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PATENT-ELIGIBILITY STANDARD FOR NETWORK ARCHITECTURE PATENTS UNDER THE FEDERAL CIRCUIT'S JURISPRUDENCE

By Ping-Hsun Chen¹

Network architecture technology is used to facilitate communications in a computer network. This computer-implemented technology is exposed to the patent-eligibility review under the Alice standard. This article reviews four Federal Circuit's decisions related to network architecture patents and concludes that there may be a single test for patent-eligibility of network architecture patents. The Federal Circuit searches for unconventional features that the invention implements in conventional or unconventional network architecture. To satisfy the unconventionality requirement, a claim must include a mechanism for executing the claimed unconventional feature. For example, a claim may recite physical components or software components of the invention's network architecture. How to achieve such a mechanism must be described in the specification.

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INTRODUCTION

The Internet was an important invention in the twentieth century and has heavily affected people's lives since its creation.² communication using the Internet is undeniable because of high speed and convenience the Internet can provide.³

One of many technologies used to implement Internet communications is network architecture.⁴ "Network architecture" can be described as "a set of abstract principles for the technical design of protocols and mechanisms for computer communication."⁵ It informs "a framework for the specification of a network's physical components and their functional organization and configuration, its operational principles and procedures, as well as data formats use."⁶

To implement a technical design of network architecture, communication protocols and algorithms are required.⁷ For example, Hayasaka & Miki introduced a proposal for solving network failures or network unavailability encountered in Multi-Protocol Label Switching (MPLS), a connection-oriented high-speed packet network.⁸ Without 100%

² See Lulin Gao, *Intellectual Property Rights in the Internet Era: The New Frontier*, 5 J. MARSHALL REV. INTELL. PROP. L. 589, 590 (2006) (discussing how Internet changed the international regime of copyright protection). See also Steven Ferrey, *Unresolved Judicial Conflict and Critical Infrastructure*, 3 TEX. A&M L. REV. 581, 583 (2016) (mentioning several important inventions of all time); Alexandra Drury, *How Internet Users' Identities Are Being Tracked and Used*, 15 TUL. J. TECH. & INTELL. PROP. 219-20 (2012) (describing how the Internet is used by people).

³ See Justin (Gus) Hurwitz & Roslyn Layton, *Debatable Premises in Telecom Policy*, 31 J. MARSHALL J. INFO. TECH. & PRIVACY L. 453, 456-82 (2015) (arguing that low-cost access to high-speed broadband is a necessary telecommunication policy).

⁴ See Robert Braden, David Clark, Scott Shenker, & John Wroclawski, *Developing a Next-Generation Internet Architecture*, MASS. INST. OF TECH. COMPUTER SCI. & ARTIFICIAL INTELLIGENCE LAB 3 (July 15, 2000), available at <https://groups.csail.mit.edu/ana/Publications/DevelopingaNextGenerationInternetArchitecture.pdf> (last visited Apr. 1, 2019); see also The Learning Ctr., *Internet Equipment Basics*, <https://www.attinternetservice.com/resources/internet-equipment-basics/> (last visited Apr. 2, 2019).

⁵ Braden et al., *supra* note 4, at 1.

⁶ See *Network Architect*, U. OF WIS.-MILWAUKEE SCH. OF INFO. STUD., <https://uwm.edu/informationstudies/resources/career/career-paths/network-architect/> (last visited Apr. 4, 2019).

⁷ See Braden et al., *supra* note 4, at 3-4.

⁸ See Mitsuo Hayasaka and Tetsuya Miki, *A Network Architecture with High Availability for Real-Time Premium Traffic over the Internet*, 16(2) J. OF NETWORK AND SYSTEMS MGMT. 201-2 (2008), available at <https://link.springer.com/article/10.1007/s10922-007-9095-4> (last visited Apr. 29, 2019). "Packet" is defined as "a unit of data of some finite-size that is transmitted as a unit." Koninklijke KPN N.V. v. Samsung Elecs. Co., No. 2:14-CV-1165-JRG, 2016 WL 2610649, at *5 (E.D. Tex. May 6, 2016) (directly stating the plaintiff's quotation from IEEE AUTHORITATIVE DICTIONARY OF IEEE STANDARDS TERMS 787 (7th ed. 2000)). A packet is

availability, an e-commerce company would suffer from a huge monetary loss.⁹ So, the proposed solution adopts a forward error correction (FEC) technique that uses error correction code transmitted along with original media packets.¹⁰ The code is used to recover the lost original packets.¹¹ Specifically, the proposed solution includes network architecture with a detailed explanation of Traffic Allocation Algorithm.¹²

Patenting network architecture technologies has continued for years.¹³ One example is U.S. Patent No. 9,413,684 ('684 Patent), which provides "methods for provisioning communications between client computers and systems network architecture resources over a group of servers in a data center."¹⁴ The specification of the '684 Patent shows a flowchart of three steps for implementing the provisioning communications.¹⁵ For instance, the first step is to identify "resources that client computers are configured to communicate with."¹⁶ The targeted resources include sources based on Systems Network Architecture.¹⁷

The second example is U.S. Patent No. 9,674,082 ('082 Patent), which discloses a server-centric network architectural design aiming at "support[ing] high inter-server bandwidth, as well as aggregate throughput, in a modular data center ("MDC") architecture."¹⁸ The key idea is to provide the shortest paths among different servers.¹⁹ The specification of the '082

self-contained, and it has a maximum size with its own source address and destination address. *See generally Information Technology*, COLUM. U., <http://www.columbia.edu/~rk35/defn.html> (last visited May 9, 2019).

⁹ *See* Hayasaka & Miki, *supra* note 8, at 202.

¹⁰ *See id.* at 206.

¹¹ *See id.*

¹² *See id.* at 206-12.

¹³ *See Network Architecture*, FRESH PATENTS, <https://tgs.freshpatents.com/Network-Architecture-bx1.php> (last visited May 10, 2019).

¹⁴ U.S. Patent No. 9,413,684 col.1 ll.16-19 (filed Aug. 28, 2015). A "data center" is "a physical facility that organizations use to house their critical applications and data." *See also What is a Data Center*, CISCO, <https://www.cisco.com/c/en/us/solutions/data-center-virtualization/what-is-a-data-center.html> (last visited May 9, 2019). "Provisioning" means "the enterprise-wide configuration, deployment and management of multiple types of IT [(information technology)] system resources." MARK CIAMPA, SECURITY+ GUIDE TO NETWORK SECURITY FUNDAMENTALS 403 (Cengage, 6th ed. 2018).

¹⁵ *See* '684 Patent col.9 l.25 - col.10 l.9.

¹⁶ '684 Patent col.9 ll.36-37.

¹⁷ *See* '684 Patent col.5 ll.43-49, col.9 ll.36-37.

¹⁸ U.S. Patent No. 9,674,082 col.1 ll.33-34, 43-44 (filed Feb. 10, 2016). "Modular data center" (MDC) is a way to build and deploy a data center by using a shipping container to store servers and switches. *See id.* at col.1 ll.15-23.

¹⁹ *See* '082 Patent col.2 ll.41-45.

Patent illustrates architecture designs and algorithms to implement this idea.²⁰

After the Supreme Court's decision in *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*,²¹ internet-based patents are often challenged with an issue of patent-ineligibility under 35 U.S.C. § 101.²² For instance, in *Ultramercial, Inc. v. Hulu, LLC*,²³ the Federal Circuit decided that the disputed method claims for distribution of products over the Internet via a facilitator were patent-ineligible.²⁴ The Federal Circuit specifically held that "the use of the Internet is not sufficient to save otherwise abstract claims from ineligibility under § 101."²⁵

Alice provides a two-step standard for determining patent-eligibility of a claim.²⁶ The first step is to "determine whether the claims at issue are directed to a patent-ineligible concept."²⁷ If so, then the second step is to "examine the elements of the claim to determine whether it contains an *inventive concept* sufficient to transform the claimed [patent-ineligible concept] into a patent-eligible application."²⁸ In the second step, courts "consider the elements of each claim both individually and 'as an ordered combination'"²⁹ and look for an inventive concept "that is 'sufficient to ensure that the patent in practice amounts to *significantly more than* a patent upon the [ineligible concept] itself.'"³⁰

²⁰ See '082 Patent col.2 l.27 - col.16 l.15.

²¹ See *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208 (2014).

²² See Annal D. Vyas, *Alice in Wonderland v. CLS Bank: The Supreme Court's Fantastic Adventure into Section 101 Abstract Idea Jurisprudence*, 9 AKRON INTELL. PROP. J. 1, 15-7 (2015) (discussing the Federal Circuit's decisions on patent-eligibility where the disputed patents were internet-based technology); see also Huang-Chih Sung, *When Open Source Software Encounters Patents: Blockchain As an Example to Explore the Dilemma and Solutions*, 18 J. MARSHALL REV. INTELL. PROP. L. 55, 67-9 (2018) (discussing the *Alice* decision and its impact on software and e-commerce patents).

²³ *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709 (Fed. Cir. 2014).

²⁴ See *id.* at 713-17.

²⁵ *Id.* at 716.

²⁶ See Jonathan Stroud, *Patent Post-Grant Review After Alice*, 69 BAYLOR L. REV. 56, 78-81 (2017) (briefing the *Alice* decision and presenting the statistical data of how district courts applied the standard from June 19, 2014 to Feb. 28, 2016); see also Douglas B. Wentzel, *Uber & Alice: Could One Patent Really Take Down This Ridesharing Giant?*, 98 J. PAT. & TRADEMARK OFF. SOC'Y 856, 865-7 (2016) (discussing the *Alice* decision); Ping-Hsun Chen, *Questionable Patent-Eligibility of IoT Technology*, 22 MARQ. INTELL. PROP. L. REV. 165, 167-8 (2018) (introducing the *Alice* standard of patent-eligibility).

²⁷ *Alice Corp. Pty.*, 573 U.S. at 217.

²⁸ *Id.* at 221 (internal quotation marks omitted and emphasis added).

²⁹ *Id.* at 217.

³⁰ *Id.* at 218 (alteration in original and emphasis added).

The step two analysis remains the same for an invention implemented on a computer.³¹ While recognizing “that a computer is a tangible system (in § 101 terms, a ‘machine’), or that many computer-implemented claims are formally addressed to patent-eligible subject matter[.]”³² the *Alice* Court cautioned that ending the § 101 inquiry there would cause an applicant to “claim any principle of the physical or social sciences by reciting a computer system configured to implement the relevant concept.”³³

In fact, *Alice* provides that a patent-ineligible concept cannot be transformed into a patent-eligible invention by “the mere recitation of a generic computer” to the extent that “a patent’s recitation of a computer amounts to a mere instruction to ‘implemen[t]’ an abstract idea ‘on ... a computer[.]’”³⁴ This proposition is based on the notions that “[s]tating an abstract idea while adding the words apply it[.]” “limiting the use of an abstract idea to a particular technological environment,” or the combination of both are not enough for patent-eligibility.³⁵

The *Alice* standard has been criticized by some commentators because of its confusion and vagueness.³⁶ For example, one commentator observes that the Federal Circuit has struggled in defining the scope of abstract ideas and questions if the Federal Circuit has turned step two analysis into a novelty test by focusing on whether claim elements are conventional.³⁷ However, the question here is whether in the context of network architecture patents, the *Alice* standard can provide a predictable standard for determining patent-eligibility.

To explore the patent-eligibility standard for network architecture inventions, Part II of this paper briefly discusses the Federal Circuit’s implementation of the *Alice* standard. Part III analyzes four Federal Circuit’s

³¹ See *id.* at 222.

³² *Id.* at 224.

³³ *Alice Corp. Pty.*, 573 U.S. at 224.

³⁴ *Id.* at 223 (alteration in original).

³⁵ See *id.* (internal quotation marks omitted).

