REICHMAN JORGENSEN
LEHMAN & FELDBERG LLP

Patent Owner's Presentation

September 15, 2022

VMware, Inc. v. Cirba IP, Inc.,
Case No. PGR2021-00098

"Method and System for Determining Compatibility of Computer Systems"

(12) **United States Patent**
Hillier et al.

(10) **Patent No.: US 10,951,459 B2**
(45) **Date of Patent: Mar. 16, 2021**

(54) **METHOD AND SYSTEM FOR DETERMINING COMPATIBILITY OF COMPUTER SYSTEMS**

(71) Applicant: **Cirba IP Inc.**, Markham (CA)

(72) Inventors: **Andrew D. Hillier**, Toronto (CA); **Tom Yuyitung**, Toronto (CA)

(73) Assignee: **Cirba IP Inc.**, Markham (CA)

USPC 709/223
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,963,911 A 10/1999 Walker et al.
6,148,335 A 11/2000 Haggard et al.
(Continued)

"Method and System for Determining Compatibility of Computer Systems"

(57) **ABSTRACT**

Compatibility and consolidation analyses can be performed on a collection of systems to evaluate the 1-to-1 compatibility of every source-target pair, evaluate the multi-dimensional compatibility of specific transfer sets, and to determine the best consolidation solution based on various constraints including the compatibility scores of the transfer sets. The analyses can be done together or be performed independently. These analyses are based on collected system data related to their technical configuration, business factors and workloads. Differential rule sets and workload compatibility algorithms are used to evaluate the compatibility of systems. The technical configuration, business and workload related compatibility results are combined to create an overall compatibility assessment. These results are visually represented using color coded scorecard maps.

Ex. 1001 at 1 (annotated)
See Ex. 1009 at 69

“Method and System for Determining Compatibility of Computer Systems”

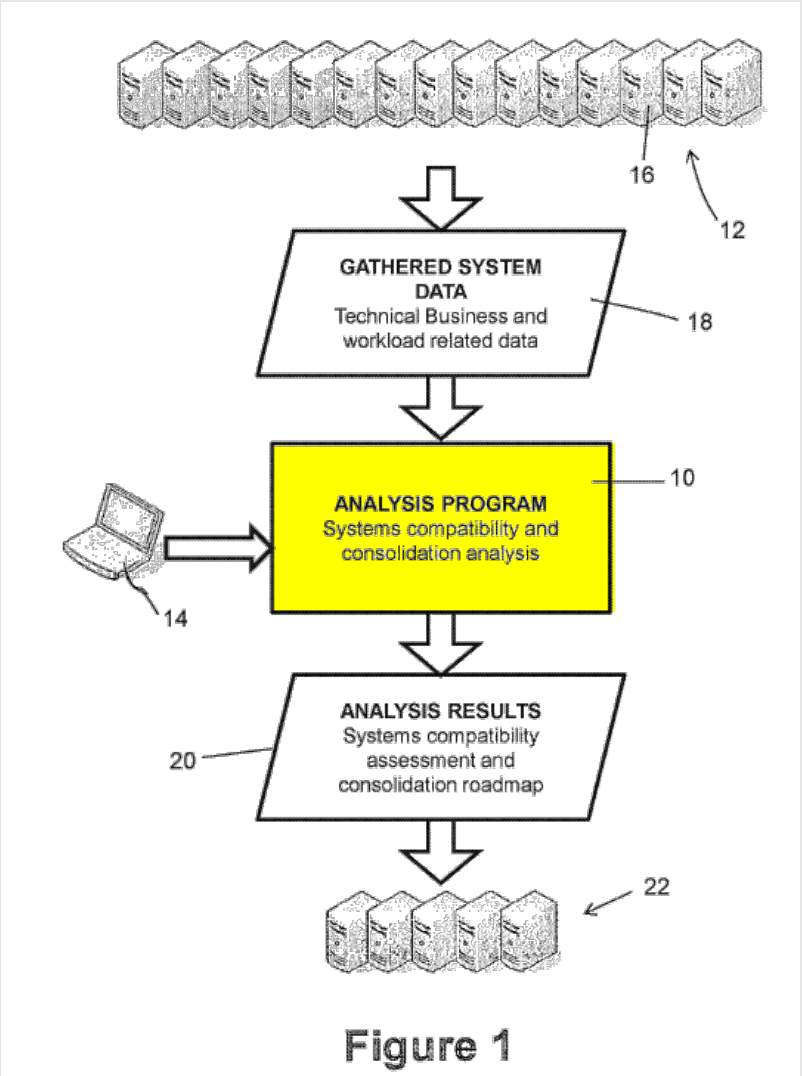


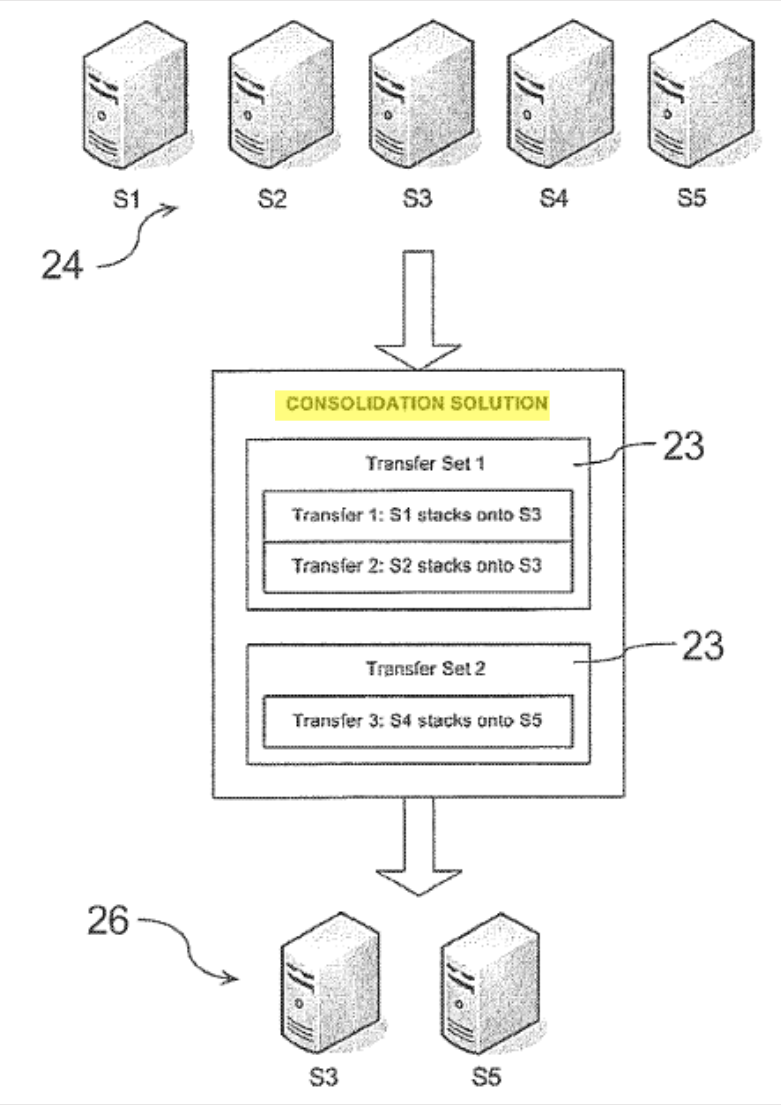
Figure 1

Analysis Program Overview

A block diagram of an analysis program **10** for determining compatibilities in computing environment **12** is provided in FIG. **1**. The analysis program **10**, accessed through a computer station **14**, gathers data **18** pertaining to a collection of systems to be consolidated **16**. The analysis program **10** uses the gathered data **18** to evaluate the compatibility of the computer systems **28** and provide a roadmap **20** specifying how the original set of systems can be consolidated to a smaller number of systems **22**.

Exhibit 1001 at 5, 61 (annotated)
Exhibit 1009 at 8 ([0074]), 70

"Method and System for Determining Compatibility of Computer Systems"



Ex. 1001 at 7 (annotated)

A consolidation solution (or roadmap) is one or more transfer sets **23** based on a common pool of source and target entities. As can be seen in FIG. **2**, the consolidation roadmap can be included in the analysis results **20**. Each source or target entity is referenced at most one time by the transfer sets that comprise the solution.

Ex. 1001 at 61 (annotated)

The consolidation analysis searches for a consolidation solution that minimizes the number of remaining source and target entities after the proposed transfers are applied, while meeting requisite compatibility constraints. This analysis employs the multi-dimensional compatibility analysis described above to evaluate the compatibility of postulated transfer sets.

Ex. 1001 at 62 (annotated)

See Ex. 1009 at 10 ([0088]), 12 ([0097]), 72

Analyses Are Not Limited to Consolidation

It will be appreciated that each analysis and associated map discussed above may instead be used for purposes other than consolidation such as capacity planning, regulatory compliance, change, inventory, optimization, administration etc. and any other purpose where compatibility of systems is useful for analyzing systems **16**. It will also be appreciated that the program **10** may also be configured to allow user-entered attributes (e.g. location) that are not available via the auditing process and can factor such attributes into the rules and subsequent analysis.

