

Filed: September 26, 2025

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BMW of North America, LLC,
Petitioner,

v.

Foras Technologies Ltd.,
Patent Owner.

IPR2024-01347
U.S. Patent No. 7,624,302

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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I. Introduction

The Petition demonstrates that the prior art renders obvious switching the role of the boot processor to a spare processor without shutting down the operating system, as claimed and described by the '302 patent. Patent Owner misconstrues this limitation as requiring the new boot processor to perform system initialization after the reboot. Paper 11 (“POR”), 25-31. Patent Owner also relies on unsupported attorney argument that cannot overcome the Petition’s Statements of Fact or showing of unpatentability of the disputed claims that are supported by Petitioner’s expert’s testimony and prior art in the record. *Id.*, 8-10, 38-48. And Patent Owner does not dispute any of the motivations to combine the prior art references, as explained in the Petition and by Dr. Brogioli. *See generally id.*

II. Petitioner’s Statements of Fact Remain Undisputed

Patent Owner admits facts set forth in Nos. 1 and 5 of Petitioner’s Statements of Facts, denies Nos. 2, 3, 6, and 8, and asserts that Nos. 4, 7, and 9 cannot be admitted or denied. POR 8-10. In denying or declining to admit these facts, Patent Owner offers no expert testimony. Instead, Patent Owner relies solely on attorney argument characterizing certain background references cited by Petitioner and Dr. Brogioli. *Id.* By contrast, Petitioner’s Statements of Facts are supported by Dr. Brogioli’s declaration, which explains the teachings of the cited prior art from

the perspective of a person of ordinary skill in the art (“POSITA”). *See* Brogioli Decl. ¶¶40-55.

Because Patent Owner’s denials rest only on unsupported attorney argument, Petitioner’s Statements of Fact remain undisputed. *Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1380 (Fed. Cir. 2009) (“[U]nsworn attorney argument ... is not evidence and cannot rebut ... other admitted evidence”); *Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017); *Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1359 (Fed. Cir. 2018).

III. Claims 1-27 Are Unpatentable

A. Patent Owner Misconstrues Switching the Role of the Boot Processor to the Spare Processor

Patent Owner argues Petitioner’s grounds fail to render obvious switching the role of the boot processor to the spare processor, as required by limitations [1d], [13e], [21e], because “[t]he role of boot processor applies during system initialization,” but “Petitioner’s proposed combination would not result in *the transferred or switched processor fulfilling the boot processor role during initialization.*” POR 11-12 (emphasis added).

Patent Owner and Mr. Jones characterize the role of the boot processor as limited to being performed “during initialization” and interpret switching the role of the boot processor to the spare processor as requiring the spare processor—the new

boot processor—to perform system initialization after system reboot or reset. *See id.*, 25-31; *see also* Ex. 2004 (Jones Decl.), ¶ 36 (contending prior art does not disclose switching processor identifier that persists through a reset); Ex. 1037 (Jones Tr.), 122:21-124:21, 138:8-136:3 (boot processor role is performed during boot-up process before operating system is running and “has no role during runtime”), 136:21-137:5 (the new boot processor needs to perform boot functions the next time the system reboots). These assertions are wrong and lack support in the claim language and specification of the ’302 patent.

First, boot processor responsibilities are not confined to the “initialization” period or boot-up process. Dr. Brogioli explains that besides performing system initialization and booting the operating system during the boot process, the boot processor “controls various system functions after the boot process.” Brogioli Decl. ¶¶ 45-47, 101. For example, the boot processor controls system shutdown, and “operat[es] as the last running processor during system shutdown.” *Id.*, ¶¶ 47, 101. Dr. Brogioli explains that “when a failure is detected in the boot processor, the boot processor should be promptly recovered to ensure continued performance of the boot processor functions during system runtime,” which would reduce system interruption and improve system reliability. *Id.*, ¶ 101.

Second, the ’302 patent claims recite that switching the role of the boot processor to a spare processor is achieved by “changing a system identifier, used by

the system's operating system to recognize the boot processor," and by "changing a system identifier of the spare processor to that of the boot processor." *See* Ex. 1001, 19:11-20 (limitations [1c], [1d]), 20:11-20 (limitations [13d], [13e]). Nothing in the claim requires the "system identifier" to "persist through a reset" or that the spare processor (new boot processor) perform initialization "next time the system reboots." *See* POR 27; Jones Decl. ¶ 36. In fact, if the switching requires the spare processor to perform initialization after system reboots, the spare processor would only function as a boot processor after the operating system shuts down and restarts. This is contrary to the claims reciting "without shutting down the system's operating system."

