

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNITED SERVICES AUTOMOBILE ASSOCIATION,
Petitioner,

v.

PNC BANK, N.A.,
Patent Owner.

IPR2021-01163
Patent 8,868,786 B1

Before MICHAEL R. ZECHER, JULIET MITCHELL DIRBA, and
RUSSELL E. CASS, *Administrative Patent Judges*.

ZECHER, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Petitioner, United Services Automobile Association (“USAA”), filed a Petition requesting an *inter partes* review (“IPR”) of claims 1–17 of U.S. Patent No. 8,868,786 B1 (Ex. 1001, “the ’786 patent”). Paper 1 (“Pet.”). Patent Owner, PNC Bank, N.A. (“PNC”), filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Taking into account the arguments presented in PNC’s Preliminary Response, we determined that the information presented in the Petition established that there was a reasonable likelihood that USAA would prevail with respect to challenging at least one of claims 1–17 of the ’786 patent as unpatentable. Pursuant to 35 U.S.C. § 314, we instituted this IPR on January 10, 2022, as to all challenged claims and all grounds raised in the Petition. Paper 9 (“Institution Decision” or “Dec. on Inst.”).

During trial, PNC filed a Patent Owner Response (Paper 16, “PO Resp.”), USAA filed a Reply to the Patent Owner Response (Paper 20, “Pet. Reply”), and PNC filed a Sur-reply to the Reply (Paper 21, “PO Sur-reply”). A consolidated oral argument with related IPR2021-01248 was held on October 12, 2022, and a transcript of the hearing is included in the record. Paper 29 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1–17 of the ’786 patent. For the reasons we identify below, we hold that USAA has demonstrated by a preponderance of the evidence that all challenged claims are unpatentable.

A. Related Matters

The parties indicate that the ’786 patent is the subject of the district court case captioned *United Services Automobile Association v. PNC Bank*,

N.A., No. 2:20-cv-00319-JRG (E.D. Tex.). Pet. 72; Paper 4 (PNC’s Mandatory Notices), 1. PNC represents that, on September 16, 2022, a jury in the district court case “found claims 1, 2, and 5 of [the ’786 patent] not invalid.” Paper 25 (PNC’s Updated Mandatory Notices), 2).

In addition to this Petition, USAA filed a petition requesting an IPR of claims 1–5 and 7–10 of U.S. Patent No. 7,949,788 B2 (“the ’788 patent”). *United Services Automobile Ass’n v. PNC Bank, N.A.*, IPR2021-01248, Paper 1 (PTAB July 9, 2021) (Petition). The petition challenging claims 1–5 and 7–10 of the ’788 patent was granted on January 14, 2022 (IPR2021-01248, Paper 8 (Institution Decision)), and a final written decision as to those challenged claims is entered concurrently herewith.

B. Real Party in Interest

USAA identifies itself as the only real party in interest. Pet. 72. PNC identifies itself as the only real party in interest. Paper 4, 1.

C. The ’786 Patent

The ’786 patent, titled “Apparatus, Systems and Methods for Transformation Services,” issued from U.S. Patent Application No. 13/088,877 (“the ’877 application”), filed on April 18, 2011. Ex. 1001, codes (54), (21), (22). The ’877 application is a divisional of U.S. Patent Application No. 11/804,664, filed on May 18, 2007—now the ’788 patent involved in related IPR2021-01248. *Id.* at code (62), 1:8–12.

The ’786 patent generally relates to “[d]ata communications between computer applications or networks” and, in particular, to “secure routing and data transformation over one or more communication networks.” Ex. 1001, 1:16–18. According to the ’786 patent, while “[c]orporate reliance on technology has increasingly become more . . . pervasive,” “the proliferation

of different computer systems and applications that use different communications protocols, security mechanisms, languages, data structures and platforms has also made the information technology infrastructure of the typical business enterprise more complex.” *Id.* at 1:22–30. The ’786 patent identifies a situation where “a source computer application or network within a corporate enterprise,” such as a bank, “may need to share confidential customer information with external networks of partners or other organizations.” *Id.* at 1:48–51. In this particular situation, the ’786 patent states that “a need exists for an intermediary transformation service to assign appropriate security controls to messages from source computer applications or networks prior to their transmission over a communications network.” *Id.* at 1:54–58.

The ’786 patent addresses this problem by providing “a web services hub [that] receives a request from a data source system, transforms the request, and transmits the transformed request to an external system.” Ex. 1001, 1:62–64. The ’786 patent discloses using “[a] secure service router coupled to the web services hub [to] authenticate[] the data source system and locate[] a transformation service to transform the request.” *Id.* at 1:64–67.

Figure 1 of the ’786 patent, reproduced below, illustrates “a high-level schematic diagram of one embodiment of a business enterprise network that includes a web services hub.” Ex. 1001, 2:3–7.

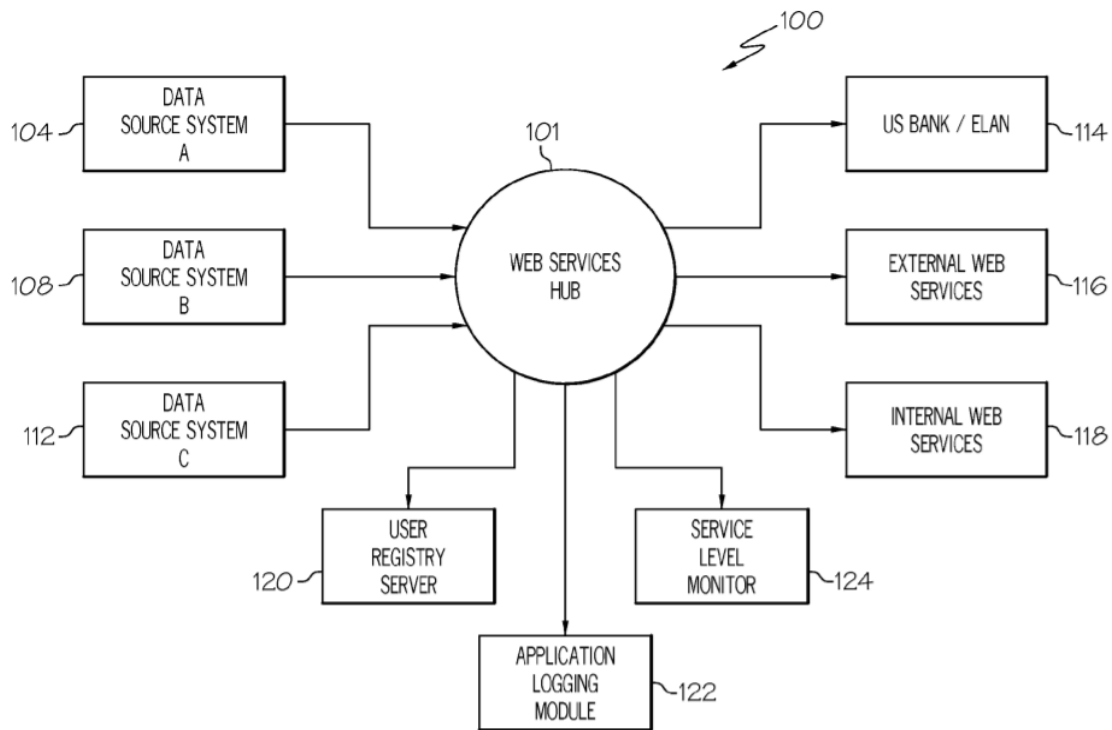


FIG. 1

Figure 1, reproduced above, illustrates business enterprise network 100 that includes web services hub 101, a plurality of business processes employing one or more data source systems 104, 108, 112, one or more target internal or external web services 114, 116, 118, user registry server 120, application logging module 122, and service level monitor 124. *Id.* at 2:63–3:1, 3:12–17. Notably, “web service hub 101 . . . enable[s] dynamic routing and transformation services for web based applications” using “synchronous or asynchronous processing models.” *Id.* at 3:19–22.

As one example of the transformation services provided by web service hub 101, the '786 patent discloses converting data from data source system A 104 to a format recognizable by an external system (e.g., external web service 116, such as another bank). Ex. 1001, 8:26–29. After transforming and transmitting the request to the external system, web service

hub 101 receives a response from the external system, transforms the response to a format recognizable by data source system A, and then transmits the newly formatted response to data source system A. *See id.* at 10:41–53.

C. Challenged Claims

Of the challenged claims, claims 1, 7, and 12 are independent claims. Independent claims 1 and 7 are each directed to “[a] system,” whereas independent claim 12 is directed to “[a] method.” Ex. 1001, 15:9, 16:8, 16:65. Claims 2–6 directly or indirectly depend from independent claim 1, claims 8–11 directly or indirectly depend from independent claim 7, and claims 13–17 directly or indirectly depend from independent claim 12. *Id.* at 15:42–16:7, 16:38–64, 17:35–18:35. Independent claim 1 is illustrative of the challenged claims and is reproduced below:

1. A system, comprising:

a web services hub comprised of hardware, the hardware comprising at least one non-transitory memory connected to at least one processor, the web services hub configured to receive a request from a data source system that is external to the web services hub; transform the request into a transformed request, and transmit the transformed request to an external system, the request to be transformed by the web services hub into the transformed request by a process comprising:

the web services hub evaluating the data source system identified in the request as being a source of the request,

the web services hub identifying a business service handler configured to transform the request,

the web services hub transforming the request via the business service handler such that the transformed

request is in a format that is understandable and processable by the external system; and

the web services hub to receive a response to the transformed request from the external system after the external system has completed processing of the transformed request and transmitted a response to the transformed request, the web services hub to parse the response to the transformed request for the data source system and transform the response to the transformed request into a transformed response to send to the data source system such that the transformed response is understandable and processable by the data source system;

a secure service router coupled to the web services hub, the secure service router to authenticate the data source system prior to the transformed request being sent to the external system.

Id. at 15:9–41.

D. Asserted Prior Art References

USAA relies on the prior art references set forth in the table below.

Pet. 3.

Name¹	Reference	Dates	Exhibit No.
Corneil	US 2003/0065623 A1	published Apr. 3, 2003; filed Oct. 1, 2001	1004
Abjanic	US 2003/0069975 A1	published Apr. 10, 2003; filed Dec. 22, 2000	1005

E. Asserted Grounds of Unpatentability

USAA challenges claims 1–17 of the '786 patent based on the grounds of unpatentability set forth in the table below. Pet. 3, 9–69.

¹ For clarity and ease of reference, we only list the first named inventor.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–17	103(a) ²	Corneil
1–17	103(a)	Corneil, Abjanic

USAA supports its arguments in the Petition with the testimony of Sam Malek, Ph.D. Ex. 1003 (Declaration of Dr. Malek in support of Petition). PNC supports its arguments in the Patent Owner Response with the testimony of Stephen Gray. Ex. 2006 (Declaration of Mr. Gray in support of Patent Owner’s Response).

II. ANALYSIS

A. Claim Construction

In an IPR based on a petition filed on or after November 13, 2018, such as here, claim terms are construed using the same claim construction standard as in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2019). That is, claim terms generally are construed in accordance with their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art, in view of the specification and the prosecution history pertaining to the patent at issue. *See id.* The ordinary and customary meaning of a claim term “is its meaning to the ordinary artisan after reading the entire patent,” and “as of the

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the ’786 patent issued from the ’877 application, which was filed before this date, the pre-AIA version of § 103 applies. Ex. 1001, codes (21), (22).

effective filing date of the patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 1321 (Fed. Cir. 2005) (en banc).

In its Petition, USAA contends that “[n]o [claim] terms need construction to resolve the issues presented in [the] Petition and the terms should be accorded their plain and ordinary meaning as would be understood by a [person of ordinary skill in the art] in light of the intrinsic evidence,” including the ’786 patent and its prosecution history. Pet. 9. In the Institution Decision, we addressed arguments previously presented by PNC that: (1) “external system” should mean “a system external to the institution receiving the request from the data source system”; and (2) “secure service router” should mean “a component the authenticates the data source system, locates a service, and forwards a message or request to the service.” *See* Dec. on Inst. 8–11. We address both claim terms below based on the arguments and evidence presented during trial.

I. “external system”

In the Institution Decision, we preliminary determined that the claim term “external system” did not require a construction because, based on the preliminary record, there was no dispute between the parties as to whether Corneil’s second trading partner 217 teaches this claim term. Dec. on Inst. 8–9. In its Patent Owner Response, PNC does not maintain its preliminary argument that the claim term “external system” requires construction. *See* PO Resp. Based the fully developed trial record, there is no readily discernible controversy between the parties that requires us to construe this claim term. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the

controversy” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

2. “*secure service router*”

In the Institution Decision, we did not adopt PNC’s proposed construction of the claim term “secure service router” and, instead, we preliminary determined that, at a minimum, this claim term must “authenticate the data source system” that sends a message or request because this is recited explicitly in independent claims 1 and 7. Dec. on Inst. 9–11. We, however, noted that a week before entering the Institution Decision, USAA submitted a claim construction order from the district court case that construed the claim term “secure service router” to mean a “service router than can verify authentication and authorization.” *Id.* at 11 n.3 (citing Ex. 1032, 88). Based on the timing of this submission, we invited the parties to provide further briefing during trial to help clarify the impact, if any, of the word “router” when arriving at the proper construction of the claim term “secure service router” in the context of the ’786 patent. *Id.*

In its Patent Owner Response, PNC acknowledges that both the district court construction and our preliminary determination require that the claim term “secure service router” perform authentication, but PNC asserts that they “both also leave unanswered what is the ‘service router’ that performs the authentication.” PO Resp. 11 (citing Ex. 2006 ¶ 36). PNC contends that the embedded phrase “service router” has no plain and ordinary meaning because, although “the term ‘router’ is widely used and well-understood, the term ‘service router’ is not.” *Id.* at 12 (citing Exs. 2002–2005, each of which provides a dictionary definition of a

“router”).³ According to PNC, dictionary definitions of “router” are not applicable to a “service router” as that term is used in the context of the ’786 patent because such definitions are “neither concerned with finding ‘efficient routes’ to forward data packets nor connecting two or more [local area networks].” *Id.* at 12–13. Instead, PNC asserts that the specification of the ’786 patent defines a “service router” by implication to mean “hardware and/or software that forwards messages or requests to services.” *Id.* at 13–14 (citing Ex. 2006 ¶ 37), 17 (citing Ex. 2006 ¶ 40); *see also id.* at 15 (arguing that “the specification may define claim terms by implication” (quoting *Irdeto Access, Inc. v. Echostar Satellite Corp.*, 383 F.3d 1295, 1300 (Fed. Cir. 2004))).