Exhibit 1001 at 78 (annotated)
See Exhibit 1009 at 64 ([0385])

"Method and System for Determining Compatibility of Computer Systems" Representative Claim 1

1. A system for determining placement of source computer systems on target computer systems, the system configured to execute operations causing the system to:

1a. collect data for a collection of computer systems, the collection of computer systems comprising a plurality of source systems and a plurality of target systems;

1b. determine a placement of at least one source system from the collection of computer systems on at least one target system from the collection of computer systems by employing the following operations:

1b1. evaluate compatibility between a specific source system from the plurality of source systems and a specific target system from the plurality of target systems by evaluating one or more rules that operate against attributes or data relating to the source and target systems being evaluated;

1b2. evaluate compatibility between the specific source system from the plurality of source systems and one or more other source systems either already placed on the specific target system, or being evaluated for placement onto the specific target system, to determine if the specific source system can be placed with those other source systems on the specific target system, by evaluating one or more rules that operate against attributes or data relating to the source systems;

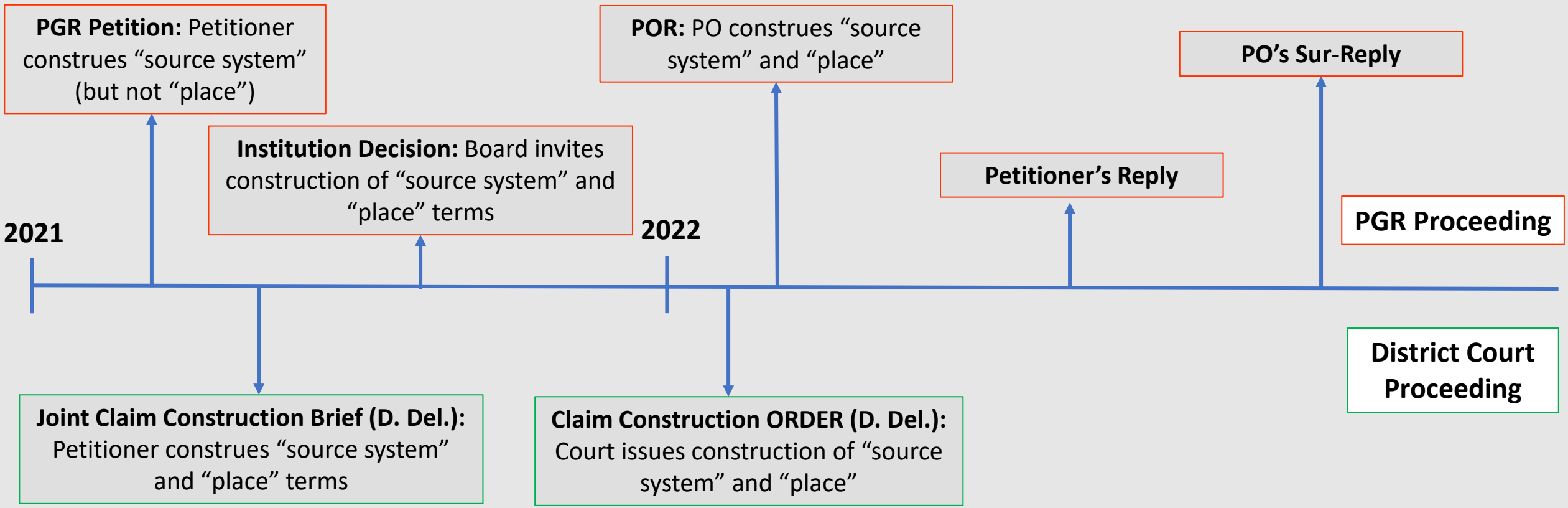
1b3. evaluate compatibility between the specific source system and the specific any one of the plurality of target system by evaluating the impact on resource utilization of the specific target system of placing the specific source system on the specific target system, in combination with the one or more other source systems, either already placed on the specific target system, or being evaluated for placement onto the specific target system; and

1c. issue instructions to place the at least one source system on the at least one target system in accordance with the determined placement.

The Claims as "Properly Construed" Have Written Description Support

"To satisfy the written description requirement, the ***properly construed*** claim must be supported by [the] specification. [T]he moving party[] bears the burden of proof to demonstrate that [the] claims ***as properly construed*** lack written description support." *Harari v. Lee*, 656 F.3d 1331, 1340-41 (Fed. Cir. 2011) (emphasis added).

Claim Construction Timeline



Claim Construction

"Given that [patent owner's] principal argument to the board about the proper interpretation of the term [in dispute] was expressly tied to the district court's claim construction, we think that the board had an obligation, in these circumstances, to evaluate that construction . . . ." *Power Integrations, Inc. v. Lee*, 797 F.3d 1318, 1327 (Fed. Cir. 2015).

Claim Construction: "Source Systems"

Patent Owner's Construction	Petitioner's Construction	District Court's Construction
"a physical, virtual, or hypothetical system from which applications and/or data are moved or are to be moved" (POR at 11)	"The '459 patent's specification expressly defines 'source system' and 'target system' as 'a system [from/to] which applications and/or data are to be moved.' . . . [Patent Owner] should be held to that meaning." (Reply at 25-6) "[T]he Board need not decide what 'source system' and 'target system' mean." (Id.)	***"a physical, virtual, or hypothetical system from which applications and/or data are moved or are to be moved"*** (Ex. 2005 at 11). ***"The Court agrees with Densify that the patent does not place a temporal limit on the claimed 'source system' - that is, it does not exclude systems that have already been moved or are currently being moved."*** (Id. at 12)

Claim Construction: "Placing" Terms ("place" & "placement")

Patent Owner's Construction	Petitioner's Construction	District Court's Construction
"plain and ordinary meaning, including 'to put in or as if in a particular place,' 'to distribute in an orderly manner,' or 'putting in a particular position or a suitable place.'" (POR at 23)	"'place' cannot mean anything beyond 'transfer,' which requires movement" (Reply at 24-25)	"***Plain and ordinary meaning.*** No construction is necessary." (Ex. 2005 at 13-15). "[***T]he specification does not limit the scope of the 'place'*** terms to exclude all other actions aside from 'moving,' as it additionally includes references to, for example, 'consolidating,' 'stacking,' and 'transferring.'" (Id.) ***"['P]lace' should be given its plain and ordinary meaning in this context, which is broader than 'move,' and may include . . . 'put[ting] in a particular position' or 'a suitable place.'"*** (Id.)

"Placing" is not limited to "physically" placing (i.e., "moving") nor exclusive of "theoretical" or "analytical" placing.

"[T]he ordinary meaning of a claim term is its meaning to the ordinary artisan after reading the entire patent." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1321 (Fed. Cir. 2005) (*en banc*).

First, the parties disagree as to whether the word "placement" should be limited to "movement." The Court agrees with Densify that the specification does not limit the scope of the "place" terms to exclude all other actions aside from "moving," as it additionally includes references to, for example, "consolidating," "stacking," and "transferring." (*See* D.I. 1094 at 45-46) (citing '459 patent at 2:5-7, 18-20, 13:37-40) That some of these actions ***involve*** moving applications and/or data does not compel the narrowing construction VMware seeks. (*See id.* at 47-49) Instead, the Court agrees with Densify that "place" should be given its plain and ordinary meaning in this context, which is broader than "move," and may include, as Densify argues, "put[ting] in a particular position" or "a suitable place." (*Id.* at 45) (citing D.I. 1095-2 Ex. B-1)

Ex. 2005 at 14 (annotated)

"Placing" Encompasses Theoretical Placing

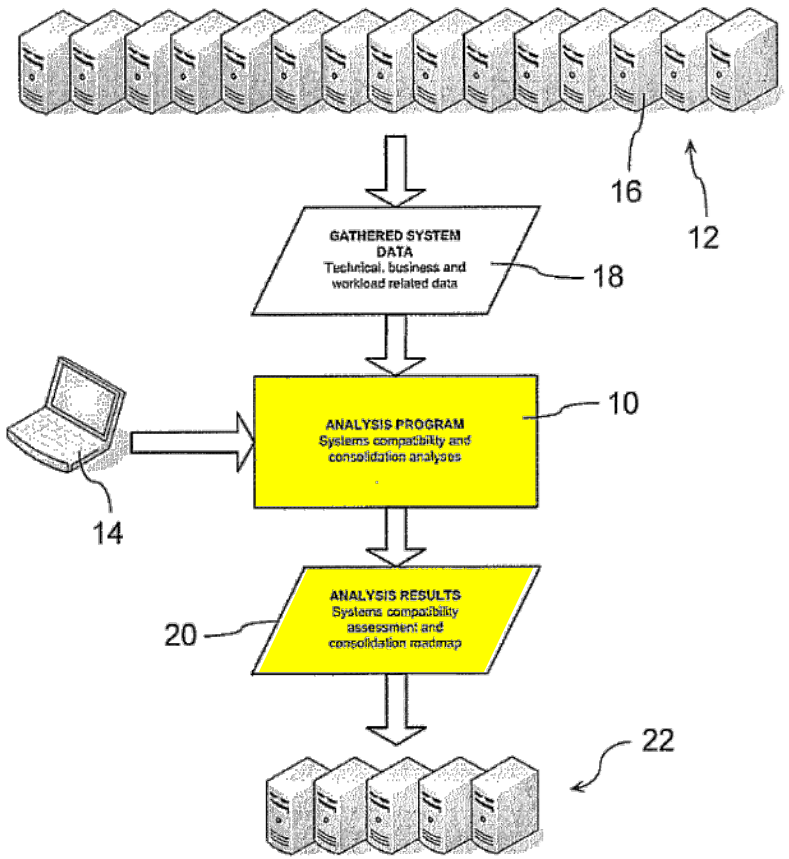


Figure 1

[0074] A block diagram of an analysis program 10 for determining compatibilities in computing environment 12 is provided in Figure 1. The analysis program 10, accessed through a computer station 14, gathers data 18 pertaining to a collection of systems to be consolidated 16. The analysis program 10 uses the gathered data 18 to evaluate the compatibility of the computer systems 28 and provide a roadmap 20 specifying how the original set of systems can be consolidated to a smaller number of systems 22.