And nowhere does the '302 specification describe switching the role of the boot processor requires storing information of the new boot processor such that it performs initialization after system reboot or reset. Patent Owner recognizes the operational flow diagrams for switching the role of boot processor to a spare processor as shown in Figures 4 and 5 (POR 5), but Patent Owner does not discuss any relevant operations described in the '302 patent.

The '302 patent describes switching the role of the boot processor by *switching the identifications* of the boot processor and the spare processor, *during runtime of the operation system*, which is *after the boot process*. *See* Ex. 1001, 19:17-20 (limitation 1[e]), 20:10-16 (limitation 13[d]), 20:51-56 (limitation 21[e]).

For example, the '302 patent describes that a “device tree” includes information identifying the boot processor and the spare processor, as shown in Table 1 below:

TABLE 1

Device	Status	Lockstep Enabled	Boot Processor?	Spare for Boot Processor?
Processor A	Present, Enabled, and Functioning	Yes	Yes	No
Processor B	N/A	Yes	No	Yes
Processor C	Present, Enabled, and Functioning	Yes	No	No
...	...	...	...	...

Id., 13:21-60; *see also id.*, 12:60-66 (Firmware builds the “device tree” so the OS can know what is installed in the system).

During operating system runtime, upon detection of a loss of lockstep (LOL) in the system, the firmware accesses this “device tree” to determine if the processor for which LOL is detected is the system’s boot processor. *Id.*, 13:60-66; *see also id.*, 5:44-48. If the processor having LOL is the boot processor, the firmware determines from this “device tree” the spare processor. *Id.*, 14:1-3, 14:35-65. To switch the role of boot processor to the spare processor, the firmware saves the state of the good processor of the lockstep pair of the boot processor (*id.*, FIG. 4, blocks 401-402), changes the identification, e.g., the Local ID (“LID”), of the boot processor (*id.*, FIG. 4, block 403), copies the saved state of the good processor to the spare processor, which allows the spare processor to assume the Local ID of the boot

processor (*id.*, FIG. 4, block 404), and updates the “device tree” to reflect the switching of the boot processor and the spare processor (*id.*, FIG. 4, block 405). *Id.*, 16:1-17:11, FIG. 4; *see also id.*, 17:12-19:3, FIGS. 4-6.

The Petition shows that Fox, Safford, and Arai (Ground 1), or alternatively Fox, Safford, Landry, and Arai (Ground 2), render obvious such switching of the boot processor to the spare processor by switching their identifications, as explained in the Petition. Paper 1 (“Pet.”), 9-53; *see below* Sections III.B-III.C.

Patent Owner’s contrary arguments rest on conflating a **boot device** with the **boot processor**. Patent Owner repeats Mr. Jones’s assertion that “the ’302 specification describes a **different approach** wherein, for example, information regarding the **boot device path** can be changed during runtime and that is then persistently stored ‘**for the next time the system reboots.**’” POR 27 (emphases added); Jones Decl. ¶ 37; Ex. 1001, 12:36-59, 8:34-59.

The “different approach” emphasized by Patent Owner and Mr. Jones has nothing to do with switching the boot processor. POR 27; Jones Decl. ¶ 37. Patent Owner and Mr. Jones cite to column 12, lines 36 to 59 of the ’302 patent specification describing “EFI may be invoked to **change the boot device path** for the next time the system reboots.” Ex. 1001, 12:55-57 (emphasis added); POR 27; Jones Decl. ¶ 37. But this describes changing the **boot device** path and does not describe changing the role of the **boot processor**. And the ’302 patent describes that

“**boot devices** ... typically include[] the **disk**. The EFI reads the **disk** to load a program into memory, typically referred to as **an operating system loader**.” Ex. 1001, 11:61-12:59 (emphases added). As such, Patent Owner and Mr. Jones’s alleged “different approach” for switching the role of the boot processor merely describes that firmware EFI can change the path for the boot device (e.g., disk) that stores an OS loader program. It has nothing to do with switching the boot processor.