³⁶ See, e.g., Jorge A. Goldstein, Michelle K. Holoubek, & Krishan Y. Thakker, *The Time Has Come to Amend 35 U.S.C. § 101*, 44 AIPLA Q.J. 171, 176-90 (2016) (explaining that the standard for finding an inventive concept is too confusing and vague); David O. Taylor, *Confusing Patent Eligibility*, 84 TENN. L. REV. 157, 186 (2016) (addressing the *Alice* standard’s confusion with other patentability requirements and policy concerns); Kristy J. Downing, Esq., *Patent Eligibility’s Doctrinal Exclusions ... Lately, A Scary Movie Too Difficult to Watch: Concrete Solutions and Suggestions*, 22 MARQ. INTELL. PROP. L. REV. 231, 266-70 (2018) (arguing that the *Alice* standard has created ambiguity as to what an abstract idea really is); Benjamin W. Hattenbach & Rosalyn M. Kautz, *Concrete Thoughts About Abstract Ideas: Why A Nebulous Exception to Patentability Should Not Swallow Computer Software*, 58 SANTA CLARA L. REV. 261, 274-84 (2018) (articulating how *Alice* has led to a situation where the Federal Circuit cannot sort out a clear border between abstract ideas and patent-eligible ideas).

³⁷ See Downing, *supra* note 36, at 266-75.

cases related to network architecture technology. These cases are selected because the claimed inventions facilitate communications in a computer network. For each case, in addition to analyzing the Federal Circuit's reasoning, Part III briefly introduces the claimed technologies. Part IV provides a comprehensive review of these four cases as a whole. Part IV also indicates that the step-one analysis focuses on an improvement the claimed invention may offer and the step two analysis concerns a search for the claimed invention's unconventionality. Finally, Part V presents practical implications drawn from these four cases. Part V discusses the possibility of a single test for network architecture patents and provides practical considerations for patent drafting.

I. *ALICE* STANDARD UNDER THE FEDERAL CIRCUIT'S JURISPRUDENCE

A. *Step One*

Laws of nature, natural phenomena, and abstract ideas are three judicially-created patent-ineligible subject matters.³⁸ While the disputed claims in *Alice* only fall within the abstract idea category,³⁹ the *Alice* standard is applicable to laws of nature and natural phenomena.⁴⁰ Yet, neither the Supreme Court nor the Federal Circuit have defined the meanings of laws of nature, natural phenomena, and abstract ideas.⁴¹ As a result, the judicial practice of determining patent-eligibility or patent-ineligibility makes the *Alice* standard less consistent and predictable.⁴²

³⁸ See *Alice Corp. Pty.*, 573 U.S. at 216.

³⁹ See *id.* at 221.

⁴⁰ See *id.* at 217.

⁴¹ See Hung H. Bui, *A Common Sense Approach to Implement the Supreme Court's Alice Two-Step Framework to Provide "Certainty" and "Predictability"*, 100 J. PAT. & TRADEMARK OFF. SOC'Y 165, 171 (2018) (stating that because of no usable definition of a patent-ineligible abstract idea, "the Federal Circuit, district courts, and the United States Patent & Trademark Office have to characterize software-related inventions or business method inventions as "a high level of abstraction"); See also *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1346 (Fed. Cir. 2017) ("The Supreme Court 'has not established a definitive rule to determine what constitutes an 'abstract idea' for the purposes of step one.'").

⁴² See 2019 Revised Patent Subject Matter Eligibility Guidance, 84 FED. REG. 50, 51-2 (Jan. 7, 2019), available at <https://www.govinfo.gov/content/pkg/FR-2019-01-07/pdf/2018-28282.pdf> ("The growing body of precedent has become increasingly more difficult for examiners to apply in a predictable manner, and concerns have been raised that different examiners within and between technology centers may reach inconsistent results."). See also Ben Hattenbach & Gavin Snyder, *Rethinking the Mental Steps Doctrine and Other Barriers to Patentability of Artificial Intelligence*, 19 COLUM. SCI. & TECH. L. REV. 313, 321 (2018) ("The lack of an explicit definition of an 'abstract idea' in *Alice* itself has led the lower courts to rule primarily by analogy to the facts of previous cases.").

Nonetheless, the Federal Circuit has added some elements to the step-one analysis.⁴³ In *Internet Patents Corp. v. Active Network, Inc.*,⁴⁴ the Federal Circuit stated that “[u]nder step one of *Mayo/Alice*, the claims are considered *in their entirety* to ascertain whether their character as a whole is directed to excluded subject matter.”⁴⁵ In *Affinity Labs of Texas, LLC v. DIRECTV, LLC*,⁴⁶ the Federal Circuit held that step one “look[s] at the ‘focus of the claimed advance over the prior art’ to determine if the claim’s ‘character as a whole’ is directed to excluded subject matter.”⁴⁷ Recently, in *Trading Technologies International, Inc. v. IBG LLC*,⁴⁸ the Federal Circuit opined that step one “evaluate[s] ‘the focus of the claimed advance over the prior art’ to determine if the character of the claim as a whole, *considered in light of the specification*, is directed to excluded subject matter.”⁴⁹

In addition, for computer-implemented or software inventions, the Federal Circuit in *Enfish, LLC v. Microsoft Corp.*⁵⁰ has provided a “specific improvement” test.⁵¹ The *Enfish* court held that step one “asks whether the focus of the claims is on the *specific asserted improvement* in computer capabilities (i.e., the self-referential table for a computer database) or, instead, on a process that qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool.”⁵² Alternatively, the Federal Circuit in *McRO, Inc. v. Bandai Namco Games America Inc.* held that step one “look[s] to whether the claims in these patents focus on *a specific means or method that improves the relevant technology* or are instead directed to *a result or effect* that itself is the abstract idea and merely invoke generic processes and machinery.”⁵³

⁴³ See Ping-Hsun Chen, *Patent Eligibility of Online Application Software After Internet Patents Corp. v. Active Network, Inc.*, 99 J. PAT. & TRADEMARK OFF. SOC’Y 97, 103 (2017) (stating that the Federal Circuit added one rule to the step-one analysis and that the rule has been followed by its latter decisions and some district courts).

⁴⁴ *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343 (Fed. Cir. 2015).

⁴⁵ *Id.* at 1346 (emphasis added); see also *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016) (“[W]e have described the first-stage inquiry as looking at the focus of the claims, their character as a whole[.]” (internal quotation marks omitted)).

⁴⁶ *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253 (Fed. Cir. 2016).

⁴⁷ *Id.* at 1257 (emphasis added).

⁴⁸ *Trading Techs. Int’l, Inc. v. IBG LLC*, 921 F.3d 1084 (Fed. Cir. 2019).

⁴⁹ *Id.* at 1092 (emphasis added).

⁵⁰ *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016).

⁵¹ See Ted G. Dane, *Are the Federal Circuit’s Recent Section 101 Decisions A “Specific Improvement” in Patent Eligibility Law?*, 26 FED. CIR. B.J. 331, 345-59 (2017) (referring to *Enfish* as the “specific improvement” test).

⁵² *Enfish*, 822 F.3d at 1335-36 (emphasis added).

⁵³ *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016) (emphasis added).

Moreover, the Federal Circuit in *Electric Power Group, LLC v. Alstom S.A.*⁵⁴ identified four information-related abstract ideas: (1) “collecting information, including when limited to particular content (which does not change its character as information)”⁵⁵; (2) “analyzing information by steps people go through in their minds, or by mathematical algorithms, without more, as essentially mental processes”⁵⁶; (3) “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)”⁵⁷; and (4) the combination of collecting, analyzing, and presenting information.⁵⁸ However, since then, the Federal Circuit has not offered other definite abstract ideas.⁵⁹

B. Step Two

Normally, the Federal Circuit applies a common law methodology to the step two analysis by “examin[ing] earlier cases in which a similar or parallel descriptive nature can be seen—what prior cases were about, and which way they were decided.”⁶⁰ That is, a disputed claim may be found patent-eligible or patent-ineligible if it is considered similar or analogous to those patent-eligible or patent-ineligible claims in previous decisions.⁶¹

⁵⁴ Elec. Power Grp., LLC v. Alstom S.A., 830 F.3d 1350 (Fed. Cir. 2016).

⁵⁵ *Id.* at 1353.

⁵⁶ *Id.* at 1354.

⁵⁷ *Id.*

⁵⁸ *See id.*

⁵⁹ *See* Trevor Bervik, *Roots to Bits: How the History of Plant Patents Can Shape Software's Future*, 17 COLO. TECH. L.J. 187, 188-9 (2018) (introducing the patent-eligibility issue of software patents); *see also* U.S. PATENT & TRADEMARK OFFICE, U.S. DEP'T OF COMMERCE, MANUAL OF PATENT EXAMINING PROCEDURE (MPEP) § 2106.04(a) (9th ed., rev. 8 2018), available at https://www.uspto.gov/web/offices/pac/mpep/s2106.html#ch2100_d29a1b_13a9e_2dc (last visited July 1, 2019) (“Despite this long history, the courts have declined to define abstract ideas. Instead, they have often identified abstract ideas by referring to earlier precedent, e.g., by comparing a claimed concept to the concepts previously identified as abstract ideas by the courts.”).

⁶⁰ *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1294 (Fed. Cir. 2016). *See also* Daniel Kazhdan, *The Federal Circuit Should Be More Tolerant of Intra-Circuit Splits*, 26 FED. CIR. B.J. 105, 119-21 (2016) (discussing the Federal Circuit’s common-law approach to develop rules for the patent law).

⁶¹ *See Amdocs (Israel) Ltd.*, 841 F.3d at 1295-99 (“We begin, then, with an examination of eligible and ineligible claims of a similar nature from past cases With this background in mind, we turn to an examination of the claims in the patents at issue to determine whether the trial court was correct in ruling them all to be invalid under § 101.”); *see also* Bui, *supra* note 41, at 245-46 (describing how the Federal Circuit’s common law approach works); Ebby Abraham, *Amdocs v. Openet: Opening a Software Rift in Alice's Wonderland*, 29 LEXOLOGY (December 5, 2016), <https://www.lexology.com/library/detail.aspx?g=2f72dbfd-86d7-4463-a2cf-e84f27a229bd> (“[T]he courts must determine whether a patent is directed to an abstract

However, for claims directed to an abstract idea, the Federal Circuit has taken at least two special approaches to implement the *Alice* step two analysis.⁶² The first approach is the traditional machine-or-transformation test embraced by the Federal Circuit in *Ultramercial, Inc. v. Hulu, LLC*.⁶³ The test requires that “[a] claimed process can be patent-eligible under § 101 if: ‘(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.’”⁶⁴ But, in *DDR Holdings, LLC v. Hotels.com, L.P.*,⁶⁵ the Federal Circuit clarified that “satisfying the machine-or-transformation test, by itself, is not sufficient to render a claim patent-eligible, as not all transformations or machine implementations infuse an otherwise ineligible claim with an ‘inventive concept.’”⁶⁶ Alternatively, as the Federal Circuit in *Vehicle Intelligence & Safety LLC v. Mercedes-Benz USA* held, the machine-or-transformation test “is no longer sufficient to render a claim patent-eligible.”⁶⁷

The second approach for abstract-idea claims is the technological arts test.⁶⁸ In *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*,⁶⁹ the Federal Circuit stated that a claim may “recite a sufficient inventive concept under step two—particularly when the claim[] solve[s] a technology-based problem,

idea by comparing the claims at issue with prior cases involving similar claims.”).

⁶² See, e.g., Joseph Allen Craig, *Deconstructing Wonderland: Making Sense of Software Patents in A Post-Alice World*, 32 BERKELEY TECH. L.J. 359, 366-73 (2017) (discussing five software patent cases and concluding that “software claims should offer a technical solution to a technical problem”); Kristen Osenga, *Institutional Design for Innovation: A Radical Proposal for Addressing § 101 Patent-Eligible Subject Matter*, 68 AM. U. L. REV. 1191, 1214-15 (2019) (discussing the Federal Circuit’s re-adoption of the machine-or-transformation test for determining an issue of patent-eligibility).

⁶³ See *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 716-17 (Fed. Cir. 2014); see also Steven Swan, *Plugging the Rabbit Hole: The Supreme Court’s Decision in Alice*, 2016 UTAH L. REV. 891, 907-08 (2016) (discussing the *Ultramercial, Inc.* decision).

⁶⁴ *Ultramercial, Inc.*, 772 F.3d at 716. The Supreme Court in *Bilski v. Kappos* held that the machine-or-transformation test was “not the sole test for deciding whether an invention is a patent-eligible ‘process.’” 561 U.S. 593, 604 (2010). For more information on the practice of the machine-or-transformation test, see generally Ebby Abraham, *Bilski v. Kappos: Sideline Analysis from the First Inning of Play*, 26 BERKELEY TECH. L.J. 15 (2011).