Ex. 1009 at 8, 70 (annotated)

“Placing” Encompasses Theoretical Placing

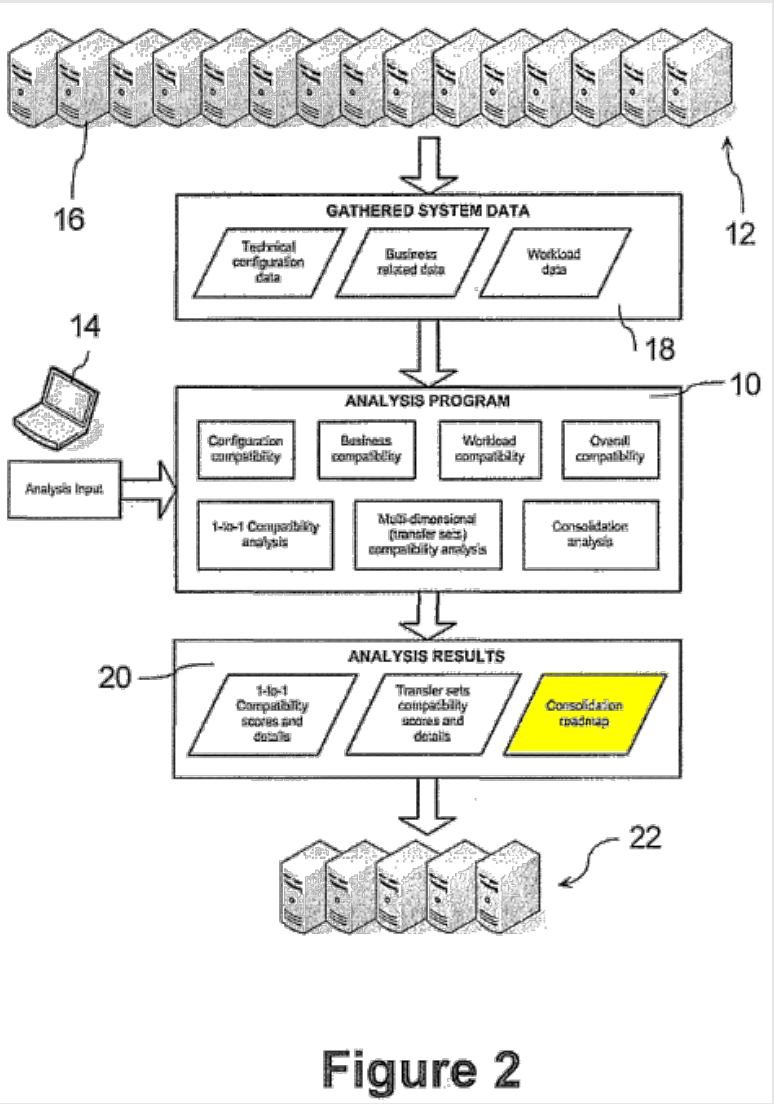


Figure 2

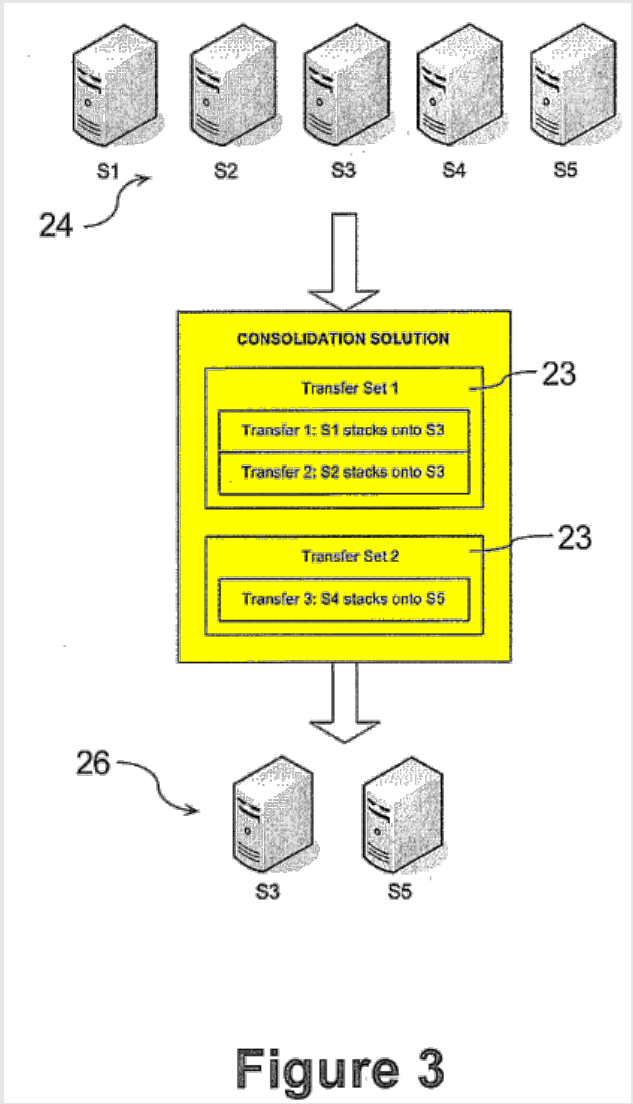


Figure 3

[0088] A consolidation solution (or roadmap) is one or more transfer sets 23 based on a common pool of source and target entities. As can be seen in Figure 2, the consolidation roadmap can be included in the analysis results 20. Each source or target entity is referenced at most one time by the transfer sets that comprise the solution.

Ex. 1009 at 10 (annotated)

[0097] The consolidation analysis searches for a consolidation solution that minimizes the number of remaining source and target entities after the proposed transfers are applied, while meeting requisite compatibility constraints. This analysis employs the multi-dimensional compatibility analysis described above to evaluate the compatibility of postulated transfer sets.

Ex. 1009 at 12 (annotated)

Ex. 1009 at 71-72 (annotated)

"Placing" Encompasses Theoretical Placing

[00305] The score provided in each cell 92 indicates the overall compatibility for consolidating systems 16. It should be noted that in some cases two systems 16 can have a high configuration compatibility but a low workload compatibility and thus end up with a reduced or relatively low overall score. It is therefore seen that the map 36 provides a comprehensive score that considers not only the compatibility of systems 28 at the setting level but also in its utilization. By displaying the configuration maps 32, business maps, workload maps 34 and overall map 36 in a consolidation roadmap, a complete picture of the entire system can be ascertained in an organized manner. The maps 32, 34 and 36 provide a visual representation of the compatibilities and provide an intuitive way to evaluate the likelihood that systems can be consolidated, to analyse compliance and drive remediation measures to modify systems 16 so that they can become more compatible with other systems 16 in the environment 12. It can therefore be seen that a significant amount of quantitative data can be analysed in a convenient manner using the graphical maps 32, 34 and 36, and associated reports and graphs (described below).

Ex. 1009 at 47 (annotated)

"Placing" Encompasses Theoretical Placing

[00342] The consolidation analysis process flow is illustrated as D in Figure 9. Using the common compatibility analysis input and additional auto fit inputs, this analysis seeks the consolidation solution that maximizes the number of transfers while still fulfilling the several pre-defined constraints. The consolidation analysis repeatedly employs the multi-dimensional compatibility analysis to assess potential transfer set candidates. The result of the consolidation analysis comprises of the consolidation solution and the corresponding multi-dimensional compatibility analysis.

Ex. 1009 at 47 (annotated)

“Placing” Encompasses Theoretical Placing

[00371] The consolidation solution is then saved, and if warranted by the selected algorithm, another auto fit can be performed with a different search parameters (e.g. sort source systems in ascending order before stacking onto target) to generate another consolidation solution.

Ex. 1009 at 61 (annotated)

Placing Hypothetical Systems is Theoretical "Placing"

[0082] The computer systems 16 may be physical systems, virtual systems or hypothetical models. In contrast to actual physical systems, hypothetical systems do not currently exist in the computing environment 12. Hypothetical systems can be defined and included in the analysis to evaluate various types of "what if" consolidation scenarios. Hypothetical targets can be used to simulate a case where the proposed consolidation target systems do not exist in the environment 12, e.g. for adding a system 16. Similarly, hypothetical source systems can be used to simulate the case where a new application is to be introduced into the environment 12 and "forward consolidated" onto existing target systems 16.

Ex. 1009 at 9 (annotated)

[0085] It will therefore be appreciated that a "system" or "computer system" hereinafter referred, can encompass any entity which is capable of being analysed for any type of compatibility and should not be considered limited to existing or hypothetical physical or virtual systems etc.

Ex. 1009 at 10 (annotated)

Theoretical "Stacking" Is An Example of "Placing"

First, the parties disagree as to whether the word "placement" should be limited to "movement." The Court agrees with Densify that the specification does not limit the scope of the "place" terms to exclude all other actions aside from "moving," as it additionally includes references to, for example, "consolidating," "stacking," and "transferring." (*See* D.I. 1094 at 45-46) (citing '459 patent at 2:5-7, 18-20, 13:37-40) That some of these actions ***involve*** moving applications and/or data does not compel the narrowing construction VMware seeks. (*See id.* at 47-49) Instead, the Court agrees with Densify that "place" should be given its plain and ordinary meaning in this context, which is broader than "move," and may include, as Densify argues, "put[ting] in a particular position" or "a suitable place." (*Id.* at 45) (citing D.I. 1095-2 Ex. B-1)

Ex. 2005 at 14 (annotated)

Theoretical "Stacking" Is An Example of "Placing"

[0098] The analysis program 10 performs consolidation analyses for virtualization and stacking strategies as will be explained in greater detail below, however, it will be appreciated that other consolidation strategies may be performed according to similar principles.