To support its proposed construction, PNC directs us to various disclosures of synchronous service routers, asynchronous service routers, and secure service routers throughout the specification of the ’786 patent. PO Resp. 15–16 (citing Ex. 1001, code (57), 1:64–67, 6:22–46, 8:9–22, 12:3–5, Fig. 2). PNC then asserts that, “[i]n each instance, the ‘service router’ (whether synchronous, asynchronous, or secure) identifies or locates a service and forwards a message to that service.” *Id.* at 16 (citing Ex. 2006 ¶¶ 38, 39).

In Petitioner’s Reply, USAA contends that no further construction of the claim term “secure service router” is required beyond our preliminary

³ We understand PNC’s citation on page 12 of the Patent Owner Response to “EX., 3 (defining ‘router’ as ‘[a] hardware device that routes data from a LAN to a telephone line or another connection that leads to another network’ and that ‘decides which way to send each information packet’)” to be a reference to the “definition” of router in the dictionary that is Exhibit 2004.

determination, and USAA argues that we should not adopt PNC’s newly proposed construction in the Patent Owner Response because it “attempt[s] to insert extraneous limitations not supported by the intrinsic record.” Pet. Reply 1. USAA argues that PNC’s newly proposed construction of the embedded phrase “service router” as “hardware and/or software that forwards messages or requests to services” attempts to interject the same limitations (i.e., “locate[] a service, and forward[] a message or request to the service”) that both the district court and the Institution Decision previously rejected. *Id.* (alterations in original). According to USAA, PNC merely omits the words “identifies or locates a service” from its newly proposed construction in the Patent Owner Response, but its declarant, Mr. Gray, admitted during cross-examination that he was reading those requirements into the use of the word “forward.” *Id.* at 1–2 (citing Ex. 1039, 104:1–5, 144:5–14).

USAA further contends that there is nothing in the specification of the ’786 patent that requires all “service routers” to “identify or locate” a service, which is functionality that only is required by specific challenged claims. Pet. Reply 2 (citing Dec. on Inst. 10). Moreover, USAA argues that the exemplary embodiments disclosed in the specification “do not require ‘service routers’ to do anything more than pass messages along to other components.” *Id.* at 2–3 (citing Ex. 1001, 8:10–15, Fig. 2, request transformer 224). Relying on the cross-examination testimony of its declarant, Dr. Malek, USAA argues that “the specification uses ‘service router’ as a generic term for a software component, with additional requirements for specific service routers being supplied by context within the claims.” *Id.* at 3 (citing Ex. 2008, 60:10–61:6, 66:18–67:15). USAA

asserts that the claims at issue here simply require receiving the message to be transformed from the data source system at the message transformation logic module from a secure service router and, as a result, “it does not place any further limitations on the functionality of the secure service router (other than what is implied by the modifier ‘secure’).” *Id.* at 3–4.

In its Patent Owner Sur-reply, PNC contends that, contrary to USAA’s assertion, its newly proposed construction in the Patent Owner Response “does not recite or import the idea of ‘identif[ying] or locat[ing] a service.” PO Sur-reply 3 (citing PO Resp. 17) (alterations in original). PNC argues that USAA misrepresents Mr. Gray’s cross-examination testimony on this particular issue, which was directed to questions regarding the specification of the ’786 patent and not PNC’s newly proposed construction of the embedded phrase “service router.” *Id.* (citing Ex. 1039, 103:20–104:5). PNC then asserts that USAA’s declarant, Dr. Malek, actually supports its newly proposed construction because he admitted during cross-examination that the claim term “secure service router” should be accorded its plain and ordinary meaning. *Id.* at 3–4 (citing Ex. 2008, 55:4–21).

During oral argument, we questioned whether the “to services” language in PNC’s newly proposed construction for the embedded phrase “service router” was necessary and whether PNC would be amenable to a construction that simply provides for “forward[ing] messages or requests.” Tr. 36:20–22. In response, counsel for PNC stated that the answer to the question was “yes” and, “[i]f the Board were so inclined to construe the term [‘service router’] such that it’s hardware and/or software that forwards messages or requests and omitted the to[]services part, that would be fine with [PNC].” *Id.* at 37:8–11.

Based on the fully developed trial record, we maintain our preliminary determination that the claim term “secure service router” must “authenticate the data source system” that sends messages or requests because this is recited explicitly in independent claims 1 and 7, but we also adopt certain portions of the “forwarding” aspect of PNC’s newly proposed construction for the embedded phrase “service router.” *See* Dec. on Inst. 11. That is, we construe the claim term “secure service router” as “hardware and/or software that authenticates the data source system prior to forwarding messages or requests.” The “authentication” aspect of our construction finds support in the specification of the ’786 patent, including the plain language of the challenged claims, which consistently reinforces that the “secure service router” must authenticate the data source system. Ex. 1001, code (57), 1:64–67, 6:50–52, 8:11–12, 15:38–40, 16:20–21.

The “forwarding” aspect of our construction, which is functionality provided by each service router disclosed in the ’786 patent, is best illustrated in Figure 2, reproduced below.

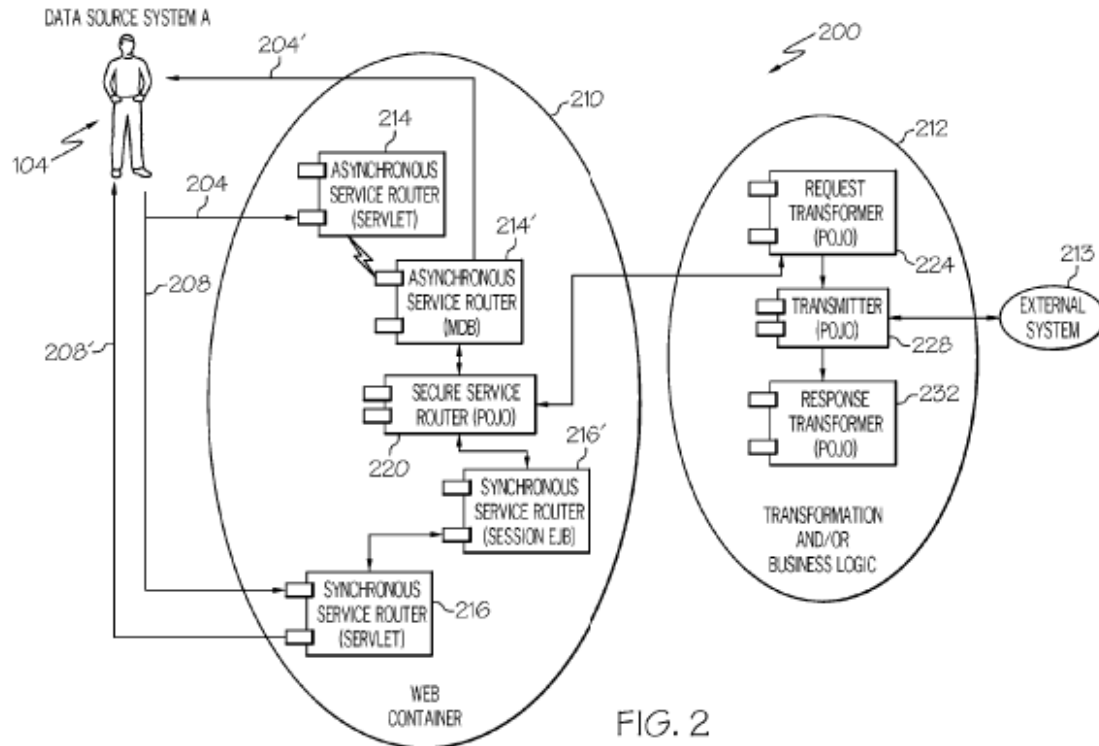


FIG. 2

Figure 2, reproduced above, illustrates a high-level process flow request/response connection topology employed in web services hub 101. Ex. 1001, 2:8–10, 5:29–31. This process flow employed by web services hub 101 includes, among other things, web container 210 that requires “asynchronous service routers 214, 214' in data communication with asynchronous communication channels 204, 204', synchronous service routers 216, 216' in data communication with synchronous communication channels 208, 208', and secure service router 220.” *Id.* at 5:53–58. The corresponding description of Figure 2 repeatedly refers to the various service routers forwarding messages or requests. *See, e.g., id.* at 8:9–11 (“Based on the [uniform resource locator], asynchronous service router 214 or synchronous service router 216 may forward the message or request to secure service router 220.”), 8:19–21 (“Secure service router 220 may then

forward the message or request to transformation and/or business logic module 212.”) The process flow illustrated in Figure 2 together with its corresponding description in the specification supports a finding that each of the service routers disclosed in the ’786 patent, including secure service router 220, forwards messages or requests.

Counsel for USAA appeared to agree that each of the service routers disclosed in the specification of the ’786 patent forwards messages or requests. During oral argument, we posed a question as to whether each of the service routers disclosed in the specification of the ’786 patent forwards messages or requests. Tr. 14:9–13. In response, counsel for USAA agreed that “the specification uses the word forwarding to describe how messages get from component to component” (e.g., from one service router to another service router as illustrated in Figure 2 of the ’786 patent), but made clear that his position was that “the plain meaning of the word forwarding” should apply. *Id.* at 14:14–23.

Although we adopt certain portions of the “forwarding” aspect of PNC’s newly proposed construction for the embedded phrase “service router,” we do not adopt the “to services” language. As we explain above, during oral argument, PNC acquiesced to our proposal of removing the “to services” language from its newly proposed construction for the embedded phrase “service router” such that a “service router” in the context of the ’786 patent simply means “hardware and/or software that forwards messages or requests.” Tr. 36:20–37:11.

In summary, based on the specification of the ’786 patent, including the plain language of the challenged claims, we construe the claim term “secure service router” as “hardware and/or software that authenticates the

data source system prior to forwarding messages or requests.”⁴ As a result, we need not resort to the extrinsic evidence, which, under these particular circumstances, includes dictionary definitions of the word “router” and declaration testimony, to determine the proper construction of the claim term “secure service router.” *See Phillips*, 415 F.3d at 1317 (“[W]hile extrinsic evidence can shed useful light on the relevant art, we have explained that it is less significant than the intrinsic record in determining the legally operative meaning of claim language.”).

B. Obviousness Over the Teachings of Corneil

USAA contends that claims 1–17 of the ’786 patent are unpatentable under § 103(a) as obvious over teachings of Corneil. Pet. 9–69. USAA contends that the teachings of Corneil account for the subject matter of each challenged claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of this reference. *Id.* During trial, PNC contends that the teachings of Corneil do not account for all the limitations of claims 1, 5–7, and 12. PO Resp. 22–54; PO Sur-reply 4–31.

Based on the fully developed trial record, we determine that USAA has shown by a preponderance of the evidence that claims 1–17 of the ’786 patent are unpatentable as obvious over the teachings of Corneil. We begin our analysis with the principles of law that generally apply to an obviousness ground, an assessment of the level of skill in the art, followed by a brief

⁴ In our obviousness analysis below, we address the scope and meaning of the word “forwarding,” as this word pertains to the teachings of Corneil contested by the parties. *See infra* Section II.B.4.a.

overview of Corneil, and then we address the parties' contentions with respect to the challenged claims.

1. Principles of Law

A claim is unpatentable under § 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) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations, such as commercial success, long-felt but unsolved needs, failure of others, etc.). *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze the asserted grounds based on obviousness with the principles identified above in mind.

2. Level of Skill in the Art

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. “The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). The “person having ordinary skill in the art” is a hypothetical construct, from whose vantage point obviousness is assessed. *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

Factors pertinent to a determination of the level of ordinary skill in the art include “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). “Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case.” *Id.* at 696–97.

Relying on the testimony of Dr. Malek, USAA argues the following:

[a] person of ordinary skill in the art . . . at the time of the alleged invention would have had a Bachelor’s degree in computer science, software engineering, or electrical engineering and two years of experience in software development and programming in the area of web services, including familiarity with enterprise systems and standard web transport and security protocols. This level of skill is approximate, and more experience would compensate for less formal education, and vice versa.

Pet. 9 (citation omitted) (citing Ex. 1003 ¶ 53).

In its Patent Owner Response, PNC offers essentially the same assessment of the level of skill in the art as USAA, arguing the following:

[a] “person of ordinary skill in the art” . . . at the time of the alleged invention would have had a degree in electrical engineering, computer engineering, computer science or the equivalent knowledge gained through experience; and at least two years of computer programming experience in the design and implementation of distributed computing systems and related Internet technologies.

PO. Resp. 10 (citing Ex. 2006 ¶ 20).

The level of skill in the art advanced by each party requires at least a Bachelor of Science degree in electrical engineering, computer/software engineering, computer science, or equivalent. We do not discern a material difference between the industry experiences advanced by either party, nor does either party premise arguments on its own industry experience. For purposes of this Final Written decision, we adopt USAA's assessment of the level of skill in the art because Dr. Malek's identification of relevant industry experience applicable to software development and programming in the area of web services, including familiarity with enterprise systems and standard web transport and security protocols, is consistent with the '786 patent and the asserted prior art. We note, however, that our obviousness analysis would be the same under either party's assessment of the level of skill in the art.

3. Overview of Corneil

Corneil generally relates to “[a] service, method, apparatus and/or network configuration that provides the exchange of electronic data or message transactions through a third party network service between trading partners that have disparate systems.” Ex. 1004, code (57). According to Corneil, its system provides data processing services that include, but are not limited to, “authentication, validation, transformation and routing of a plurality of trading partners’ electronic transactions.” *Id.*

The system uses a centralized computing platform to receive input messages from one or more trading partners in one or more message formats. If required[,] messages are transformed to a second message format The data is then sent to the plurality of trading partners as required by the originating trading partner.

Id.

Figure 2 of Corneil, reproduced below, illustrates a transaction processing system for electronic messages in accordance with one embodiment. Ex. 1004 ¶¶ 15, 32.

