prelim. Resp. 23; *see also id.* at 32 (Java’s “standard libraries are, as their name implies, libraries and not an API”). We disagree with Patent Owner. Although the cited sections mention libraries, they clearly indicate that these libraries contain APIs that are used to develop boxlets. Ex. 1004, 13:39–43; Ex. 1016, 8.

Patent Owner also argues that the APIs used for the development of boxlets are “for ‘main services and system layers’ and not for programming applications.” Prelim. Resp 26. This argument is inconsistent with Vasell’s description which states that the APIs for the main services and system services layers are “specific to boxlet development,” indicating that they are, in fact, for programming the service applications. Ex. 1016, 8; *see also* Ex. 1004, 13:39–43 (service application program interfaces for main services and system services layer are “specific to development of boxlets.”). Furthermore, the main services and system layers provide the ability to program the service applications by managing the “service applications 70–

72 lifetimes,” and by downloading, installing, removing, executing, and controlling the service applications. *See* 20:52–54 (explaining that the cell manager 93, which is part of the main services layer, “facilitate[s] management of service applications 70–72 lifetimes and allow resource management for cells”); 22:35–38 (explaining that the system service layer includes a management system service 76 that downloads, installs, removes, executes, and controls service applications). To the extent Patent Owner is arguing that the claim term “program” excludes the management, installation, removal, execution, and control of service applications, we disagree based on the current record. To the extent Patent Owner’s arguments for patentability depend on the scope of the term “program,” Patent Owner should assert its claim construction arguments and evidence in its Patent Owner Response or otherwise during trial, as permitted by our rules.

We also disagree with Patent Owner’s argument that Vasell’s boxlets execute solely within the confines of a single gateway runtime environment and that nothing suggests that the boxlets are programmed by an API set that spans across edge and cloud domains and that is “domain-spanning [and] hardware-agnostic.” Prelim. Resp. 28. Patent Owner, at this stage of the proceeding, does not provide citations from the record evidence or expert testimony supporting its argument that Vasell’s boxlets are confined to a single gateway runtime environment. Petitioner, on the other hand, has provided sufficient evidence that Vasell’s service applications, which “include the boxlets,” (Ex. 1004, 13:28), are distributed across the service platform server, service provider server, and network operator server (Pet. 45 (citing Ex. 1004, 2:64–3:6, 8:53–9:18)) and that they are programmed using standard Java APIs and APIs specific to boxlet development (Ex.

1004, 13:39–43; Ex. 1016, 4, 8). We determine this is sufficient to demonstrate a reasonable likelihood that Vasell’s service applications “form unified capabilities enabling a plurality of upper layer application programming interfaces (APIs) to program” the service applications. To the extent Patent Owner’s arguments for patentability depend on the scope of the term “unified capabilities,” Patent Owner should assert its claim construction arguments and evidence in its Patent Owner Response or otherwise during trial, as permitted by our rules.

Having reviewed the parties’ arguments and the cited evidence, we are persuaded, at this stage of the proceeding, by Petitioner’s arguments for the reasons summarized above.

c) Conclusion – Claim 1

For the aforementioned reasons, we determine Petitioner has established a reasonable likelihood that the combination of Vasell, Alves, and Rellermeyer teaches the limitations of claim 1.

2. Analysis of Independent Claim 19

Independent claim 19 comprises a preamble and several limitations that are nearly identical to the preamble and limitations 1.1–1.4 of claim 1. *Compare* Ex. 1001, 37:40–54 *with id.* at 40:15–30. For these limitations, Petitioner relies on its contentions for claim 1. Pet. 63–64. We determine Petitioner has demonstrated a reasonable likelihood that the combination teaches the preamble and undisputed limitations for the reasons provided in the Petition and summarized above in our analysis of claim 1.

Claim 19 recites two additional limitations beyond those that correspond with limitations 1.1–1.4 of claim 1. Petitioner labels these as limitations 19.5 and 19.6. Pet. 64–65. Limitation 19.5 recites “an application management portal capable of managing life cycles of the

plurality of network device applications and plurality of cloud applications.” Ex. 1001, 40:31–33. Petitioner contends that Vasell’s service gateway system “is ‘remotely managed’ via ‘management system service’” that provides an external interface through which the service applications may be downloaded, installed, removed, executed, and controlled. Pet. 64–65 (citing Ex. 1004, 12:11–29, 20:10–22:30, 22:34–37, 15:58–17:39, 4:44–50, 5:16–26, Fig. 6; Ex. 1016, 7–8, Figs. 4, 9; Ex. 1003 ¶¶ 498–502). Petitioner contends that Vasell discloses that its cell manager performs the aforementioned operations (downloading, installing, and removing service applications) and that these operations “facilitate management of the service applications . . . lifetimes.” *Id.* at 65 (citing Ex. 1004, 20:49–54, 22:35–38).