[00316] For each transfer set 23, a compatibility score is computed for each rule set 28 and workload type 30. An overall compatibility score the transfer set 23 is then derived from the individual scores. For example, consider an analysis comprised of 20 systems, 3 rule sets, 2 workload types and 5 transfer sets 23:

- Systems: S1, S2, S3, … S20
- Analyzed with rule sets: R1, R2, R3
- Analyzed with workload types: W1, W2
- Transfer sets:
  - T1 (S1, S2, S3 stacked onto S4)
  - T2 (S5, S6, S7, S8, S9 stacked onto S10)
  - T3 (S11, S12, S13 stacked onto S14)
  - T4 (S15 stacked onto S16)
  - T5 (S17 stacked onto S18)
- Unaffected systems: S19, S20

[00371] The consolidation solution is then saved, and if warranted by the selected algorithm, another auto fit can be performed with a different search parameters (e.g. sort source systems in ascending order before stacking onto target) to generate another consolidation solution.

[0089] Figure 3 shows how an example pool 24 of 5 systems (S1, S2, S3, S4 and S5) can be consolidated through 2 transfer sets 23: stack S1 and S2 onto S3, and stack S4 onto S5. The transfer sets 23 include 3 transfers, and each system 16 is referenced by the transfer sets 23 only once. In the result, a consolidated pool 26 of 2 systems is achieved.

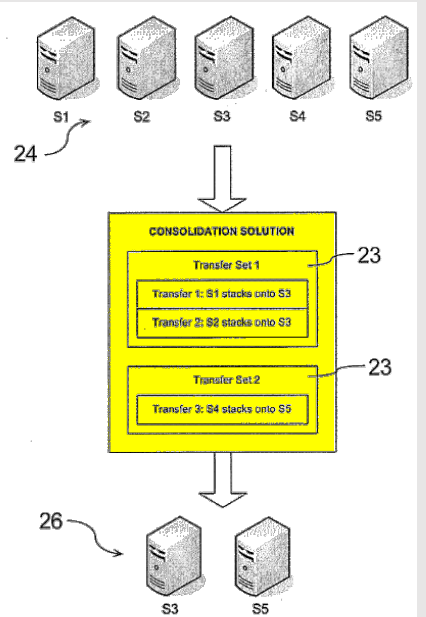


Figure 3

Ex. 1009 at 10-12, 49-50, 61, 72 (annotated)

"Placing" Encompasses Physical Placing

[0005] While the benefits of a distributed approach are numerous and well understood, there has arisen significant practical challenges in managing such systems for optimizing efficiency and to avoid redundancies and/or under-utilized hardware. In particular, one challenge occurs due to the sprawl that can occur over time as applications and servers proliferate. Decentralized control and decision making around capacity, the provisioning of new applications and hardware, and the perception that the cost of adding server hardware is generally inexpensive, have created environments with far more processing capacity than is required by the organization.

[0006] When cost is considered on a server-by-server basis, the additional cost of having underutilized servers is often not deemed to be troubling. However, when multiple servers in a large computing environment are underutilized, having too many servers can become a burden. Moreover, the additional hardware requires separate maintenance considerations; separate upgrades and requires the incidental attention that should instead be optimized to be more cost effective for the organization. Heat production and power consumption can also be a concern. Even considering only the cost of having redundant licenses, removing even a modest number of servers from a large computing environment can save a significant amount of cost on a yearly basis.

Ex. 1009 at 1-2(annotated)

6/15/2022 Deposition of Dr. Madisetti

Question:

15 Q Can you give me an example of a
16 placement?

Dr. Madisetti:

7 For example, an underutilized
8 environment having two systems, 16, can
9 be consolidated to a target system, one
10 other system, by moving applications
11 and/or data from the source system, which
12 is the other of the systems, to the
13 target system.

Ex. 1023 at 54:15-55:13 (annotated)

"Placing" Encompasses Physical Placing

[0009] OS-Level application stacking involves moving the applications and data from one or more systems to the consolidated system. This can effectively replace multiple operating system instances with a single OS instance, e.g. system A running application X and system B running application Y are moved onto system C running application Z such that system C runs applications X, Y and Z, and system A and B are no longer required. This strategy is applicable to all operation system types, e.g. Windows™, Linux™, Solaris™, AIX™, HP-UX™, etc.

Ex. 1009 at 1-2(annotated)

6/15/2022 Deposition of Dr. Madisetti

Dr. Madisetti:

And, in this case, Z's an example again, an example of a source system that's already placed on Z -- on Z, and A that runs Application X, Y that's running on System B, and X and Y are moved to System C.

Question:

Q So I believe you said that stacking a source system onto a target system includes moving the applications in our data from the source system to the target system; is that correct?

Dr. Madisetti:

A As I said, it does not -- it's not necessary to move. You can -- moving can be included, but it does not -- it's not necessary.

Ex. 1023 at 12:19-13:6 (annotated)

"Placing" Encompasses Physical Placing

[00325] When *stacking* multiple source entities onto a target, the source entities and targets coexist in the same operating system environment. Because of this inherent sharing, there is little flexibility in accommodating individual application requirements, and thus the target is deemed to be concrete. As such, the multi-dimensional analysis considers the N-to-1 inter-compatibility between the source entities and the target as the primary analysis mechanism, but, depending on the rule sets in use, may also consider the N-by-N intra-compatibility of the source entities amongst each other.

[00326] When virtualizing multiple source entities onto a target, the source entities are often transferred as separate virtual images that run on the target. This means that there is high isolation between operating system-level parameters, and causes virtualization rule sets to generally ignore such items. What is relevant, however, is the affinity between systems at the hardware, storage and network level, and it is critical to ensure that the systems being combined are consistent in this regard. In general, this causes the multi-dimensional analysis to focus on the N-to-N compatibility within the source entities, although certain concrete aspects of the target systems (such as processor architecture) may still be subjected to (N-to-1) analysis.

Ex. 1009 at 51-52 (annotated)

The Related '492 Patent's Prosecution History Does Not Disavow Analytical "Placing"

Petitioner's New Argument Based on New Evidence

"The prosecution history of the '459 patent's parent, U.S. Patent No. 10,523,492, confirms that placement must be more than just part of an analysis, which is all that mapping is . . . ."

Reply at 3-4 (annotated)

Petitioner Could Have Raised Both in its Petition

Second, although Petitioner makes arguments based on the meaning of the term "placement" in the claims, Petitioner never conducts a claim construction analysis for the terms "placed" or "placement." Pet. 34. To the extent appropriate, the parties may address the proper construction of these terms during the trial.

Institution Decision at 22 (annotated)

Petitioner's New Argument Based on New Evidence is Inappropriate

"While replies and sur-replies can help crystalize issues for decision, ***a reply*** or sur-reply ***that raises a new issue or belatedly presents evidence may not be considered***." PTAB Consolidated Patent Trial Practice Guide (Nov. 21, 2019) at 74; *see Qiagen N. Am. Holdings, Inc. v. HandyLab*, Inc., 2021 WL 5024387, at *3 (Fed. Cir. Oct. 29, 2021).

POR at 15-16, Sur-Reply at 10-11

The Related '492 Patent's Prosecution History Does Not Disavow Analytical "Placing"

Applicant has amended claim 1 as indicated above, to specify a practical application of the previously recited "output", namely: "placing the source systems onto the target systems in accordance with technical, business, and workload constraints determined in the compatibility analysis". Applicant submits that the rejections under 35 U.S.C. 101 are thereby rendered moot.

Ex. 1024 at 53 (annotated)

In particular, claim 1 as amended recites: "placing the source systems onto the target systems in accordance with technical, business, and workload constraints determined in the compatibility analysis". That is, claim 1 clearly recites applying the result of the compatibility analysis by placing source systems onto target systems – a practical application of any alleged abstract idea.

Ex. 1024 at 54 (annotated)

"Stacking" for a Roadmap or Consolidation Solution is an Example of "Placing"

[0086] Consolidation as described above can be considered to include one or more "transfers". The actual transfer describes the movement of a single source entity onto a target, wherein the specification identifies the source, target and transfer type. The transfer type (or consolidation strategy) describes how a source entity is transferred onto a target, e.g. virtualization, OS stacking etc.

[0087] A transfer set 23 (see Figure 3) can be considered one or more transfers that involve a common target, wherein the set specifies one or more source entities, the target and a transfer type.

[0088] A consolidation solution (or roadmap) is one or more transfer sets 23 based on a common pool of source and target entities. As can be seen in Figure 2, the consolidation roadmap can be included in the analysis results 20. Each source or target entity is referenced at most one time by the transfer sets that comprise the solution.