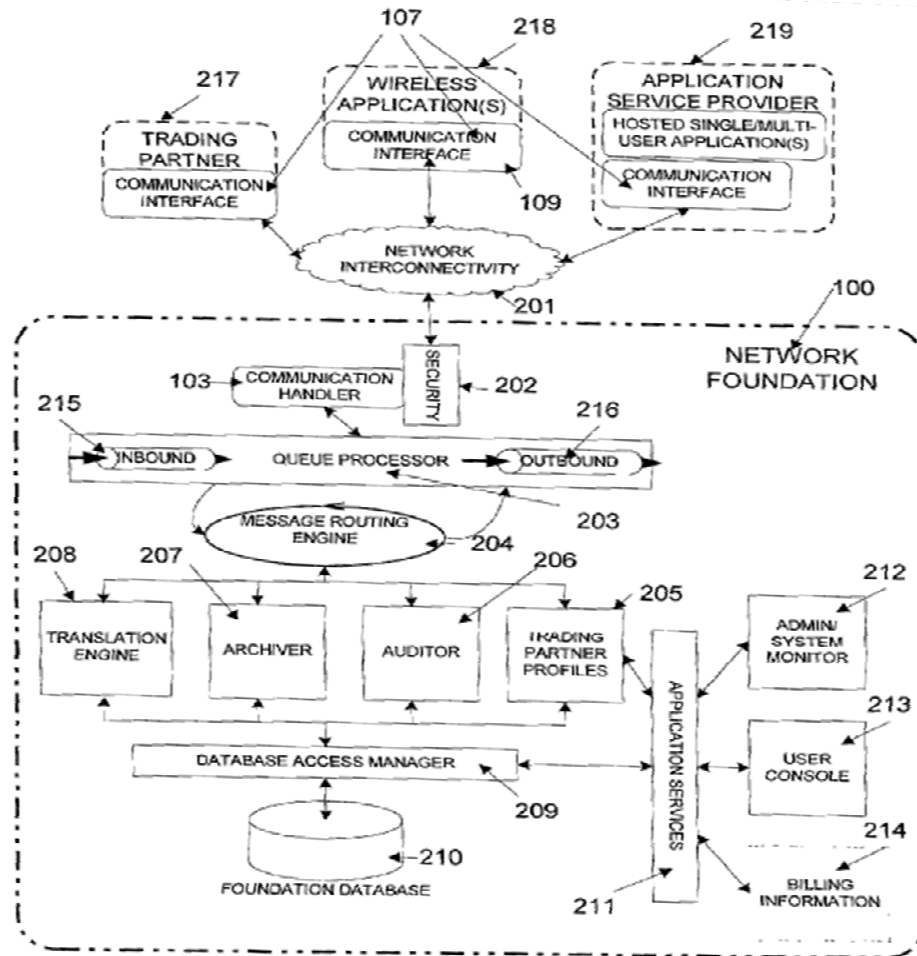


FIGURE 2

Figure 2, reproduced above, illustrates how messages are routed from trading partners 217 through network interconnectivity 201 to network foundation 100. *Id.* ¶¶ 32, 33. Network foundation 100 further includes, among other things, security handler 202 that “executes processes to assure the security of the messages received over” network interconnectivity 201 (e.g., “by validating authentication information”), communication handler

103 that “understands and manages” different communication protocols used by trading partners 217, queue processor 203 that maintains inbound 215 and outbound 216 electronic message queues, and message routing engine 204 that serves as “the main execution thread for transaction processing.” *Id.* ¶¶ 33, 34.

When describing the operations of one embodiment, Corneil discloses that message routing engine 204 “picks up, authenticates and properly routes incoming messages and outgoing messages.” Ex. 1004 ¶ 51. In connection with Figure 6 (not reproduced here), Corneil discloses that the processing of messages as they are received by network foundation 101 includes checking the messages “to ensure that they are sent by the authorized Trading Partner by reconciling 604 the message[s] with a Trading Partner Profile.” *Id.* ¶ 45, Fig. 6, step 604.

4. Claims 1 and 12

USAA relies on essentially the same arguments and evidence to explain how the teachings of Corneil account for all the limitations of independent claims 1 and 12. *Compare* Pet. 10–34, *with id.* at 64–66. Our obviousness analysis below only focuses on the limitations of independent claim 1, but our obviousness analysis equally applies to independent claim 12.

The preamble of independent claim 1 recites “[a] system, comprising.” Ex. 1001, 15:9. To the extent the preamble should be treated as limiting, USAA contends that Corneil teaches the feature recited in the preamble because Figure 2 of Corneil illustrates a system having all the elements of independent claim 1, including a “web services hub,” a “secure service router,” and multiple “data source systems” and “external systems.”

Pet. 10. Each of these elements is illustrated in the annotated version of Figure 2 of Corneil, reproduced below.

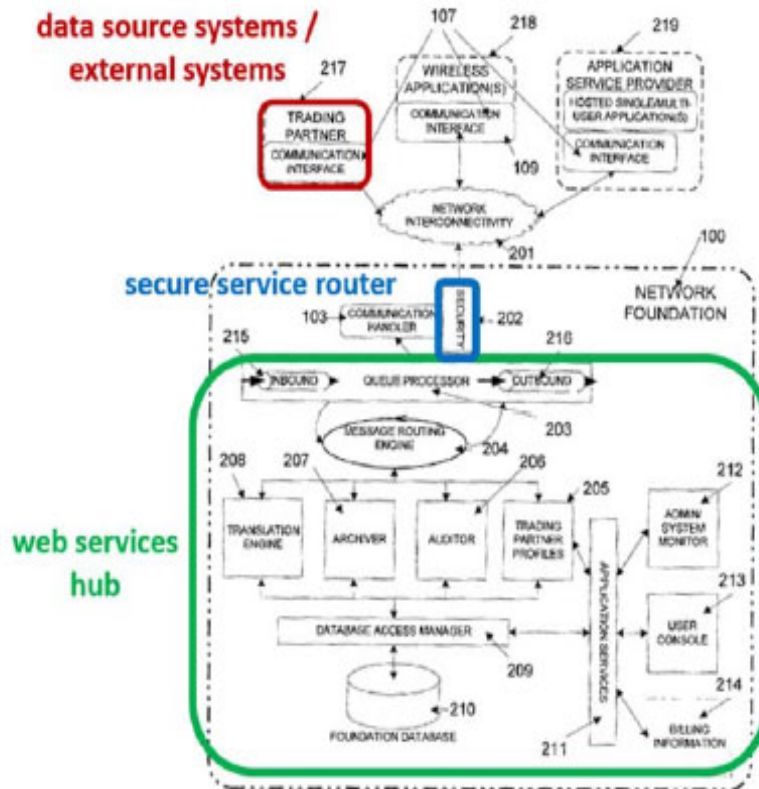


FIGURE 2

Id. Based on the annotated version of Figure 2, reproduced above, which illustrates a transaction processing system for electronic messages, USAA argues that “trading partner 217” (in red) represents a collection of “distinct, plural trading partners [who] communicate with each other by routing electronic documents through the managed network.” *Id.* at 10 (quoting Ex. 1004 ¶ 23) (alteration in original). More specifically, USAA argues that first trading partner 217 is the “data source system” (in red) that sends a message via “web services hub” (in green) to second trading partner 217 that is the “external system” (also in red). *Id.* at 10–11 (citing Ex. 1004 ¶ 23; Ex. 1003 ¶ 83).

Next, independent claim 1 recites “a web services hub comprised of hardware, the hardware comprising at least one non-transitory memory connected to at least one processor.” Ex. 1001, 15:10–12. USAA contends that Corneil teaches this limitation because it discloses that the “web services hub” (in green above) includes, among other things, queue processor 203, message routing engine 204, and translation engine 208. Pet. 11 (citing Ex. 1004, code (57), ¶ 31). USAA then argues that Corneil’s “web services hub” includes at least one processor that executes software processes, and the software executing on the processor stores data, which means Corneil’s system necessarily includes at least one non-transitory memory connected to the processor. *Id.* at 12–13 (citing Ex. 1004 ¶¶ 25, 26, 32, Fig. 2, claims 15 and 16; Ex. 1003 ¶ 85).

Independent claim 1 further recites “the web services hub configured to receive a request from a data source system that is external to the web services hub.” Ex. 1001, 15:12–14. USAA contends that Corneil teaches this limitation because it discloses that first trading partner 217 sends a message (e.g., purchase orders and other business transactions) to second trading partner 217 by passing the message through communication handler 103 and security handler 202 to inbound 215 electronic message queue of queue processor 203 located in “web services hub” (in green above). Pet. 14–15 (citing Ex. 1004 code (57), ¶¶ 2, 33, 51, Fig. 2, claim 15; Ex. 1003 ¶¶ 86–88). USAA argues that Corneil’s trading partners 217, which are disclosed as being computer applications, are “data source systems” within the meaning of the ’786 patent because the specification states that “data source” may include “databases, computer applications

and/or internal or external networks.” *Id.* at 15–16 (quoting Ex. 1001, 2:33–34) (citing Ex. 1004 ¶ 23).

Independent claim 1 also recites “[the web services hub configured to] transform the request into a transformed request, and transmit the transformed request to an external system, the request to be transformed by the web services hub into the transformed request by a process comprising.” Ex. 1001, 15:14–18. USAA contends that Corneil teaches this limitation because it discloses that, after the “web services hub” (in green above) receives a message from first trading partner 217, translation engine 208 is capable of transforming the message into a format recognizable by second trading partner 217 prior to sending the message to the second trading partner. Pet. 16–17 (citing Ex. 1004, code (57), ¶¶ 11, 35, 45; Ex. 1003 ¶ 90). USAA argues that Corneil’s second trading partner 217 is an “external system” to the “web services hub” within the meaning of the ’786 patent because it is capable of receiving a message from each trading partner and providing a response. *Id.* at 17 (citing Ex. 1004, Fig. 2; Ex. 1003 ¶ 89; Ex. 1001, 3:56–60).

The first processing step of independent claim 1 recites “the web services hub evaluating the data source system identified in the request as being a source of the request.” Ex. 1001, 15:19–21. USAA contends that Corneil teaches this limitation because it discloses that message routing engine 204 located within Corneil’s “web services hub” (in green above) determines the data source system identified in a message by inspecting the trading partner information within the message to ensure it was sent by an authorized trading partner. Pet. 18–19 (citing Ex. 1004 ¶¶ 34, 45, 52, Fig. 2; Ex. 1003 ¶¶ 93, 94).

The second processing step in independent claim 1 recites “the web services hub identifying a business service handler configured to transform the request.” Ex. 1001, 15:22–23. USAA contends that Corneil teaches this limitation because it discloses that, when message routing engine 204 receives a message from first trading partner 217, it examines the header information of the message to determine if it requires transformation and, if transformation is required, message routing engine 204 sends the message to translation engine 208 for further processing. Pet. 19 (citing Ex. 1004 ¶ 35; Ex. 1003 ¶ 96). According to USAA, the ’786 patent identifies a “transformation service” as just one example of a service that would qualify as “a business service handler.” *Id.* at 19–20 (quoting Ex. 1001, 10:25–30).

The third processing step in independent claim 1 recites “the web services hub transforming the request via the business service handler such that the transformed request is in a format that is understandable and processable by the external system.” Ex. 1001, 15:24–27. USAA contends that Corneil teaches this limitation because it discloses that translation engine 208 located within the “web services hub” (in green above) transforms the message received from first trading partner 217 to a format that second trading partner 217 is capable of understanding and processing. Pet. 20–21 (citing Ex. 1004 ¶¶ 11, 33, 34, 42, 45; Ex. 1003 ¶¶ 97, 98).

The fourth processing step in independent claim 1 recites the following:

the web services hub to receive a response to the transformed request from the external system after the external system has completed processing of the transformed request and transmitted a response to the transformed request, the web services hub to parse the response to the transformed request for the data source

system and transform the response to the transformed request into a transformed response to send to the data source system such that the transformed response is understandable and processable by the data source system.

Ex. 1001, 15:28–37. USAA contends that Corneil teaches this limitation because its system receives the message from first trading partner 217, uses translation engine 208 to transform the message into a format that second trading partner 217 is capable of understanding and processing, and then transmits the transformed message to second trading partner 217. Pet. 22–23 (citing Ex. 1004 ¶ 2; Ex. 1003 ¶ 99). Relying on the testimony of Dr. Malek, USAA argues that a person of ordinary skill in the art would have recognized that, in situations such as the one taught by Corneil, it would have been beneficial for second trading partner 217 to transmit a response after it processes the transformed message. *Id.* at 23 (citing Ex. 1003 ¶ 100). As one example, USAA argues that “a buyer using Corneil’s [transaction processing] system to send a purchase order request to a seller would want to receive a response indicating acceptance or rejection of the purchase order.” *Id.* According to USAA, this would provide the predictable benefit of letting Corneil’s first trading partner 217 know that second trading partner 217 received and processed the purchase order, as well as informing first trading partner 217 about the status of the purchase order and whether any changes were necessary to complete the purchase order. *Id.* As further support for its argument, USAA directs us to Corneil’s use of “EDI” messages as “a standardized message format used for business transactions” that typically involves one request message and one response message. *Id.* at 23–24 (citing Ex. 1004 ¶ 32; Ex. 1006, 58 (an E-Commerce

textbook that discloses an exemplary “EDI enable procurement process”); Ex. 1003 ¶ 100).

USAA also argues that Corneil provides explicit motivation that its transaction processing system is capable of handling a request-response exchange because it discloses the following: (1) message routing engine 204 “maintains running conversations, i.e., multi-message communication threads, and processes messages”; and (2) Corneil already permits two disparate systems associated with different trading partners 217 to communicate, without the need to understand the same data format. Pet. 24–25 (emphasis omitted) (quoting Ex. 1004 ¶ 34) (citing Ex. 1004, code (57), ¶¶ 31, 34, 35; Ex. 1003 ¶¶ 101, 102). USAA asserts that transforming a response from Corneil’s second trading partner 217 to a format that first trading partner 217 would be able to understand and process “would provide the same predictable and known benefits as the initial [message]” and “would require no modification to Corneil’s existing functionality.” *Id.* at 25 (citing Ex. 1004, code (57); Ex. 1003 ¶ 102). USAA also asserts that a person of ordinary skill in the art would have been motivated to implement a request-response exchange in Corneil’s transaction processing system with a reasonable expectation of success because it would require “only routine programming using the existing functionality of Corneil” (i.e., Corneil already supports “running conversations” or “multi-message communication threads” between first and second trading partners 217). *Id.* at 25–26 (quoting Ex. 1004 ¶ 34) (citing Ex. 1003 ¶ 103).