B. Ground 1 Renders Obvious Switching the Role of the Boot Processor to the Spare Processor

The combination of Fox, Safford, and Arai (Ground 1) renders obvious switching the role of the boot processor to the spare processor by switching the identifications of the boot processor and spare processor without shutting down the operating system, as claimed and described by the '302 patent. Pet. 28-30; Brogioli Decl. ¶¶ 124-128.

Fox discloses a multiprocessor system that dynamically switches a failing processor to a spare processor during system runtime. Fox, Abstract, [0006], [0014], [0016], [0019], [0023]-[0024], [0036], [0044], [0047]; Pet. 9; Brogioli Decl. ¶¶ 60-61, 110. Fox combined with Safford renders obvious detecting LOL in a processor and determining that the processor for which said LOL is detected is the boot processor. Pet. 11-15, 22-25; Brogioli Decl. ¶¶ 87-96. Fox/Safford, further combined with Arai’s processor-switching implementation details, renders obvious

switching the identification, e.g., logical APIC ID, of the boot processor to the spare processor, thereby switching the role of the boot processor to the spare processor without shutting down the operating system. Pet. 15-22, 26-30. Brogioli Decl. ¶¶ 97-108, 118-128.

Patent Owner and its expert, Mr. Jones, assert that “no evidence ... that changes to the APIC ID play any role in boot processor functions,” because “APIC ID, stored in RAM would not persist through a reset.” POR 27; Jones Decl. ¶ 36; Jones Tr., 131:2-6 (changing APIC ID cannot change boot processor role). These assertions are unavailing for at least two reasons.

First, these assertions rest on misconstruing switching the role of the boot processor in the claims as requiring the new boot processor to perform system initialization after the system reboots. As discussed above, this construction lacks support in the claims and specification of the '302 patent. *See above* Section III.A. Rather, the '302 patent claims and specification recite switching the role of the boot processor by changing the identifications, such as the local ID, of the boot processor and the spare processor. *See above* Section III.A. Like the '302 patent, Fox combined with Safford and Arai renders obvious switching the role of the boot processor by switching the logical APIC IDs of the boot processor and the spare processor. Pet. 26-30; Brogioli Decl. ¶¶ 118-128.

Second, Patent Owner and Mr. Jones dismiss the relevance of transferring processor state or context during the switching, as discussed in the Petition and by Dr. Brogioli. POR 28; Pet. 18-20; Brogioli Decl. ¶¶ 50, 104-106. But the claims require the switching to be performed “without shutting down the system’s operating system.” *See* Ex. 1001, 19:17-20 (limitation [1d]), 20:10-16 (limitation [13d]), 20:51-56 (limitation [21e]), 22:1-5 (limitation [22c]). Dr. Brogioli explains that incorporating Arai’s teaching of transferring processor context from the failing processor to the spare processor would not interrupt the operating system and its running applications as desired by Fox. Brogioli Decl. ¶ 105; Fox, [0041]; Arai, [0022], [0025]. Dr. Brogioli further explains transferring both the identification of the failing boot processor and its context/state to the spare processor would provide the benefit of switching the role of the failing boot processor to the spare processor without affecting the operating system and running applications. Brogioli Decl. ¶ 106; Fox, [0008], [0013], [0036]; Arai, [0005]-[0006]; Slegel, 3:7-20. In the State-of-the-Art Section, Dr. Brogioli explains that it was conventional and well known to a POSITA that transferring both the identification and state of the failing processor to switch the failing processor to a spare processor is desirable to minimize interruption to the operating system. Brogioli Decl. ¶ 51; Zorek, 2:61-67, 3:1-17, 7:40-57, 8:9-19. Thus, transferring processor state/context together with switching

processor identification would allow for switching “without shutting down the system’s operating system.”

Indeed, transferring both the processor identification and context/state during the switch is consistent with the ’302 patent claims and specification, which describes transferring the state of the good processor of the current boot processor to the spare processor when switching the role of the boot processor to the spare processor. Ex. 1001, 16:21-48, FIG. 4 (blocks 402-404); *see also id.*, 19:58-60, 20:7–9 (Claims 11) (switching includes copying the state from the LOL processor to the spare processor).