Ex. 1009 at 10 (annotated)

[00316] For each transfer set 23, a compatibility score is computed for each rule set 28 and workload type 30. An overall compatibility score the transfer set 23 is then derived from the individual scores. For example, consider an analysis comprised of 20 systems, 3 rule sets, 2 workload types and 5 transfer sets 23:

- Systems: S1, S2, S3, … S20
- Analyzed with rule sets: R1, R2, R3
- Analyzed with workload types: W1, W2
- Transfer sets:
  - T1 (S1, S2, S3 stacked onto S4)
  - T2 (S5, S6, S7, S8, S9 stacked onto S10)
  - T3 (S11, S12, S13 stacked onto S14)
  - T4 (S15 stacked onto S16)
  - T5 (S17 stacked onto S18)
- Unaffected systems: S19, S20

Ex. 1009 at 49-50 (annotated)

…ement." The Court agrees with Densify that the specification does not limit the scope of the "place" terms to exclude all other actions aside from "moving," as it additionally includes references to, for example, "consolidating," "stacking," and "transferring." (*See* D.I. 1094 at 45-46) (citing '459 patent at 2:5-7, 18-20, 13:37-40) That some of these actions ***involve*** moving

Ex. 2005 at 14 (annotated)

"Source Systems" Encompass Already Placed Systems

sis" activity. (*Id.* at 36-37) Densify concedes that the compatibility ***analysis*** is forward-looking, but notes that the term to be construed is "source system," not analysis. (*See* Tr. at 59)

The Court agrees with Densify that the patent does not place a temporal limit on the claimed "source system" – that is, it does not exclude systems that have already been moved or are currently being moved. (*See id.* at 59-60)

Ex. 2005 at 14 (annotated)

Petitioner Disregards Federal Circuit Guidance Regarding "Express Definitions"

The '459 patent's specification expressly defines "source system" and "target system" as "a system [from/to] which applications and/or data are to be moved." (Ex. 1001, 5:57-60; Petition, 19.) By adopting these definitions in *inter partes* review for the '459 patent's parent, the '492 patent, Patent Owner put the public on notice as to what these terms mean. *See VMware, Inc. v. Cirba IP Inc.*, Case No. IPR2021-00008, Paper No. 8, Patent Owner's Preliminary Response, at 5 (PTAB Feb. 18, 2021). It should be held to that meaning.

Reply at 25-26 (annotated)

ll.65–67. The district court made two important changes to this express definition in construing the word "static." First, the district court added the word "manual" in front of the term "re-centering command." Second, it deleted the word "normally." The district court's definition may seem narrower than the inventors' express definition at first glance. However, the claims, the rest of the specification, and the prosecution history support the district court's definition. Therefore, this court, after reconstruing this term based on its own understanding of the claims, specification, prosecution history, and record, agrees with the district court's claim construction of the word "static."

Trading Techs. Int'l, Inc. v. eSpeed, Inc., 595 F.3d 1340, 1353-56 (Fed. Cir. 2010) (annotated)

"Source Systems" Encompass Entire Systems and System Components

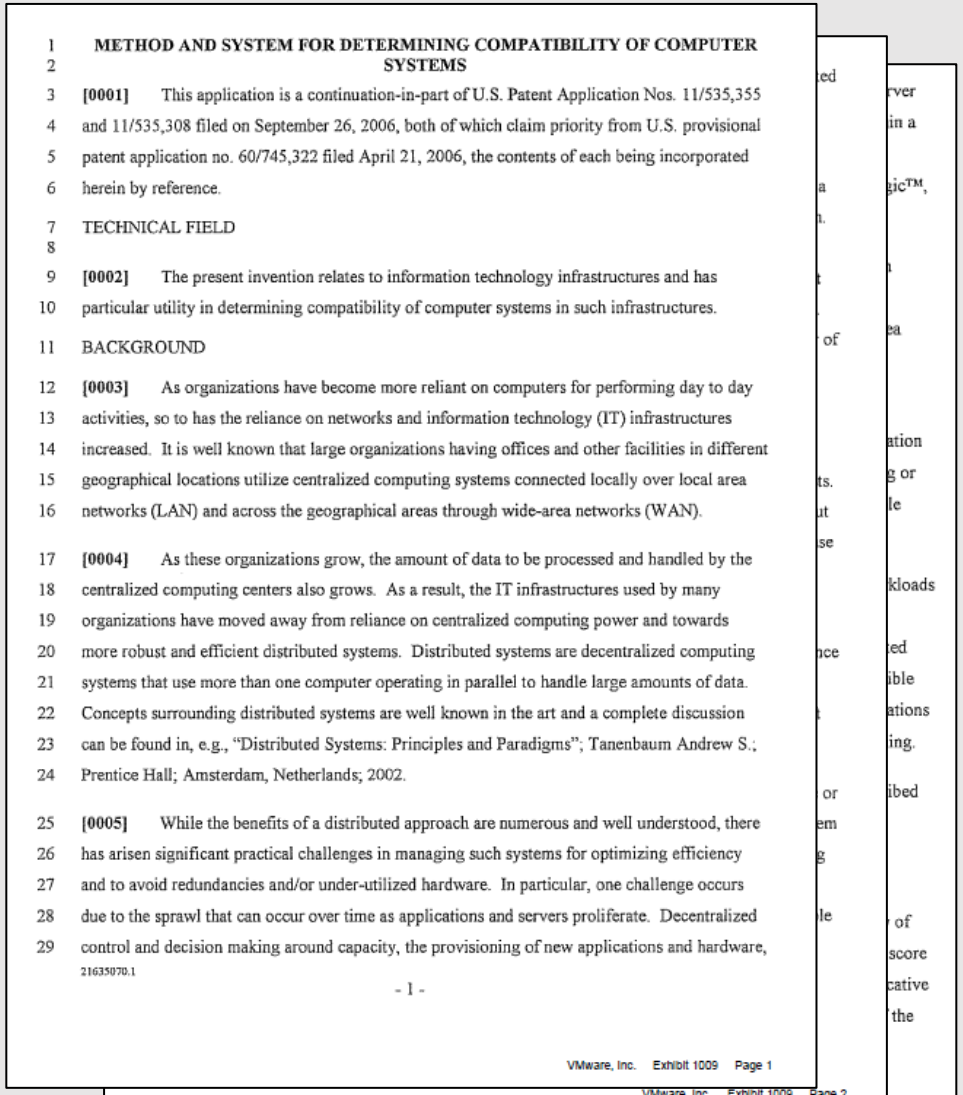
Finally, the Court agrees with Densify that ***components*** are not excluded from the scope of "source system," as the specification does not limit "source systems" to entire systems. (*See, e.g.*, '492 patent at 6:28-32) ("[A] 'system' . . . can encompass any entity [capable of being analyzed] for any type of compatibility and should not be considered limited to existing or hypothetical physical or virtual systems.")

Ex. 2005 at 12 (annotated)

Second, the parties dispute whether the "source systems" being placed should be limited to the "applications and/or data" within those source systems. A POSA would not read the specification as teaching that a "source system" is merely the applications and/or data within it. (*See id.* at 50-51) Similarly, the claim language does not foreclose placing an entire source system (and not merely its contents) on a target system. (*See id.*)

Ex. 2005 at 15 (annotated)

The ‘936 Application Describes “Already Placed” Source Systems



METHOD AND SYSTEM FOR DETERMINING COMPATIBILITY OF COMPUTER SYSTEMS

[0001] This application is a continuation-in-part of U.S. Patent Application Nos. 11/535,355 and 11/535,308 filed on September 26, 2006, both of which claim priority from U.S. provisional patent application no. 60/745,322 filed April 21, 2006, the contents of each being incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention relates to information technology infrastructures and has particular utility in determining compatibility of computer systems in such infrastructures.

BACKGROUND

[0003] As organizations have become more reliant on computers for performing day to day activities, so to has the reliance on networks and information technology (IT) infrastructures increased. It is well known that large organizations having offices and other facilities in different geographical locations utilize centralized computing systems connected locally over local area networks (LAN) and across the geographical areas through wide-area networks (WAN).

[0004] As these organizations grow, the amount of data to be processed and handled by the centralized computing centers also grows. As a result, the IT infrastructures used by many organizations have moved away from reliance on centralized computing power and towards more robust and efficient distributed systems. Distributed systems are decentralized computing systems that use more than one computer operating in parallel to handle large amounts of data. Concepts surrounding distributed systems are well known in the art and a complete discussion can be found in, e.g., “Distributed Systems: Principles and Paradigms”; Tanenbaum Andrew S.; Prentice Hall; Amsterdam, Netherlands; 2002.

[0005] While the benefits of a distributed approach are numerous and well understood, there has arisen significant practical challenges in managing such systems for optimizing efficiency and to avoid redundancies and/or under-utilized hardware. In particular, one challenge occurs due to the sprawl that can occur over time as applications and servers proliferate. Decentralized control and decision making around capacity, the provisioning of new applications and hardware,

21635070.1

- 1 -

VMware, Inc. Exhibit 1009 Page 1

VMware, Inc. Exhibit 1009 Page 2

VMware, Inc. Exhibit 1009 Page 3

"Stacked" Systems Are Examples of "Already Placed" Systems

"The Court agrees with [Patent Owner] that the specification does not limit the scope of the 'place' terms to exclude all other actions aside from 'moving,' as it additionally includes references to, for example, 'consolidating,' '***stacking***,' and 'transferring.'"

Ex. 2005 at 12 (emphasis added)

[00316] For each transfer set 23, a compatibility score is computed for each rule set 28 and workload type 30. An overall compatibility score the transfer set 23 is then derived from the individual scores. For example, consider an analysis comprised of 20 systems, 3 rule sets, 2 workload types and 5 transfer sets 23:

- Systems: S1, S2, S3, … S20
- Analyzed with rule sets: R1, R2, R3
- Analyzed with workload types: W1, W2
- Transfer sets:
  - T1 (S1, S2, S3 stacked onto S4)
  - T2 (S5, S6, S7, S8, S9 stacked onto S10)
  - T3 (S11, S12, S13 stacked onto S14)
  - T4 (S15 stacked onto S16)
  - T5 (S17 stacked onto S18)
- Unaffected systems: S19, S20

[00313] The high level process flow of the multi-dimensional compatibility analysis is illustrated in Figure 24(a). In addition to the common compatibility analysis input, this analysis takes a consolidation solution as input. In contrast to the 1-to-1 compatibility analysis that evaluates the compatibility of each system pair, this multi-dimensional compatibility analysis evaluates the compatibility of each transfer set 23 specified in the consolidation solution.