Lastly, independent claim 1 recites “a secure service router coupled to the web services hub, the secure service router to authenticate the data source system prior to the transformed request being sent to the external

system.” Ex. 1001, 15:38–41. USAA contends that Corneil teaches this limitation because it discloses that security handler 202 ensures the security of the message sent by first trading partner 217 over network interconnectivity 201, “for example by validating authentication information.” Pet. 31–33 (emphasis omitted) (quoting Ex. 1004 ¶ 33) (citing Ex. 1004 ¶ 31, Fig. 2; Ex. 1003 ¶ 1007). Stated differently, USAA argues that security handler 202 authenticates the message sent by first trading partner 217 prior to translation engine 208 transforming the message into a format that second trading partner 217 would be able to understand and process, and these steps of authentication and transformation occur prior to second trading partner 217 receiving the transformed message. *Id.* at 34 (citing Ex. 1004 ¶¶ 33–34).

Alternatively, USAA takes the position that, even if PNC argues that Corneil’s security processes do not “authenticate the data source system,” this would have been obvious to a person of ordinary skill in the art. Pet. 33 n.4. According to USAA, the ’786 patent broadly describes authentication as including any verification of the data source system’s identity by using well-known methods, such as username/password or access tokens. *Id.* (citing Ex. 1001, 6:47–67). Relying on the testimony of Dr. Malek, USAA argues that it would have been obvious to apply these well-known techniques to Corneil’s security processes because it would improve the security of its system and prevent unauthorized access. *Id.* (citing Ex. 1003 ¶ 108).

During trial, PNC contends that Corneil does not teach the following limitations: (1) “a secure service router” (independent claim 1 only); (2) “web services hub evaluating the data source system identified in the

request as being a source of the request” (independent claims 1 and 12); and (3) “web services hub identifying a business service handler configured to transform the request” (independent claims 1 and 12). PO Resp. 22–34 (arguments presented for independent claim 1), 54 (arguing that, “for the reasons discussed . . . regarding claim 1, claim 12 is not obvious over Corneil” alone); PO Sur-reply 4–21 (arguments presented for independent claim 1), 31 (arguing that, “for the reasons discussed regarding claim 1, claim 12 is not obvious over Corneil alone”). After considering the parties’ arguments and evidence, USAA has shown by a preponderance of the evidence that Corneil teaches or suggests each limitation of independent claims 1 and 12, notwithstanding PNC’s arguments to the contrary. Below, we address PNC’s arguments directed to each limitation in turn.

a. “a secure service router”

In its Patent Owner Response, PNC contends that USAA improperly relies on Corneil’s security handler 202 to teach the claimed “secure service router.” PO Resp. 23–24 (citing Ex. 1004 ¶ 33, Fig. 2; Ex. 2006 ¶ 52). PNC argues that Corneil’s security handler 202 does not satisfy its newly proposed construction of the embedded phrase “service router” because Corneil discloses that messages merely “pass through” security handler 202, and the Petition fails to establish that security handler 202 forwards messages to a service. *Id.* at 24–25 (quoting Ex. 1004 ¶ 33) (citing Ex. 2006 ¶¶ 53, 54).

PNC then contends that a person of ordinary skill in the art would have understood that it was likely that components on the same computer, such as Corneil’s security handler 202 and communication handler 103, would communicate using shared memory and, therefore, security handler

202 would not necessarily forward any messages as required by PNC's newly proposed construction of the embedded phrase "service router." PO Resp. 25 (citing Ex. 2006 ¶ 55). To support this argument, PNC directs us to the following: (1) the cross-examination testimony of USAA's declarant, Dr. Malek, who purportedly agrees that there are many different mechanisms for communicating messages between processes, and that shared memory is one mechanism for communication between two processes on the same computer; and (2) Figure 3 of Corneil, which illustrates security handler 202 and communication handler 103 both located on transaction server/portal server 302. *Id.* at 25–28 (citing Ex. 1004 ¶ 41, Fig. 3; Ex. 2008, 24:15–24, 28:15–20, 31:10–23, 35:7–36:1; Ex. 2006 ¶¶ 56–59). Based on the cross-examination testimony of Dr. Malek and Figure 3 of Corneil, PNC asserts that "a [person of ordinary skill in the art] would have understood it was more likely that the Security Handler 202 and Communication Handler 103 would communicate via shared memory for efficiency because they are on the same computer" and, therefore, "would not have . . . found it obvious that Corneil teaches that Security Handler 202 would have forwarded messages to a service." *Id.* at 28–29 (citing Ex. 2006 ¶ 60). In addition, PNC argues that Figure 2 of Corneil illustrates that security handler 202 and communication handler 103 "are drawn as adjacent boxes and not as boxes connected via an arrow," which, according to PNC, further suggests to a person of ordinary skill in the art that these two components "are two aspects of the same process" that "communicate information by using a shared memory." *Id.* at 29–30 (citing Ex. 1004, Fig. 2; Ex. 2006 ¶ 61).

In its Reply, USAA contends that PNC's argument that Corneil's security handler 202 does not teach the claimed "secure service router" entirely depends on its newly proposed construction of the embedded phrase "service router." Pet. Reply 4. USAA asserts that we should not adopt PNC's newly proposed construction. *Id.* USAA argues that, even if we were to adopt PNC's newly proposed construction, Corneil's security handler 202 authenticates messages received from first trading partner 217 and then forwards those messages onward to services via communication handler 103 and inbound 215 electronic message queue. *Id.* at 4–5 (citing Ex. 1004 ¶¶ 35–37, Fig. 2; Ex. 1003 ¶ 95; Ex. 1039, 145:8–17; Ex. 1044 ¶ 75). To support this argument, USAA provides two general purpose dictionary definitions of "forward" indicating that its plain and ordinary meaning "does not require anything more than passing or sending data onward to another destination, by whatever means." *Id.* at 6 (citing Ex. 1040, 640; Ex. 1041, 296). According to USAA, applying the plain and ordinary meaning of "forward" is consistent with how "every 'service router' described in the specification [of the '786 patent] 'identifies and forwards the message to an applicable service,' even though (as illustrated in Fig. 2) some of the service routers are simply 'pass throughs' on the way to the destination service." *Id.* at 7 (quoting Ex. 1001, 6:14–38) (citing Ex. 1001, Fig. 2). USAA then asserts that, under the plain and ordinary meaning of "forward," Corneil teaches the claimed "secure service router" because PNC admits that messages pass through security handler 202 and communication handler 103 on their way to inbound 215 electronic message queue and translation engine 207 and, therefore, security handler 202 is

sending messages to communication handler 103 after authentication. *Id.* at 7–8 (citing PO Resp. 33, 46).

USAA contends that PNC’s arguments raised in the Patent Owner Response are based on the following two premises: (1) Corneil’s security handler 202 and communication handler 103 communicate via “shared memory”; and (2) sending messages via “shared memory” is not “forwarding.” Pet. Reply 8. USAA argues that the first premise is incorrect because there is nothing in Corneil that requires security handler 202 and communication handler 103 to communicate via “share memory” and, as PNC concedes, communicating via “shared memory” is just one of “many different communication mechanisms for communicating messages between processes.” *Id.* (quoting PO Resp. 25–26). USAA asserts that “Corneil itself does not require any particular communication mechanism, leaving it up to the implementer to choose from among the many known mechanisms for communicating within a software environment.” *Id.* at 9 (citing Ex. 1004 ¶¶ 31, 32; Ex. 2008, 34:19–35:1). Next, USAA argues that the second premise is self-defeating because, even if sending messages via “shared memory” is not “forwarding,” PNC asserts in the Patent Owner Response that Corneil’s security handler 202 and communication handler 103 are “two aspects of the same process.” *Id.* at 12–13 (emphasis omitted) (quoting PO Resp. 29). USAA asserts that, if we were to accept PNC’s reading of Corneil, its transaction processing system would include a single software process that both “authenticates the data source system that sent the message or request” and “forwards messages or requests to services,” thereby satisfying PNC’s newly proposed construction of the claim term “secure service router.” *Id.* at 13.

In its Sur-reply, PNC contends that Corneil discloses that messages pass through security handler 202 on their way to communication handler 103, but “passively allowing messages to pass through is not the same as actively passing a message on.” PO Sur-reply 5–6 (citing Ex. 1004 ¶¶ 33, 41, 45, 51, Fig. 1; Ex. 1040, 640; Ex. 1041, 296); *see also id.* at 6 (arguing that “*passing through* is not the same as affirmatively *passing on*”), 9 (arguing that “messages merely pass through Security Handler 202 and that Security Handler 202 does not actively forward messages to any other component of Corneil”). PNC asserts that, apart from attorney argument, “USAA provides no evidence . . . that forwarding a message encompasses merely by allowing the message to pass through the component.” *Id.* at 6; *see also id.* at 9 (arguing that “USAA provides no expert testimony and only attorney argument that Security Handler 202 forwards messages, as opposed to merely allowing messages to pass through.”). According to PNC, Corneil’s communication handler 103—not security handler 202—sends messages to inbound 215 electronic message queue, which, in turn, allows message routing engine 204 to retrieve the messages and send them to translation engine 208 for further processing. *Id.* at 6–7 (citing Ex. 1004 ¶ 51, Fig. 2).

PNC then reiterates its argument first raised in the Patent Owner Response that, because Corneil’s security handler 202 and communication handler 103 “could have been implemented using shared memory,” security handler 202 does not necessarily forward messages to communication handler 103. PO Sur-reply 11 (citing PO Resp. 25–30). As further support for this argument, PNC asserts the following: (1) forwarding and shared memory are mutually exclusive; (2) USAA provides no evidence that

Corneil does not use shared memory instead of forwarding; and (3) USAA's other arguments directed to this particular issue are irrelevant because they either rely on the '786 patent as a road map or they mischaracterize the evidence of record. *Id.* at 12–16.

Based on the fully developed record, we agree with USAA that Corneil's security handler 202 teaches the claimed "secure service router." *See* Pet. 31–34. As we explain in our claim construction section above, we construe the claim term "secure service router" as "hardware and/or software that authenticates the data source system prior to forwarding messages or requests." *See supra* Section II.A.2. Corneil discloses that many of the components that operate within the transaction processing system illustrated in Figure 2, including security handler 202, are described "by function" and constitute "software processes." Ex. 1004 ¶¶ 32, 41. Notably, Corneil discloses that security handler 202 ensures the security of the message sent by first trading partner 217 over network interconnectivity 201, "for example by validating authentication information." *Id.* ¶ 33; *see also id.* ¶ 31 (disclosing that security handler 202 contains a "set of tools . . . that assist with the process of securing data to the network [that] include, but are not limited to validation, authentication and authorization"). Based on these cited disclosures, we find that Corneil's security handler 202 is a software process that uses the information contained within each message to authenticate first trading partner 217.

Corneil further discloses that, after security handler 202 ensures the security of the messages sent by first trading partner 217 over network interconnectivity 201, "for example by validating authentication information," the messages "pass through" a layer of security handler 202.

Ex. 1004 ¶ 33. Stated differently, if the information contained within each message authenticates first trading partner 217, Corneil's security handler 202 allows the messages to "pass through" a layer of its software process. If the information contained within each message does not authenticate first trading partner 217, security handler 202 will not allow the messages to "pass through" a layer of its software process. Once the messages sent by first trading partner 217 "pass through" a layer of security handler 202, they are sent to communication handler 103, which, in turn, "provides connectivity" to trading partners 217 because it "understands and manages" different communication protocols used by those trading partners. *Id.* In our view, Corneil's disclosure of communication handler 103 receiving messages that "pass through" a layer of security handler 202 satisfies the "forwarding" aspect of our claim construction because, in essence, this process involves security handler 202 forwarding the messages where first trading partner 217 has been authenticated to communication handler 103.

We do not agree with PNC's arguments that attempt to distinguish Corneil's disclosure of security handler 202 that allows messages to "pass through" a layer of its software process from the "forwarding" now required by our construction of the claim term "secure service router." *See* PO Sur-reply 6–9. PNC does not provide a persuasive explanation as to why the word "forward" should be accorded anything other than its plain and ordinary meaning. Instead, we agree with USAA that the word "forward" should be accorded its plain and ordinary meaning as evidenced by two dictionary definitions. *See* Pet. Reply 6 (citing Exs. 1040, 1041). This first dictionary is Collins English Dictionary that was published by HarperCollins Publishers in 2005. Ex. 1040. One of the definitions provided in the Collins

English Dictionary for the word “forward” is “to send forward or pass on to an ultimate destination.” *Id.* at 640. The second dictionary definition is Wiley Electrical and Electronics Engineering Dictionary that was published by John Wiley & Sons, Inc. in 2004. Ex. 1041. The Wiley Electrical and Electronics Engineering Dictionary defines the word “forward” as “[t]o send on to a new destination. For example, to forward data, or a telephone call.” *Id.* at 296. Both dictionary definitions support USAA’s position that the plain and ordinary meaning of the word “forward” is passing or sending data onward to another destination, by whatever means. *See* Pet. Reply 6. As we explain above, Corneil’s security handler 202 performs this function. That is, once the information contained within each message is used to authenticate first trading partner 217, a layer of Corneil’s security handler 202 passes or sends those messages (i.e., data) onward to communication handler 103 (i.e., another destination).

We also do not agree with PNC’s arguments that a person of ordinary skill in the art would have understood that Corneil’s security handler 202 and communication handler 103 *could be* implemented using “shared memory” and, therefore, security handler 202 would not necessarily forward messages to communication handler 103. *See* PO Resp. 25–29; PO Sur-reply 11–16. As an initial matter, contrary to PNC’s arguments, USAA does not take this position in the Petition when arguing that Corneil’s security handler 202 teaches the claimed “secure service router,” nor does USAA use language that would implicate the doctrine of inherency (e.g., inherently, necessarily, necessarily present, etc.). *See* Pet. 31–34. Instead, as we explain above, we understand USAA to argue that Corneil’s security handler 202 teaches the claimed “secure service router” because Corneil discloses

the following: (1) security handler 202 is a software process that uses the information contained within each message to authenticate first trading partner 217; (2) once first trading partner 217 has been authenticated, a layer of Corneil's security handler 202 forwards those messages by passing or sending them onward to communication handler 103. Ex. 1004 ¶¶ 31, 33, 41.

We recognize that there is some testimony in the fully developed record suggesting that, because Corneil's Figure 3 illustrates that security handler 202 and communication handler 103 both reside on transaction server/portal server 302, it is possible that these two components could, instead, communicate using "shared memory." Ex. 2006 ¶¶ 57–60; Ex. 2008, 31:10–23, 35:7–36:1. We, however, find that this is not the most logical reading of Corneil. PNC does not direct us to, nor can we find, a disclosure in Corneil indicating that security handler 202 and communication handler 103 actually operate in this way. *See* Pet. Reply 8–9 (citing Ex. 1004 ¶¶ 31, 32; Ex. 2008, 30:18–24, 35:7–36:1). Instead, as we note above, Corneil discloses that the messages "pass through" a layer of security handler 202 before being sent to communication handler 103 (Ex. 1004 ¶ 33), and we are persuaded that this particular disclosure teaches security handler 202 forwarding messages to communication handler 103.