C. Ground 2 Renders Obvious Switching the Role of the Boot Processor to the Spare Processor

The combination of Fox, Safford, Landry, and Arai (Ground 2) renders obvious switching the role of boot processor to a spare processor by switching the identifications of the boot processor (i.e., logical CPU0) and the spare processor without shutting down the operating system. Pet. 31-36; Brogioli Decl. ¶¶ 131-145.

Landry discloses designating a functional CPU as logical CPU0 that performs the unique functions of a boot processor. Pet. 31; Landry, Abstract, 1:6-10, 2:9-41, 6:44-7:42, Figs. 1, 4; Brogioli Decl. ¶¶ 70-72. Fox combined with Safford and Landry renders obvious identifying logical CPU0 as the boot processor having a

lockstep processor pair. Pet. 30-32; Brogioli Decl. ¶¶ 132-134; Landry, Abstract, 1:6-10, 2:9-41, 6:44-7:42, Figs. 1, 4.

Safford discloses a lockstep pair of processors appearing to the system as a single logical CPU0, and in response to detecting loss of lockstep in the logical CPU0, switching logical CPU0 to a spare pair of processors. Safford, [0015], [0018]-[0021]. Fox combined with Safford and Landry further renders obvious determining that the processor for which said LOL is detected is logical CPU0 (boot processor) and switching logical CPU0 (boot processor) to the spare processor. Pet. 31-32; Brogioli Decl. ¶¶ 135, 140-145.

Patent Owner argues Ground 2 fails for the same reasons as Ground 1. POR 34; Jones Decl, ¶ 43. Patent Owner again asserts that switching the identification of the boot processor, logical CPU0, does not have the effect of switching the role of boot processor to a spare processor, which lacks support in the claim language and specification of the '302 patent. POR 34; *see above* Section III.A.

Patent Owner does not separately dispute Dr. Brogioli's explanation and evidence that a POSIA would have found it obvious to implement Landry's boot processor selection and thereby designate logical CPU0 as the boot processor in Fox, and that a POSITA would have found it obvious to switch Fox-Landry's logical CPU0 (boot processor) to the spare processor in response to detecting loss of

lockstep in the logical CPU0 in view of Safford. Pet. 31-32; Brogioli Decl. ¶¶ 132-135; POR 31-36.

D. There Are No “Gaps” to Fill

Patent Owner admits Fox discloses a multiprocessor system “provided within basic input output system (BIOS) of the IA-32 architecture.” POR 15; Jones Tr. 77:16-18, 79:22-80:11, 83:5-12, 92:14-93:3. Patent Owner contends that “Fox does not disclose, teach or suggest a boot processor” or “a BSP flag,” and the Petition improperly relies on Ex. 1008, IA-32 Intel® Architecture Software Developer’s Manual, Vol. 3: System Programming Guide, (“IA-32”) and Ex. 1028, MultiProcessor Specification (“MP Specification”) to remedy “gaps.” POR 15-17, 20. Not so.

The Petition and Dr. Brogioli explain how a POSITA, based on background knowledge of the IA-32 multiprocessor system, would have understood that Fox’s IA-32 multiprocessor system would have, or it would have been obvious to have, designated a boot processor to perform system initialization. Pet. 15-18; Brogioli Decl. ¶¶ 45-48, 59-63, 97-102. This is not gap-filling but applying well-established background knowledge in the obviousness analysis. *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1337-38 (Fed. Cir. 2020) (finding that the Board properly relied on expert evidence, corroborated by prior art, in concluding that a claim limitation was not only in the prior art, but also within the general knowledge

of a skilled artisan); *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 401, (2007) (the obviousness analysis requires an assessment of the “background knowledge possessed by a person having ordinary skill in the art”); *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362-63 (Fed. Cir. 2013) (“the knowledge of such an artisan is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious”); *Anacor Pharms. v. Iancu*, 889 F.3d 1372, 1380-81 (Fed. Cir. 2018) (petitioners may rely on expert testimony and supporting documentation to show how a skilled artisan would have understood the prior art).