[00318] The systems 16 referenced in the transfer sets 23 of the consolidation solution correspond to the systems 16 specified in the analysis input. Typically, the consolidation solution is manually specified by the user, but may also be based on the consolidation analysis, as described later.

[00319] In addition to evaluating the compatibility of the specified transfer sets, the compatibility analysis can evaluate the incremental effect of adding other source systems (specified in the analysis input) to the specified transfer sets. From the above example consisting of systems S1 to S20, the compatibility of the source systems S5 to S20 can be individually assessed against the transfer set T1. Similarly, the compatibility of the source systems S1 to S4 and S11 to S20 can be assessed with respect to the transfer set T2.

Ex. 1009 at 49-50 (annotated)

Forward Consolidation of a Hypothetical System Involves "Already Placed" Systems

"In the Court's view, the specification's disclosure that the systems may be physical, virtual, or ***hypothetical*** is 'consistent with the express definition while providing more specificity.'"

Ex. 2005 at 11 (emphasis added)

[0082] The computer systems 16 may be physical systems, virtual systems or hypothetical models. In contrast to actual physical systems, hypothetical systems do not currently exist in the computing environment 12. Hypothetical systems can be defined and included in the analysis to evaluate various types of "what if" consolidation scenarios. Hypothetical targets can be used to simulate a case where the proposed consolidation target systems do not exist in the environment 12, e.g. for adding a system 16. Similarly, hypothetical source systems can be used to simulate the case where a new application is to be introduced into the environment 12 and "forward consolidated" onto existing target systems 16.

Ex. 1009 at 9 (emphasis added)

Forward Consolidation of a Hypothetical System Involves "Already Placed" Systems

"In the Court's view, the specification's disclosure that the systems may be physical, virtual, or ***hypothetical*** is 'consistent with the express definition while providing more specificity.'"

Ex. 2005 at 11 (emphasis added)

[0085] It will therefore be appreciated that a "system" or "computer system" hereinafter referred, can encompass any entity which is capable of being analysed for any type of compatibility and should not be considered limited to existing or hypothetical physical or virtual systems etc.

Ex. 1009 at 10 (emphasis added)

Forward Consolidation of a Hypothetical System Involves "Already Placed" Systems

"The Court agrees with [Patent Owner] that the patent does not place a temporal limit on the claimed 'source system' - that is, it ***does not exclude systems that have already been moved*** or are currently being moved."

Ex. 2005 at 12 (emphasis added)

[00345] As part of a compatibility analysis input specification, systems can be designated for consideration as a source only, as a target only or as either a source or a target. These designations serve as constraints when defining transfers in the context of a compatibility analysis. The analysis can be performed on an analysis with pre-existing source-target transfers. Analyses containing systems designated as source or target-only (and no source or target designations) are referred to as "directed analysis."

[00380] Again continuing from the above example; a consolidation analysis may be performed to search for a consolidation solution by automating the analysis of the multi-dimensional scenarios. The input screen for the consolidation analysis is shown in Figure 49. Users can specify several parameters including the minimum allowable overall compatibility score and the transfer type. As well, users can choose to keep or remove existing transfer sets before performing the consolidation analysis.

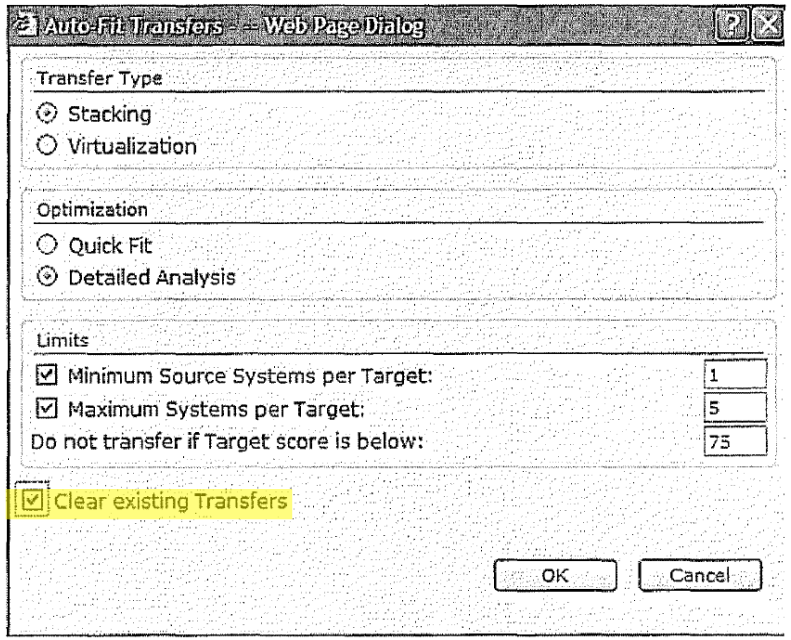


Figure 49

Ex. 1009 at 56, 63, 120 (annotated)

Evaluating the Incremental Effect of Adding a Source System to a Specified Transfer Set Involves "Already Placed" Source Systems

"The Court agrees with [Patent Owner] that the specification does not limit the scope of the 'place' terms to exclude all other actions aside from 'moving,' as it additionally includes references to, for example, 'consolidating,' '***stacking***,' and 'transferring.'" (Ex. 2005 at 14 (emphasis added)).

Ex. 2005 at 12 (emphasis added)

[00316] For each transfer set 23, a compatibility score is computed for each rule set 28 and workload type 30. An overall compatibility score the transfer set 23 is then derived from the individual scores. For example, consider an analysis comprised of 20 systems, 3 rule sets, 2 workload types and 5 transfer sets 23:

- Systems: S1, S2, S3, … S20
- Analyzed with rule sets: R1, R2, R3
- Analyzed with workload types: W1, W2
- Transfer sets:
  - T1 (S1, S2, S3 stacked onto S4)
  - T2 (S5, S6, S7, S8, S9 stacked onto S10)
  - T3 (S11, S12, S13 stacked onto S14)
  - T4 (S15 stacked onto S16)
  - T5 (S17 stacked onto S18)
- Unaffected systems: S19, S20

[00319] In addition to evaluating the compatibility of the specified transfer sets, the compatibility analysis can evaluate the incremental effect of adding other source systems (specified in the analysis input) to the specified transfer sets. From the above example consisting of systems S1 to S20, the compatibility of the source systems S5 to S20 can be individually assessed against the transfer set T1. Similarly, the compatibility of the source systems S1 to S4 and S11 to S20 can be assessed with respect to the transfer set T2.

[00325] When *stacking* multiple source entities onto a target, the source entities and targets coexist in the same operating system environment. Because of this inherent sharing, there is little flexibility in accommodating individual application requirements, and thus the target is deemed to be concrete. As such, the multi-dimensional analysis considers the N-to-1 inter-compatibility between the source entities and the target as the primary analysis mechanism, but, depending on the rule sets in use, may also consider the N-by-N intra-compatibility of the source entities amongst each other.

Ex. 1009 at 49-51 (annotated)

Using an Existing Consolidation Solution as an Input to a Compatibility Analysis Involves "Already Placed" Source Systems

[00313] The high level process flow of the multi-dimensional compatibility analysis is illustrated in Figure 24(a). In addition to the common compatibility analysis input, this analysis takes a consolidation solution as input. In contrast to the 1-to-1 compatibility analysis that evaluates the compatibility of each system pair, this multi-dimensional compatibility analysis evaluates the compatibility of each transfer set 23 specified in the consolidation solution.

[00319] In addition to evaluating the compatibility of the specified transfer sets, the compatibility analysis can evaluate the incremental effect of adding other source systems (specified in the analysis input) to the specified transfer sets. From the above example consisting of systems S1 to S20, the compatibility of the source systems S5 to S20 can be individually assessed against the transfer set T1. Similarly, the compatibility of the source systems S1 to S4 and S11 to S20 can be assessed with respect to the transfer set T2.

Ex. 1009 at 49-50 (annotated)

The '936 Application's "Auto-Fit Algorithm" Involves "Already Placed" Source Systems

"The Court agrees with [Patent Owner] that the specification does not limit the scope of the 'place' terms to exclude all other actions aside from 'moving,' as it additionally includes references to, for example, 'consolidating,' '***stacking***,' and 'transferring.'"

"The Court agrees with [Patent Owner] that the patent does not place a temporal limit on the claimed 'source system' - that is, it ***does not exclude systems that have already been moved*** or are currently being moved."

Ex. 2005 at 12, 14 (emphasis added)

[00366] The candidate transfer sets 23 are then compiled from the source-target candidates. For each target, the candidate sources are sorted in descending order and are incrementally stacked onto the target. The transfer set score is computed as each source is stacked and if the score is above the minimum allowable score, the source is added to the transfer set 23. If the score is below the minimum allowable, the source is not included in the set. This process is repeated until all the sources have been attempted or the maximum number of sources per target has been reached.

Ex. 1009 at 60 (annotated)

Analyses that Use Pre-Existing Source-Target Transfers Involve "Already Placed" Source Systems

"The Court agrees with [Patent Owner] that ***the specification does not limit the scope of the 'place' terms to exclude all other actions aside from 'moving,'*** as it additionally includes references to, for example, 'consolidating,' 'stacking,' and 'transferring.'" (Ex. 2005 at 14 (emphasis added)).

"The Court agrees with [Patent Owner] that the patent does not place a temporal limit on the claimed 'source system' - that is, it ***does not exclude systems that have already been moved*** or are currently being moved." (Ex. 2005 at 12 (emphasis added)).