In any event, even if we were to assume that Corneil's security handler 202 and communication handler 103 communicate using "shared memory," which, as we explain above, is not the most logical reading of Corneil, this still would satisfy the "forwarding" aspect of our claim construction for the claim term "secure service router." In our view, there would be a need for Corneil's security handler 202 to notify communication

handler 103 of the information contained within each message so that communication handler 103 may “provide[] connectivity” to trading partners 217 because it is the main conduit identified within Corneil’s transaction processing system that “understands and manages” different communication protocols used by those trading partners. Ex. 1004 ¶ 33.

b. “web services hub evaluating the data source system identified in the request as being a source of the request”

In its Patent Owner Response, PNC contends that Corneil’s disclosure of checking to ensure that a message sent by first trading partner 217 complies with its corresponding trading partner profile “is an example of evaluating the authenticity of the *message* itself, and is not an evaluation of the *source* of the message.” PO Resp. 31 (citing Ex. 1004 ¶ 45). In contrast, PNC argues that independent claim 1 requires evaluating the data source system that transmitted the message (e.g., to confirm authorization that the data source system has the proper permissions)—not authenticating the message itself. *Id.* PNC also contends that Corneil’s disclosure that message header information includes “sender and receiver information” fares no better because “[t]here is no disclosure of evaluating the data source system identified in the request as being a source of the request.” *Id.* at 31–32 (quoting Ex. 1004 ¶ 52) (citing Ex. 2006 ¶ 64).

In its Reply, USAA contends that PNC does not dispute that Corneil discloses checking to ensure that a message sent by first trading partner 217 complies with its corresponding trading partner profile. Pet. Reply 13 (citing Ex. 1004 ¶ 45; Ex. 1003 ¶ 94; PO Resp. 31). According to USAA, this disclosure in Corneil is the exact same “evaluation of the source of the message” that is required by independent claim 1. *Id.* (citing Ex. 1004

¶¶ 45, 52; Ex. 1003 ¶ 94). Indeed, USAA asserts that the '786 patent uses the same information (i.e., header parameters) to authenticate the data source as the source of a message. *Id.* at 13–14 (citing Ex. 1001, 9:39–44, 10:1–4).

In its Sur-reply, PNC reiterates its contention that independent claim 1 requires evaluating the data source system that transmitted the message (e.g., to confirm that the data source system has the proper permissions)—not authenticating the message itself. PO Sur-reply 18. In contrast, PNC argues that Corneil's disclosure of checking a message to ensure that the message was sent by first trading partner 217 is not checking the data source—it is checking the message. *Id.* (citing Ex. 2006 ¶ 64). PNC also argues that, even though some of the citations in USAA's Reply establish that the '786 patent discloses using a "SOURCE" header parameter to verify access and transmission rights of the data source system, this verification of a data source is different from Corneil's disclosure of evaluating a message, regardless of whether both the '786 patent and Corneil use some of the same header parameters. *Id.* at 18–19.

Based on the fully developed record, we agree with USAA that Corneil's messaging routing engine 204 determines the data source system as the source of a message by evaluating the trading partner information within the message to ensure it was sent by an authorized trading partner and, therefore, teaches the claimed "web services hub evaluating the data source system identified in the request as being a source of the request." *See* Pet. 18–19. Corneil discloses that "[a] typical message" received by the transaction processing system illustrated in Figure 2 includes "an electronic message containing header information including, but not limited to, sender and receiver information." Ex. 1004 ¶ 52. Corneil further discloses that,

when message routing engine 204 receives a message from first trading partner 217, it examines the header information that includes “information on message incoming and outgoing formats, *trading partner information*, routing characteristics and application information for [the] transaction.” *Id.* ¶ 34 (emphasis added). In connection with a method of processing messages illustrated in Figure 6, Corneil discloses that “[m]essages are checked to ensure that they are sent by the authorized Trading Partner by reconciling 604 the message[s] with a Trading Partner Profile.” *Id.* ¶ 45; *see also id.* ¶ 51 (disclosing that message routing engine 204 “picks up, authenticates and properly routes incoming messages and outgoing messages”). Based on these cited disclosures, we find that Corneil’s message routing engine 204 checks to ensure that first trading partner 217 is the source of a message by reconciling first trading partner 217 information contained in the header information of the message with its corresponding trading partner profile. In our view, this process of reconciling first trading partner 217 information contained in the header information of the message with a corresponding trading partner profile includes evaluating whether first trading partner 217 was the source of the message.

Moreover, we note that Corneil’s reconciliation process identified above is consistent with how the ’786 patent authenticates the data source system as the source of a message. The ’786 patent discloses that a data request from data source system A 104 contains hypertext transport protocol headers that include, among other things, a “SOURCE” header parameter that provides “[t]he name of the system initiating the request.” Ex. 1001, 9:22–45. The ’786 patent discloses that, in one embodiment, “secure service 220 may invoke additional authentication and authorization routines to

verify access and transmission rights of data source system A 104 using SOURCE header parameter.” *Id.* at 10:1–14. The process disclosed in the ’786 patent that uses SOURCE header parameter information in a request to identify the name of the data source system initiating the request is, in all relevant respects, indistinguishable from Corneil’s reconciliation process that uses trading partner information contained in the header information of the message to identify the source of the message.

In its Sur-reply, PNC appears to agree that both the ’786 patent and Corneil describe using some of the same header parameter information to verify a data source, but nonetheless argues that the two processes are different. *See* PO Sur-reply 18–19. As we explain above, we are unable to discern a material difference between the process disclosed in the ’786 patent that uses the SOURCE header parameter information in a request to identify the name of the data source system initiating the request and Corneil’s reconciliation process that uses trading partner information contained in the header information of a message to identify the source of the message.

c. “web services hub identifying a business service handler configured to transform the request”

In its Patent Owner Response, PNC contends that “Corneil’s use of a single dedicated pipeline with a single translation engine is distinguishable from the ’786 patent, which consistently describes service routers locating and invoking a business service amongst multiple potential business services” plural. PO Resp. 32–33 (citing Ex. 1001, 6:25–31, 6:36–38, 7:1–3, 10:25–27, 12:1–2; Ex. 2006 ¶ 67). That is, PNC argues that the ’786 patent refers to business services plural to demonstrate that the claimed “web

services hub” “identifies a business service handler amongst multiple [business] service handlers to find one that is suitable, appropriate, or capable of handling a request.” *Id.* at 33–34. PNC argues that, in contrast, Corneil only discloses a single business service handler in the form of translation engine 208 and, therefore, has no need to “identify” translation engine 208 amongst multiple business service handlers. *See id.* at 34 (citing Ex. 2006 ¶¶ 68, 69).

In its Reply, USAA disagrees with PNC’s arguments because, according to USAA, the ’786 patent does not “consistently describe[]” multiple potential business service handlers. Pet. Reply 14. As one example to support its argument, USAA directs us to Figure 2 of the ’786 patent that illustrates a single transformation and/or business logic 212, which uses the same request transformer 224 to perform data conversion. *Id.* at 14–15 (citing Ex. 1001, Fig. 2; Ex. 1039, 168:8–18). According to USAA, there is nothing in the specification of the ’786 patent or the disputed claim language “suggesting that the web services hub must select from a *plurality* of business service handlers to handle a task.” *Id.* at 15–16. Instead, USAA asserts that independent claim 1 simply requires “identifying a business service handler configured to transform the request.” *Id.* at 16 (citing Ex. 1001, 15:22–23 (claim 1)).

In its Sur-reply, PNC contends that USAA ignores that transformation and/or business logic module 212 illustrated in Figure 2 of the ’786 patent may include multiple business service handlers other than request transformer 224. PO Sur-reply 19–20 (citing Ex. 1001, 6:29, 6:40–41, 7:29–33, 8:21–22, 8:40–41). PNC argues that, even if the ’786 patent discloses embodiments in which there is a single business service handler such as

request transformer 224, independent claim 1 is not directed to those embodiments. *Id.* at 20 (citing Ex. 1001, 15:22–23 (claim 1)). PNC reiterates its argument that, “if a system only has one business service handler, the web services hub would have no need to identify the business service handler configured to handle the request because the web services hub would simply automatically forward all requests to the one business services handler.” *Id.* (citing Ex. 2006 ¶¶ 68, 69). PNC argues that, even though Corneil discloses services other than translation engine 208 (e.g., trading partner profiles 205, archiver 207, auditor 206, data access manager 209, admin/system monitor 212, billing information 214), “USAA does not allege or provide any evidence that Corneil exercises any discretion whether to route incoming requests from a data source to any of Corneil’s other services.” *Id.* at 21.

Based on the fully developed record, we agree with USAA that Corneil’s disclosure of message routing engine 204 receiving a message from first trading partner 217, examining the header information of the message to determine if it requires transformation and, if transformation is required, sending the message to translation engine 208 for further processing teaches the claimed “web services hub identifying a business service handler configured to transform the request.” *See* Pet. 19–20. In the Institution Decision, we preliminarily determined that “identifying a business service handler configured to transform the request” is not so restrictive, but is broad enough to encompass identifying a single business service handler to transform the request. Dec. on Inst. 25. During trial, PNC appears to address this preliminary determination by arguing that the specification of the ’786 patent consistently describes service routers

locating and invoking a business service handler amongst a plurality of potential business service handlers to handle a task. *See* PO Resp. 32–34.

The U.S. Court of Appeal for the Federal Circuit “has repeatedly ‘cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification.’” *Williamson v. CitrixOnline, LLC*, 792 F.3d 1339, 1346–47 (Fed. Cir. 2015) (quoting *Teleflex, Inc. v. Ficoso N. Am. Corp.*, 299 F.3d 1313, 1328 (Fed. Cir. 2002)). Significantly, “it is the claims, not the written description, which define the scope of the patent right.” *Id.* at 1346 (quoting *Laitram Corp. v. NEC Corp.*, 163 F.3d 1342, 1347 (Fed. Cir. 1998) (alterations and emphasis removed). Here, we maintain our preliminary determination that “identifying a business service handler configured to transform the request” is broad enough to encompass identifying a single business service handler to transform the request. Contrary to PNC’s argument, this language does not require identifying a business service handler amongst a plurality of business service handlers to handle a task.

As we discuss previously, Corneil discloses that, when message routing engine 204 receives a message from first trading partner 217, it examines the header information that includes “*information on message incoming and outgoing formats*, trading partner information, routing characteristics and application information for [the] transaction.” Ex. 1004 ¶ 34 (emphasis added). Corneil then discloses that, if necessary, message routing engine 204 sends the message to translation engine 208 for further processing, which includes transforming the message “from the incoming message format . . . to the outbound message format” acceptable to second trading partner 217. *Id.* ¶ 35. Based on these cited disclosures, we find that,

when necessary, Corneil's message routing engine 204 identifies translation engine 208 to transform a message received from first trading partner 217 into a format acceptable to second trading partner 217 (i.e., the intended recipient of the message).

d. Summary

We have reviewed USAA's arguments and supporting evidence as to how the teachings of Corneil account for all the limitations of independent claims 1 and 12, and we agree with and adopt USAA's analysis. *See* Pet. 10–18, 20–30. In summary, USAA has demonstrated by a preponderance of the evidence that the subject matter of independent claims 1 and 12 would have been obvious over the teachings of Corneil.

5. Claims 2–4

USAA also contends that dependent claims 2–4 of the '786 patent are unpatentable under § 103(a) as obvious over teachings of Corneil. Pet. 34–49. USAA explains how the teachings of Corneil account for the subject matter of each dependent claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of this reference. *Id.*

As one example, claim 2 depends from independent claim 1 and further recites “a web container coupled to the data source system.” Ex. 1001, 15:43. USAA contends that Corneil teaches this limitation by relying on an annotated version of Figure 2, reproduced below.

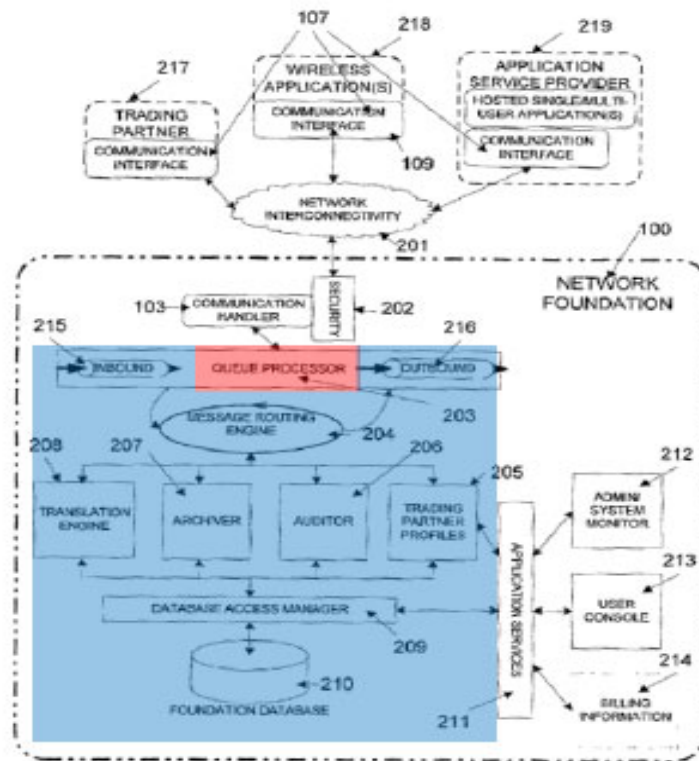


FIGURE 2

Pet. 35. Based on the annotated version of Figure 2, reproduced above, which illustrates queue processor 203 (in red) and web container (in blue), USAA argues that Corneil teaches the claimed “web container” because, when considering how the specification of ’786 patent describes the “web container,” Corneil’s transaction processing system possesses the same functionality. Pet. 36. That is, similar to the “web container” of the ’786 patent, USAA argues that Corneil’s web container includes, among other things, (1) message routing engine 204 that “establishes and maintains the execution environment, provides global access to run-time session data, . . . and processes messages”; (2) various software modules for processing messages and storing messages; and (3) inbound 215 and outbound 216 electronic message queues that are “preferably implemented, but not limited to using a Java Messenger Services (JMS) queueing system.” *Id.* (quoting

Ex. 1004 ¶¶ 33, 34) (citing Ex. 1004 ¶ 35; Ex. 1003 ¶ 112). USAA also argues that Corneil’s web container is coupled to trading partners 217 via its inbound 215 electronic message queue, which receives incoming messages from the trading partners. *Id.* (citing Ex. 1004 ¶ 51, Figs. 1, 2).