⁶⁵ *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014).

⁶⁶ *Id.* at 1256 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 84 (2012)).

⁶⁷ *Vehicle Intelligence & Safety LLC v. Mercedes-Benz USA, LLC*, 635 F. App’x 914, 919 (Fed. Cir. 2015) (citing *DDR Holdings, LLC*, 773 F.3d at 1256). In *Enfish*, when applying the *Alice* step-one analysis, the Federal Circuit held “that the improvement is not defined by reference to ‘physical’ components does not doom the claims. To hold otherwise risks resurrecting a bright-line machine-or-transformation test, or creating a categorical ban on software patents[.]” 822 F.3d 1327, 1339 (Fed. Cir. 2016). This trend indicates that the Federal Circuit has abandoned the machine-or-transformation test for determining patent-eligibility.

⁶⁸ See Craig, *supra* note 62, at 372-73 (referring to *Amdocs (Israel) Ltd.*, 841 F.3d at 1288, as a technological arts test).

⁶⁹ *Amdocs (Israel) Ltd.*, 841 F.3d at 1288.

even with conventional, generic components, combined in an unconventional manner.”⁷⁰ After *Alice*, the name of the test was first mentioned by Judge Haldane Robert Mayer in his concurring opinion in *I/P Engine, Inc. v. AOL Inc.*⁷¹ Judge Mayer concluded that “the inventive concept *itself* must be new technology, a novel application of scientific principles and natural laws to solve problems once thought intractable.”⁷²

II. NETWORK ARCHITECTURE PATENT CASES

A. *Amdocs (Israel) Ltd. V. Openet Telecom, Inc.*

1. Background

In *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, the patented technology was related to “a system designed to solve an accounting and billing problem faced by network service providers.”⁷³ The system included components such as network devices, information source modules (ISMs), gatherers, a central event manager (CEM), a central database, a user interface server, and terminals or clients.⁷⁴ The components were arranged in a distributed architecture that reduces the data traffic impact on network and system resources.⁷⁵

Four patents, U.S. Patent Nos. 7,631,065 (’065 Patent), 7,412,510 (’510 Patent), 6,947,984 (’984 Patent), and 6,836,797 (’797 Patent), were involved in the case and derived from the same parent patent.⁷⁶ The ’065 Patent covered “a system, method, and computer program for merging data in a network-based filtering and aggregating platform” and an apparatus “for enhancing networking accounting data records.”⁷⁷ The ’510 Patent illustrated “a system, method, and computer program for reporting on the collection of network usage information.”⁷⁸ The ’984 Patent focused on “a system and accompanying method and computer program for reporting on the collection

⁷⁰ *Id.* at 1300.

⁷¹ See *I/P Engine, Inc. v. AOL Inc.*, 576 F. App’x 982, 992-96 (Fed. Cir. 2014) (Mayer, J., concurring); see also Austin Steelman, *Curiouser and Curiouser! Why the Federal Circuit Can’t Make Sense of Alice*, 98 J. PAT. & TRADEMARK OFF. SOC’Y 374, 389 (2016) (explaining Judge Mayer’s view on *Alice*); see also Fabio E. Marino & Teri H. P. Nguyen, *From Alappat to Alice: The Evolution of Software Patents*, 9 HASTINGS SCI. & TECH. L.J. 1, 18-19 (2017) (analyzing Judge Mayer’s technological arts test).

⁷² *I/P Engine, Inc.*, 576 F. App’x at 993 (Mayer, J., concurring) (emphasis in original).

⁷³ *Amdocs (Israel) Ltd.*, 841 F.3d at 1291.

⁷⁴ See *id.*

⁷⁵ See *id.* at 1291-92.

⁷⁶ See *id.* at 1290-91.

⁷⁷ *Id.* at 1291.

⁷⁸ *Id.*

of network usage information from a plurality of network devices.”⁷⁹ Finally, the ’797 Patent described “a system, method, and computer program for generating a single record reflecting multiple services for accounting purposes.”⁸⁰

On appeal, for each patent, the Federal Circuit chose one disputed claim as a representative claim for patent-eligibility analysis.⁸¹ Finally, while assuming that the disputed claims were directed to an abstract idea, the Federal Circuit reversed the district court’s holding that all disputed claims were patent-ineligible.⁸²

2. Computer Program Claims

The Federal Circuit first examined claim 1 of the ’065 Patent reciting:

1. A computer program product embodied on a computer readable storage medium for processing *network accounting information* comprising:

computer code for receiving from a first source a first network accounting record;

computer code for correlating the first network accounting record with accounting information available from a second source; and

computer code for using the accounting information with which the first network accounting record is correlated to *enhance* the first network accounting record.⁸³

The Federal Circuit’s analysis under step two of the *Alice* standard focused on the term “enhance” referred to as the enhancing limitation.⁸⁴ The Federal Circuit first looked into the specification and found that the disputed claims “entail[ed] an unconventional technological solution (enhancing data in a distributed fashion) to a technological problem (massive record flows which previously required massive databases).”⁸⁵

⁷⁹ *Amdocs (Israel) Ltd.*, 841 F.3d at 1291.

⁸⁰ *Id.*

⁸¹ *See id.* at 1299-306.

⁸² *See id.* at 1299-307; *see also* Matthew B. Hershkowitz, *Patently Insane for Patents: A Judge-by-Judge Analysis of the Federal Circuit’s Post-Alice Patentable Subject Matter Eligibility of Abstract Ideas Jurisprudence*, 28 *FORDHAM INTELL. PROP. MEDIA & ENT. L.J.* 109, 148 (2017) (mentioning that the step one analysis was not addressed in *Amdocs*).

⁸³ *Amdocs (Israel) Ltd.*, 841 F.3d at 1299 (emphasis added).

⁸⁴ *See id.* at 1299-307.

⁸⁵ *Id.* at 1300.

Second, while noticing that the technological solution utilized generic components, such as network devices and gatherers,⁸⁶ the Federal Circuit found that “these generic components operate[d] in an unconventional manner to achieve an improvement in computer functionality.”⁸⁷ Besides, the Federal Circuit examined the specification and concluded that the enhancing limitation depended upon “the invention’s distributed architecture” as well as “the network devices and gatherers ... working together in a distributed manner.”⁸⁸

Lastly, by comparing claim 1 with several patent-eligible or patent-ineligible claims in its previous cases,⁸⁹ the Federal Circuit noted that claim 1 was “tied to a specific structure of various components,”⁹⁰ because these components were purposefully arranged in a distributed architecture to achieve the technological solution described in the specification.⁹¹ Additionally, the Federal Circuit opined that the distributed architecture provided an inventive concept to some limitations considered individually or as an ordered combination.⁹² Thus, the Federal Circuit reversed the district court’s ruling on patent-ineligibility.⁹³

Next, the Federal Circuit reviewed claim 16 of the ’510 Patent reciting:

16. A computer program product stored in a computer readable medium for reporting on a collection of *network usage information* from a plurality of *network devices*, comprising:

computer code for *collecting* network communications usage information in real-time from a plurality of network devices at a plurality of layers;

computer code for *filtering* and *aggregating* the network communications usage information;

computer code for *completing* a plurality of data records from the filtered and aggregated network communications usage information, the plurality of data records corresponding to network usage by a plurality of users;

computer code for storing the plurality of data records in a database;

⁸⁶ *See id.* at 1301.

⁸⁷ *Id.* at 1300-01.

⁸⁸ *Id.* at 1301.

⁸⁹ *Amdocs (Israel) Ltd.*, 841 F.3d at 1301-02.

⁹⁰ *Id.* at 1301.

⁹¹ *See id.*

⁹² *See id.* at 1302.

⁹³ *See id.*

computer code for submitting queries to the database utilizing predetermined reports for retrieving information on the collection of the network usage information from the network devices; and

computer code for outputting a report based on the queries;

wherein resource consumption queries are submitted to the database utilizing the reports for retrieving information on resource consumption in a network; and

wherein a resource consumption report is outputted based on the resource consumption queries.⁹⁴

The Federal Circuit’s step two analysis under the *Alice* standard started with interpreting a claim term “completing” as carrying the same meaning of the enhancing limitation in the ’065 Patent.⁹⁵ Then, the Federal Circuit examined the specification and concluded that “[t]he collection, filtering, aggregating, and completing (including enhancing) steps all depend[ed] upon the system’s unconventional distributed architecture.”⁹⁶ The Federal Circuit further held that “the ordered combination of these limitations yield[ed] an inventive concept sufficient to confer eligibility without undue preemption.”⁹⁷ Alternatively, the Federal Circuit held that the disputed claims recited “a technological solution to a technological problem specific to computer networks—an unconventional solution that was an improvement over the prior art.”⁹⁸ Therefore, the Federal Circuit reversed the district court’s patent-ineligibility decision.⁹⁹

3. Method Claims

The third patent the Federal Circuit analyzed is the ’984 Patent, in which claim 1 was selected as a representative claim that recites:

1. A method for reporting on the collection of *network usage information* from a plurality of *network devices*, comprising:

(a) *collecting* network communications usage information in real-time from a plurality of network devices at a plurality of layers utilizing multiple gatherers each including a plurality of information source modules each interfacing with one of the network devices and capable of communicating using a protocol specific to the network device coupled thereto, the

⁹⁴ *Id.* (emphasis added).

⁹⁵ See *Amdocs (Israel) Ltd.*, 841 F.3d at 1303.

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *Id.*

⁹⁹ See *id.* at 1304.

network devices selected from the group consisting of routers, switches, firewalls, authentication servers, web hosts, proxy servers, netflow servers, databases, mail servers, RADIUS servers, and domain name servers, the gatherers being positioned on a segment of the network on which the network devices coupled thereto are positioned for minimizing an impact of the gatherers on the network;

(b) *filtering* and *aggregating* the network communications usage information;

(c) *completing* a plurality of data records from the filtered and aggregated network communications usage information, the plurality of data records corresponding to network usage by a plurality of users;

(d) storing the plurality of data records in a database;

(e) allowing the selection of one of a plurality of reports for reporting purposes;

(f) submitting queries to the database utilizing the selected reports for retrieving information on the collection of the network usage information from the network devices; and

(g) outputting a report based on the queries.¹⁰⁰

When applying step two of the *Alice* standard, the Federal Circuit cited the specification to support that the steps for collecting, filtering, aggregating, and completing all depended on the system's distributed architecture.¹⁰¹ In addition, the Federal Circuit found that "the overall ordered combination of all of the limitations was unconventional."¹⁰² Thus, the Federal Circuit reversed the district court's patent-ineligibility decision.¹⁰³

Finally, the Federal Circuit discussed claim 1, a representative claim of the '797 Patent, which recites:

1. A method for generating a single record reflecting multiple services for accounting purposes, comprising:

(a) identifying a plurality of services carried out *over a network*;

(b) *collecting* data describing the plurality of services; and

(c) *generating* a single record including the collected data, wherein the *single record represents each of the plurality of*

¹⁰⁰ *Id.* (emphasis added).

¹⁰¹ See *Amdocs (Israel) Ltd.*, 841 F.3d at 1304.

¹⁰² *Id.*

¹⁰³ See *id.* at 1305.

services;

wherein the services include at least two services selected from a group consisting of a hypertext transfer protocol (HTTP) session, an electronic mail session, a multimedia streaming session, a voice over Internet Protocol (IP) session, a data communication session, an instant messaging session, a peer-to-peer network application session, a file transfer protocol (FTP) session, and a telnet session;

wherein the data is collected utilizing *an enhancement procedure* defined utilizing a graphical user interface by:

listing a plurality of available functions to be applied in real-time prior to end-user reporting,

allowing a user to choose at least one of a plurality of fields, and

allowing the user to choose at least one of the listed functions to be applied to the chosen field in real-time prior to the end-user reporting.