Ex. 2005 at 12, 14 (emphasis added)

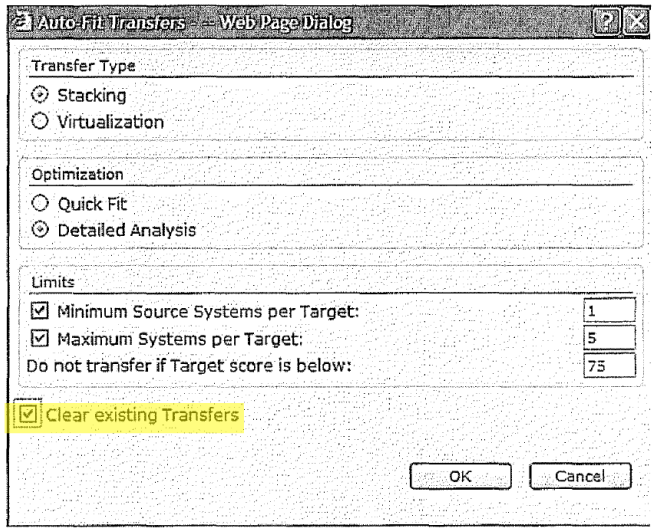


Figure 49

Ex. 1009 at 120 (annotated)

6/15/2022 Deposition of Dr. Madisetti

Dr. Madisetti (Ex. 1024 89:16 - 90:9 annotated)

"For example, Figure 49 describes different options in these transfers. It discusses in the context 19 of transfer type stacking. It also discusses things like minimum source systems for target, maximum systems for target.

So this means that you are considering -- a person of ordinary skill in the art would understand you're considering already-placed systems.

And you also have a box there called Clear Existing Transfers that also provides some insight to a person of ordinary skill as to an existing transfer, which could -- which could be under the nonlimiting example of an already-placed system.

Incremental Consolidation using 1-to-1 Compatibility Analyses Involves "Already Placed" Source Systems

[0095] The 1-to-1 compatibility analysis evaluates the compatibility of every possible source-target pair combination in the collection of systems 16 on a 1-to-1 basis. This analysis is useful in assessing single transfer consolidation candidates. In practice, it may be prudent to consolidate systems 16 incrementally and assess the impact of each transfer before proceeding with additional transfers.

Ex. 1009 at 11-12 (annotated)

OS-Level Application Stacking Involves "Already Placed" Source Systems

[0009] OS-Level application stacking involves moving the applications and data from one or more systems to the consolidated system. This can effectively replace multiple operating system instances with a single OS instance, e.g. system A running application X and system B running application Y are moved onto system C running application Z such that system C runs applications X, Y and Z, and system A and B are no longer required. This strategy is applicable to all operation system types, e.g. Windows™, Linux™, Solaris™, AIX™, HP-UX™, etc.

Ex. 1009 at 2

6/15/2022 Deposition of Dr. Madisetti

Dr. Madisetti:

So if you look at -- so if you look at Paragraph 9, so -- of Exhibit 1009 that we are looking at, that refers to the same example that I think we discussed earlier. Again, it's a nonlimiting example. Here, application Z, running on system C, is an example of a source system that was already -- it's a nonlimiting example of a source system that was already placed.

Ex. 1023 71:19-72:4 (annotated)

OS-Level Application Stacking Involves "Already Placed" Source Systems

[0009] OS-Level application stacking involves moving the applications and data from one or more systems to the consolidated system. This can effectively replace multiple operating system instances with a single OS instance, e.g. system A running application X and system B running application Y are moved onto system C running application Z such that system C runs applications X, Y and Z, and system A and B are no longer required. This strategy is applicable to all operation system types, e.g. Windows™, Linux™, Solaris™, AIX™, HP-UX™, etc.

Ex. 1009 at 2

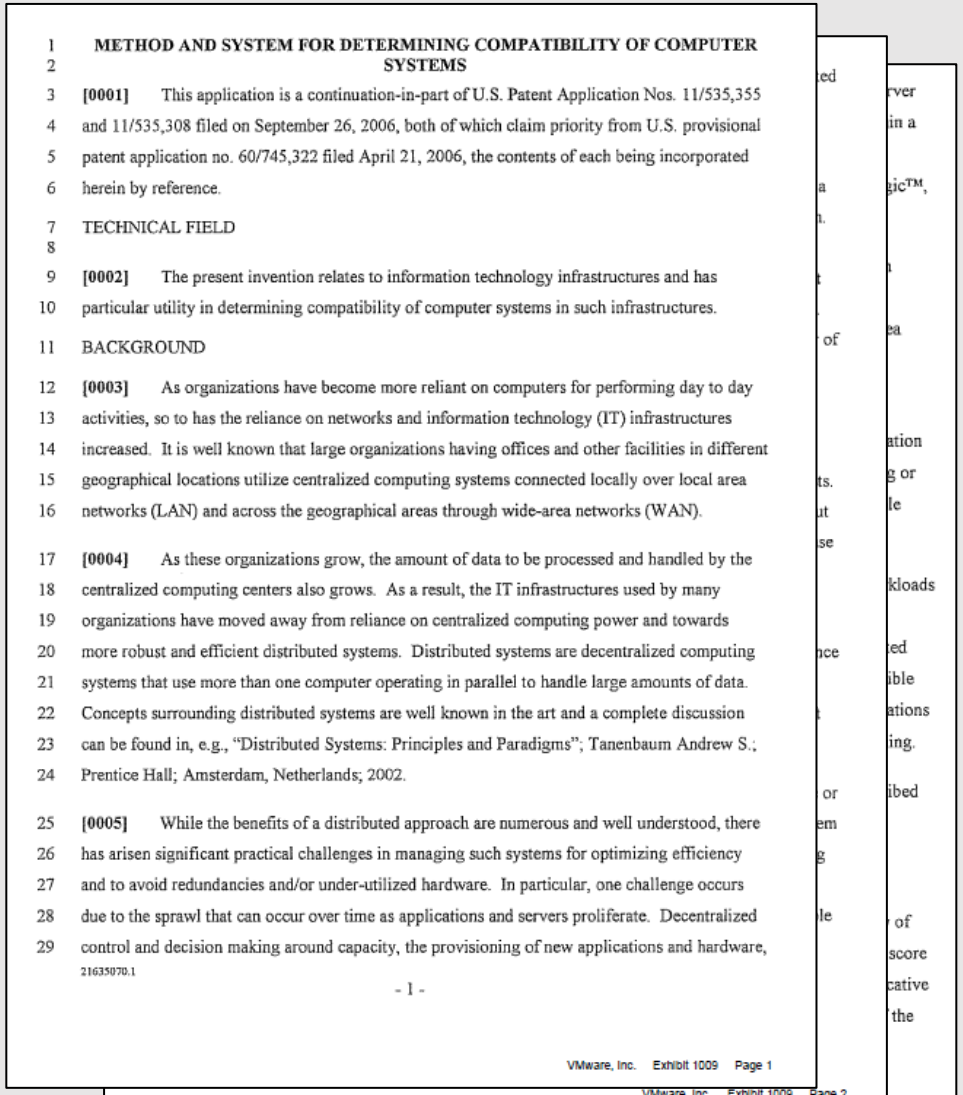
6/15/2022 Deposition of Dr. Madisetti

Dr. Madisetti:

And what is happening here is that one of these -- in this example, one of the source systems, which is Z, is already running on system C. The other two source systems, X and Y, are evaluated and then moved onto system C for this consolidated solution for stacking, again, in a nonlimiting manner.

Ex. 1023 34:15-21 (annotated)

The ’936 Application Describes “Instructions to Place”



METHOD AND SYSTEM FOR DETERMINING COMPATIBILITY OF COMPUTER SYSTEMS

[0001] This application is a continuation-in-part of U.S. Patent Application Nos. 11/535,355 and 11/535,308 filed on September 26, 2006, both of which claim priority from U.S. provisional patent application no. 60/745,322 filed April 21, 2006, the contents of each being incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention relates to information technology infrastructures and has particular utility in determining compatibility of computer systems in such infrastructures.

BACKGROUND

[0003] As organizations have become more reliant on computers for performing day to day activities, so to has the reliance on networks and information technology (IT) infrastructures increased. It is well known that large organizations having offices and other facilities in different geographical locations utilize centralized computing systems connected locally over local area networks (LAN) and across the geographical areas through wide-area networks (WAN).

[0004] As these organizations grow, the amount of data to be processed and handled by the centralized computing centers also grows. As a result, the IT infrastructures used by many organizations have moved away from reliance on centralized computing power and towards more robust and efficient distributed systems. Distributed systems are decentralized computing systems that use more than one computer operating in parallel to handle large amounts of data. Concepts surrounding distributed systems are well known in the art and a complete discussion can be found in, e.g., “Distributed Systems: Principles and Paradigms”; Tanenbaum Andrew S.; Prentice Hall; Amsterdam, Netherlands; 2002.

[0005] While the benefits of a distributed approach are numerous and well understood, there has arisen significant practical challenges in managing such systems for optimizing efficiency and to avoid redundancies and/or under-utilized hardware. In particular, one challenge occurs due to the sprawl that can occur over time as applications and servers proliferate. Decentralized control and decision making around capacity, the provisioning of new applications and hardware,

21635070.1

- 1 -

VMware, Inc. Exhibit 1009 Page 1

VMware, Inc. Exhibit 1009 Page 2

VMware, Inc. Exhibit 1009 Page 3

The ’936 Application Describes “Instructions to Place”

There is no requirement that disclosures providing §112(a) support be “distinct” for each claim element. (Sur-Reply at 19).

2. Written Description

To satisfy the written description requirement under 35 U.S.C. § 112(a), the specification must “reasonably convey[] to those skilled in the art that the inventor had possession” of the claimed invention as of the filing date. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). An adequate description does not require any particular form of disclosure or that the specification recite the claimed invention *in haec verba*, but must do more than render the claimed invention obvious. *Id.* at 1352. In evaluating the adequacy of the disclosure, a court may

Institution Decision at 13 (annotated)

"Instructions" Are Not Limited to Any Particular Type of Instruction

The claims recite:

The invention claimed is:

1. A system for determining placement of source computer systems on target computer systems, the system configured to execute operations causing the system to:

.
.
.

issue instructions to place the at least one source system on the at least one target system in accordance with the determined placement.

Ex. 1001 at 78

The claims do not recite:

- "instructions that the chosen transfers be carried out"
- "instructions. . . to implement the analytical results"
- "directives"

(Reply at 20-21)

Patent Owner's Expert Testimony Supports Patent Owner's Position

6/15/2022 Deposition of Dr. Madisetti (Ex. 1023 at 66:16-23 (annotated))

16 **Q** [The issue instructions limitation] requires applying the determined
17 placement, correct?
18 **A** Again, that's not in the claim language.
19 It just says issue instructions. It doesn't say
20 anything about applying. It does not say any
21 requirement, other than what's in the claim, just
22 issue an instruction in accordance with the
23 determined placement. That's it.

"Actual Transfers" Instruct which Source Is Placed on which Target and How

The claims recite:

The invention claimed is:

1. A system for determining placement of source computer systems on target computer systems, the system configured to execute operations causing the system to:

.
.
.

issue instructions to place the at least one source system on the at least one target system in accordance with the determined placement.

Ex. 1001 at 78

The '936 application discloses:

- "***Figure 52*** is an example of a set of instructions that specify which source is placed on which target, in the same way that the wedding couple's notecards or list of table assignments are instructions on where to sit." (Sur-Reply at 22).
- "Figure 52 provides a list of ***actual transfers*** proposed by the consolidation analysis, derived from the broader consolidation solution exemplified by Figure 50." (Id.)

The ’936 Application Describes “Instructions to Place”

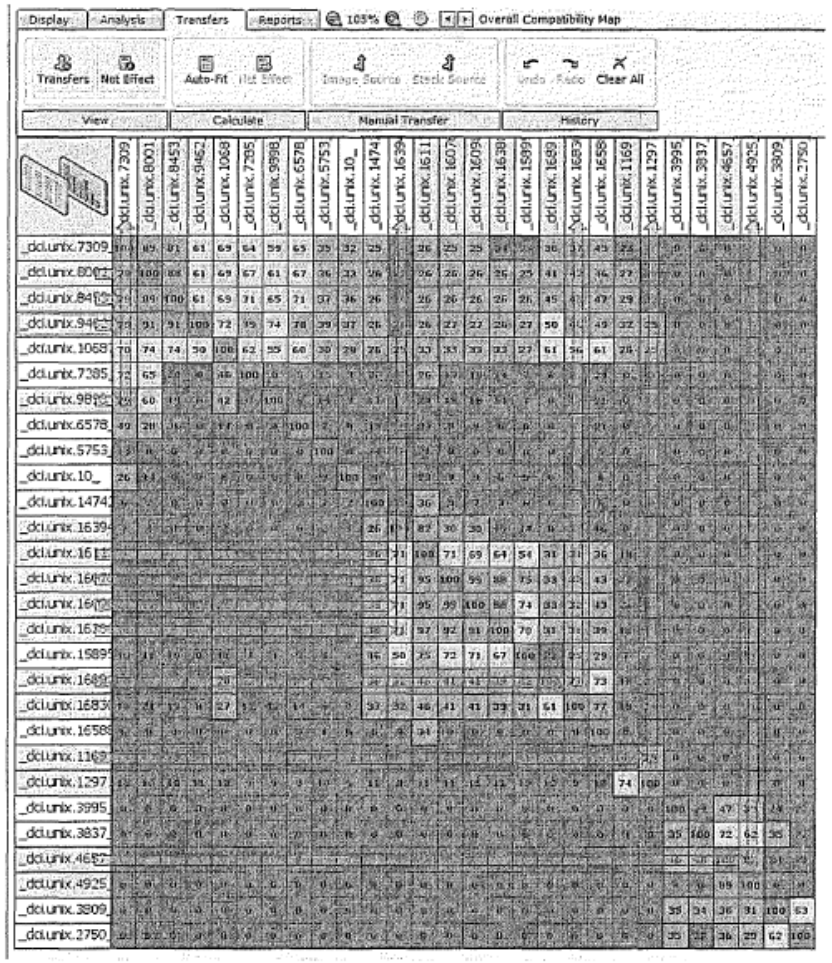


Figure 50

Transfers

Source	Transfer	Target
dci.unix.9898	Stacks onto	_dci.unix.7309_
dci.unix.8453	Stacks onto	_dci.unix.7309_
dci.unix.9462	Stacks onto	_dci.unix.7309_
dci.unix.8001	Stacks onto	_dci.unix.7309_
dci.unix.16113	Stacks onto	_dci.unix.16394_
dci.unix.16096	Stacks onto	_dci.unix.16394_
dci.unix.16380	Stacks onto	_dci.unix.16394_
dci.unix.16078	Stacks onto	_dci.unix.16394_
dci.unix.4657	Stacks onto	_dci.unix.4925_
dci.unix.16891	Stacks onto	_dci.unix.16830_
dci.unix.11691	Stacks onto	_dci.unix.12971_

Figure 52

Ex. 1009 at 122-123

"Actual Transfers" Instruct which Source Is Placed on which Target and How

Once specified, the consolidation analysis can be executed and the chosen transfer sets **23** are presented in the map as shown in FIG. **50**. The multi-dimensional compatibility score calculations are also used. Finally, a consolidation summary is provided as shown in FIGS. **51** and **52**. FIG. **51** shows that should the proposed transfers be applied, 28 systems would be consolidated to 17 systems, resulting in a 39% reduction of systems. FIG. **52** lists the actual transfers proposed by the consolidation analysis.

Ex. 1001 at 78 (39:5-13) (annotated)
See Ex. 100 at 63 ([0381])

[0086] Consolidation as described above can be considered to include one or more "transfers". The actual transfer describes the movement of a single source entity onto a target, wherein the specification identifies the source, target and transfer type. The transfer type (or consolidation strategy) describes how a source entity is transferred onto a target, e.g. virtualization, OS stacking etc.

Ex. 1009 at 10 (annotated)

Transfers

Source	Transfer	Target
dci.unix.9898	Stacks onto	_dci.unix.7309_
dci.unix.8453	Stacks onto	_dci.unix.7309_
dci.unix.9462	Stacks onto	_dci.unix.7309_
dci.unix.8001	Stacks onto	_dci.unix.7309_
dci.unix.16113	Stacks onto	_dci.unix.16394_
dci.unix.16098	Stacks onto	_dci.unix.16394_
dci.unix.16380	Stacks onto	_dci.unix.16394_
dci.unix.16078	Stacks onto	_dci.unix.16394_
dci.unix.4657	Stacks onto	_dci.unix.4925_
dci.unix.16891	Stacks onto	_dci.unix.16830_
dci.unix.11691	Stacks onto	_dci.unix.12971_

Figure 52

Ex. 1009 at 123

The ’936 Application Discloses Other Types of Instructions

6/15/2022 Deposition of Dr. Madisetti

Q Using your example in Column 5, what is -- what would to place refer to here?
A Place refer to here. We are referring to issuing instructions, right?
Q Uh-huh.
A So in this claim there is the specific limitation called issue instructions to place the at-least-one source system on the at-least-one target system.
An example of -- again, a nonlimiting example of how the '459 specification issues such instructions could be that -- again, one nonlimiting way could be to -- Column 3, for example, Lines 34 through 35, it could be to initiate a transfer. That could be one nonlimiting way that could be an example of issuing instructions.

Ex. 1023 59:3-18 (annotated)

Q And, in your opinion, could these instructions be for a computer program that performs the transfers?
A Again, whether it's direct or indirect, whether it's direct instructions, indirect instructions, I mean, all these are possible and I have to look at the context of the exact system, exact analysis and the exact scenario and how particular implementations are there.
But the correct answer is it could, in a nonlimiting manner. Again, it depends on the system and the context.

Ex. 1023 65:9-20 (annotated)

The Board Must Issue A Final Written Decision

"If a post-grant review is instituted and not dismissed under this chapter, the Patent Trial and Appeal Board ***shall issue a final written decision*** with respect to the patentability of any patent claim challenged by the petitioner and any new claim added under section 326(d)." 35 U.S.C. § 328(a) (emphasis added).

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **PATENT OWNER'S DEMONSTRATIVE EXHIBIT** was filed and served on September 12, 2022, via electronic mail to VMware-Cirba-IPR@mofo.com, as agreed to by counsel, upon the following counsel for Patent Owner:

Alex S. Yap
ayap@mofo.com
Mehran Arjomand
marjomand@mofo.com
MORRISON & FOERSTER LLP
707 Wilshire Boulevard
Los Angeles, CA 90017-3542

Diek O. Van Nort
dvannort@mofo.com
Richard S.J. Hung
rhung@mofo.com
Matthew I. Kreeger
mkreeger@mofo.com
MORRISON & FOERSTER LLP
425 Market Street
San Francisco, CA 94105-2482

Stephen Liu
sliu@mofo.com
MORRISON & FOERSTER LLP
755 Page Mill Road
Palo Alto, CA 94304-1018

Dated: September 12, 2022

/Philip J. Eklem/
Philip J. Eklem
PTO Reg. No. 76,490