Dependent claim 2 also recites “a queue processor coupled to the web container: coupled to the data source system via a first secure transmission channel; and coupled to the secure service router, the queue processor to listen to an input queue of the request contained in the web container.” Ex. 1001, 15:44–48. USAA contends that Corneil teaches this limitation because it discloses queue processor 203 (in red above) coupled to web container (in blue above) that maintains inbound 215 and outbound 216 electronic message queues. Pet. 38 (citing Ex. 1004 ¶ 33; Ex. 1003 ¶ 114). USAA argues that the connection between the web container and first trading partner 217 is a secure communication channel (e.g., a secure hypertext transfer protocol secure (“HTTPS”) channel). *Id.* at 39–40 (citing Ex. 1004 ¶¶ 27, 33, 45). USAA also argues that Corneil’s queue processor 203 listens to inbound 215 electronic message queue, which is a simple first in first out (“FIFO”) queue, contained within the web container. *Id.* at 40–41 (citing Ex. 1004 ¶ 33).

During trial, PNC does not address separately USAA’s arguments and supporting evidence as to how the teachings of Corneil account for the additional limitations of dependent claims 2–4. *See* PO Resp. 54; PO Sur-reply 32. We have reviewed USAA’s arguments and supporting evidence as to how the teachings of Corneil account for the additional limitations of these dependent claims, and we agree with and adopt USAA’s analysis. *See* Pet. 34–49. Accordingly, USAA has demonstrated by a preponderance of

the evidence that the subject matter of dependent claims 2–4 would have been obvious over the teachings of Corneil.

6. *Claim 5*

Claim 5 depends from dependent claim 2, which, in turn, depends from independent claim 1, and further recites “a web server coupled to a web container.” Ex. 1001, 15:62. USAA contends that Corneil teaches this limitation because it explicitly discloses “a web server” in connection with user console 213 that functions as an interface to edit and update trading partner profiles. Pet. 49–50 (quoting Ex. 1004 ¶ 53) (citing Ex. 1004 ¶ 55, Fig. 2). USAA argues that, although Corneil discloses that user console 213 uses the web server to deliver web content to trading partners 217, Corneil does not “specify precisely where in its [transaction processing] system architecture the web server is located.” *Id.* at 50. Relying on the testimony of Dr. Malek, USAA asserts that “a [person of ordinary skill in the art] would have found it obvious for the web server to be coupled to the web container and receive requests from trading partners [217] over a secure connection,” such as via communication handler 103. *Id.* (citing Ex. 1003 ¶ 122). According to USAA, associating the web server with Corneil’s communication handler 103 would have been obvious because the communication handler 103 “is the module that ‘provides connectivity to the trading partners’ [217] and ‘understands and manages a number of communication protocols including,’” hypertext transfer protocol (“HTTP”) and HTTPS which are protocols known in the art for delivering web content (i.e., hypertext markup language (“HTML”)) to and from a web server. *Id.* (citing Ex. 1004 ¶ 33; 1003 ¶ 122). USAA also argues that it would have been obvious to a person of ordinary skill in the art to couple Corneil’s web

server to the web container because the web server receives messages from trading partners 217 that are then passed to the web container for further processing. *Id.* (citing Ex. 1004 ¶ 52, Fig. 2; Ex. 1003 ¶ 122).

Dependent claim 5 further recites that “the web server to deliver web content and provide a first secure connection to the data source system.” Ex. 1001, 15:62–64. USAA contends that Corneil teaches this limitation because, as it identifies above, the web server delivers web content (e.g., graphical user interfaces) to trading partners 217. Pet. 51 (citing Ex. 1004 ¶¶ 53, 55, Fig. 2). USAA argues that Corneil’s web server delivers web content via a secure connection to trading partners 217 and verifies authorization and access rights of the trading partners to the information being requested “using standard methods, such as digital certificates, secure socket layers (SSL) and Virtual Private Network Technologies.” *Id.* at 51–52 (quoting Ex. 1004 ¶ 45) (citing Ex. 1004 ¶ 55). According to USAA, a person of ordinary skill in the art also would have understood that “messages delivered to and from Corneil’s [transaction processing] system via . . . HTTPS protocol to be web content delivered by a web server via a secure connection.” *Id.* at 52 (citing Ex. 1004 ¶ 33; Ex. 1003 ¶ 123).

Dependent claim 5 also recites that “the web server to receive the request over a cryptographic protocol and to verify access authorization and access rights of the data source system based on the request.” Ex. 1001, 15:64–67. USAA contends that Corneil teaches this limitation because it discloses that its transaction processing system illustrated in Figure 2 receives secure requests over what the ’786 patent acknowledges are known cryptographic protocols, such as HTTPS and SSL. Pet. 52 & n.7 (citing Ex. 1004 ¶¶ 33, 45; Ex. 1003 ¶ 124; Ex. 1001, 11:48–51). USAA also

argues that Corneil discloses restricting accessibility to the data of trading partners 217 using “conventional authentication and logic methods,” which include verifying access authorization and access rights of trading partner 217 based on the information being requested. *Id.* at 52–53 (citing Ex. 1004 ¶¶ 45, 55; Ex. 1003 ¶ 124).

Lastly, dependent claim 5 recites “a second keystore coupled to the web server, the second keystore comprising a keystore file containing both public and private encryption keys.” Ex. 1001, 16:1–3. USAA contends that Corneil teaches this limitation because, as it identifies above, the transaction processing system illustrated in Figure 2 employs a secure connection between the web server and trading partners 217, such as HTTPS and SSL. Pet. 53 (citing Ex. 1004 ¶ 45; Ex. 1003 ¶ 125). USAA argues that Corneil’s disclosure of secure connections over SSL would have included a keystore containing the public and private keys used for SSL encryption. *Id.* at 53–54. USAA also argues that Corneil’s secure communications over SSL is the same encryption protocol disclosed in the ’786 patent. *Id.* at 54–55 (*comparing* Ex. 1004 ¶ 45, *with* Ex. 1001, 11:31–32) (citing Ex. 1003 ¶ 125). Relying on the testimony of Dr. Malek, USAA argues that SSL was already well-known in the art years before the alleged invention of the ’786 patent, one example being the built-in “mod_ssl” component of the widely-used Apache HTTP server that included a configurable keystore. *Id.* at 55 (citing Ex. 1003 ¶ 125; Ex. 1021). As a result, USAA asserts that a person of ordinary skill in the art would have found it obvious and straightforward to use keystores to store public and private keys needed by Corneil’s web service hub for secure communications over HTTPS and SSL protocols. *Id.* (citing Ex. 1004 ¶¶ 33, 45; Ex. 1003 ¶ 125).

- a. *“a web server [that] . . . receive[s] the request over a cryptographic protocol and to verify access authorization and access rights of the data source system based on the request”*

In its Patent Owner Response, PNC presents several arguments as to why Corneil does not teach “a web server [that] . . . receive[s] the request over a cryptographic protocol and to verify access authorization and access rights of the data source system based on the request,” as recited in dependent claim 5. PO Resp. 35–49. First, PNC contends that Corneil only discloses a web server associated with user console 213 and, according to PNC, user console 213 merely allows trading partners 217 to “update their profiles,” “review previously sent messages,” and “access billing records.” *Id.* at 37–38 (citing Ex. 1004 ¶¶ 43, 44, 47, 48, 53–55, Fig. 2). PNC argues that “[n]owhere does Corneil even suggest that the web server or User Console [213] receive any request from a trading partner [217] that is transformed and transmitted to another trading partner [217].” *Id.* at 38 (citing Ex. 2006 ¶ 74). Relying on an annotated version of Figure 2 of Corneil, PNC argues that requests sent by first trading partner 217 to second trading partner 217 never pass through the web server associated with user console 213, instead user console 213 is bypassed completely. *Id.* at 39–40. PNC asserts that USAA “never even attempts to provide any evidence that Corneil’s web server receives ‘the request’” that was introduced in independent claim 1 and subsequently required by dependent claim 5. *Id.* at 40.

Second, PNC contends that Corneil does not disclose using “cryptographic protocols” to communicate with user console 213 and the web server. PO Resp. 42 (citing Ex. 2006 ¶ 79). PNC argues that every reference to secure protocols in Corneil relates only to requests received by

communication handler 103—not user console 213 or its corresponding web server. *Id.* at 43 (citing Ex. 1004 ¶¶ 33, 45). PNC further argues that USAA attempts to remedy this purported deficiency in Corneil by arguing that a person of ordinary skill in the art would have found it obvious to position the web server such that it receives requests from trading partners 217 via communication handler 103. *Id.* PNC disagrees with USAA’s position in this regard because, according to PNC, a person of ordinary skill in the art upon reading Corneil would have understood that the web server is part of user console 213 and, therefore, would have had no reason to look for other locations to place the web server. *Id.* (citing Ex. 2006 ¶ 80). To support its argument that Corneil’s web server is part of user console 213, PNC provides the following reasons: (i) user console 213, itself, works with a web browser and does not disclose a separate web server that acts as an interface between user console 213 and the web browser; (ii) the disclosure in Corneil that mentions the “User Console interface” conveys that the web server is part of user console 213; (iii) the Internet connection that links user console 213 to the web browser provides further evidence that the web server is integral to user console 213—not separate; and (iv) Figure 2 of Corneil, on its face, is evidence that the web server is part of user console 213 as there is no web server actually depicted in this particular figure. *Id.* at 44–45 (quoting Ex. 1004 ¶ 56) (citing Ex. 1004 ¶ 55, Fig. 2; Ex. 2006 ¶¶ 81–85).

Third, PNC contends that Corneil only discloses that user console 213 uses the web server to update trading partner profiles and for other back-end management tasks, such as billing. PO Resp. 48. As a result, PNC argues that Corneil’s web server does not receive requests that are transformed and

sent to different trading partners 217 and, therefore, cannot verify the access authorization and access rights of trading partners 217 based on the requests. *Id.* (citing Ex. 2006 ¶ 89). In addition, PNC argues that a person of ordinary skill in the art would not have been motivated to modify Corneil's user console 213 to provide verification of access authorization and access rights because Corneil already discloses that security handler 202 performs these security functions. *Id.* PNC then asserts that having Corneil's user console 213 perform such security functions "would . . . result in unnecessary and wasteful redundancy." *Id.* (citing Ex. 2006 ¶ 90).

In its Reply, USAA contends that PNC mischaracterizes its argument with respect to dependent claim 5, which, for added clarity, is that "a [person of ordinary skill in the art] would have found it obvious for [Corneil's] web server to be coupled to the web container and receive requests from trading partners over a secure connection," such as via communication handler 103. Pet. Reply 16–18 (quoting Pet. 50) (citing Ex. 1003 ¶ 122). USAA argues that there are several reasons as to why a person of ordinary skill in the art would have coupled Corneil's web server to communication handler 103, including: (1) the '786 patent admits that web servers were well-known in the art and commonly used to handle HTTP/HTTPS requests and, therefore, it would have been obvious to a person of ordinary skill in the art to implement a web server in Corneil's transaction processing system illustrated in Figure 2 at the contact point between trading partners 217 and communication handler 103; and (2) a person of ordinary skill in the art would not have needed to add any new components to Corneil's transaction processing system because Corneil already discloses a web server, albeit in conjunction with handling HTTP requests at user console 213, and it would

have been obvious and straightforward to use the same web server in conjunction with communication handler 103 because, like user console 213, communication handler 103 also handles HTTP requests. *Id.* at 18–20 (citing Ex. 1001, 11:26–30; Ex. 1004 ¶ 45; Ex. 1003 ¶ 122). USAA asserts that PNC’s remaining arguments directed to dependent claim 5 are inapposite because they do not address the actual obviousness theory presented by USAA in the Petition. *See* Pet. Reply 20–30.

In its Sur-reply, PNC reiterates its argument that nothing in Corneil teaches or suggests that the web server associated with user console 213 would also receive requests from first trading partner 217 that are intended for second trading partner 217 and, therefore, “there would be no reason for the web server to ‘verify access authorization and access rights of the data source system based on the request,’ because no such requests are ever received by the web server in the first place.” PO Sur-reply 21–22. PNC also disagrees with USAA’s position that it would have been obvious to a person of ordinary skill in the art to couple Corneil’s web server to communication handler 103 because Corneil never discloses using the web server in the communication path between first and second trading partners 217, and inserting the web server in this communication path would have resulted in unnecessary processing steps in Corneil. *Id.* at 23–24. In any event, PNC argues that coupling Corneil’s web server to communication handler 103 merely because communication handler 103 understands HTTP/HTTPS and other messaging protocols would not have been obvious for the following reasons: (1) “not all servers that support HTTP/HTTPS are necessarily ‘web’ servers”; (2) the only mention of web browsers in Corneil is with respect to the “User Console interface”—not in connection with

messages sent by first trading partner 217 to second trading partner 217; and (3) the other messaging protocols that communication handler 103 is capable of supporting are “not web protocols” and “are not processed or understood by a web server.” *Id.* at 24–25 (citing Ex. 1004 ¶¶ 33, 55, 56; Ex. 2006 ¶ 80; Ex. 2008, 96:4–18, 117:24–118:4).

Based on the fully developed record, we agree with USAA that Corneil teaches the limitations of dependent claim 5 because it would have been obvious to a person of ordinary skill in the art to couple Corneil’s web server to communication handler 103 in a manner that allows the web server to deliver web content via a secure connection to different trading partners 217, and verify access authorization and access rights of trading partners 217 to the information being requested using known cryptographic protocols. *See* Pet. 49–55. The parties’ dispute with respect to dependent claim 5 centers on the location of Corneil’s web server in the transaction processing system illustrated in Figure 2. Corneil discloses that “user console (FIG. 2, 213) provides client, trading partners *via a web server*, an interface to edit, execute, or update information in their Trading Partner Profiles (FIG. 2, 205).” Ex. 1004 ¶ 53 (emphasis added). Although this is the sole disclosure of “a web server” in Corneil, we do not view this disclosure as limiting the use of the web server only to user console 213.