Regarding step two of the *Alice* standard, the Federal Circuit reviewed the specification and concluded that the collecting step, generating step, and enhancement procedure in claim 1 depended on a distributed architecture of the invention.¹⁰⁴ Particularly, when discussing the generating step, the Federal Circuit interpreted that a “single record represents each of the plurality of services” as something requiring aggregating, which also depend[ed] on the distributed architecture.¹⁰⁵

Additionally, the Federal Circuit recognized that claim 1 may “at first blush” rely on generic components or functionalities thereof.¹⁰⁶ However, the Federal Circuit held that in light of this specification, some claimed limitations were actually “considered individually and as an ordered combination [as to] provide an inventive concept sufficient to confer eligibility.”¹⁰⁷ The Federal Circuit also noted that “many of these components and functionalities [were] in fact neither generic nor conventional individually or in ordered combination.”¹⁰⁸ Rather, as the Federal Circuit emphasized again, “they describe[d] a specific, unconventional technological solution, narrowly drawn to withstand

¹⁰⁴ *See id.* at 1305-06.

¹⁰⁵ *See id.* at 1305.

¹⁰⁶ *See id.* at 1306.

¹⁰⁷ *Amdocs (Israel) Ltd.*, 841 F.3d at 1306.

¹⁰⁸ *Id.*

preemption concerns, to a technological problem.”¹⁰⁹ Thus, the Federal Circuit reversed the district court’s decision on patent-ineligibility.¹¹⁰

B. Two-Way Media Ltd. v. Comcast Cable Communications, LLC

1. Background

In *Two-Way Media Ltd. v. Comcast Cable Communications, LLC*,¹¹¹ the patented technology were covered by four patents and related to “a system for streaming audio/visual data over a communications system like the internet.”¹¹² The patents-in-suit described “an *improved scalable architecture* for delivering real-time information [through] a control mechanism that provides for the management and administration of users who are to receive real-time information.”¹¹³

The patents-in-suit, including U.S. Patent Nos. 5,778,187 (’187 Patent), 5,983,005 (’005 Patent), 6,434,622 (’622 Patent), and 7,266,686 (’686 Patent), were “related as a series of continuation applications” and shared “substantially the same specification.”¹¹⁴ On appeal, the parties divided the claims-in-dispute into three groups.¹¹⁵ Eventually, the Federal Circuit upheld the district court’s patent-ineligibility determination of all patents-in-suit.¹¹⁶

2. Group I Claims

The representative claim of the first group was claim 1 of U.S. Patent No. 5,778,187 (’187 Patent), which recites:

1. A method for transmitting message packets over a *communications network* comprising the steps of:

converting a plurality of streams of audio and/or visual information into a plurality of streams of addressed digital packets *complying with the specifications of a network communication protocol*,

for each stream, *routing* such stream to one or more users,
controlling the routing of the stream of packets in response to *selection signals received from the users*, and

¹⁰⁹ *Id.*

¹¹⁰ *See id.*

¹¹¹ *Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC*, 874 F.3d 1329 (Fed. Cir. 2017), *cert. denied*, 139 S. Ct. 378 (2018).

¹¹² *Id.* at 1332-33.

¹¹³ *Id.* at 1333 (emphasis added).

¹¹⁴ *Id.* at 1332-33.

¹¹⁵ *See id.* at 1332-33.

¹¹⁶ *See id.* at 1332-33.

monitoring the reception of packets by the users and *accumulating* records that indicate which streams of packets were received by which users, wherein at least one stream of packets comprises an audio and/or visual selection and the records that are accumulated indicate the time that a user starts receiving the audio and/or visual selection and the time that the user stops receiving the audio and/or visual selection.¹¹⁷

Under step one of the *Alice* standard, which follows *McRO, Inc.*,¹¹⁸ the Federal Circuit characterized claim 1 as reciting “a method for routing information using result-based functional language” and requiring “the functional results of ‘converting,’ ‘routing,’ ‘controlling,’ ‘monitoring,’ and ‘accumulating records[.]’”¹¹⁹ However, the Federal Circuit found that these functional-result limitations did not “sufficiently describe how to achieve these results in a non-abstract way.”¹²⁰ The Federal Circuit criticized that “claim 1 manipulate[d] data but fail[ed] to do so in a non-abstract way.”¹²¹

In addition, the Federal Circuit considered the patentee’s claim construction that allegedly tied claim 1 to particular scalable network architecture.¹²² For instance, the controlling step was construed as “directing a portion of the routing path taken by the stream of packets from one of a designated group of intermediate computers to the user in response to one or more signals from the user selecting the stream.”¹²³ However, the Federal Circuit held that such a construction merely recited conventional computer components.¹²⁴

When applying step two of the *Alice* standard, the Federal Circuit held that claim 1 missed an inventive concept.¹²⁵ First, in examining the converting step, routing step, and controlling step, the Federal Circuit concluded that claim 1 failed to specify “the rules forming the communication protocol” or “parameters for the user signals.”¹²⁶

Second, while the patentee pointed out some technical problems that the claimed invention would solve, the Federal Circuit commented that claim 1 “only use[d] generic functional language to achieve these purported

¹¹⁷ *Two-Way Media Ltd.*, 874 F.3d at 1334-35 (emphasis added).

¹¹⁸ *See id.* at 1337 (quoting *McRO, Inc.*, 837 F.3d at 1314).

¹¹⁹ *Id.*

¹²⁰ *Id.*

¹²¹ *Id.* at 1338.

¹²² *See id.*

¹²³ *Two-Way Media Ltd.*, 874 F.3d at 1338.

¹²⁴ *See id.*

¹²⁵ *See id.* at 1338-39.

¹²⁶ *Id.* at 1339.

solutions.”¹²⁷ The Federal Circuit further stated that either claim 1 itself or the patentee’s claim construction required “anything other than conventional computer and network components operating according to their ordinary functions.”¹²⁸

Lastly, the Federal Circuit examined claim 1 as a whole, but concluded that claim 1 recited “a conventional ordering of steps—first processing the data, then routing it, controlling it, and monitoring its reception—with conventional technology to achieve its desired result.”¹²⁹ Therefore, among other things, the Federal Circuit held that claim 1 did not transform an abstract idea into a patent-eligible subject matter.¹³⁰

3. Group II and Group III Claims

The Federal Circuit examined Group II and Group III claims together.¹³¹ The representative claim of the second group was claim 29 of U.S. Patent No. 6,434,622 (‘622 Patent), which recites:

29. A method for forwarding real-time information to one or more users having access to *a communications network* comprising:

processing one or more streams of audio or visual information into one or more streams of packets for forwarding over the communications network, wherein at least one stream of packets comprises audio or video information,

forwarding the digital packets to the users in response to information selection signals received from the users,

verifying the operational status of the users’ access to the communications network during delivery of the real-time information, and

updating a database with indications of: (i) which streams of packets were received by which users, (ii) the time when delivery of each stream to each user commenced, and (iii) the time when delivery of each stream to each user terminated.¹³²

The representative claim of the third group was claim 30 of U.S. Patent No. 7,266,686 (‘686 Patent), reciting:

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ *Two-Way Media Ltd.*, 874 F.3d at 1339.

¹³⁰ *See id.*

¹³¹ *See id.* at 1340-41.

¹³² *Id.* at 1335 (emphasis added).

30. A method for metering real-time streaming media for commercial purposes, said method comprising:

selecting an intermediate server from multiple intermediate servers;

forwarding at least one copy of a real-time media stream from said intermediate server toward a user device;

detecting a termination of said forwarding;

after said termination, *determining* an extent of said real-time media stream forwarded toward said user device; and

logging said extent for commercial purposes.¹³³

The Federal Circuit found both representative claims patent-ineligible.¹³⁴

Regarding step one of the *Alice* standard, the Federal Circuit agreed with the district court, who determined that the '622 Patent was directed to an abstract idea of “monitoring the delivery of real-time information to a user or users” and that the '686 Patent was directed to an abstract idea of “measuring the delivery of real-time information for commercial purposes.”¹³⁵ The Federal Circuit reasoned that the disputed claims “suffer[ed] from the same ineligibility infirmity as claim 1 of the ['187 Patent,]”¹³⁶ while the patentee admitted they were broader than claim 1 of the '187 Patent.¹³⁷

When applying step two of the *Alice* standard, the Federal Circuit found no inventive concept in the disputed claims.¹³⁸ First, the Federal Circuit upheld the district court’s opinion that “nothing in these claims requires anything other than conventional computer and network components operating according to their ordinary functions.”¹³⁹ Second, the Federal Circuit found that the claimed steps were “organized in a completely conventional way—data are first processed, sent, and once sent, information about the transmission is recorded.”¹⁴⁰ Thus, the Federal Circuit held that the

¹³³ *Id.* (emphasis added).

¹³⁴ *See id.* at 1340-41.

¹³⁵ *Two-Way Media Ltd.*, 874 F.3d at 1340. (summarizing the district court’s opinion and citing *Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC*, No. CV 14-1006-RGA, 2016 WL 4373698, at *1 (D. Del. Aug. 15, 2016)).

¹³⁶ *Id.*

¹³⁷ *See id.*

¹³⁸ *See id.* at 1340-41.

¹³⁹ *Id.* at 1341.

¹⁴⁰ *Id.*

disputed claims failed to specify a “discrete implementation of an abstract idea sufficient to qualify for eligibility under § 101.”¹⁴¹

C. SRI International, Inc. v. Cisco Systems, Inc.

1. Background

In *SRI International, Inc. v. Cisco Systems, Inc.*,¹⁴² the patented technology was related to “methods and systems for deploying a *hierarchy of network monitors* that can generate and receive reports of suspicious network activity,”¹⁴³ such as hacker attacks, malware, and other security threats.¹⁴⁴ Two patents, U.S. Patent Nos. 6,484,203 (’203 Patent) and 6,711,615 (’615 Patent), were involved.¹⁴⁵ The ’615 Patent was a continuation of the ’203 Patent, so both patents shared a common specification.¹⁴⁶

2. Patent-Eligibility Analysis

On appeal, the Federal Circuit’s patent-eligibility analysis focused on claim 1 of the ’615 Patent, which recites:

1. A computer-automated method of hierarchical event monitoring and analysis within an enterprise network comprising:

deploying a plurality of network monitors in the enterprise network;

detecting, by the *network monitors*, suspicious network activity based on analysis of *network traffic data* selected from one or more of the following categories: {network packet data transfer commands, network packet data transfer errors, network packet data volume, network connection requests, network connection denials, error codes included in

¹⁴¹ *Two-Way Media Ltd.*, 874 F.3d at 1341 (internal quotation marks omitted).

¹⁴² *SRI Int’l, Inc. v. Cisco Sys., Inc.*, 918 F.3d 1368 (Fed. Cir. 2019), *modified and superseded on reh’g sub nom. SRI INTERNATIONAL, INC., Plaintiff-Appellee v. CISCO SYSTEMS, INC., Defendant-Appellant*, No. 2017-2223, 2019 WL 3162421 (Fed. Cir. Mar. 20, 2019), and *withdrawn on reh’g*, No. 2017-2223, 2019 WL 3060974 (Fed. Cir. July 12, 2019) (“IT IS ORDERED THAT: ... The previous precedential opinion in this appeal, issued March 20, 2019, is withdrawn and replaced with the modified precedential opinion accompanying this order. The modifications appear in section V of the opinion, along with corresponding changes to the introduction and conclusion”). Because the section V of the original opinion is only related to the district court’s award of attorneys’ fees, *see SRI Int’l, Inc.*, 918 F.3d at 1382-83. This paper uses the original opinion for purposes of discussing the patent-eligibility issue.

¹⁴³ *SRI Int’l, Inc. v. Cisco Sys., Inc.*, 179 F. Supp. 3d 339, 348 (D. Del. 2016) (emphasis added).

¹⁴⁴ *See SRI Int’l, Inc.*, 918 F.3d at 1372.