Fox discloses its multiprocessor system is configured with IA-32 architecture and discloses “system boot” utilizing the BIOS or “BIOS boot.” Fox, Abstract, FIG. 1, [0009], [0014]-[0015], [0034]-[0035], [0040], claims 4-6, 15, 16; Brogioli Decl. ¶ 97. Dr. Brogioli explains that it was conventional and well known to a POSITA that one of the processors in a multiprocessor system would be the boot processor (bootstrap processor or BSP) that initializes the system, including initializing the other processors and booting the operating system. Brogioli Decl. ¶ 45. Dr. Brogioli also explains that Intel’s multiprocessor system configured with IA-32 architecture, such as Fox’s IA-32 system, selects one of the processors as the boot processor, and as part of the selection process, a BSP flag of the selected processor is set to 1 to indicate it is the boot processor. Brogioli Decl. ¶¶ 46-47;

IA-32, 238. And after the initialization is completed, each processor is assigned and can be identified by a unique local APIC ID. Brogioli Decl. ¶ 47; IA-32, 244; MP Specification, 33. Based on such background knowledge and Fox's express disclosure of BIOS boot, Dr. Brogioli further explains that a POSITA would have understood that Fox's IA-32 system would have, or it would have been obvious to have, designated a boot processor to perform its system BIOS boot as in an IA-32 multiprocessor system. Brogioli Decl. ¶¶ 62, 97, 116; IA-32, 238; Schelling, [0003]-[0005]; MP Specification, 17.

Patent Owner offers no evidence to rebut Dr. Brogioli's explanation and evidence. *See generally* POR; Brogioli Decl. ¶¶ 45-48, 62, 97. Patent Owner even acknowledges that selecting a bootstrap processor in multiprocessor systems was a "common approach." POR 9 (acknowledging Schelling's disclosure of selecting a boot strap processor as "a common approach" and Datta's disclosure of "usually" selecting a single bootstrap processor in a multiprocessor system). Nor does Patent Owner dispute that it would have been obvious to a POSITA that Fox's system would have designated a boot processor to perform the BIOS boot, which was conventional and well known. Brogioli Decl. ¶¶ 45-48, 62, 97; Jones Tr., 96:3-98:9 (a POSITA would have understood that one of the approaches to perform BIOS boot would use a processor executing BIOS).

Patent Owner contends that two of the background references cited by Dr. Brogioli—IA-32 and MP Specification—have not been shown as prior art of the '302 patent. POR 21-23; *see* Brogioli Decl. ¶¶ 45-48, 62 (discussing using a boot processor to initialize a multiprocessor system was known, citing Schelling, Jayakumar, Datta, IA-32, MP Specification, Landry, Jin).

Patent Owner contends IA-32 “bear[ing] an apparent copyright date of 2003” appears inconsistent with a declaration from the Internet Archive that a web page disclosing the document was dated February 14, 2002. POR 21-22. But IA-32, on page 2, notes that Intel owns the copyright of this document from 1997 to 2003, consistent with the fact that this document was available and archived in 2002. Ex. 1008, 2; Ex. 1009. Patent Owner also contends that no evidence shows that the MP specification “was ever available outside of Intel.” POR 23. But the MP specification, on page 2, notes copies of this document may be obtained from Intel. Ex. 1028, 2.

Patent Owner argues that the Board should not consider these documents because they are not authenticated and are inadmissible hearsay. POR 21. But Patent Owner has not filed any objection to or a motion to exclude these references. These documents are Intel’s published technical specifications, routinely relied upon by skilled artisans. *See, e.g.*, Ex. 1031, 479 (In support of the *ex parte* reexamination of the '302 patent, Dr. Wolfe cited to MP Specification in his declaration); *id.* (citing

Intel IA-64 Architecture Software Developer's Manual, Revision 1.1 (July 2000) and *Intel, Extensible Firmware Interface Specification*, Version 1.10 (Dec. 1, 2002) (“Intel EFI Specification”). Experts may rely on such documents regardless of admissibility. Fed. R. Evid. 703.

Patent Owner argues Dr. Brogioli did not personally obtain these documents or ascertain public availability of these documents. POR 21-23. But experts may rely on facts or data that the expert has been made aware of. Fed. R. Evid. 703.

E. Grounds 1 and 2 Render Obvious Claims 3, 4, 15, 16, and 24

Patent Owner's arguments regarding these claims rely solely on attorney argument (POR 38-44), which cannot overcome the Petition's showing—supported by expert testimony—that Grounds 1 and 2 each render obvious these claims. Pet. 56-58; Brogioli Decl. ¶¶ 199-204.