Corneil further discloses that the “User Console interface” supports various web browsers and that “[c]ommunication infrastructure is required between the user’s browser and the User Console process (FIG. 2, 213), such as an Internet connection (FIG. 2, 201).” Based on this disclosure, we find that trading partners 217 communicate with user console 213 using web browsers that deliver web content via network interconnectivity 201 (i.e. the

Internet connection). Corneil, however, makes clear that messages sent by trading partners 217 “pass through” a layer of security handler 202 to communication handler 103, which, in turn, “provides connectivity” to trading partners 217 because it “understands and manages” different communication protocols used by those trading partners, including HTTP and HTTPS. *Id.* ¶ 33; *see also id.* at ¶ 45 (“Messages can be delivered in secure and un-secure modes using standard HTTP, HTTPS . . . protocols or any other [protocols] understood by the Security Handler (FIG. 2, 202[]) and Communication Handler (FIG. 1, 103). . . . Authentication 603 and validation 605 of messages can be performed using standard methods, such as digital certificates, secure socket layers (SSL) and Virtual Private Network Technologies.”).

Based on these cited disclosures in Corneil, we find that processing messages in the transaction processing system illustrated in Figure 2 includes sending the messages from trading partners 217 through network interconnectivity 201 to security handler 202 and communication handler 103, after which the messages may be routed to user console 213. With this in mind, we agree with USAA that it would have been obvious to a person of ordinary skill in the art to couple the web server already disclosed in Corneil to communication handler 103, which is the main conduit for “provid[ing] connectivity” to trading partners 217, in a manner that would allow the web server to deliver web content via a secure connection to those trading partners.

USAA’s declarant, Dr. Malek, provides testimony supporting our determination in this regard. In his Declaration accompanying the Petition,

Dr. Malek provides the following testimony regarding the coupling of Corneil's web server to communication handler 103:

While Corneil discloses that the User Console [213] uses the web server to deliver web content to client trading partners [217], Corneil does not specify precisely where in its system architecture the web server is located. It would have been obvious to a [person of ordinary skill in the art] to couple the web server to the web container and receive requests from client trading partners [217] via secure connection, i.e., via HTTPS through the Communication Handler 103. EX1004, ¶[0033]. This would have been an obvious use of Corneil's web server, as the Communication Handler 103 is the module that "provides connectivity to the trading partners" and "understands and manages a number of communication protocols including, but not limited to HTTP, HTTPS . . . ," which were the protocols known in the art for delivering web content (such as HTML) to and from a web server. . . . In other words, the web server would act as the intermediary between the client trading partners [217], which send and receive data (including web content) over a secure protocol such as HTTPS, and the web container, which handles and processes incoming and outgoing messages. This was a well-known use of web servers in the prior art and it would have been obvious and straightforward for a [person of ordinary skill in the art] to use the web server described in Corneil in this way, e.g., to securely exchange messages with client trading partners [217] over commonly-used web protocols such as HTTPS and deliver those messages to the web container for processing.

Ex. 1003 ¶ 122. We credit the aforementioned testimony of Dr. Malek because it takes into account the reasonable inferences a person of ordinary skill the art would draw to explain how the web server already disclosed in Corneil would be used to deliver messages that include web content via a secure connection to trading partners 217. *See KSR*, 550 U.S. at 418 (An obviousness evaluation "need not seek out precise teachings directed to the

specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”).

Given our agreement with USAA’s argument that it would have been obvious to a person of ordinary skill in the art to couple the web server already disclosed in Corneil to communication handler 103, PNC’s arguments with respect to the disputed limitation of dependent claim 5 are unavailing. That is, we do not agree with PNC’s argument that, when Corneil’s web server is coupled to communication handler 103, it would not have been obvious to make the web server capable of receiving “the request” sent by first trading partner 217 intended for second trading partner 217, as required by dependent claim 5. *See* PO Resp. 35–40, 43–45; PO Sur-reply 21–24. PNC’s arguments in this regard are predicated on the notion that the web server already disclosed in Corneil is part of, or integral to, user console 213. As we explain above, although Corneil discloses “a web server” only once, we do not view the sole disclosure in Corneil as limiting the use of the web server only to user console 213. Ex. 1004 ¶ 53. Moreover, Dr. Malek provides credible testimony that explains how a person of ordinary skill in the art would have appreciated using Corneil’s web server to deliver messages that include web content via a secure connection to trading partners 217. *See* Ex. 1003 ¶ 122.

We also do not agree with PNC’s arguments that, when Corneil’s web server is coupled to communication handler 103, it would not have been obvious to make the web server capable of “receiv[ing] the request over a cryptographic protocol and . . . verify[ing] access authorization and access rights of the data source system based on the request,” as recited in

dependent claim 5. *See* PO Resp. 42–43, 48; PO Sur-reply 21–25. As we explain above, Corneil discloses delivering messages sent by first trading partner 217 to security handler 202 and communication handler 103 in secure modes using, as two examples, standard HTTPS protocols and SSL. Ex. 1004 ¶¶ 33, 45. Corneil’s process of delivering messages over cryptographic protocols is consistent with how the ’786 patent receives and transmits requests over cryptographic protocols. Indeed, the ’786 patent discloses that its web server 404 illustrated in Figure 4 receives and transmits requests using the same secure connection protocols as Corneil, such as HTTPS and SSL. Ex. 1001, 11:48–51 (“Data source system A 104 may transmit a request 401 over a cryptographic protocol such as secure sockets layer (SSL) to web server 404.”), 11:54–57 (“Web server 404 may then transmit request 401 over secure connection protocols such as, for example XML over HTTPS to web container 210.”)

b. Summary

We have reviewed USAA’s arguments and supporting evidence as to how the teachings of Corneil account for the additional limitations of dependent claim 5, and we agree with and adopt USAA’s analysis. *See* Pet. 49–55. In summary, USAA has demonstrated by a preponderance of the evidence that the subject matter of dependent claim 5 would have been obvious over the teachings of Corneil.

7. Claim 6

Claim 6 depends from dependent claim 5, which, in turn, depends from dependent claim 2, and further recites “wherein the second keystore assigns a public or private encryption key digital signature to the request and the web server transmits the request over a second secure connection to the

web container.” Ex. 1001, 16:4–7. USAA contends that Corneil teaches this limitation because it discloses authenticating and validating messages “using standard methods, such as digital certificates, secure socket layers (SSL) and Virtual Private Network Technologies.” Pet. 55 (quoting Ex. 1004 ¶ 45). Relying on the testimony of Dr. Malek, USAA argues that implementing these standard methods disclosed in Corneil would have included the second keystore assigning a public and private encryption digital signature to the request before transmission over the secure connection. *Id.* at 55–56 (citing Ex. 1003 ¶ 126).

USAA then argues that a person of ordinary skill in the art would have found it obvious (1) “to use well-known digital signature functionality to assign a public or private encryption key digital signature to the request before securely forwarding the request to the web container for routing and processing”; and (2) “to transmit the request from the web server to the web container securely, using the SSL protocol described in Corneil, which would have involved signing the request with the [web] server’s private key.” Pet. 56 (citing Ex. 1003 ¶ 126). According to USAA, a person of ordinary skill in the art also would have been motivated “to do both of the above to ensure the security of the request, e.g., to prevent the request from being intercepted or modified in transit to the web container.” *Id.* (citing Ex. 1017, 2, 6; Ex. 1003 ¶ 126). Lastly, USAA asserts that a person of ordinary skill in the art would have had a reasonable expectation of success in modifying Corneil to implement secured communications in the aforementioned ways because Corneil already discloses using standard secure SSL communication techniques. *Id.* at 57.

In its Patent Owner Response, PNC relies on essentially the same arguments presented above with respect to dependent claim 5 to rebut USAA's explanation as to how the teachings of Corneil account for the additional limitation of dependent claim 6. PO Resp. 49–51 (citing Ex. 2006 ¶¶ 93–96; Ex. 1001, Fig. 4, web server 404); PO Sur-reply 30. For the same reasons we identify above with respect to dependent claim 5, we do not agree with PNC's arguments. *See supra* Section II.B.6.a.

We have reviewed USAA's arguments and supporting evidence as to how the teachings of Corneil account for the additional limitations of dependent claim 6, and we agree with and adopt USAA's analysis. *See* Pet. 55–57. Accordingly, USAA has demonstrated by a preponderance of the evidence that the subject matter of dependent claim 6 would have been obvious over the teachings of Corneil.

8. Claim 7

Independent claim 7 recites “a web services hub comprising a web container and a queue processor, the web services hub comprising hardware, the hardware comprised of non-transitory memory connected to at least one processor.” Ex. 1001, 16:9–12. USAA relies on essentially the same arguments and evidence it identifies above with respect to “web services hub” of independent claim 1 and the “web container” of dependent claim 2 to explain how the teachings of Corneil account for this limitation of independent claim 7. Pet. 57. That is, based on annotated versions of Figure 2 of Corneil, USAA argues that Corneil's web services hub contains web container and queue processor 203. *See id.* at 12, 35. USAA also argues that Corneil's web services hub includes at least one processor that executes software processes, and the software executing on the processor stores data,

which means Corneil's system necessarily includes at least one non-transitory memory connected to the processor. *Id.* at 12–13 (citing Ex. 1004 ¶¶ 25, 26, 32, Fig. 2, claims 15 and 16; Ex. 1003 ¶ 85).

Independent claim 7 further recites “the web container coupled to a data source system to receive a request from a data source system.” Ex. 1001, 16:13–14. USAA contends that Corneil teaches this limitation because its web container (identified above in blue in the analysis of dependent claim 2) is coupled to first trading partner 217 via security handler 202, communication handler 103, and queue processor 203. Pet. 47. USAA argues that message routing engine 204 located within Corneil's web container receives the message from first trading partner 217 via this coupling. *Id.* at 58 (citing Ex. 1004 ¶¶ 34, 51).

Independent claim 7 also recites “the queue processor coupled to the web container, coupled to the data source system via a secure response transmission channel, and coupled to a secure service router, the queue processor to listen to an input queue of the request contained in the web container.” Ex. 1001, 16:15–19. USAA relies on essentially the same arguments and evidence it identifies above with respect to “queue processor” of dependent claim 2 to explain how the teachings of Corneil account for this limitation of independent claim 7. Pet. 57. That is, USAA argues that queue processor 203 is coupled to web container and maintains inbound 215 and outbound 216 electronic message queues. *Id.* at 38 (citing Ex. 1004 ¶ 33; Ex. 1003 ¶ 114). USAA further argues that the connection between the web container and first trading partner 217 is a secure communication channel (e.g., a secure HTTPS channel). *Id.* at 39–40 (citing Ex. 1004 ¶¶ 27, 33, 45). USAA also argues that Corneil's queue processor 203 listens to

inbound 215 electronic message queue, which is a simple FIFO queue, contained within the web container. *Id.* at 40–41 (citing Ex. 1004 ¶ 33). Lastly, USAA argues that Corneil teaches “the queue processor . . . coupled to a secure service router” because it discloses that message routing engine 204 performs the authentication and routing functions within the web container. *Id.* at 59 (citing Ex. 1004 ¶ 45).

Independent claim 7 then recites “wherein the secure service router is operative to authenticate the data source system and locate a transformation service to transform the request such that the request is transformed by the transformation service via a transformation process comprising.” Ex. 1001, 16:20–24. USAA contends that Corneil teaches this limitation because, after message routing engine 204 receives the message from first trading partner 217, it reviews the message header information to determine the processes that need to be performed, one of which is authenticating first trading partner 217. Pet. 60 (citing Ex. 1004 ¶ 45). According to USAA, one way by which Corneil’s message routing engine 204 authenticates first trading partner 217 is by checking its messages “to ensure that they are sent by the authorized Trading Partner by reconciling 604 the message[s] with a Trading Partner Profile.” *Id.* (quoting Ex. 1004 ¶ 45). USAA also argues that, if necessary, Corneil’s message routing engine 204 routes a message from first trading partner 217 to translation engine 208, which “performs the necessary data transformation.” *Id.* at 61 (quoting Ex. 1004 ¶ 51) (citing Ex. 1004 ¶¶ 34, 35, Fig. 2).

The only processing step of independent claim 7 recites “transforming the request such that the transformed request is in a format that is understandable and processable by an external system.” Ex. 1001, 16:25–

27. USAA relies on essentially the same arguments and evidence it identifies above with respect to “transforming the request” of independent claim 1 to explain how the teachings of Corneil account for this limitation of independent claim 7. Pet. 62. That is, USAA contends that Corneil teaches this limitation because it discloses that translation engine 208 transforms the message received from first trading partner 217 to a format that second trading partner 217 would be able to understand and process. *Id.* at 20–21 (citing Ex. 1004 ¶¶ 11, 33, 34, 42, 45; Ex. 1003 ¶¶ 97, 98).

Finally, independent claim 7 recites the following:

the web services hub to receive a response to the transformed request from the external system after the external system has completed processing of the transformed request and transmitted a response to the transformed request, the web services hub to parse the response to the transformed request for the data source system and transform the response to the transformed request into a transformed response to send to the data source system such that the transformed response is understandable and processable by the data source system.

Ex. 1001, 16:28–37. USAA relies on essentially the same arguments and evidence it identifies above with respect to the “response” steps of independent claim 1 to explain how the teachings of Corneil account for these limitations of independent claim 7. Pet. 62. That is, USAA contends that Corneil teaches these limitations because its system receives the message from first trading partner 217, uses translation engine 208 to transform the message into a format that second trading partner 217 would be able to understand and process, and then transmits the transformed message to second trading partner 217. *Id.* at 22–23 (citing Ex. 1004 ¶ 2; Ex. 1003 ¶ 99). Relying on the testimony of Dr. Malek, USAA argues that a

person of ordinary skill in the art would have recognized that, in situations such as the one taught by Corneil, it would have been beneficial for second trading partner 217 to transmit a response after it processes the transformed message. *Id.* at 23 (citing Ex. 1003 ¶ 100). As one example, USAA argues that “a buyer using Corneil’s [transaction processing] system to send a purchase order request to a seller would want to receive a response indicating acceptance or rejection of the purchase order.” *Id.* According to USAA, this would provide the predictable benefit of letting first trading partner 217 know that second trading partner 217 received and processed the purchase order, as well as informing first trading partner 217 about the status of the purchase order and whether any changes were necessary to complete the purchase order. *Id.* As further support for its argument, USAA directs us to Corneil’s use of “EDI” messages as “a standardized message format used for business transactions” that typically involves one request message and one response message. *Id.* at 23–24 (citing Ex. 1004 ¶ 32; Ex. 1006, 58; Ex. 1003 ¶ 100).

USAA also argues that Corneil provides explicit motivation that its transaction processing system is capable of handling a request-response exchange because it discloses the following: (1) message routing engine 204 “maintains running conversations, i.e., multi-message communication threads, and processes messages”; and (2) Corneil already permits two disparate systems associated with different trading partners 217 to communicate, without the need to understand the same data format. Pet. 24–25 (emphasis omitted) (quoting Ex. 1004 ¶ 34) (citing Ex. 1004, code (57), ¶¶ 31, 34, 35; Ex. 1003 ¶¶ 101, 102). USAA asserts that transforming a message from second trading partner 217 to a format that first trading

partner 217 would be able to understand and process “would provide the same predictable and known benefits as for the initial [message]” and “would require no modification to Corneil’s existing functionality.” *Id.* at 25 (citing Ex. 1004, code (57); Ex. 1003 ¶ 102). USAA also asserts that a person of ordinary skill in the art would have been motivated to implement a request-response exchange in Corneil’s transaction processing system with a reasonable expectation of success because it would require “only routine programming using the existing functionality of Corneil” (i.e., Corneil already supports “running conversations” or “multi-message communication threads” between trading partners). *Id.* at 25–26 (quoting Ex. 1004 ¶ 34) (citing Ex. 1003 ¶ 103).

In its Patent Owner Response, PNC relies on essentially the same arguments presented above with respect to the “web services hub identifying a business service handler configured to transform the request” of independent claim 1, to rebut USAA’s explanation as to how the teachings of Corneil account for the “the secure service router . . . operative to . . . locate a transformation service to transform the request” of independent claim 7. PO Resp. 52–54 (citing Ex. 1004 ¶¶ 34, 35, 51; Ex. 2006 ¶¶ 97–103); PO Sur-reply 30–31. For the same reasons we identify above with respect to the “web services hub identifying a business service handler configured to transform the request” of independent claim 1, we do not agree with PNC’s arguments. *See supra* Section II.B.4.c.

We have reviewed USAA’s arguments and supporting evidence as to how the teachings of Corneil account for all the limitations of independent claim 7, and for the same reasons we explain above in the context of independent claim 1 and dependent claim 2, we agree with and adopt

USAA's analysis. Accordingly, USAA has demonstrated by a preponderance of the evidence that the subject matter of independent claim 7 would have been obvious over the teachings of Corneil.

9. Claims 8–11 and 13–17

USAA also contends that dependent claims 8–11 and 13–17 of the '786 patent are unpatentable under § 103(a) as obvious over teachings of Corneil. Pet. 63, 66–69. USAA explains how the teachings of Corneil account for the subject matter of each dependent claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of this reference. *Id.*

As one example, claim 8 depends from independent claim 7 and further recites “a web transmitter coupled to the queue processor and coupled to the external system via secure response transmission channel.” Ex. 1001, 16:40–42. USAA contends that Corneil teaches this limitation for the same reasons Corneil teaches the limitation of dependent claim 3. Pet. 63. That is, USAA contends that Corneil's communication handler 103 teaches the claimed “web transmitter” because (1) it is coupled to queue processor 203 and (2) it is coupled to trading partners 217 via a secure communication channel (e.g., a secure HTTPS channel). *Id.* at 41–43 (citing Ex. 1004 ¶¶ 27, 33, Fig. 2.; Ex. 1003 ¶ 117)

Dependent claim 8 also recites “a first keystore coupled to the web transmitter.” Ex. 1001, 16:43. USAA contends that Corneil teaches this limitation for the same reasons it identifies above with respect to dependent claim 3. Pet. 63. That is, USAA contends that it would have been obvious to a person of ordinary skill in the art to include a keystore coupled to Corneil's communication handler 103 to store public and private keys that

are used by communication handler 103 when communicating via HTTPS protocol. *Id.* at 43 (citing Ex. 1004, Fig. 4; Ex. 1003 ¶ 118). To support its argument, USAA directs us to Corneil’s disclosure that communication handler 103 support secure communications via HTTPS, which uses SSL encryption technology to secure messages, and argues that a person of ordinary skill in the art would have understood that sending encrypted messages via HTTPS requires access to encryption keys (e.g., the SSL public key of the message recipient). *Id.* at 43–44 (citing Ex. 1004 ¶ 45; Ex. 1003 ¶ 118; Ex. 1017). According to USAA, the ’786 patent uses a keystore for the same purposes, which it explains “may be implemented as an SSL keystore file containing both public and private keys” (e.g., of the type employed in existing software such as “Apache HTTP Server from Apache Software Foundation”). *Id.* at 44 (quoting Ex. 1001, 11:23–32).

Lastly, dependent claim 8 recites “wherein the first keystore and the web transmitter transform the response from the external system and forward the transformed response to the queue processor for subsequent sending to the data source system.” Ex. 1001, 16:44–47. USAA contends that Corneil teaches this limitation for the same reasons it identifies above with respect to dependent claim 3. Pet. 63. That is, USAA contends that Corneil’s transaction processing system performs the same transformation process when receiving a message signed and encrypted according to SSL because communication handler 103 receives messages, verified and decrypted if necessary, and then forwards those messages to queue processor 203 via inbound 215 electronic message queue. *Id.* at 46–47 & n.6 (*comparing* Ex. 1001, 12:13–17, Fig. 4, *with* Ex. 1004 ¶¶ 33, 45) (citing Ex. 1003 ¶ 119). Relying on the testimony of Dr. Malek, USAA argues that

a person of ordinary skill in the art would have found it obvious (1) “to decrypt incoming HTTPS messages . . . before passing the messages on to the queue processor [203], because otherwise the queue processor [203] would be unable to read the content of the message and perform any necessary transformations”; and (2) “to verify [a] message’s digital signature, in order to ensure that the message in fact came from [trading partner 217] and was not intercepted or modified in transit.” *Id.* at 47–48 (citing Ex. 1003 ¶ 120). Turning to its arguments and evidence with respect to the claimed “first keystore coupled to the web transmitter,” USAA asserts that such functions were well-known, standard implementations of secure communications using the stored SSL key files. *Id.* at 48–49 (citing Ex. 1003 ¶ 120; Ex. 1017, 2). USAA, therefore, asserts that a person of ordinary skill in the art would have found it obvious to employ these well-known techniques to have both the first keystore and Corneil’s communication handler 103 transform the message before forwarding it to queue processor 203 for further processing. *Id.* at 49 (citing Ex. 1003 ¶ 120).

During trial, PNC does not address separately USAA’s arguments and supporting evidence as to how the teachings of Corneil account for the additional limitations of dependent claims 8–11 and 13–17. *See* PO Resp. 54; PO Sur-reply 32. We have reviewed USAA’s arguments and supporting evidence as to how the teachings of Corneil account for the additional limitations of these dependent claims, and we agree with and adopt USAA’s analysis. *See* Pet. 63, 66–69. Accordingly, USAA has demonstrated by a preponderance of the evidence that the subject matter of dependent claims 8–11 and 13–17 would have been obvious over the teachings of Corneil.

*C. Obviousness Over the Combined Teachings of
Corneil and Abjanic*

Alternatively, USAA also contends that claims 1–17 of the ’786 patent are unpatentable under § 103(a) as obvious over the combined teachings of Corneil and Abjanic. Pet. 9–69. USAA contends that the teachings of Corneil and Abjanic account for the subject matter of each challenged claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to combine the teachings of these references. *Id.* Apart from the arguments for claims 1, 5–7, and 12 raised above in the context of the obviousness ground based on the teachings of Corneil alone, PNC does not address separately USAA’s arguments and supporting evidence as to how the combined teachings of Corneil and Abjanic account for all the limitations of claims 1–17. *See* PO Resp. 22–54; PO Sur-reply 4–32.

Based on the fully developed trial record, we determine that USAA has shown by a preponderance of the evidence that claims 1–17 of the ’786 patent are unpatentable as obvious over the combined teachings of Corneil and Abjanic. We begin our analysis with a brief overview of Abjanic and then we address USAA’s contentions with respect to the challenged claims.

1. Overview of Abjanic

Abjanic generally relates to a transforming switch “that includes a transformer to transform a message from a first format to a second format, and a switch to switch the message to a selected server or processing node.” Ex. 1005, code (57). In one embodiment, Abjanic discloses that transforming switch 710 includes, among other things, transformer 715 and switch 165. *Id.* ¶ 73, Fig. 7. “Transformer 715 can transform messages

between a variety of different data formats, as required.” *Id.* ¶ 74. As one example of the functionality provided by transformer 715, Abjanic discloses the following:

a first node may issue a request over network or Internet 130 that is received by a second node. The second node may send a response back to the first node. Both the request and response may typically be routed over the Internet or network 130 and transforming switch 710. The request and response may both include data that may need to be transformed.

Id.; *see also id.* ¶ 75 (discloses “four general cases involving transformation,” one of which being “[transformation] may be performed . . . on data in the request and in the response”).

2. Claims 1, 7, and 12

Apart from one exception, USAA relies on essentially the same arguments and evidence for independent claims 1 and 7 it identifies above in the obviousness ground based on the teachings of Corneil alone to explain how the combined teachings of Corneil and Abjanic account for all the limitations of independent claims 1, 7, and 12. *See* Pet. 9–34, 57–62, 64–66. Each of independent claims 1 and 7 recites, in relevant part:

the web services hub to receive a response to the transformed request from the external system after the external system has completed processing of the transformed request and transmitted a response to the transformed request, the web services hub to parse the response to the transformed request for the data source system and transform the response to the transformed request into a transformed response to send to the data source system such that the transformed response is understandable and processable by the data source system.

Ex. 1001, 15:28–37, 16:28–37. Independent claim 12 recites similar limitations. *Id.* at 17:19–33. USAA contends that, to the extent that Corneil

does not teach the “response” steps required by independent claims 1, 7, and 12, Abjanic teaches these limitations because it discloses transformer 715 that parses and transforms, if necessary, requests and responses into “a format that is compatible with the receiving node.” Pet. 26 (quoting Ex. 1005 ¶ 75) (citing Ex. 1005 ¶ 74). USAA argues that Abjanic provides a specific example of a business transaction between “Bookstore.com” and “market.com,” where “Bookstore.com” understands and processes messages in “format A” and “market.com” understands and processes messages in “format B.” *Id.* at 28 (quoting Ex. 1005 ¶ 96) (citing Ex. 1003 ¶ 104). USAA argues that Abjanic’s system uses “tags” and other information to identify messages that need to be transformed so that “Bookstore.com” and “market.com” can communicate. *See id.* (quoting Ex. 1005 ¶ 98).

Turning to rationale to combine, USAA contends that, when considering the teachings of Abjanic that it identifies above, a person of ordinary skill in the art would have been motivated “to use Corneil’s [transaction processing] system to receive a response from the external system after it has completed processing a transformed request and to parse and transform that response into a format understandable and processable by the data source system to which the response is to be transmitted.” Pet. 28–29 (citing Ex. 1003 ¶ 105). According to USAA, “[t]his would have allowed a [person of ordinary skill in the art] to implement a business transaction, such as a purchase order request and response accepting the order, while taking advantage of the translation and efficiency features of Corneil’s web services hub.” *Id.* at 29. USAA also argues that there would have been a reasonable expectation of success in “[u]sing Corneil’s [transaction processing] system for both requests and responses between trading

partners,” as taught by Abjanic, because it would provide certain benefits, such as “cost savings and efficiency resulting from eliminating point-to-point integrations and improved interoperability between otherwise incompatible systems, with no drawback that would have discouraged a [person of ordinary skill in the art] from implementing the claimed functionality.” *Id.* at 30 (citing Ex. 1003 ¶ 106).

Apart from the arguments it raises with respect to independent claims 1, 7, and 12 in context of the obviousness ground based on the teachings of Corneil alone, PNC does not address separately USAA’s arguments and supporting evidence as to how the combined teachings of Corneil and Abjanic account for all the limitations of these three independent claims. *See* PO Resp. 22–34, 52–54; PO Sur-reply 4–21, 30–31. For the same reasons we identify above with respect to independent claims 1, 7, and 12, we do not agree with PNC’s arguments. *See supra* Section II.B.4 & 8.

We have reviewed USAA’s arguments and supporting evidence as to how the combined teachings of Corneil and Abjanic account for the limitations of independent claims 1, 7, and 12, and we agree with and adopt USAA’s analysis. *See* Pet. 10–34, 57–62, 64–66. Accordingly, USAA has demonstrated by a preponderance of the evidence that the subject matter of independent claims 1, 7, and 12 would have been obvious over the combined teachings of Corneil and Abjanic.

3. Claims 2–6, 8–11, and 13–17

USAA relies on essentially the same arguments and evidence for dependent claims 2–6, 8–11, and 13–17 that it identifies above in the obviousness ground based on the teachings of Corneil alone to explain how the combined teachings of Corneil and Abjanic account for each of the

limitations of these dependent claims. *See* Pet. 34–57, 63, 66–69. Apart from the arguments it raises with respect to dependent claims 5 and 6 in the context of the obviousness ground based on the teachings of Corneil alone, PNC does not address separately USAA’s arguments and supporting evidence as to how the combined teachings of Corneil and Abjanic account for all the additional limitations of dependent claims 2–6, 8–11, 13–17. *See* PO Resp. 35–52, 54; PO Sur-reply 21–30, 32. For the same reasons we identify above with respect to dependent claims 5 and 6, we do not agree with PNC’s arguments. *See supra* Section II.B.6 & 7. We have reviewed USAA’s arguments and supporting evidence as to how the combined teachings of Corneil and Abjanic account for the additional limitations of dependent claims 2–6, 8–11, and 13–17, and we agree with and adopt USAA’s analysis. *See* Pet. 34–57, 63, 66–69. Accordingly, USAA has demonstrated by a preponderance of the evidence that the subject matter of dependent claims 2–6, 8–11, and 13–17 would have been obvious over the combined teachings of Corneil and Abjanic.

III. CONCLUSIONS⁵

Based on the fully developed record, USAA has demonstrated by a preponderance of the evidence that claims 1–17 of the '786 patent are unpatentable under § 103(a) as obvious. A summary of our conclusions is set forth in the table below.

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
17	103(a)	Corneil	1–17	
17	103(a)	Corneil, Abjanic	1–17	
Overall Outcome			1–17	

IV. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1–17 of the '786 patent are held to be unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

⁵ Should PNC wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw PNC's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If PNC chooses to file a reissue application or a request for reexamination of the challenged patent, we remind PNC of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

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