¹⁴⁵ *See id.*

¹⁴⁶ *See id.* at 1372-73.

a network packet, network connection acknowledgements, and network packets indicative of well-known network-service protocols};

generating, by the monitors, reports of said suspicious activity; and

automatically *receiving and integrating* the reports of suspicious activity, by one or more hierarchical monitors.¹⁴⁷

Without going through step two of the *Alice* standard, the Federal Circuit upheld the district court's denial of the defendant's motion for summary judgment on patent-ineligibility.¹⁴⁸

The Federal Circuit's analysis under step one of the *Alice* standard began with the language of the representative claim.¹⁴⁹ The Federal Circuit characterized claim 1 as "using network monitors to detect suspicious network activity based on analysis of network traffic data, generating reports of that suspicious activity, and integrating those reports using hierarchical monitors."¹⁵⁰ The Federal Circuit found the disputed claims directed to "an improvement in computer network technology" rather than something "just [for] analyzing data from multiple sources to detect suspicious activity."¹⁵¹ In addition, the Federal Circuit adopted *Enfish* to emphasize that the focus of the disputed claims here was on "a network defense system that monitors network traffic in real-time to automatically detect large-scale attacks."¹⁵²

Second, the Federal Circuit looked into the specification of the '615 Patent and concluded that the disputed claims were directed to "a technological solution to a technological problem."¹⁵³ As the Federal Circuit found, the specification explained why a network is vulnerable to attack and how a conventional network will have globally disastrous effects because of localized triggering events.¹⁵⁴ The Federal Circuit also noted that the specification described the claimed invention as providing a framework for "solving these weaknesses in conventional networks[.]"¹⁵⁵

Lastly, the Federal Circuit responded to the defendant's three main arguments.¹⁵⁶ The defendant first argued that the disputed claims were

¹⁴⁷ *Id.* at 1373 (emphasis added).

¹⁴⁸ *See id.* at 1372, 74-76.

¹⁴⁹ *See id.* at 1375.

¹⁵⁰ *SRI Int'l, Inc.*, 918 F.3d at 1375 (citing U.S. Patent No. 6,711,615 col. 15 ll. 2-21 (claim 1) (filed Sept. 25, 2002)).

¹⁵¹ *Id.*

¹⁵² *Id.* (citing *Enfish*, 822 F.3d at 1335-36).

¹⁵³ *Id.*

¹⁵⁴ *See id.*

¹⁵⁵ *Id.*

¹⁵⁶ *See SRI Int'l, Inc.*, 918 F.3d at 1375-76.

directed to generic steps for collecting and analyzing data.¹⁵⁷ But the Federal Circuit found that the disputed claims “actually prevent[ed] the normal, expected operation of a conventional computer network.”¹⁵⁸ The defendant then denied any improvement of computer functionality found in the disputed claims.¹⁵⁹ But the Federal Circuit stated that “the representative claim improve[d] the technical functioning of the computer and computer networks by reciting a specific technique for improving computer network security.”¹⁶⁰ Lastly the defendant insisted that the disputed claims included what people can “go through in their mind.”¹⁶¹ But the Federal Circuit found that “the human mind is not equipped to [perform the claimed steps].”¹⁶²

As a result, the Federal Circuit held the disputed claims “directed to using a specific technique—using a plurality of network monitors that each analyze specific types of data on the network and integrating reports from the monitors—to solve a technological problem arising in computer networks: identifying hackers or potential intruders into the network.”¹⁶³

D. Uniloc USA, Inc. v. ADP, LLC

1. Background

In *Uniloc USA, Inc. v. ADP, LLC*,¹⁶⁴ the patented technology was related to a computer network including a server that supports client stations and called a “client-server environment.”¹⁶⁵ Four patents, U.S. Patent Nos. 6,324,578 (’578 Patent), 6,510,466 (’466 Patent), 6,728,766 (’766 Patent), and 7,069,293 (’293 Patent), were involved.¹⁶⁶ The ’578 and ’766 Patents shared a common specification, while the ’466 and ’293 Patents also shared a common specification.¹⁶⁷

¹⁵⁷ *See id.* at 1375-76.

¹⁵⁸ *Id.* at 1376.

¹⁵⁹ *See id.*

¹⁶⁰ *Id.*

¹⁶¹ *Id.*

¹⁶² *SRI Int’l, Inc.*, 918 F.3d at 1376.

¹⁶³ *Id.* at 1375.

¹⁶⁴ *Uniloc USA, Inc. v. ADP, LLC*, No. 2018-1132, 2019 WL 2245938 (Fed. Cir. May 24, 2019).

¹⁶⁵ *See Uniloc USA, Inc. v. AVG Techs. USA, Inc.*, No. 216CV00393RWSLEAD, 2017 WL 1154927, at *1 (E.D. Tex. Mar. 28, 2017).

¹⁶⁶ *See Uniloc USA, Inc.*, 2019 WL 2245938, at *1.

¹⁶⁷ *See Uniloc USA, Inc. v. ADP, LLC*, 279 F. Supp. 3d 736, 739 (E.D. Tex. 2017); *see also* U.S. Patent No. 7,069,293 col.1 ll.9-10 (filed May 31, 2001) (“This application is a divisional of application Ser. No. 09/211,528 filed Dec. 14, 1998 now U.S. Pat. No. 6,510,466.”); U.S. Patent No. 6,728,766 col.1 ll.8-9 (filed Apr. 10, 2001) (“This application is a divisional of application Ser. No. 09/211,529 filed Dec. 14, 1998 U.S. Pat. No. 6,324,578.”).

In a client-server environment with many client stations and servers implemented usually for a large organization, users may utilize different client stations to get access to the network at different times.¹⁶⁸ This has brought a challenge to a network administrator who must “maintain[] proper licenses for existing software and deploy[] new or updated applications programs across the network.”¹⁶⁹ To overcome this challenge, the patented technology provides centralized application management so that a network administrator can exert control “from a single point for an entire managed network environment.”¹⁷⁰

These four asserted patents addressed different aspects of the patented technology.¹⁷¹ The '293 Patent described “distributing applications to on-demand servers from a centralized network management server.”¹⁷² The '578 Patent showed “obtaining user and administrator sets of configuration preferences for applications and then executing the applications[.]”¹⁷³ The '466 Patent covered “installing application software on the server and providing instances of that software to the clients for execution” and “establishing a user-specific desktop interface for clients [that shows] display regions associated with the application software.”¹⁷⁴ Lastly, the '766 Patent focused on “the management of licenses for the application software, including maintaining license-related policies and information [for communicating license availability] to clients on a user-specific basis.”¹⁷⁵

On appeal, the Federal Circuit held that the disputed claims of the '293 and '578 Patents were patent-eligible but those of the '466 and '766 Patents were patent-ineligible.¹⁷⁶

2. '293 and '578 Patents

Regarding the '293 Patent, the Federal Circuit’s patent-eligibility analysis focused on claim 1 that recites:

1. A method for distribution of application programs to a target on-demand server *on a network* comprising the

¹⁶⁸ See U.S. Patent No. 6,510,466 col.1 ll.44-52 (filed Dec. 14, 1998); '766 Patent col.1 ll.45-53.

¹⁶⁹ '466 Patent col.1 ll.52-56; '766 Patent col.1 ll.53-57.

¹⁷⁰ *AVG Techs. USA, Inc.*, 2017 WL 1154927, at *1 (quoting '466 Patent col.3 ll.35-36; '766 Patent col.3 ll.35-36).

¹⁷¹ See *AVG Techs. USA, Inc.*, 2017 WL 1154927, at *2; see also *ADP, LLC*, 279 F. Supp. 3d at 739.

¹⁷² *ADP, LLC*, 279 F. Supp. 3d at 740.

¹⁷³ *Id.*

¹⁷⁴ See *AVG Techs. USA, Inc.*, 2017 WL 1154927, at *2.

¹⁷⁵ See *id.*

¹⁷⁶ See *Uniloc USA, Inc.*, 2019 WL 2245938, at *1.

following executed on a centralized network management server coupled to the network:

providing an application program to be distributed to the network management server;

specifying a source directory and a target directory for distribution of the application program;

preparing a *file packet* associated with the application program and including a segment configured to initiate registration operations for the application program at the target on-demand server; and

distributing *the file packet* to the target on-demand server to make the application program available for use by a user at a client.¹⁷⁷

The patent-eligibility analysis ended at step one of the *Alice* standard, because the Federal Circuit concluded that the disputed claims were directed not to an abstract idea, but to “the use of file packets with segments configured to initiate centralized registration of an application from an application server[.]”¹⁷⁸

First, relying on the claim language and the asserted advance described in the specification,¹⁷⁹ the Federal Circuit found that the disputed claims clearly focused on “a particular improvement in *how* this is done—i.e. by use of a file packet to enable the further functionality of initiating on-demand registration of the application.”¹⁸⁰

In addition, the Federal Circuit found nothing in the record suggesting that “such network architecture was so conventional as to exclude that architectural limitation in framing what the claims are ‘directed to.’”¹⁸¹ On one hand, as the Federal Circuit criticized, the district court misunderstood the description related to the Tivoli Management Environment (TME), commercial network management software, and erroneously found that the claimed invention used generic activities of servers and a routine activity of the TME.¹⁸² On the other hand, the Federal Circuit stated that the cited

¹⁷⁷ *ADP, LLC*, 279 F. Supp. 3d at 740 (emphasis added); see also *Uniloc USA, Inc.*, 2019 WL 2245938, at *4 (rephrasing the patentee’s argument that was based on claim 1).

¹⁷⁸ *Uniloc USA, Inc.*, 2019 WL 2245938, at *5.

¹⁷⁹ See *Uniloc USA, Inc.*, 2019 WL 2245938, at *5 (citing ‘293 Patent col.3 ll.43-46, col.4 ll.14-26, col.5 ll.33-58, col.17 l.55 - col.20, l.64).

¹⁸⁰ *Id.* (emphasis in original).

¹⁸¹ *Id.*

¹⁸² See *Uniloc USA, Inc.*, 2019 WL 2245938, at *5; see also *ADP, LLC*, 279 F. Supp. 3d at 745-46. The TME was developed by Tivoli Systems, Inc.; ‘293 Patent col.2 ll.10-14. Tivoli Systems, Inc. was acquired by IBM in 1996, and the TME is now part of IBM’s product lines. See, e.g., Phil Wainwright, *Will AppDynamics Become the Tivoli of the Digital Era?*, DIGINOMICA (June

description “merely describe[d] *the implementation of the claimed invention using the TME*”¹⁸³ and further clarified that the cited description did not “indicate that the *TME itself previously used the claimed file packets*[.]”¹⁸⁴

Moreover, the Federal Circuit emphasized that “the relevant question for purposes of step one is what is ‘the focus of the claimed advance over the prior art.’”¹⁸⁵ Because “the addition of the file packet limitation during prosecution was the heart of the patent’s allowance[.]”¹⁸⁶ the Federal Circuit opined that the focus here was “the use of the file packet configured to initiate registration of an application from an application server.”¹⁸⁷ Again, the Federal Circuit criticized that the district court failed to acknowledge that the specification described “the enhanced functionality provided to the prior art TME system by the use of the claimed file packets.”¹⁸⁸

As a result, the Federal Circuit held that the disputed claims of the ’293 Patent were patent-eligible, because they were “a particular improvement in the functioning of prior art application distribution networks.”¹⁸⁹

Regarding the ’578 Patent, the Federal Circuit chose claim 1 as the representative claim.¹⁹⁰ Claim 1 recited:

1. A method for management of configurable application programs *on a network* comprising the steps of:

installing an application program having a plurality of configurable preferences and a plurality of authorized users on a server coupled to the network;

distributing an application launcher program associated with the application program to a client coupled to the network;

obtaining a user set of the plurality of configurable preferences associated with one of the plurality of authorized users executing the application launcher program;

obtaining an administrator set of the plurality of configurable preferences from an administrator; and

executing the application program using the obtained user

27, 2014), <https://diginomica.com/appdynamics-tivoli-digital-era>; Tivoli Monitoring Environment, TIVOLI SOFTWARE, https://publib.boulder.ibm.com/tividd/td/ITMBI/SC32-1403-00R/en_US/HTML/BI52UGmst14.htm (last visited July 12, 2019).

¹⁸³ *Uniloc USA, Inc.*, 2019 WL 2245938, at *5 (emphasis in original).

¹⁸⁴ *Id.* (emphasis in original).

¹⁸⁵ *Id.*

¹⁸⁶ *Id.*

¹⁸⁷ *Id.*

¹⁸⁸ *Id.*

¹⁸⁹ *Uniloc USA, Inc.*, 2019 WL 2245938, at *5.