Patent Owner's arguments also fail on the merits. Patent Owner contends that “Fox only teaches a hot-spare processor,” and does not disclose “idling an active spare processor.” POR 44. This is incorrect.

Fox discloses an alternative embodiment that enables the hot spare processor “on-the-fly by the OS” with a driver-OS-SMI handshake. Pet. 56-57; Brogioli Decl. ¶ 200; Fox, [0035]. This discloses or renders obvious configuring one of the active processors to be the spare processor dynamically as needed while the operating system is running, and would have understood such active processor as “an active

spare.” Pet. 56-57; Brogioli Decl. ¶¶ 200-201; Fox, [0035]. Further, Fox discloses or renders obvious idling the “active spare” when the spare processor is needed to switch with the failing processor during system runtime. Pet. 57-58; Brogioli Decl. ¶¶ 200-201, 204; Fox, [0034]-[0035], [0041]; *see* Ex. 1001, 15:21-27 (describing “in an alternative embodiment a hot spare need not be held as such, but rather a processor can be dynamically made a ‘spare’ when needed”).

Patent Owner argues “a POSITA would have understood that the disclosure in Fox relied upon by Petitioner is still performed **during system initialization.**” POR 43 (emphasis added). That misreads Fox. Fox discloses “**in one embodiment, ... the spare processor [being removed] from the group of executing processors occurs before the BIOS hands over control to the OS.**” Fox, [0034]-[0035] (emphases added). This embodiment discloses reserving the spare processor during system initialization. *Id.* Fox continues to disclose “[i]n another embodiment, the system is made to enable the ‘hot spare processor’ feature **on-the-fly by the OS** with a driver-OS-SMI handshake.” *Id.* (emphases added). This embodiment discloses configuring an active processor to be a spare processor dynamically as needed while the operating system is running **after system initialization.** Pet. 56-57; Brogioli Decl. ¶¶ 200-201.

Fox’s dynamic configuring a hot spare processor does not detract from any of its teaching regarding reducing system downtime by switching a failing processor

with a spare processor without affecting the operating system. Fox, [0014]-[0016]. The prior art is relevant for all that it teaches. *See In re Fritch*, 972 F.2d 1260, 1264 (Fed. Cir. 1992); *Merck & Co. v. Biocraft Lab'ys, Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989).

Patent Owner argues that there is no basis for the Board to find claim 24 unpatentable. POR 48-50. This is incorrect.

Claim 24 recites “caus[ing] the operating system to idle the another processor module before causing said operating system to recognize said another processor module as said system boot processor.” The Petition presents that claim 24 is unpatentable under Grounds 1 and 2. Pet. 1. The Petition explains that Fox’s spare processor discloses the “another processor module,” and Grounds 1 and 2 render obvious “causing said operating system to recognize said another processor module as said system boot processor” under limitation [21e]. Pet. 52-53; Brogioli Decl. ¶¶ 185-190. As explained for claims 3, 4, 15, and 16, Fox discloses or renders obvious configuring the spare processor as an “active spare” and idling the “active spare” when the spare processor is needed to switch with the failing processor during system runtime. Pet. 56-58; Brogioli Decl. ¶¶ 200-201, 204; Fox, [0034]-[0035], [0041].

Patent Owner had an opportunity to dispute the Petition’s showing of unpatentability of the limitations of claim 24 and questioned Dr. Brogioli regarding

how Fox discloses an “active spare” and idling such processor. *See* POR 38-44; Ex. 2007 (Brogioli Tr.), 58:18-78:16. As such, the Board is equipped with the arguments and evidence to find claim 24 unpatentable, and need not consider any new theory or undisclosed prior art. *See* POR 48-50.

F. Grounds 1 and 2 Render Obvious Claims 6, 8, and 25

Patent Owner’s arguments regarding claims 6, 8, and 25 rely solely on attorney argument (POR, 45-48), which cannot overcome the Petition’s showing—supported by expert testimony—that Grounds 1 and 2 each render obvious these claims. Pet. 59-62; Brogioli Decl. ¶¶ 207-214.