Limitation 19.6 recites “an infrastructure application marketplace in communication with the application management portal, said infrastructure application marketplace capable of providing tested distributed applications to the application management portal.” Ex. 1001, 40:34–38. Petitioner argues that “Vasell in view of Alves discloses this limitation.” Pet. 65. Petitioner contends that Vasell’s management services provide an external interface through which service applications may be downloaded and installed from different service providers and third party developers. Pet. 65 (citing Ex. 1004, 3:10–15, 5:27–33, 10:18–23, 13:37–43, 22:35–37; Ex. 1016, 4, 7–9; Ex. 1003 ¶¶ 503–506). Petitioner acknowledges that Vasell does not explicitly disclose a centralized application repository storing the service applications developed by the different service providers and third party developers. *Id.* at 66 (citing Ex. 1004, 7:14–18, 8:29–36, 8:47–9:18; Ex. 1003 ¶ 507). For this, Petitioner relies on Alves, arguing that a POSITA would have been motivated to modify Vasell’s with Alves’ teachings of having a cloud provider give Vasell’s service gateway system

management services access to its application store in which validated applications would be stored. *Id.* at 66–67 (citing Ex. 1008, 263, 266–267, Fig. 10.12, 126–130; Ex. 1003 ¶¶ 508–513). Patent Owner does not dispute Petitioner’s contentions for limitations 19.5 and 19.6.

We have reviewed Petitioner’s contentions and, at this stage of the proceeding, determine that Petitioner has sufficiently demonstrated a reasonable likelihood that the combination of Vasell and Alves teaches the additional limitations for the reasons provided in the Petition and summarized above. Specifically, we agree with the Petitioner that Vasell teaches “managing life cycles of the plurality of network device applications and plurality of cloud applications” by disclosing that its cell manager 93, which is part of the main services layer, “facilitate[s] management of service applications 70–72 lifetimes and allow resource management for cells.” Ex. 1004, 20:49–54. We also agree, at this stage, that Alves teaches “an infrastructure application marketplace . . . capable of providing tested distributed applications to the application management portal” by disclosing an OSGi bundle repository which installs, updates, and uninstalls bundles and by disclosing that the applications in the repository are “validate[d]” before moving the applications to the cloud. Ex. 1008, 266.

3. *Analysis of Claims 2 and 12–15*

Claims 2 and 12–15 depend either directly or indirectly from claim 1. Petitioner addresses each of the limitations of dependent claims 2 and 12–15. Pet. 57–63. Petitioner demonstrates a reasonable likelihood of success in proving that at least both of the independent claims of the ’823 patent are unpatentable. At this stage of the proceeding, we do not provide an assessment of these dependent claims, which Patent Owner does not

separately address. Petitioner's assertions regarding these claims, in our view, are best left for trial after full development of the record.

4. *Conclusion – Ground 1*

We determine Petitioner has established a reasonable likelihood that the combination of Vasell, Alves, and Rellermeyer teaches the subject matter of independent claims 1 and 19.

G. *Ground 2*

Petitioner argues claims 3–5, 7, 8, and 18 of the '823 patent are unpatentable as obvious over the combination of Vasell, Alves, Rellermeyer, and Hall. Pet. 67–76. Patent Owner does not separately dispute Petitioner's contentions under Ground 2. Below we analyze Petitioner's contentions for claim 3.

1. *Analysis of Dependent Claim 3*

Claim 3 depends from claim 1 and further recites:

[3.1] an application management portal capable of managing life cycles of the distributed applications; and

[3.2] an infrastructure application marketplace in communication with the application management portal, said infrastructure marketplace capable of providing tested and certified distributed applications to the application management portal.

Petitioner contends that limitations 3.1 and 3.2 are taught by the combination of Vasell and Alves for the same reasons provided for limitations 19.5 and 19.6 above. Pet. 67–68. In addition, Petitioner contends that, to the extent Vasell and Alves do not teach “certified” distributed applications, Hall does. Pet. 68. Specifically, Petitioner relies on Hall's disclosure of requiring OSGi-application-developers to use digital signatures and certificate techniques “whereby a ‘well-known (trusted)’

party *certifies* a respective application’s authenticity if it is digitally signed by . . . [the] certificate-identified developer.” *Id.* (citing Ex. 1009, 179, 331–334, 457–463, 472–476; Ex. 1003 ¶¶ 521–525). Patent Owner does not separately dispute these contentions.

We have reviewed Petitioner’s contentions and, at this stage of the proceeding, determine that Petitioner has sufficiently demonstrated a reasonable likelihood that the combination of Vasell, Alves, Rellermeyer, and Hall teaches the limitations of claim 3 for the reasons provided in the Petition and summarized above. Specifically, Hall teaches the recited “certified distributed applications” by disclosing, for example, the use of digitally signed bundles and certificates to secure third party applications. Ex. 1009, 457–458. Petitioner demonstrates that the other limitations of claim 3 are taught by the combination for the same reasons explained in our analysis of claim 19.

2. *Claims 4, 5, 7, 8, and 18*

We have determined that Petitioner has demonstrated a reasonable likelihood of success in proving that at least one claim of the ’823 patent would have been obvious under Ground 2. At this stage of the proceeding, we do not assess Petitioner’s challenge to dependent claims 4, 5, 7, 8, and 18, which Patent Owner does not separately address.

III. CONCLUSION

Petitioner has demonstrated a reasonable likelihood of prevailing in showing the unpatentability of both independent claims and at least one challenged claim from both asserted grounds of unpatentability. Consequently, we institute on all grounds and all claims raised in the Petition. *See* C.F.R. § 42.108(a). At this stage of the proceeding, however,

we have not made a final determination with respect to the patentability of the challenged claims.

IV. ORDER

For the foregoing reasons, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–5, 7, 8, 12–15, 18, and 19 of the '823 patent is instituted with respect to all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '823 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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Patent 11,695,823 B1

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