¹⁹⁰ *See id.* at *6.

set and the obtained administrator set of the plurality of configurable preferences responsive to a request from the one of the plurality of authorized users.¹⁹¹

The Federal Circuit’s analysis of step one under the *Alice* standard resulted in finding that the disputed claims were not directed to an abstract idea.¹⁹² First, by examining the claim language and specification,¹⁹³ the Federal Circuit concluded that claim 1 was “directed to a particular way of using a conventional application server to nevertheless allow [the claimed on-demand installation of an application] by adding the application manager and configuration manager as additions to each application.”¹⁹⁴ Alternatively, the Federal Circuit stated that “[t]he two specific added components[, the application manager and configuration manager, did] not merely fulfill their ordinary roles[.]”¹⁹⁵ Instead, the Federal Circuit pointed out that “their use together on an application server represent[ed] a different way of achieving the improvement claimed in the ’578 [P]atent.”¹⁹⁶

With respect to step two under the *Alice* standard, the Federal Circuit held that claim 1 had an inventive concept under which the positioning of the application manager and configuration manager on the application server, “together with the application launcher on the client computer[,] allows customization by both the administrator and the user in such a way as the installation can proceed on-demand with both sets of preferences.”¹⁹⁷ The Federal Circuit further considered such an inventive concept as an unconventional network architecture.¹⁹⁸ Therefore, among other things, the Federal Circuit concluded that the disputed claims were patent-eligible.¹⁹⁹

¹⁹¹ *ADP, LLC*, 279 F. Supp. 3d at 740 (emphasis added); see also *Uniloc USA, Inc.*, 2019 WL 2245938, at *6.

¹⁹² See *Uniloc USA, Inc.*, 2019 WL 2245938, at *6.

¹⁹³ See *id.*

¹⁹⁴ *Id.* (emphasis in original); see also U.S. Patent No. 6,324,578 col.3 ll.55-63 (filed Dec. 14, 1998) (“The on-demand Server makes the first, or *configuration manager*, program available to an administrator classified user (either remotely at a client Station or at a direct interface to the server station) to provide an interface to establish preferences for the configurable preferences of the application program which have been designated as administrator only settable.” (emphasis added)).

¹⁹⁵ *Uniloc USA, Inc.*, 2019 WL 2245938, at *6.

¹⁹⁶ *Id.*

¹⁹⁷ *Id.*; see also ‘578 Patent col.3 ll.55-63 (“The on-demand server also provides a second, or *application launcher*, program to client stations on the network and served by the on-demand server.” (emphasis added)).

¹⁹⁸ See *Uniloc USA, Inc.*, 2019 WL 2245938, at *6.

¹⁹⁹ See *id.* at *7.

3. '466 and '766 Patents

Regarding the '466 Patent, the Federal Circuit did not designate any claim as a representative claim,²⁰⁰ but it eventually upheld the district court's decision that claim 1 was patent-ineligible.²⁰¹ Claim 1 of the '466 Patent recited:

1. A method for management of application programs *on a network* including a server and a client comprising the steps of:

installing a plurality of application programs at the server;
receiving at the server a login request from a user at the client;

establishing *a user desktop interface* at the client associated with the user responsive to the login request from the user, *the desktop interface including a plurality of display regions* associated with a set of the plurality of application programs installed at the server for which the user is authorized;

receiving at the server a selection of one of the plurality of application programs from the user desktop interface; and

providing an instance of the selected one of the plurality of application programs to the client for execution responsive to the selection.²⁰²

Under step one of the *Alice* standard, the Federal Circuit centered its analysis on the “user desktop interface” limitation.²⁰³ The patentee characterized the improvement of claim 1 as a “seamless integration of application access and session characteristics across heterogenous network[s],”²⁰⁴ and argued that the improvement was implemented through “a user desktop interface that includes display regions associated with application programs for which the user is authorized.”²⁰⁵ But the Federal Circuit disagreed and held that claim 1 was directed to an abstract idea of “using a desktop interface to access an application server.”²⁰⁶

²⁰⁰ *See id.*

²⁰¹ *See id.*

²⁰² *AVG Techs. USA, Inc.*, 2017 WL 1154927, at *2 (emphasis added); *see also Uniloc USA, Inc.*, 2019 WL 2245938, at *7.

²⁰³ *See Uniloc USA, Inc.*, 2019 WL 2245938, at *7.

²⁰⁴ *Id.* (quoting '466 Patent col.3 ll.21-25).

²⁰⁵ *Id.* (internal quotation marks omitted).

²⁰⁶ *Id.*

The Federal Circuit found that “[t]he ‘display regions’ of the claimed desktop interface [were] simply icons that execute programs.”²⁰⁷ The Federal Circuit criticized that the patentee did not “argue that the display icons or the user desktop incorporate any unconventional software or perform any unconventional functionality[,]” or “contend that using an icon to access an application is in any way unconventional.”²⁰⁸ Furthermore, the Federal Circuit stated that merely “using a desktop interface to access a conventional application server using conventional software [was] not an improvement in ‘network architecture’[,]” and therefore “[t]he user desktop interface with display regions [did] not impart any materially different functionality to the network itself over a conventional application server.”²⁰⁹

The Federal Circuit also noted that claim 1 was “wholly functional” and included no “specificity required to transform a claim from one claiming only a result to one claiming a way of achieving it.”²¹⁰ The Federal Circuit characterized the “user desktop interface” limitation as “the user-specificity of the available applications” which “is merely an elementary form of customization” and “does not itself render claims non-abstract.”²¹¹ Eventually the Federal Circuit concluded that claim 1’s focus was on an abstract idea of “using a desktop interface to access an application server” and that the claimed improvement arose “wholly out of the conventional advantages of using networked computers as tools” and did not represent “a particular improvement in the computer or network.”²¹²

Next, the Federal Circuit went on to conclude that claim 1 failed step two of the *Alice* test.²¹³ The patentee characterized the software limitations and their interaction as an ordered combination in claim 1, and asserted that it was an inventive step.²¹⁴ Nevertheless, the Federal Circuit commented that the software limitations or the alleged ordered combination was merely conventional.²¹⁵

The patentee also argued that no evidence supporting the district court’s patent-ineligibility determination.²¹⁶ But, the Federal Circuit

²⁰⁷ *Id.*

²⁰⁸ *Id.*

²⁰⁹ *Uniloc USA, Inc.*, 2019 WL 2245938, at *7.

²¹⁰ *Id.*

²¹¹ *Id.*

²¹² *Id.*

²¹³ *See id.* at *8.

²¹⁴ *See id.*; *see also AVG Techs. USA, Inc.*, 2017 WL 1154927, at *7 (“Plaintiffs state that ‘[t]he inventive concept inherent in the ’466 Patent allows for a variety of application programs to be maintained at the server and an instance of a selected one of the application programs to be provided as needed to a user logged onto a client device.’” (alternation in original)).

²¹⁵ *See Uniloc USA, Inc.*, 2019 WL 2245938, at *8.

²¹⁶ *See id.*

responded that the district court correctly based its decision on a part of the specification that describes a prior-art architecture necessarily includes a user interface and provides “the transmission of an application program from a server to a client for installation.”²¹⁷ Although noticing that the referenced part showed the prior art’s limitations, such as the installation only for a particular client, the Federal Circuit criticized that claim 1 failed to recite how to overcome those limitations.²¹⁸

The patentee’s third argument was that the examiner did not cite anything showing the “display region” limitation, but the Federal Circuit stated that the patentee failed to point out “anything in particular in the prosecution history.”²¹⁹ The Federal Circuit noted that “[t]he mere allowance of claims during prosecution does not preclude dismissal for patent ineligibility.”²²⁰

The patentee’s last argument was based on the claimed improvement as an improvement in efficiency.²²¹ While the patentee cited several cases to support this allegation, the Federal Circuit found that “the efficiency improvements in those cases arose out of claimed unique improvements in computer functionality, rather than improvements inherent in the use of conventional computer components as tools to perform conventional functions.”²²² The Federal Circuit clarified that it “is incorrect that an improvement in efficiency guarantees patent eligibility.”²²³ Therefore, the Federal Circuit upheld the district court’s patent-ineligibility decision.²²⁴

Regarding the ’766 Patent, the representative claim for the Federal Circuit’s patent-eligibility analysis was claim 1 reciting:

1. A method for management of license use *for a network* comprising the steps of:

maintaining *license management policy information* for a plurality of application programs at a license management server, the license management policy information including at least one of *a user identity based policy*, an administrator policy override definition or a user policy override

²¹⁷ *Id.*; see also ‘466 Patent col.1 l.57 - col.2 l.11 (“The application generally cannot be automatically deleted from the client station’s desktop or automatically upgraded the next time the user Starts the application.”).

²¹⁸ See *Uniloc USA, Inc.*, 2019 WL 2245938, at *8; see also ‘466 Patent col.2 ll.3-4 (“Furthermore, once installed at a client, a user must typically use that specific client station.”).

²¹⁹ *Uniloc USA, Inc.*, 2019 WL 2245938, at *8.

²²⁰ *Id.*

²²¹ See *id.*

²²² *Id.*

²²³ *Id.*

²²⁴ See *id.*

definition;

receiving at *the license management server* a request for a license availability of a selected one of the plurality of application programs from a user at a client;

determining the license availability for the selected one of the plurality of application programs for the user based on the maintained license management policy information; and

providing an unavailability indication to the client responsive to the selection if the license availability indicates that a license is not available for the user *or an availability indication* if the licensed availability indicates that a license is available for the user.²²⁵

First, applying step one of the *Alice* standard, the Federal Circuit held that claim 1 was directed to an abstract idea of “a license management method that indicates a user’s authorization to access an application.”²²⁶ First, the Federal Circuit considered claim 1 as that “[t]he information being collected is who the user is, tested against the user identity policy, with a resulting display of authorization.”²²⁷ However, the Federal Circuit stated that this was “not an improvement in network architecture[, but instead] the use of a computer as a tool to process information.”²²⁸

Second, in response to the patentee’s assertion that the claimed improvement allows access to client-independent, user-specific applications, the Federal Circuit commented that “neither that functionality nor how that can be achieved [was] in the claims.”²²⁹ The Federal Circuit also emphasized that “we have held that incorporating user-customization when using the computer as a tool does not render claims patent eligible.”²³⁰

Third, the Federal Circuit rejected the patentee’s reliance on the prosecution history to support the claimed improvement.²³¹ The patentee contended that its response to the examiner’s obviousness rejection expressed that the non-obviousness is based on the claimed installation license associated with a user, as opposed to the prior art’s license associated with a computer.²³² But, the Federal Circuit stated that the patentee failed to “explain how its argument to the examiner for non-obviousness informs the

²²⁵ *AVG Techs. USA, Inc.*, 2017 WL 1154927, at *2 (emphasis added); *see also Uniloc USA, Inc.*, 2019 WL 2245938, at *8.

²²⁶ *Uniloc USA, Inc.*, 2019 WL 2245938, at *8.

²²⁷ *Id.*

²²⁸ *Id.* (alteration in original).

²²⁹ *Id.* (alteration in original).

²³⁰ *Id.*

²³¹ *See id.* at *8-9.

²³² *See Uniloc USA, Inc.*, 2019 WL 2245938, at *8.

step one directed-to inquiry here.”²³³ In addition, the Federal Circuit emphasized that “a license to a user is not materially different than a license to a computer for purposes of eligibility of this claim.”²³⁴

Next, the Federal Circuit applied step two of the *Alice* standard and concluded that no inventive concept was contained in claim 1.²³⁵ Without citing any reference, the Federal Circuit stated that the claimed licensing policy, application server, or notification of authorization was not “asserted as unique or non-conventional from the way that those components ordinarily function.”²³⁶ On one hand, the Federal Circuit noted that the claimed real-time availability of authorization information did not improve efficiency as the patentee claimed to constitute an inventive concept, but rather it was “a staple of a conventional network.”²³⁷ On the other hand, the Federal Circuit commented that even considering a “user identity based policy” as a new source or type of information did not make the claimed policy contribute to any inventive concept, but instead the claimed policy was still abstract information.²³⁸ Therefore, the Federal Circuit affirmed the district court’s patent-ineligibility decision.²³⁹

III. PATENT-ELIGIBILITY STANDARD FOR NETWORK ARCHITECTURE PATENTS

A. *Step One: Improvement/Conventionality Dichotomy*

The Federal Circuit in *Electric Power* has stated that step one of the *Alice* standard “is a meaningful one, sometimes ending the § 101 inquiry.”²⁴⁰ In *SRI*, and *Uniloc*, the Federal Circuit only went through step one for some patents-in-suit.²⁴¹ These three cases together indicate a bright line rule for the step-one analysis concerning network architecture patents.²⁴² That is, “improvement” is a key to passing step one.²⁴³

²³³ *Id.* at *9.

²³⁴ *Id.*

²³⁵ *See id.*

²³⁶ *Id.*

²³⁷ *Id.*

²³⁸ *See Uniloc USA, Inc.*, 2019 WL 2245938, at *9.

²³⁹ *See id.*

²⁴⁰ *Elec. Power Grp., LLC v. Alston S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016).

²⁴¹ *See supra* Sections II.C, II.D.

²⁴² *See infra* Section IV.A.

²⁴³ *See* Ted G. Dane, *Are the Federal Circuit's Recent Section 101 Decisions a “Specific Improvement” in Patent Eligibility Law?*, 26 FED. CIR. B.J. 331, 345-60 (2017) (discussing some Federal Circuit cases and expressing that the court has adopted a “specific improvement” test as a surrogate for either step one or step two of the *Alice* standard).

“Improvement” means a specific, technical solution for enhancing a conventional network. In addition, “specific” is understood in light of “conventionality.” That is, such a solution has to provide an unconventional functionality. In *SRI*, the Federal Circuit referred to the specific, technical solution as “using a plurality of *network monitors* that each analyze specific types of data on the network and integrating reports from the monitors.”²⁴⁴ Additionally, the Federal Circuit stated that the claimed technology not only prevented “the *normal, expected* operation of a conventional computer network,” but also overrode “the *routine and conventional* sequence of events.”²⁴⁵

Similarly, in *Uniloc*, the Federal Circuit recognized that the ’293 Patent claimed “a particular improvement in *how* this is done—i.e. by use of a file packet to enable the further functionality of initiating on-demand registration of the application.”²⁴⁶ The Federal Circuit also noted that there was “nothing in the record to suggest that such network architecture was so *conventional*.”²⁴⁷ When examining claim 1 of the ’578 Patent, the Federal Circuit opined that the claim was “directed to a *particular* way of using a conventional application server to nevertheless allow on-demand installation of an application incorporating preferences from two different sources by adding [two components] as additions to each application.”²⁴⁸ Besides, the Federal Circuit found that “[t]he two *specific* added components [*did*] *not merely fulfill their ordinary roles*—their use together on an application server represent[ed] a different way of achieving the improvement claimed in the ’578 [P]atent.”²⁴⁹

This approach can also be seen in *Two-Way* and *Uniloc*, where the Federal Circuit considered the disputed claims as directed to abstract ideas. In *Two-Way*, when reviewing the patentee’s claim construction related to the patent-eligibility issue, the Federal Circuit responded that the construction failed to “indicate how the claims are directed to a scalable network architecture that itself leads to an improvement in the *functioning* of the system.”²⁵⁰ The Federal Circuit also found that the construction did not “provide any parameters for the ‘signals’ purportedly dictating how the information is being routed.”²⁵¹ Moreover, the Federal Circuit criticized that

²⁴⁴ *SRI Int’l, Inc.*, 918 F.3d at 1375 (emphasis added).

²⁴⁵ *Id.* at 1376 (emphasis added).

²⁴⁶ *Uniloc USA, Inc.*, 2019 WL 2245938, at *4 (emphasis in original).

²⁴⁷ *Id.* (emphasis added).

²⁴⁸ *Id.* at *5 (emphasis added).

²⁴⁹ *Id.* at *6 (emphasis added) (alteration in original).

²⁵⁰ *Two-Way Media Ltd.*, 874 F.3d at 1338 (emphasis in original).

²⁵¹ *Id.*

the construction merely provided “the use of *generic computer components* to carry out the recited abstract idea.”²⁵²

Similarly, in *Uniloc*, when examining the ’466 Patent with regard to the “desktop interface” limitation, the Federal Circuit commented that “the mere *fact* of using a desktop interface to access a conventional application server using conventional software [was] not an improvement[.]”²⁵³ In addition, the Federal Circuit criticized that the claim was “wholly functional and [did] *not include* the ‘*specificity* required to transform a claim from one claiming only a result to one claiming a way of achieving it.”²⁵⁴ In examining the ’766 Patent, the Federal Circuit described that in the representative claim, “[t]he information being collected is who the user is, tested against the user identity policy, with a resulting display of authorization.”²⁵⁵ However, the Federal Circuit concluded that this was “not an improvement in network architecture—it [was] the use of a computer as a tool to process information.”²⁵⁶

As the Federal Circuit in *Enfish* has noted, step one “asks whether the focus of the claims is on the specific asserted improvement in computer capabilities . . . or, instead, on a process that qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool.”²⁵⁷ Or, as the Federal Circuit in *Electric Power* mentioned, there is a “distinction made in *Alice* between computer-functionality improvements, and uses of existing computers as tools in aid of processes focused on ‘abstract ideas[.]’”²⁵⁸ *Two-Way*, *SRI*, and *Uniloc* may provide another distinction between patent-eligible claims and patent-ineligible claims for network architecture patents. That is, under *SRI* and *Uniloc*, a claim reciting a technical improvement that is unconventional in a network architecture is patent-eligible, even though such a network architecture is conventional. On the other hand, under *Two-Way* and *Uniloc*, a claim merely reciting a conventional functionality of a network architecture is directed to an abstract idea.

B. Step Two: Unconventionality

As the Federal Circuit in *Electric Power* has advised, step one and step two “are plainly related” and “involve overlapping scrutiny of the content of the claims.”²⁵⁹ In reviewing the disputed claims of the ’065 Patent, the

²⁵² *Id.* (emphasis added).

²⁵³ *Uniloc USA, Inc.*, 2019 WL 2245938, at *7.

²⁵⁴ *Id.* (emphasis added).

²⁵⁵ *Id.* at *8.

²⁵⁶ *Id.*

²⁵⁷ *Enfish*, 822 F.3d at 1335-36 (emphasis added).

²⁵⁸ *Elec. Power Grp., LLC*, 830 F.3d at 1354 (citing *Enfish*, 822 F.3d at 1335-36).

²⁵⁹ *Id.* at 1353.

Federal Circuit in *Amdocs* observed that “we have found eligibility when somewhat facially-similar claims . . . recite a sufficient inventive concept under step two—particularly when the claims solve a *technology-based problem*, even with conventional, generic components, combined in an unconventional manner.”²⁶⁰ But, in *SRI*, the Federal Circuit’s step one analysis considered the disputed claims as “directed to using a specific technique . . . to solve a *technological problem* arising in computer networks: identifying hackers or potential intruders into the network.”²⁶¹ *Amdocs* and *SRI* looked at the technological problem in step two and step one respectively. Therefore, *Amdocs* and *SRI* may verify the *Electric Power* court’s expectation.

Nonetheless, *Amdocs*, *Two-Way* and *Uniloc* together suggest a consistent approach to the step two analysis for network architecture patents. That is, the Federal Circuit focuses on whether a claim recites any unconventional feature of network architecture.

In *Amdocs*, regarding the ’065 Patent, the Federal Circuit found the disputed claims patent-eligible under step two by reasoning that they included an inventive concept by reciting the enhancing limitation that depends on the invention’s distributed architecture with the invention’s network devices and gatherers.²⁶² The Federal Circuit noted that “this enhancing limitation necessarily involve[d] the arguably generic gatherers, network devices, and other components working in an *unconventional distributed fashion* to solve a particular technological problem.”²⁶³

In *Uniloc*, regarding the ’578 Patent, the Federal Circuit considered the claimed network architecture as “[t]he positioning of [the claimed] components on the application server together with the application launcher on the client computer [that] allows customization by both the administrator and the user in such a way as the installation can proceed on-demand with both [administrator and user] sets of preferences.”²⁶⁴ In holding that the claimed network architecture was an inventive concept, the Federal Circuit stated that there had “been *no showing or determination* that such a network architecture was *conventional*.”²⁶⁵

Amdocs and *Uniloc* may teach that recitation of an unconventional network architecture is a key to passing step two. Contrarily, in *Two-Way*,

²⁶⁰ *Amdocs (Israel) Ltd.*, 841 F.3d at 1300 (emphasis added) (citing *DDR Holdings*, 773 F.3d at 1256-59; *Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1349-52).

²⁶¹ *SRI Int’l, Inc.*, 918 F.3d at 1375 (emphasis added).

²⁶² *Amdocs (Israel) Ltd.*, 841 F.3d at 1300-02.

²⁶³ *Id.* at 1301 (emphasis added).

²⁶⁴ *Uniloc USA, Inc.*, 2019 WL 2245938, at *6.

²⁶⁵ *Id.* (emphasis added).

regarding the '187 Patent, the Federal Circuit found no inventive concept because the disputed claims failed to recite a system architecture that the specification describes as a purported innovative scalable architecture.²⁶⁶ The Federal Circuit also commented that the disputed claims did not include the rules of the claimed network communication protocol and parameters for the claimed selection signals received from the users, but instead utilized a conventional ordering of steps.²⁶⁷

Similarly, the Federal Circuit in *Uniloc* examined the disputed claims of the '466 Patent and treated the software limitations, the alleged inventive concept, as “merely the *conventional* ones[.]”²⁶⁸ In reviewing the disputed claims of the '766 Patent, the Federal Circuit stated that “[n]othing about the [claimed components was] asserted as *unique or non-conventional* from the way that those components ordinarily function.”²⁶⁹ Thus, the Federal Circuit found that the '466 Patent and '766 Patent did not pass step two.²⁷⁰

Amdocs, Two-Way and *Uniloc* together show the Federal Circuit’s step two analysis centers on unconventionality of the claimed functionalities or features of a claim. This approach is consistent with the Supreme Court in *Alice* that cautions that “the *mere recitation of a generic computer* cannot transform a patent-ineligible abstract idea into a patent-eligible invention.”²⁷¹

Alice has provided that “if a patent’s recitation of a computer amounts to a mere instruction to ‘implemen[t]’ an abstract idea ‘on . . . a computer,’ that addition cannot impart patent eligibility.”²⁷² One way to go beyond a mere instruction is that a claim as a whole “purport[s] to improve the functioning of the computer itself.”²⁷³ For instance, in *Amdocs*, the Federal Circuit found that the disputed claims provided benefits through “the distributed, remote enhancement that produced an *unconventional result*—reduced data flows and the possibility of smaller databases.”²⁷⁴ In *Uniloc*, the Federal Circuit implied that the functional improvement was “customization by both the administrator and the user in such a way as the installation can proceed on-demand with [the claimed] sets of preferences.”²⁷⁵

²⁶⁶ *Two-Way Media Ltd.*, 874 F.3d at 1338-39.

²⁶⁷ *Id.* at 1339.

²⁶⁸ *Uniloc USA, Inc.*, 2019 WL 2245938, at *7 (emphasis added).

²⁶⁹ *Id.* at *9 (emphasis added).

²⁷⁰ *Id.* at *7-9.

²⁷¹ *Alice Corp. Pty.*, 573 U.S. at 223 (emphasis added).

²⁷² *Id.* (citation omitted).

²⁷³ *Id.* at 225.

²⁷⁴ *Amdocs (Israel) Ltd.*, 841 F.3d at 1302 (emphasis added) (discussing U.S. Patent No. 7,631,065 (filed Dec. 7, 2001)).

²⁷⁵ *Uniloc USA, Inc.*, 2019 WL 2245938, at *6 (discussing '293 Patent).

In conclusion, these three network architecture cases show that a network architecture with unconventional functionality can be an inventive concept, as long as the claim recites such a network architecture.

IV. PRACTICAL IMPLICATIONS FOR PATENT DRAFTING

A. *Unconventional Network Architecture*

Amdocs, *Two-Way*, *SRI*, and *Uniloc* may support a single test for patent-eligibility of network architecture patents.²⁷⁶ That is, under either step one or step two, the Federal Circuit ultimately searches for something unconventional. Focusing on unconventionality is not a novelty test.²⁷⁷ Rather, it helps in determining whether a claim recites merely an instruction of utilizing generic functions of a computer system, as the Supreme Court in *Alice* has cautioned.²⁷⁸ However, the question is whether a predictable definition of “unconventionality” for network architecture can be derived from these four cases. The answer may be yes.

These four cases suggest that unconventionality is based on an invention’s advancement over the prior art in a way that such the unconventionality solves the prior art’s problem. In *Amdocs*, before stating that “[i]n other words, this claim [of the ’065 Patent] entail[ed] an unconventional technological solution (*enhancing* data in a distributed fashion)[,]”²⁷⁹ the Federal Circuit expressed that “this distributed enhancement was a critical advancement over the prior art[.]”²⁸⁰ The Federal Circuit also quoted a part of the specification that describes the invention’s advantage and the flaws in previous systems.²⁸¹ The flaws were considered

²⁷⁶ It is not uncommon for the Federal Circuit to develop a patent-validity standard for a particular technology. For instance, the Federal Circuit has created a “lead compound” theory for analyzing whether a pharmaceutical compound claim is obvious in view of prior art compounds. *See* *Novartis Pharmaceuticals Corp. v. West-Ward Pharmaceuticals Int’l Ltd.*, 923 F.3d 1051, 1060 (Fed. Cir. 2019); *see generally* Briana Barron, *Structural Uncertainty: Understanding the Federal Circuit’s Lead Compound Analysis*, 16 MARQ. INTELL. PROP. L. REV. 401 (2012) (discussing the “lead compound” analysis).

²⁷⁷ Hao J. Wu, Casenote, *Patentable Subject Matter: Alice Does Not Permit the Dead to Frolic in a 3D Wonderland*, 69 SMU L. REV. 299, 299 (2016) (commenting that the Central District of California improperly incorporating the novelty analysis under 35 U.S.C. § 102 into the patent-eligibility analysis).

²⁷⁸ *Alice Corp. Pty.*, 573 U.S. at 223.

²⁷⁹ *Amdocs (Israel) Ltd.*, 841 F.3d at 1300 (emphasis added).

²⁸⁰ *Id.*

²⁸¹ *See id.* (quoting ’065 Patent col.4 ll.33-42) (“This helps avoids [*sic*] reduce congestion in network bottlenecks but still allows the data to be accessible from a central location. In previous systems, all the network information flows to one location, making it very difficult to keep up with the massive record flows from the network devices and requiring huge databases.” (alteration in original)).

as a technological problem that the enhancing technology was intended to solve.²⁸²

In *Two-Way*, the Federal Circuit agreed with the District Court's acknowledgement that the missing inventive concept was the scalable architecture described in the specification but not recited in the disputed claims.²⁸³ There, the District Court noted that "[t]he patent specifications [did], in fact, point to the architecture of the system as *the technological innovation*."²⁸⁴ The district court also implied that it could "accept that the architecture described in the patent specification is designed to solve the technological problems of load, bottlenecking, and inadequate records[.]"²⁸⁵

In *SRI*, the Federal Circuit acknowledged that the claimed technology prevented "the normal, expected operation of a conventional computer network" and overrode "the routine and conventional sequence of events."²⁸⁶ The Federal Circuit also pointed to a part of the specification that describes the weaknesses in conventional networks and provides a framework for recognizing such a weakness.²⁸⁷

Finally, in *Uniloc*, by reviewing a part of the specification of the '293 Patent,²⁸⁸ the Federal Circuit found that there was "*nothing* in the record to suggest that such network architecture was so *conventional*[.]"²⁸⁹ The Federal Circuit also noted that "[t]he district court failed to appreciate that the specification was describing *the enhanced functionality provided to the prior art TME system by the use of the claimed file packets*."²⁹⁰

Therefore, although the Federal Circuit has not explicitly defined unconventional network architecture, it has been looking for something in the specification to show the invention's advancement for solving problems in the prior art network.

B. Patent Drafting

Amdocs, *Two-Way*, *SRI*, and *Uniloc* may teach some rules for drafting claims or specification of a network architecture patent. First, a claim must include a mechanism to utilize network architecture that the invention relies

²⁸² *Id.*

²⁸³ *Two-Way Media Ltd.*, 874 F.3d at 1338-39.

²⁸⁴ *Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC*, No. CV 14-1006-RGA, 2016 WL 4373698, at *5 (D. Del. Aug. 15, 2016) (emphasis added) (citing U.S. Patent No. 5,778,187 col.2 ll.3-5, col.3 ll.55-59 (filed May 9, 1996)).

²⁸⁵ *Comcast Cable Commc'ns, LLC*, 2016 WL 4373698, at *5.

²⁸⁶ *See SRI Int'l, Inc.*, 918 F.3d at 1376.

²⁸⁷ *See id.* at 1375 (citing '615 Patent col.1 ll.36-39, 43-47, col.3 ll.44-48).

²⁸⁸ *See Uniloc USA, Inc.*, 2019 WL 2245938, at *5 (referring to '293 Patent col.17 ll.20-54).

²⁸⁹ *Id.* (emphasis added).

²⁹⁰ *Id.* (emphasis added).

on. In *Two-Way*, the Federal Circuit noted that “the [disputed] claim require[d] the *functional results* of ‘converting,’ ‘routing,’ ‘controlling,’ ‘monitoring,’ and ‘accumulating records,’ but [did] not sufficiently describe *how to achieve these results* in a non-abstract way.”²⁹¹ However, the Federal Circuit recognized that the disputed claim should have been patent-eligible if it had recited a “scalable architecture” described in the specification of the ’187 Patent.²⁹²

In fact, the ’187 Patent describes: “[t]he present invention is a scalable architecture for delivery of real-time information over a communications network. Embedded into the architecture is a control mechanism that provides for the management and administration of users who are to receive the real-time information.”²⁹³ The specification further defines the invention as including three elements: distribution architecture, control architecture, and user interface.²⁹⁴

Then, the question is how to incorporate such network architecture into a claim. *SRI* and *Uniloc* suggest that a claim must include components of network architecture to meet the “how” requirement. In *SRI*, representative claim 1 of the ’615 Patent included semi-functional limitations: “deploying a plurality of *network monitors* in the enterprise network; detecting, by the *network monitors*, suspicious network activity based on analysis of network traffic data ...”; “generating, by the *monitors*, reports of said suspicious activity”; and “automatically receiving and integrating the reports of suspicious activity, by one or more *hierarchical monitors*.”²⁹⁵ As the Federal Circuit stated, claim 1 was “not directed to just analyzing data from multiple sources to detect suspicious activity[, but instead] directed to an improvement in computer network technology [by reciting] using network monitors to [perform the claimed steps].”²⁹⁶ That is, the “monitor” limitation was a key for the Federal Circuit to find the patent-eligible character of claim 1.²⁹⁷

While *SRI* teaches that a claim must include physical components of the invention’s network architecture, *Uniloc* stands for cases requiring software components. In *Uniloc*, representative claim 1 of the ’293 Patent included functional steps without citing any physical device, such as “providing ...,” “specifying ...,” “preparing ...,” and “distributing ...,” and

²⁹¹ *Two-Way Media Ltd.*, 874 F.3d at 1337 (emphasis added).

²⁹² *See id.* at 1338-39 (citing ’187 Patent col.2 ll.3-7).

²⁹³ ’187 Patent col.2 ll.1-5.

²⁹⁴ ’187 Patent col.3 ll.55-67.

²⁹⁵ *SRI Int’l, Inc.*, 918 F.3d at 1373 (emphasis added).

²⁹⁶ *Id.* at 1375 (emphasis added).

²⁹⁷ *See id.*

two steps recited a “file packet” limitation.²⁹⁸ The Federal Circuit found that claim 1 was “directed to the use of file packets . . . , and that this [was] not an abstract idea.”²⁹⁹ In addition, the Federal Circuit noted that “the patent claim[ed] a particular improvement in *how* this is done—i.e. by use of *a file packet* to enable the further functionality of [the claimed initiating step.]”³⁰⁰ Hence, the “file packet” limitation was the focus of the Federal Circuit’s patent-eligibility determination.³⁰¹

Similarly, representative claim 1 of the ’578 Patent in *Uniloc* also included functional steps, such as “installing an application program having a plurality of configurable preferences and a plurality of authorized users . . . ,” “distributing an application launcher program . . . ,” “obtaining a user set of the plurality of configurable preferences . . . ,” “obtaining an administrator set of the plurality of configurable preferences . . . ,” and “executing”³⁰² The Federal Circuit held that claim 1 was “directed to a particular way of using a conventional application server to nevertheless allow on-demand installation of an application incorporating preferences from two different sources by adding the application manager *and* configuration manager as additions to each application.”³⁰³ Therefore, the “configurable preference” limitations for a user and administrator and the “application program” limitation together supported the Federal Circuit’s decision on patent-eligibility.³⁰⁴

Lastly, *Amdocs* suggests a specification must describe how the claimed steps are implemented through the invention’s network architecture. In *Amdocs*, the representative claim of the ’065 Patent recited mean-plus function limitations, such as “computer code for using the accounting information with which the first network accounting record is correlated to *enhance* the first network accounting record,”³⁰⁵ while the representative claim of the ’510 Patent also recited mean-plus function limitations, such as “computer code for collecting . . . ,” “computer code for filtering and aggregating . . . ,” and “computer code for completing”³⁰⁶ The representative claim of the ’984 Patent included functional steps, such as “collecting . . . ,” “filtering and aggregating . . . ,” and “completing . . . ,”³⁰⁷

²⁹⁸ See *ADP, LLC*, 279 F. Supp. 3d at 740; see also *Uniloc USA, Inc.*, 2019 WL 2245938, at *5.

²⁹⁹ *Uniloc USA, Inc.*, 2019 WL 2245938, at *5.

³⁰⁰ *Id.* (emphasis in original for “how” and emphasis added for “a file packet”).

³⁰¹ See *id.*

³⁰² See *id.* at *6.

³⁰³ *Id.* (emphasis in original).

³⁰⁴ See *id.* at *6-7.

³⁰⁵ *Amdocs (Israel) Ltd.*, 841 F.3d at 1299 (emphasis added).

³⁰⁶ See *id.* at 1302.

³⁰⁷ See *id.* at 1304.

while the representative claim of the '797 Patent also recited functional limitations, such as “collecting ...,” “generating ...,” and “wherein the data is collected utilizing an enhancement procedure ...”³⁰⁸

The Federal Circuit examined the specifications of the disputed patents and found that the limitations reciting “collecting,” “filtering,” “aggregating,” “completing,” and “enhance” or “enhancement” all depend on the invention’s distributed architecture that sufficiently transforms all disputed claims into patent-eligible subject matters.³⁰⁹ For example, the Federal Circuit found that the specification of the '065 Patent described that the gatherers, network devices, ISMs, and other components work together in a distributed fashion to solve the alleged technological problem.³¹⁰ Even though the disputed claims of the '065 Patent actually did not recite a term “distributed architecture” as used in the specification,³¹¹ the Federal Circuit still found the disputed claims patent-eligible.³¹²

CONCLUSION

In the context of network architecture patents, the Federal Circuit has provided a predictable application of the *Alice* two-part test. Under step one, the Federal Circuit examines the language of a disputed claim and the specification to identify whether there exists a specific, technical solution for improving a conventional network. The Federal Circuit judges “specificity” by looking at whether such a solution provides an unconventional functionality. Under step two, the Federal Circuit looks into claim limitations to see whether any unconventional feature of network architecture is recited.

In addition, *Amdocs*, *Two-Way*, *SRI*, and *Uniloc* together suggest a single test for patent-eligibility of network architecture patents. As long as an invention’s advancement over the prior art is based on an unconventional solution for solving the prior art’s technical problem, such an invention is more likely to be found patent-eligible. Moreover, a claim of such an invention must recite a mechanism to utilize network architecture by, for example, including physical components or software components of such network architecture. Meanwhile, the specification must describe how to implement such a mechanism through the invention’s network architecture.

³⁰⁸ See *id.* at 1305.

³⁰⁹ See *id.* at 1300-01, 1303-06.

³¹⁰ See *id.* at 1301.

³¹¹ See '065 Patent col.15 ll.66-7, col.16 ll.1-2 (“Because of the distributed architecture, filtering and enhancements, the system efficiently and accurately collects the network usage information for storage in a form that is useful for billing and accounting.”).

³¹² See *Amdocs (Israel) Ltd.*, 841 F.3d at 1301-02.