Patent Owner’s arguments also fail on the merits. Arai discloses storing information identifying processors (e.g., ACPI table or MP table) in the system in a main memory, Fox discloses a non-volatile system memory for storing BIOS, and a POSITA would have found it obvious to store Fox’s information identifying the boot and spare processors (e.g., register or table) in its system memory. Arai, [0019]-[0021], [0025]-[0026]; Fox, [0028], FIG. 1; Pet. 59-62; Brogioli Decl. ¶¶ 207-214.

Patent Owner acknowledges that Fox’s BIOS would be stored in a non-volatile memory. POR 47. Yet, Patent Owner concludes that “[a] POSITA would not make the mistaken assumption that all of the system memory in Fox is non-volatile memory.” *Id.* Patent Owner then sets up a straw man, arguing that

“[a] POSITA would also understand that information identifying a boot processor or a spare processor would not be stored in **memory that could not be written to, such as ROM.**” *Id.* (emphasis added).

Patent Owner conflates **non-volatile** with **read-only** and improperly confines the Petition and Dr. Brogioli’s declaration to read-only memory.

While Dr. Brogioli lists ROM as an example of a non-volatile memory accessible to BIOS in describing Fox’s system memory, he also identifies other types of memory for storing processor information, such as EEPROM and RAM, that are not read-only. IA-32, 242; MP Specification, 38; Brogioli Decl. ¶¶ 210-211.

To the extent that Patent Owner argues Petitioner’s combination stores processor identification in an RAM and RAM cannot be the claimed “non-volatile data storage,” this is wrong. No evidence shows that RAM cannot be “non-volatile.” The ’302 patent itself discloses the information identifying the processors—the “device tree”—is stored in a RAM. *See* Ex. 1001, 9:4-15, 12:60-66, 13:21-44. Brogioli Decl. ¶ 212; Ex. 1034, 14:25-29 (showing some RAM can be non-volatile, such as an NVRAM that saves changes to the next reset).

Dr. Brogioli’s opinion that it would be obvious to use Fox’s non-volatile system memory to store Fox’s information identifying the processors remains undisputed. Brogioli Decl. ¶¶ 210-211.

G. Grounds 1 and 2 Render Obvious Dependent Claims 11, 12, and 17

Patent Owner argues that there is no basis for the Board to find claims 11, 12, and 17 unpatentable. POR 48-50. Not so. As shown in the table below, the Petition discusses limitations recited in these claims under independent claims 1, 13, and 21, and demonstrates these claims are unpatentable under Grounds 1 and 2:

Claim	Limitation	Ground 1	Ground 2
11	[1a], [13b], [13c]	Pet. 9-25, 38-43; Brogioli Decl. ¶¶ 82-108, 111-114, 153-162	Pet. 30-33, 38-43; Brogioli Decl. ¶¶ 129-135, 138, 153-162
12	[1a], [13b], [13c]	Pet. 9-25, 38-43; Brogioli Decl. ¶¶ 82-108, 111-114, 153-162	Pet. 30-33, 38-43; Brogioli Decl. ¶¶ 129-135, 138, 153-162
17	[1d], [13e], [21e] ¹	Pet. 9-22, 28-30, 43, 51-53;	Pet. 30-33, 36, 43, 51-53;

¹ Patent Owner concedes “caus[ing] said operating system to recognize another processor module as system boot processor” of claim limitation [21e] is equivalent to “changing the role of boot processor to a spare processor” consistent with the specification of the ’302 Patent. POR 31; Jones Decl. ¶ 51.

		Brogioli Decl. ¶¶ 124-128, 164, 185-190	Brogioli Decl. ¶¶ 129-135, 145, 164, 185-190
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The Board is equipped with the arguments and evidence to find claims 11, 12, and 17 unpatentable, and need not consider any new theory or prior art.

H. Patent Owner Does Not Separately Address Independent Claims 13, 21, 26, and Other Dependent Claims

Patent Owner argues Grounds 1 and 2 do not render independent claims 13 and 21 obvious, and Grounds 3 and 4 do not render independent claim 26 obvious, for the same reasons as to claim 1. POR 11-13, 30-31, 37-38. Patent Owner does not separately dispute Petitioner’s showing as to these independent claims or any of the dependent claims 2, 5, 7, 9-10, 13-14, 18-23, 25, and 27. POR; *In re NuVasive, Inc.*, 842 F.3d 1376, 1379-82 (Fed. Cir. 2016). These claims are unpatentable. Pet. 36-55, 58, 65-74; Brogioli Decl. ¶¶ 146-198, 205-206, 215-220, 223-254.

IV. The Board Should Give Mr. Jones’s Testimony Little Weight

The Board should give the declaration of Patent Owner’s expert, Mr. Jones, little weight because (1) Mr. Jones’s testimony lacks sufficient factual basis; and (2) Mr. Jones’s testimony does not reflect the knowledge and skill of a POSITA. Pet. 4; POR 7-8; Brogioli Decl. ¶¶ 28-30; Jones Decl. ¶¶ 24-26.

First, Mr. Jones interprets switching the role of the boot processor as requiring the new boot processor to initialize the system after system reboot. *See above* Section III.A. This interpretation lacks support in the specification and contradicts the claims, which require the switching to be performed without shutting down the operating system. Section III.A His opinions also rest on the incorrect assumption that a “boot device” for storing an OS loader program is equivalent to a “boot processor.” *See above* Section III.A; Jones Decl. ¶ 37; Fed. R. Evid. 702(b); 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

Second, Mr. Jones’s testimony does not reflect the knowledge and skill of a POSITA. He admitted his current work is litigation-based consulting, and in providing his declaration, he did not provide a CV that “lists his technical experiences in detail,” but instead provided his “expert witness CV” focusing on the cases he worked on. Jones Tr., 30:22-31:15; Ex. 2005. While he claimed that he had experience using Intel processors (not disclosed in Ex. 2005) and considered materials for those processors (Jones Tr., 29:20-32:16), and acknowledged that Fox discloses an Intel IA-32 multiprocessor system (*id.*, 77:16-18, , 79:22-80:11, 83:5-12), he admitted that he “have not given any thought to” Intel multiprocessor systems from before 2004 (*id.*, 34:4-37:5). *But see id.*, 102:14-105:19 (Mr. Jones admitting

“Intel publishes technical documentation about its processors,” and some people working on an IA-32 processor “would have consulted Intel documentation”).

Mr. Jones also emphasized that, in forming his opinions, he considered only the documents mentioned in his declaration and the Petition itself. Jones Tr., 36:4-10, 37:6-38:4; *see also id.*, 107:1-108:13 (asserting the MP Specification is irrelevant for this matter because he “can’t believe [it] was published).”

And although Mr. Jones acknowledged Fox discloses an IA-32 multiprocessor system that performs BIOS booting (Jones Tr., 92:14-93:3), and that a POSITA would have known various approaches for BIOS booting, including using a processor to execute the BIOS (*id.*, 94:22-98:9), he nevertheless asserted that a POSITA would have considered how Fox’s system boots as irrelevant (*id.*, 81:12-83:4). He even testified that a POSITA “wouldn’t have to know what a boot processor is” (*id.*, 69:7-22), treating a POSITA’s background knowledge of boot processors as irrelevant (*id.*, 74:2-75:1).

Accordingly, Mr. Jones’s testimony reflects that he considered only a small subset of the record and offered opinions without factual basis or technical perspective required of a POSITA. *KSR*, 550 U.S. at 421 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”).

V. Conclusion

For the foregoing reasons, and as explained in the Petition, all Challenged Claims of the '302 patent are unpatentable.

Dated: September 26, 2025

Respectfully submitted,

/Lionel M. Lavenue/

Lionel M. Lavenue, Lead Counsel
Reg. No. 46,859

CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), the undersigned hereby certifies that the foregoing **Petitioner's Reply to Patent Owner's Response** contains 5,360 words, excluding the parts exempted under 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

/Lionel M. Lavenue/

Lionel M. Lavenue

Reg. No. 46,859

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing **Petitioner's Reply to Patent Owner's Response** was served on September 26, 2025, via email directed to counsel of record for the Patent Owner at the following:

Brett Cooper
bcooper@bc-lawgroup.com

Robert A. Auchter
robert@auchterlaw.com

Seth Lindner
slindner@bc-lawgroup.com

Foras_Counsel@bc-lawgroup.com

Dated: September 26, 2025

By: /Daniel E. Doku/
Daniel E. Doku
Senior Litigation Paralegal
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP