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Application Number	Not Yet Assigned
Filing Date	Herewith
First Named Inventor	Glenn Coleman
Title	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	LCOM_ENT_Collab_US01

SIGNATURE of Applicant or Patent Practitioner

Signature	/Benjamin Chalfin/	Date (Optional)	2018-09-25
Name	Benjamin Chalfin	Registration Number	74,181
Title (if Applicant is a juristic entity)	Patent Practitioner		
Applicant Name (if Applicant is a juristic entity)	L3 Technologies, Inc.		

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☑ *Total of 1 forms are submitted.

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PAN EX1002
Palo Alto Networks v. Croga Innovations
IPR2024-01421

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I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

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☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 15027

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I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

L3 Technologies, Inc.

☐ Inventor or Joint Inventor (title not required below)

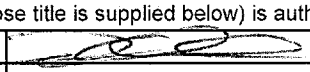
☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

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SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	7-27-17
Name	Donald L. Letizia		
Title	VP, General Counsel CSG		

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DOCKET NO.: LCOM_ENT_Collab_US01 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
L3 Technologies, Inc.

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AUTHORIZATION TO TREAT A REPLY AS INCORPORATING AN EXTENSION OF TIME UNDER C.F.R. § 1.136(a)(3)

Sir/Madame:

The Commissioner is hereby requested to grant an extension of time for the appropriate length of time, should one be necessary, in connection with this filing or any further filing submitted to the U.S. Patent and Trademark Office in the above-identified application during the pendency of this application. The Commissioner is further authorized to charge any fees related to any such extension of time to Deposit Account No. 50-5519.

Date: September 25, 2018

/Benjamin Chalfin/
Name: Benjamin Chalfin
Registration No.: 74,181

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Filer:	Benjamin S. Chalfin/MELISSA OVERLINE
Attorney Docket Number:	LCOM_ENT_Collab_US01

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1720**

Electronic Acknowledgement Receipt

EFS ID:	33824771
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	15027
Filer:	Benjamin S. Chalfin/MELISSA OVERLINE
Filer Authorized By:	Benjamin S. Chalfin
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	25-SEP-2018
Filing Date:	
Time Stamp:	17:12:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1720
RAM confirmation Number	092618INTEFSW17135700
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		LCOM_ENT_Collab_US01_AS_FILED_Specification.pdf	215221 dc5544670a1708078017beee315da52c2b78efa5	yes	33

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Abstract	33	33
	Claims	29	32
	Specification	1	28

Warnings:					
Information:					
2	Drawings-only black and white line drawings	LCOM_ENT_Collab_US01_AS_FILED_Drawings.pdf	294925 dce1500510fdb7c45597e7dcb5a82c0262e60127	no	4
Warnings:					
Information:					
3	Application Data Sheet	LCOM_ENT_Collab_US01_AS_FILED_ADS.pdf	102708 cdb8a027e0fadfec6a86f8ec1513d78e71bd19f8	no	9
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4	Oath or Declaration filed	LCOM_ENT_Collab_US01_AS_FILED_Executed_Declarations.pdf	329544 62a3e49df25fe928a38aee0d2fd1444d835adcb6	no	3
Warnings:					
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5	Power of Attorney	LCOM_ENT_Collab_US01_AS_FILED_POA.pdf	240491 59bfafd8f2470bad69bff20385f44db7a170ff96	no	2
Warnings:					
Information:					
6	Authorization for Extension of Time all replies	LCOM_ENT_Collab_US01_AS_FILED_EOT_Authorization.pdf	69722 0317539bf60bc9bb917c5f1550f5a210ebad37d7	no	1
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	34897 a292da715c26361059664ffb0692dfe8a1dfbe67	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	1287508	

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

ABSTRACT

Methods and systems are disclosed for isolation of collaboration software on a host computer system. A networked computer system may include a network, a first host computer system, a border firewall and/or a web proxy. The host computer system may be configured to run a collaboration software application or process that enables interaction with one or more other host computer systems. The collaboration software application or process may be run within an untrusted memory space. The collaboration software application or process may enable interaction between a second host computer system and the untrusted memory space such that the second host computer system may access meeting data within a sandboxed computing environment operating within the untrusted memory space.

CLAIMS

What Is Claimed:

1. A host computer system comprising a processor and memory, the processor configured to:

implement a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implement an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolate the isolated computing environment from the workspace using an internal isolation firewall; and

communicate data associated with the multi-user interactive software application with at least one untrusted destination via a proxy device, wherein the multi-user interactive software application is unable to communicate the data until the isolated computing environment has authenticated with an authentication device.

2. The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote machine to control one or more of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the one or more application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process.

3. The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the host computer system.

4. The system of claim 1, wherein the host computer system is connected to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

5. The system of claim 4, wherein the processor is further configured to implement a host-based firewall, the host based-firewall being configured to isolate the host computer system from communicating with one or more other devices on the network.

6. The system of claim 5, wherein the host-based firewall is configured to block incoming communications from the network that are sent to the workspace.

7. The system of claim 4, wherein the processor is further configured to run one or more trusted applications in the first memory space, and wherein the trusted applications are configured to communicate with one or more trusted machines via the network.

8. The system of claim 1, wherein the internal isolation firewall is further configured to prompt a user of the host computer system to allow communication between the first memory space and the second memory space.

9. A method comprising:

implementing a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implementing an isolated computed environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolating the isolated computing environment from the workspace using an internal isolation firewall; and

communicating data associated with the multi-user interactive software application with at least one untrusted destination via a proxy device, wherein the multi-user interactive software application is unable to communicate the data until the isolated computing environment has authenticated with an authentication device.

10. The method of claim 9, wherein the multi-user interactive software application is configured to allow a remote machine to control one or more of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the one or more application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process.

11. The method of claim 9, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the isolated computing environment.

12. The method of claim 9, further comprising connecting to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

13. The method of claim 12, further comprising implementing a host-based firewall, the host based-firewall being configured to isolate the first memory space and the second memory space from communicating with one or more devices on the network.

14. The method of claim 13, wherein the host-based firewall is configured to block incoming communications from the network that are sent to the workspace.

15. The method of claim 12, further comprising running one or more trusted applications in the first memory space, wherein the trusted applications are configured to communicate with one or more trusted machines via the network.

16. The method of claim 9, wherein the internal isolation firewall is further configured to prompt a user of the workspace to allow communication between the first memory space and the second memory space.

17. A system comprising:

a network;

an authentication device;

a first computer configured to connect to the network, the first computer comprising a first processor and a first memory, wherein the first processor is configured to:

implement a first workspace, wherein the first workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implement a first isolated computing environment, the first isolated computing environment being configured to enable operation of a second set of

one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application; and

isolate the first isolated computing environment from the first workspace using a first internal isolation firewall; and

a second computer configured to connect to the first computer via the network, the second computer comprising a second processor and a second memory, wherein the second processor is configured to:

implement a second workspace, wherein the second workspace is configured to enable operation of a third set of one or more applications or processes via a third memory space;

implement a second isolated computing environment, the second isolated computing environment being configured to enable operation of a fourth set of one or more applications or processes via a fourth memory space, wherein the fourth set of one or more applications or processes comprises a multi-user interactive software application; and

isolate the second isolated computing environment from the second workspace using a second internal isolation firewall;

wherein the first computer and the second computer are configured to communicate data associated with the multi-user interactive software application via a proxy device, and wherein the multi-user interactive software application is unable to communicate the data until the first isolated computing environment and the second isolated computing environment have authenticated with the authentication device.

NETWORK ISOLATION FOR COLLABORATION SOFTWARE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application Serial No. 62/564,371, filed September 28, 2017, the contents of which are incorporated by reference herein.

BACKGROUND

[0002] The Internet provides access to a large number of systems from which beneficial and/or harmful data may be retrieved by a host computer system attached to and communicating over the Internet. Harmful data that can be accessed through the Internet includes a variety of viral software constructs, generally referred to as malicious software or malware. Malware may be downloaded to a host computer system unintentionally, for example, by and/or without the knowledge of the user of the host computer system.

[0003] A host computer system that has downloaded malware may be referred to as an infected host computer system. An infected host computer system may result in possible security losses, reduction of efficiency, and/or malfunctions. Security losses may include, but are not limited to, the loss of some or all data that is accessible by the infected host computer system, the installation of additional malware onto the infected host computer system, and/or the loss of command and control of the infected host computer system. Reduction of efficiency may be incurred from, but not limited to, additional processor demand, additional memory usage, and/or additional network access by the executing malware

[0004] The security and privacy of the user of the infected host computer system may be compromised by malware. Both information located on the infected host computer system and/or information stored on or communicated via a local area network may be susceptible to attack by the malware. In many instances, an infected host computer may be used by the malware as a vehicle to stage an attack on other network resources that are accessible from the

infected host computer system. Such an attack method is often undetected by the user of the host computer system and/or network administrators.

[0005] An infected host computer system may lose command and control. The loss of command and control of the infected host computer system may include performing one or more actions the author of the downloaded malware may desire. For example, the malware may perform a reconnaissance of the infected host computer system, determine system privileges, access local files, access security tokens, and/or attempt infection or access of other network resources accessible from the infected computer system

SUMMARY OF THE INVENTION

[0006] Methods and systems are disclosed for isolation of multi-user interactive software (e.g., collaboration software) on a host computer system. A host computer system may include a processor and a memory. The host computer system may include a workspace. One or more applications may run in the workspace via a first memory space (e.g., a trusted memory space). The host computer system may include an isolated computing environment. The isolated computing environment may be isolated from the workspace by an internal isolation firewall. The internal isolation firewall may prevent communication between the isolated computing environment and the workspace. The internal isolation firewall may allow communication between the isolated computing environment and the workspace if, for example, the user of the host computer system allows the communication. The host computer system may prompt the user to allow the communication.

[0007] One or more isolated applications may run in the isolated computing environment via a second memory space. The isolated applications may have access to one or more Internet destinations (e.g., untrusted Internet destinations), The isolated applications may communicate with the Internet destinations via an authentication device. For example, the authentication device may prevent the multi-user interactive software application from communicating with the Internet destinations until after the isolated computing environment has authenticated with the authentication device.

[0008] The isolated applications may include a multi-user interactive software application. A multi-user interactive software application may be an application that allows one or more remote machines to control (e.g., access, view, interact with, download from, upload to, and/or modify) an application running on the host computer system. For example, the multi-user interactive software application may allow the remote machines to view a display of the host computer

system (e.g., for a presentation or screen-sharing). The multi-user interactive software application may allow the remote machine to control the host computer system by allowing the remote machines to control a pointer device, a keyboard input, and/or a display of the host computer system.

[0009] The host computer system may be configured to connect to a network. For example, the network may be a local area network (LAN), a wide area network (a WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, and/or a satellite network. The host computer system may be connected to multiple networks at the same time. For example, the host computer system may be simultaneously connected to a Wi-Fi network and a LAN. The host computer system may run one or more trusted applications in the workspace. The trusted applications may be configured to communicate with one or more trusted machines via the network.

[0010] The host computer system may include a host-based firewall. The host-based firewall may be configured to isolate the host computer system from communicating with one or more devices on the network. The host-based firewall may allow the host computer system to communicate with, for example, one or more predetermined network devices using one or more predetermined ports. The host-based firewall may block incoming communications that are sent to the workspace from the network.

[0011] A networked computer system may include a network, a first host computer system, a border firewall and/or a web proxy. The host computer system may include a processor and memory. The network may include one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, an ad-hoc network, a satellite network, a cable modem network, and/or the like. The networked computer system may be configured to implement network isolation between one or more untrusted network destinations and the first host computer system. The network isolation may be implemented via one or more of a host-based firewall on the first host computer system, a border firewall around a portion of the network that includes the first host computer system, a web proxy, an internal isolation firewall on the host computer system, and/or a segregation of a trusted memory space and an untrusted memory space.

[0012] The first host computer system may be configured to run a collaboration software application or process that enables interaction with one or more other host computer systems. The collaboration software application or process may be run within the untrusted memory space. The collaboration software application or process may enable interaction between a

second host computer system and the untrusted memory space such that the second host computer system may access meeting data within a sandboxed computing environment operating within the untrusted memory space. The collaboration software application or process may allow the second host computer system to control the pointer device within the sandboxed computing environment of the first host computer system.

[0013] The collaboration software application or process may be configured to allow the second host computer system to control a keyboard input within the sandboxed computing environment of the first host computer system. The collaboration software application or process may be configured to allow the second host computer system to cut and paste data within the sandboxed computing environment of the first host computer system. The collaboration software application or process may be configured to allow the second host computer system to transfer one or more files to and/or from the sandboxed computing environment of the first host computer system.

[0014] The host-based firewall may be configured to prevent lateral communication and movement of malware between the first host computer system and other devices on the networked computer system. The web proxy may be configured to prevent unauthorized communication between the first host computer system and the one or more untrusted network destinations. The segregation of the trusted memory space and the untrusted memory space may be enforced by the internal isolation firewall. The first host computer system may be configured to run one or more applications or processes in the trusted memory space that are configured to communicate with one or more trusted devices. The trusted memory space may be a first memory space.

[0015] The first host computer system may be configured to enable a plurality of sandboxed computing environments and/or untrusted memory spaces. For example, a first sandboxed computing environment may be configured to enable operation of a collaboration software application. The first sandboxed computing environment may operate within a second memory space. A second sandboxed computing environment may be configured to enable operation of a browser program. The second sandboxed computing environment may operate within a third memory space. The second memory space and the third memory space may be separate untrusted memory spaces.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 depicts an example host computer system.

[0017] FIG. 2 depicts an example host computer system configured to participate in a software based meeting with one or more other host computer systems, the example host computer system using a sandbox based network isolation system.

[0018] FIG. 3 depicts another example host computer system configured to participate in a software based meeting with one or more other host computer systems, the example host computer system using a sandbox based network isolation system.

[0019] FIG. 4 depicts an example host computer system configured to enable separate sandboxed computing environments, the example host computer system using a sandbox based network isolation system.

DETAILED DESCRIPTION

[0020] Systems and methods are disclosed for isolation of collaboration software on a host computer system. Isolation of collaboration software may protect the host computer system from collaboration software-based interactions that may bypass other network security controls. For example, isolation of collaboration software may protect the host computer system from one or more of command and control infection, data exfiltration, or general automated infection that can occur from communicating with one or more trusted or untrusted devices via collaboration software. A host computer system may initiate collaboration software to securely browse, access, share data, and/or communicate with untrusted network destinations, including but not limited to resources accessible via the Internet. The host computer system may be a laptop computer, a mobile phone, a tablet, *etc.* The host computer system may be connected to a network (*e.g.*, a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, an ad-hoc network, a satellite network, a cable modem network, *etc.*). The host computer system may be a physical machine, a virtual machine, or a combination thereof. The isolation may be enforced via the host computer system itself and/or via one or more network entities located within the network.

[0021] Systems and methods are described to provide a layer of communication isolation between collaboration software applications and untrusted network destinations in order to prevent malware from effectively exfiltrating data from the host computer system and/or establishing command and control channels with an attacker resources in order to attempt to gain control of the host computer system. The host computer system may isolate the collaboration software from other applications and/or processes operating on the computer system. The

collaboration software may be implemented using software that is commercially available, for example, such as WebEx, GoToMeeting, *etc.*

[0022] The terms "collaboration software" and "multi-user interactive software" may be used interchangeably herein. For example, they may refer to software that, when run in an application on a host machine, allows a remote machine to control the host machine via a network (e.g., the Internet). Multi-user interactive software applications may allow information (e.g., files, data objects, etc.) to be transferred from the remote machine to the host machine and vice versa. Examples of collaboration or multi-user software may include screen sharing applications, collaborative meeting applications, remote desktop applications, gaming applications, shared document application, file sharing applications, and/or the like.

[0023] Internet isolation, or also known herein as communication isolation may be provided via untrusted memory space segregation. The host computer system may have a sandbox protected application or process and/or an internal isolation firewall running thereon. For example, collaboration software may wholly or partially be contained in a sandboxed computing environment (e.g., an isolated computing environment). As another example, a collaboration software application may instantiate its own sandboxed computing environment, firewall, and/or untrusted memory space. The host computer system may enable use of collaboration software via a web browser and/or a specific collaboration software application. For example, one or more plugins may installed in a web browser to enable use of the collaboration software and/or features. Other isolation methods such as operating the collaboration software applications within a virtual machine may be used.

[0024] The sandbox protected application or process may operate within a sandboxed computing environment. The sandboxed computing environment may include resources (*e.g.*, a limited set of resources) allocated for operation of a sandbox container process. The sandboxed computing environment may be enforced via the sandbox container process. The sandbox container process may be a security mechanism used to separate the sandboxed computing environment from other applications and/or processes that may be running on a workspace of the host computer system. The sandboxed container process may be configured to enable one or more applications and/or processes (*e.g.*, such as a collaboration software application and/or process) being executed within the sandboxed computing environment to access the resources allocated for operation of the sandbox container process. For example, the one or more applications and/or processes being operated within the sandboxed computing environment may be allowed to access memory associated with the sandboxed computing environment. The

memory associated with the sandboxed computing environment may be separate from memory that is configured to enable storage and operation of the workspace.

[0025] The terms "sandboxed computing environment" and "isolated computing environment" may be used interchangeably herein. For example, they may refer to a memory space that is isolated (e.g., by use of an internal isolation firewall) from another memory space (e.g., a workspace). Applications running in the isolated computing environment may be able to interact with one or more Internet resources, for example via one or more proxy servers and/or authentication devices. An isolated computing environment may be implemented using a sandbox container and/or other isolation techniques such as a virtual machine.

[0026] The workspace may include one or more processes operating within the operating system that are not restricted by the sandbox container process. The operating system of the host computer system may include a set of resources configured to enable operation of the workspace and the sandbox container process.

[0027] The sandbox container process may have access to one or more operating system and/or kernel processes in order to enforce isolation between the workspace associated with the first memory space and the sandboxed computing environment associated with the second memory space. For example, the isolation of the workspace from the sandboxed computing environment may be enforced by an internal isolation firewall. The sandbox container process may enforce the segregation using techniques such as namespace isolation such that processes running in the sandboxed computing environment in the second memory space are restricted from accessing the first memory space including the workspace (*e.g.*, and vice versa). The sandbox container process may restrict access to certain resources by processes running in the sandboxed computing environment. The sandboxed container process may allow the workspace and the sandboxed computing environment to share access to the host operating system and host operating resources (e.g., including the kernel and libraries) while enforcing the segregation of the memory spaces access by the workspace and the sandboxed computing environment. In this manner, the sandbox container process may permit isolation of the sandboxed computing environment without requiring the sandboxed computing environment to boot a separate operating system, load separate libraries, *etc.*, which would require separate private memory for those files.

[0028] The one or more processes or applications operating within the sandboxed computing environment may be permitted to access untrusted network destinations via an intermediate connection device. The intermediate connection device may be a web proxy and/or an authentication device, for example. The isolated computing environment may be required to

authenticate with the intermediate connection device in order for applications running in the isolated computing environment to communicate with the untrusted network destinations. For example, the multi-user interactive software application may be unable to communicate data until after the isolated computing environment has authenticated with the intermediate connection device.

[0029] The one or more processes or applications operating within the sandboxed computing environment may connect to the untrusted network destinations as a dedicated network interface device with using a specific Internet Protocol (IP) address. The one or more processes or applications operating within the sandboxed computing environment may be referred to as sandboxed processes or applications. The host computer system may maintain a list of untrusted network destinations and/or a list of trusted network destinations. The list of trusted network destinations may be a whitelist. The list of untrusted network destinations may be a blacklist. The whitelist and the blacklist may be refined based on username and/or machine identification (ID). For example, the lists of trusted and untrusted network destinations may be different for different users and/or machines associated with a respective network. The whitelist and/or the blacklist may be associated with one or more access levels. For example, a first whitelist and a first blacklist may be assigned to a first access level. An untrusted network destination may be an untrusted resource, an untrusted device, an untrusted website, and/or the like. Since the untrusted network destinations may be sources of malware, the one or more processes or applications operating within the sandboxed computing environment may be allowed to communicate with the untrusted network destination(s), but other communication from the host computer system (*e.g.*, communications originating from outside the sandboxed computing environment such as from within the workspace) to the untrusted network destination(s) may be prevented.

[0030] Communication isolation may be provided via a host-based firewall. The host-based firewall may be configured to prevent unauthorized communication between applications and/or processes operating in the workspace of the host computer system to other devices on the network over which the host computer is communicating. The host-based firewall may be configured to block incoming communications to the workspace of the host computer system, except for predetermined trusted devices and/or predetermined network ports. The host-based firewall may allow outgoing communications to be sent from a process in the workspace to a non-web-based (*e.g.*, LAN destination).

[0031] Communication isolation may be provided via an internal isolation firewall. The internal isolation firewall may enable separation between the sandboxed computing environment

and the workspace. The applications and/or processes operating within the sandboxed computing environment may be prevented from access any additional resources of the host computer system or may be prevented from access any additional resources of the host computer system without explicit user action. For example, the internal isolation firewall may generate a command prompt that enables a user selection if an application and/or process operating within the sandboxed computing environment is requesting access to resources outside of the sandbox memory space. By prompting the user to confirm that the applications and/or processes operating within the sandboxed computing environment are permitted to access additional resources outside the sandbox memory space, malware that is designed to attempt to remain transparent to the user may be limited to operation within the sandboxed computing environment. Thus, the malware within the sandboxed computing environment may be unable to access other resources available to the host system generally, such as local area networks and secure memory regions.

[0032] The internal isolation firewall may allow certain actions to be performed with approval of the user of the host system. For example, the internal isolation firewall may prompt the user to allow communication between the workspace and the isolated computing environment. For example, an application and/or process operating within the sandboxed computing environment may be allowed access to the host system to perform one or more of a cut or copy of data, a paste of data, a printing of data to a local printer, a file transfer, and/or the like. The host computer system may prevent one or more other transfers of data between the sandboxed computing environment and the workspace except those user initiated actions described herein. For example, the sandbox container process may prevent unauthorized data transfers between the sandboxed computing environment and the workspace.

[0033] FIG. 1 illustrates an example of a host computer system that may implement one or more applications in a sandboxed environment. For example, a Host Computer System 10 may include one or more Processor(s) 12, Memory 14, one or more Input and/or Output (I/O) Devices 16, and one or more Network Interface Adapter(s) 18. Generally, the Host Computer System 10 may be any computing device capable of communicating over a network and/or performing processing tasks. Although the examples set forth herein may be described in terms general purpose computing workstations, the systems and methods disclosed herein may be equally applicable to any computing device or communication device for which internet isolation is desired. For example, the systems and methods disclosed herein may be applicable for providing sandbox based internet isolation for cell phones, pagers, personal computers (PCs), laptops,

vehicles, kiosks, facilities, servers, workstations, tablets, smartphones, routers, controllers, microcontrollers, and/or any other processing and/or communication device.

[0034] Processor(s) 12 may include one or more of a general purpose processor, a special purpose processor, a conventional processor, a digital signal processor (DSP), a plurality of microprocessors, one or more microprocessors in association with a DSP core, a controller, a microcontroller, Application Specific Integrated Circuits (ASICs), Field Programmable Gate Array (FPGA) circuits, any other type of integrated circuit (IC), a state machine, and/or the like. The Processor(s) 12 may perform data processing, input/output processing, instantiate operating system(s), execute application(s), and/or any other functionality that enables the use of sandbox isolation of one or more applications and/or processes.

[0035] Memory 14 may include volatile and/or non-volatile memory. Memory 14 may include read-only memory (ROM), random access memory (RAM), a register, cache memory, semiconductor memory devices, magnetic media such as, but not limited to, internal hard disks and removable disks, magneto-optical media, and/or optical media such as CD-ROM disks, and/or digital versatile disks (DVDs), and/or the like. Memory 14 may be configured to store computer readable instructions that when implemented by Processor(s) 12 may cause Processor(s) 12 to implement one or more of the functions or procedures described herein. For example, Memory 14 may be configured to store software code implemented by Processor(s) 12 that instantiate a restricted operating system environment for operation of the sandboxed browser and/or other sandboxed applications(s) and/or process(es). The software may restrict sandbox-based access to one more file descriptors, memory, file system space, etc. For example, the applications and/or processes operating within the sandboxed computing environment may be permitted to certain portions of Memory 14 but may not be allowed access to other portions of Memory 14. As an example, Memory 14 may be partitioned into a first memory space and a second memory space. The first memory space may be configured to enable storage and/or operation of a workspace configured to execute a first set of one or more applications and/or processes running on the operating system of the Host Computer System 10. The second memory space may be configured to enable storage and/or operation of a second set of one or more applications and/or processes running within the sandboxed computing environment. The sandboxed computing environment may be enforced via a sandbox container process. The sandbox container process may segregate the workspace associated with the first memory space from the sandboxed computing environment associated with the second memory space. For example, the sandbox container process may include an internal isolation firewall. The internal isolation firewall may enforce the segregation of the first and second memory spaces.

[0036] The Host Computer System 10 may include I/O Device(s) 16. The I/O Devices 16 may include one or more of a monitor, keyboard, mouse, touchscreen interface, digital camera, a digital display, a graphical user interface, and/or the like. The I/O Device(s) 16 can allow user interaction with the Host Computer System 10, for example to allow certain interactions between an application or a process operating within the sandboxed computing environment and non-sandboxed resources.

[0037] The Network Interface Adapter(s) 18 may be configured to allow communication between the Host Computer System 10 and other devices. The Network Interface Adapter(s) 18 may include one or more wired and/or wireless communication devices.

[0038] The sandbox container process may be configured to protect the host computer system from one or more malware toolsets. For example, the Network Interface Adapter(s) 18 may include one or more of a modem, Ethernet adapter, radio, wired and/or wireless transceiver, computer port, network socket, network interface controller, and/or the like. The Processor(s) 12 may maintain rules related to access to the Network Interface Adapter(s) 18 for both access via the sandboxed computing environment and via the workspace. Further, the Processor(s) 12 may enforce a host-based firewall that implements additional rules related to access to the Network Interface Adapter(s) 18.

[0039] As described herein, a sandbox protected application or process may be used for communicating with untrusted sources, such as Internet based resources. In this manner, if malware is transferred back to the host computer system due to interactions with the untrusted source, the malware may be isolated to the sandboxed computing environment, which may make it difficult for the malware to infect the workspace of the host computer system. For example, the sandbox container process may prevent the malware toolset from performing a reconnaissance of the host computer system to assess what data is available from the host computer system, such as computing resources, files, network information, additional network connectivity, *etc.* The sandbox container process (*e.g.*, the internal isolation firewall) may prevent the data on the host computer system from being reported back to the remote device that sent the malware to the host computer and/or any other remote devices.

[0040] The sandbox container process may prevent the malware toolset from determining user system privileges of the host computer system, which can be used to access data on any associated network or local area network. For example, applications and/or processes operating within the sandboxed computing environment may not have access and/or authorization to such host computer configurations.

[0041] The sandbox container process may prevent the malware toolset from accessing local files stored on the host computer system. For example, the sandbox container process may isolate the first memory space from the second memory space. Such isolation can help prevent the malware from attempting to transmit such information back to the remote device that is the source of the malware. For example, the malware toolset may attempt to transmit a local security database from which additional user credentials can be derived, including potential privileged user credentials. These user credentials may be used by the malware to attempt to gain access to other resources on any associated network or the local area network. Where the user credentials are for a privileged user account, these credentials may be used to gain privileged access to other resources on any associated network or local area network.

[0042] The sandbox container process may prevent the malware toolset from accessing a security token and/or hash of the host computer user from the memory of the host computer system and/or a network data stream. This security token or hash can be used to gain access to other resources on any associated network or the local area network. Where the security token or hash is for a privileged user account, this security token or hash may be used to gain privileged access to other resources on any associated network or local area network.

[0043] The sandbox container process may prevent the malware toolset from enabling remote control and/or access of the host computer system by a remote device that is unknown to the user. When malware enables remote control and/or access, the remote device may be able to control one or more (*e.g.*, all) operations of an infected host computer system and perform whatever alternative uses that an enslaved, infected host computer system can perform. For example, a remote device may download additional data to an infected host computer system, access other websites for denial of service attacks, and/or convert the infected host computer system into a source of malicious software from which toolsets or secondary payloads are downloaded to other, subsequently infected, host computer systems.

[0044] FIG. 2 depicts an example host computer system 212 configured to participate in a software based meeting with one or more other host computer systems, the example host computer system 212 using a sandbox based network isolation system. The host computer system 212 may include a host-based firewall 214, an operating system 226, a sandboxed computing environment (e.g., an isolated computing environment) 220, an internal isolation firewall 218, and a workspace 216. The host computer system 212 may be any host computer system, such as a cell phone, a pager, a personal computer (PC), a laptop, a vehicle computer system, a kiosk computer system, a server, a workstation, a tablet, a smartphone, a router, a controller, a microcontroller, and/or any other processing and/or communication device. The

host computer system 212 may be operatively connected with one or more user-accessible data entry devices, a display device viewable by a user, and/or a computer-accessible data storage. One or more application programs may run on the operating system 226.

[0045] As an example, the trusted host computer system 212 may be a PC, with 4 GB RAM and 146 GB hard disk computer-accessible storage, a monitor, a keyboard, and a mouse. The operating system 226 may be Windows-based, Linux-Based, Macintosh-based, and/or the like. The computer-accessible storage may store data corresponding to one or more software programs (*e.g.*, computer-readable instructions) stored on the trusted host computer system 212 for common operation. The software programs may include word processing programs, accounting programs, remote connectivity programs, and/or other types of applications.

[0046] The host computer system 212 may be configured to isolate communication with untrusted network destinations. The host computer system 212 may isolate communication with untrusted network destinations using one or more of the host-based firewall 214, a border firewall (not shown), a web proxy (not shown), an internal isolation firewall 218, or a segregation of untrusted memory space.

[0047] The sandboxed computing environment 220 may include resources (*e.g.*, a limited set of resources) allocated to operation of a sandbox container process. The sandboxed computing environment 220 may be enforced via the sandbox container process. The sandbox container process may be a security mechanism used to separate resources associated with the sandboxed computing environment 220 from other applications and/or processes that may be running on the workspace 216 of the host computer system 212. The sandboxed container process may be configured to enable one or more applications and/or processes (*e.g.*, such as collaboration software application 222) being executed within the sandboxed computing environment 220 to access the resources allocated for operation of the sandbox container process. For example, the one or more applications and/or processes being operated within the sandboxed computing environment 220 may be allowed to access memory associated with the sandboxed computing environment 220. The memory associated with the sandboxed computing environment 220 may be separate from memory that is configured to enable storage and operation of the workspace 216.

[0048] The workspace 216 may include one or more processes operating within the operating system 226 that are not restricted by the sandbox container process. The operating system 226 of the host computer system 212 may include a set of resources configured to enable operation of the workspace 216 and the sandbox container process. One or more applications and/or processes (e.g., trusted applications) may be configured to run in the workspace 216.

[0049] The host computer system 212 may enable the host-based firewall 214. The host-based firewall 214 may prohibit and/or prevent communication (*e.g.*, direct communication) between the host computer system 212 and other devices on the network 230. Each device on the network 230 may include a host-based firewall (*e.g.*, such as the host-based firewall 214). The host-based firewall 214 may prohibit and/or prevent communication (*e.g.*, direct communication) between the host computer system 212 and other devices within the network 230. For example, the host-based firewall 214 may be configured to block incoming traffic from the other devices within the network 230. The host-based firewall 214 may allow traffic received by the host computer system 212 via one or more predetermined devices and/or ports. For example, one or more devices (*e.g.*, predetermined devices) on the network 230 may bypass the host-based firewall 214, for example, using a predetermined set of protocols and/or ports. The host-based firewall 214 may be configured to allow certain communication between the workspace 216 (e.g., via the trusted applications) and the network.

[0050] The host-based firewall 214 may be implemented using software and/or hardware. For example, the host-based firewall 214 may be implemented using software that is commercially available, for example, such as Symantec Endpoint Protection, MacAfee Host Based Security Systems, *etc.* The host-based firewall 214 may be implemented using software inherent in the operating system 226 of the trusted host computer system 212, for example the Windows operating system firewall. The host-based firewall 214 may be implemented using software for configuring and/or implementing restrictive ingress and/or egress policies on the host computer system 212.

[0051] The host computer system 212 may run the sandboxed computing environment 220. The sandboxed computing environment 220 may run within the operating system 226 of the host computer system 212. For example, the sandboxed computing environment 220 may be configured to run within a second memory space of the host computer system 212. A first memory space may be configured to enable storage and operation of a workspace configured to execute a first set of one or more applications and/or processes running on the operating system 226 of the host computer system 212. For example, the collaboration software application 222 may operate within the sandboxed computing environment 220. The sandboxed computing environment 220 may be prohibited from communicating with other devices within the network 230.

[0052] The collaboration software application 222 may enable the host computer system 212 to participate in a software and/or web-based meeting. The collaboration software application 222 may be configured to enable a device (*e.g.*, a trusted device or an untrusted device) to view,

via web protocols or other protocols, meeting data associated with the host computer system 212. The collaboration software application 222 may be configured to enable an untrusted device to present, via web protocols or other protocols, meeting data to the host computer system 212 and/or any other host computer systems (*e.g.*, trusted or untrusted) that may be participating in a meeting via web traffic and/or other protocols. The collaboration software application 222 may be configured to permit an untrusted device to interact with the host computer system 212 via web protocols or other protocols. For example, the untrusted device may use the collaboration software application 222 to control a pointer device, a keyboard input, a cut/paste capability, and/or a file transfer capability on the host computer system 212. Controlling the host computer system may include, for example, viewing a display of, modifying, interacting with, uploading data to, and/or downloading data from the host computer system. Operating the collaboration software application 222 within the sandboxed computing environment 220 may restrict command and control between the host computing system 212 and the untrusted device to the sandboxed computing environment 220 and/or the untrusted memory space of the host computing device 212.

[0053] For example, host computer system 234 may be configured to interact with the host computer system 212 via the collaboration software application (e.g., multi-user interactive software application) 222. The host computer system 234 may execute an instance of a collaboration software application (*e.g.*, such as the collaboration software application 222). The host computer system 234 may be connected to a disparate network 232. The disparate network 232 may be trusted or untrusted. The host computer system 234 may access the Internet 242 via the disparate network 232. The host computer system 212 and the host computer system 234 may communicate via the respective collaboration software applications running thereon. The host computer system 212 may allow the host computer system 234 to access the sandboxed computing environment 220. For example, the host computer system 212 may allow the host computer system 234 to access meeting data within the sandboxed computing environment 220. The host computer system 212 (*e.g.*, the internal isolation firewall 218) may be configured to prevent the host computer system 234 from accessing the workspace 216.

[0054] If malware is transferred to the host computer system 212 due to interactions with the host computer system 234, the malware may be isolated to the sandboxed computing environment 220, which may make it difficult for the malware to infect the workspace 216 of the host computer system 212 and/or other devices on the network 230. For example, the sandbox container process may prevent the malware toolset from performing a reconnaissance of the host computer system 212 to assess what data is available from the host computer system 212, such as

computing resources, files, network information, additional network connectivity, *etc.* The sandbox container process may prevent the malware toolset from performing a reconnaissance of the network 230, via the host computing device 212. A reconnaissance may be used, for example, to assess what data is available from the network 230, such as computing resources, files, network information, additional network connectivity, *etc.* The sandbox container process (*e.g.*, the internal isolation firewall 218) may prevent the data on the host computer system 212 and/or the network 230 from being reported back to the host computer system 234, another device that may have sent the malware to the host computer system 212, and/or any other remote devices.

[0055] Browser solutions running within the workspace 216 of the host computer system 212 may be utilized for communication between the host computer system 212 and trusted network destinations. For example, the one or more applications or processes running within the workspace 216 of the host computer system 212 may enable access to the trusted network destinations.

[0056] The sandboxed computing environment 220 and/or the sandbox container process may be implemented using software and/or hardware. For example, the sandboxed computing environment 220 and/or the sandbox container process may be implemented using software that is commercially available, for example, such as Invincea Endpoint Protection, Tanium Endpoint Platform, Bromium Advanced Endpoint Security, *etc.*

[0057] The sandboxed computing environment 220 may provide separate and/or isolated memory space from the workspace 216 of the host computer system 212. For example, the sandboxed computing environment 220 may be enforced using a sandbox container process. The sandbox container process may segregate the workspace 216 from the sandboxed computing environment 220. The first memory space (*e.g.*, the workspace memory) may enable storage and/or operation of the workspace 216. The operating system 226 may enable operation of the sandboxed computing environment 220. The second memory space may enable storage and/or operation of one or more applications and/or processes associated with the sandboxed computing environment 220. For example, the second memory space may be reserved for storage and/or operation of the applications and/or processes running within the sandboxed computing environment 220. The sandbox container process may isolate the first memory space and the second memory space. For example, the sandbox container process may enable the internal isolation firewall 218. The internal isolation firewall 218 may enforce a separation of the first and second memory spaces. For example, the internal isolation firewall 218 may allow a predefined set of processes to be executed within the sandboxed computing environment 220.

The internal isolation firewall 218 may prevent execution, in the sandboxed computing environment 220, of any processes outside of the predefined set of processes. The second memory space may be referred to as a separate and/or isolated memory space. The sandbox container process may segregate the second memory space, any additional processes and/or memory usage required for usage of untrusted network destination related content during an established communication session. Separation and/or isolation of computer resources may be referred to as a virtual air gapped solution. The first memory space and the second memory space may be separate physical memory locations. The first memory space and the second memory space may be collocated on a physical memory.

[0058] If malware in a sandboxed computing environment 220 is able to access the resources, assets, and/or files of the operating system 226, the host computer system 212 may be considered infected and untrusted. For example, the malware may bypass the internal isolation firewall 218 via explicit user input. The host-based firewall 214 may prohibit the introduced malware from communicating with any other device on the network 230. For example, the host-based firewall 214 may be configured to block incoming traffic from the network 230.

[0059] Malware may be introduced to the operating system 226 from a source other than communication with the Internet 242. For example, malware may be introduced to the operating system 226 via an infected email, an infected USB memory stick, and/or another infected hardware device.

[0060] An infected and/or untrusted host computer system (*e.g.*, regardless of the introduced malware's vector) may have no communication (*e.g.*, direct communication) with the Internet 242. For example, the border firewall (not shown) may prevent the infected and/or untrusted host computer system from communicating with the Internet 242. Without a connection to (*e.g.*, communication with) the Internet 242, the introduced malware may be prevented from performing many toolset functions described herein or any other function that an enslaved, infected and/or untrusted host computer system may perform. Without a connection to the Internet 242, the introduced malware may not be able to transfer any data from the infected and/or untrusted host computer system to the Internet 242.

[0061] The host computer system 212 and/or the network 230 may limit the adverse effects associated with a received malware. For example, the host computer system 212 and/or the network 230 may prevent the received malware from using its vector to communicate data from the host computer system 212.

[0062] Malware introduced to the operating system 226 of the host computer system 212 may be prevented from accessing one or more other participants of a meeting associated with the

collaboration software application 222. For example, the internal isolation firewall 218 may prevent malware in the trusted memory space of the host computer system 212 from infecting the host computer system 234. The internal isolation firewall 218 may prevent malware in the trusted memory space of the host computer system 212 from initiating a data transfer to and/or from the host computer system 234 and/or another remote device. The internal isolation firewall 218 may be configured to prevent establishment of a communication channel for malware to interact with an untrusted device (*e.g.*, such as the host computer system 234).

[0063] An author of the malware may not be aware of any level of efficacy of the introduced malware and/or its successful attack vector. The host computer system 212 and/or the network 230 may prevent data of an infected and/or untrusted host computer system that may have been compromised and/or collected by the malware from being communicated to the author of the malware. For example, the host computer system 212 may prevent communication between an infected and/or untrusted host computer system and the Internet 242 (*e.g.*, the author of the malware via the Internet 242).

[0064] FIG. 3 depicts an example host computer system 312 (*e.g.*, such as the host computer system 212 shown in FIG. 2) configured to participate in a software based meeting with one or more other host computer systems, the example host computer system 312 using a sandbox based network isolation system. The host computer system 312 may be configured to connect to a network 330. The network 330 may be a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, an ad-hoc network, a satellite network, a cable modem network, *etc*. The network 330 may include a plurality of physical and/or virtual devices. The network 330 may include a plurality of host computer systems. Each of the host computer systems may transmit electrical data signals to one or more other host computer systems on the network 330. The network 330 may send web traffic and/or other protocols (*e.g.*, to support remote meeting software applications) to one or more untrusted network destinations using one or more of a border firewall 338 or a web proxy 336. For example, the network 330 may access the internet 342 and/or another host computer system 310 via the network 330, the border firewall 338, and/or the web proxy 336.

[0065] The host computer system 312 may include a host-based firewall 314, an operating system 326, a sandboxed computing environment 320, an internal isolation firewall 318, and a workspace 316. The host computer system 312 may be any host computer system, such as a cell phone, a pager, a personal computer (PC), a laptop, a vehicle computer system, a kiosk computer system, a server, a workstation, a tablet, a smartphone, a router, a controller, a microcontroller,

and/or any other processing and/or communication device. The host computer system 312 may be operatively connected with one or more user-accessible data entry devices, a display device viewable by a user, and/or a computer-accessible data storage. One or more application programs may run on the operating system 326.

[0066] As an example, the trusted host computer system 312 may be a PC, with 4 GB RAM and 146 GB hard disk computer-accessible storage, a monitor, a keyboard, and a mouse. The operating system 326 may be Windows-based, Linux-Based, Macintosh-based, and/or the like. The computer-accessible storage may store data corresponding to one or more software programs (*e.g.*, computer-readable instructions) stored on the trusted host computer system 312 for common operation. The software programs may include word processing programs, accounting programs, remote connectivity programs, and/or other types of applications.

[0067] The host computer system 312 may be configured to isolate communication with untrusted network destinations. The host computer system 312 may isolate communication with untrusted network destinations using one or more of the host-based firewall 314, a border firewall 338, a web proxy 336, an internal isolation firewall 318, or a segregation of untrusted memory space.

[0068] The host computer system 312 may enable a host-based firewall 314. The host-based firewall 314 may prohibit and/or prevent communication (*e.g.*, direct communication) between the host computer system 312 and other devices connected to the network 330. The host-based firewall 314 may prohibit and/or prevent communication (*e.g.*, direct communication) between the host computer system 312 and other devices within the network 330. For example, the host-based firewall 314 may be configured to block incoming traffic from the other devices within the network 330. The host-based firewall 314 may allow traffic to be received by the host computer system 312 via one or more predetermined devices and/or ports. For example, one or more devices (*e.g.*, predetermined devices) on the network 330 may bypass the host-based firewall 314, for example, using a predetermined set of protocols and/or ports.

[0069] The host-based firewall 314 may be implemented using software and/or hardware. For example, the host-based firewall 314 may be implemented using software that is commercially available, for example, such as Symantec Endpoint Protection, MacAfee Host Based Security Systems, *etc.* The host-based firewall 314 may be implemented using software inherent in the operating system 326 of the host computer system 312, for example the Windows operating system firewall. The host-based firewall 314 may be implemented using software for configuring and/or implementing restrictive ingress and/or egress policies on the host computer system 312.

[0070] The sandboxed computing environment 320 may include resources (*e.g.*, a limited set of resources) allocated to operation of a sandbox container process. The sandboxed computing environment 320 may be enforced via the sandbox container process. The sandbox container process may be a security mechanism used to separate resources associated with the sandboxed computing environment 320 from other applications and/or processes that may be running on the workspace 316 of the host computer system 312. The sandboxed container process may be configured to enable one or more applications and/or processes (*e.g.*, such as collaboration software application 322) being executed within the sandboxed computing environment 320 to access the resources allocated for operation of the sandbox container process. For example, the one or more applications and/or processes being operated within the sandboxed computing environment 320 may be allowed to access memory associated with the sandboxed computing environment 320. The memory associated with the sandboxed computing environment 320 may be separate from memory that is configured to enable storage and operation of the workspace 316.

[0071] The workspace 316 may include one or more processes operating within the operating system 326 that are not restricted by the sandbox container process. The operating system 326 of the host computer system 312 may include a set of resources configured to enable operation of the workspace 316 and the sandbox container process.

[0072] The host computer system 312 may run the sandboxed computing environment 320. The sandboxed computing environment 320 may run within the operating system 326 of the host computer system 312. For example, the sandboxed computing environment 320 may be configured to run within a second memory space of the host computer system 312. A first memory space may be configured to enable storage and operation of a workspace configured to execute a first set of one or more applications and/or processes running on the operating system 326 of the host computer system 312. For example, the collaboration software application 322 may operate within the sandboxed computing environment 320. The sandboxed computing environment 320 may be prohibited from communicating with other devices within the network 330.

[0073] The collaboration software application 322 may be configured to enable a device (*e.g.*, a trusted device or an untrusted device) to view, via web protocols or other protocols, meeting data associated with the host computer system 312. The collaboration software application 322 may be configured to enable an untrusted device to present, via web protocols or other protocols, meeting data to the host computer system 312 and/or any other host computer systems (*e.g.*, trusted or untrusted) that may be participating in a meeting via web traffic and/or

other protocols. The collaboration software application 322 may be configured to permit an untrusted device to interact with the host computer system 312 via web protocols or other protocols. For example, the untrusted device may use the collaboration software application 322 to control a pointer device, a keyboard input, a cut/paste capability, and/or a file transfer capability on the host computer system 312. Controlling the host computer system may include, for example, viewing a display of, modifying, interacting with, uploading data to, and/or downloading data from the host computer system. Operating the collaboration software application 322 within the sandboxed computing environment 320 may restrict command and control between the host computing system 312 and the untrusted device to the sandboxed computing environment 320 and/or the untrusted memory space of the host computing device 312.

[0074] For example, host computer system 310 may be configured to interact with the host computer system 312 via the collaboration software application 322. The host computer system 310 may execute an instance of a collaboration software application (*e.g.*, such as the collaboration software application 322). The host computer system 310 may be connected to a disparate network 332. The disparate network 332 may be trusted or untrusted. The host computer system 310 may access the Internet 342 via the disparate network 332. The host computer system 312 and the host computer system 310 may communicate via the respective collaboration software applications running thereon. The host computer system 312 may allow the host computer system 310 to access the sandboxed computing environment 320. For example, the host computer system 312 may allow the host computer system 310 to access meeting data within the sandboxed computing environment 320. The host computer system 312 (*e.g.*, the internal isolation firewall 318) may be configured to prevent the host computer system 310 from accessing the workspace 316.

[0075] If malware is transferred to the host computer system 312 due to interactions with the host computer system 310, the malware may be isolated to the sandboxed computing environment 320, which may make it difficult for the malware to infect the workspace 316 of the host computer system 312 and/or other devices on the network 330. For example, the sandbox container process may prevent the malware toolset from performing a reconnaissance of the host computer system 312 to assess what data is available from the host computer system 312, such as computing resources, files, network information, additional network connectivity, *etc.* The sandbox container process may prevent the malware toolset from performing a reconnaissance of the network 330, for example, via the host computing device 312. A reconnaissance of the network 330 may be used to assess what data is available from the network 330, such as

computing resources, files, network information, additional network connectivity, *etc* The sandbox container process (*e.g.*, the internal isolation firewall 318) may prevent the data on the host computer system 312 and/or the network 330 from being reported back to the host computer system 310, another device that may have sent the malware to the host computer system 312, and/or any other remote devices.

[0076] Browser solutions running within the workspace 316 of the host computer system 312 may be utilized for communication between the host computer system 312 and trusted network destinations. For example, the one or more applications or processes running within the workspace 316 of the host computer system 312 may enable access to the trusted network destinations.

[0077] The border firewall 338 may enable isolation of the host computer system 312 (*e.g.*, the workspace 316) from one or more untrusted network destinations. The border firewall 338 may be configured to restrict traffic to the untrusted network destinations (*e.g.*, the Internet 242) from the web proxy 336 and/or the network 330. The host computer systems 312 may access a whitelisted web server and/or an untrusted web server via a web proxy device 336, for example, via the border firewall 338. The border firewall 338 may be configured to block communication between the host computer system 312 and one or more untrusted network destinations, for example, the Internet 342. For example, the border firewall 338 may be configured to block untrusted traffic that is not routed through the web proxy 336. The border firewall 338 may be configured to block untrusted traffic that is not received from one or more predetermined devices. The border firewall 338 may be configured to block untrusted traffic that is not received via one or more predetermined network ports.

[0078] FIG. 4 depicts an example host computer system 412 (*e.g.*, such as the host computer system 212 shown in FIG. 2 and/or the host computer system 312 shown in FIG. 3) configured to enable separate sandboxed computing environments 420A, 420B, the example host computer system 412 using a sandbox based network isolation system. The host computer system 412 may be configured to connect to a network 430. The network 430 may be a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, an ad-hoc network, a satellite network, a cable modem network, *etc*. The network 430 may include a plurality of physical and/or virtual devices. The network 430 may include a plurality of host computer systems. Each of the host computer systems may transmit electrical data signals to one or more other host computer systems on the network 430. The network 430 may send web traffic to one or more untrusted network destinations using one or more of a border firewall 438, a web proxy 436, or a

termination device 440. For example, the network 430 may access the internet 442 and/or another host computer system 410 via the network 430, the border firewall 438, the web proxy 436, and/or the termination device 440.

[0079] The host computer system 412 may include a host-based firewall 414, an operating system 426, a first sandboxed computing environment 420A, a second sandboxed computing environment 420B, a first internal isolation firewall 418A, a second internal isolation firewall 418B, and a workspace 416. The host computer system 412 may be any host computer system, such as a cell phone, a pager, a personal computer (PC), a laptop, a vehicle computer system, a kiosk computer system, a server, a workstation, a tablet, a smartphone, a router, a controller, a microcontroller, and/or any other processing and/or communication device. The host computer system 412 may be operatively connected with one or more user-accessible data entry devices, a display device viewable by a user, and/or a computer-accessible data storage. One or more application programs may run on the operating system 426.

[0080] As an example, the trusted host computer system 412 may be a PC, with 4 GB RAM and 146 GB hard disk computer-accessible storage, a monitor, a keyboard, and a mouse. The operating system 426 may be Windows-based, Linux-Based, Macintosh-based, and/or the like. The computer-accessible storage may store data corresponding to one or more software programs (*e.g.*, computer-readable instructions) stored on the trusted host computer system 412 for common operation. The software programs may include word processing programs, accounting programs, remote connectivity programs, and/or other types of applications.

[0081] The host computer system 412 may be configured to isolate communication with untrusted network destinations. The host computer system 412 may isolate communication with untrusted network destinations using one or more of the host-based firewall 414, the border firewall 438, the web proxy 436, the termination device 440, the first internal isolation firewall 418A, the second internal isolation firewall 418B, or a segregation of untrusted memory space.

[0082] The host computer system 412 may enable a host-based firewall 414. The host-based firewall 414 may prohibit and/or prevent communication (*e.g.*, direct communication) between the host computer system 412 and other devices connected to the network 430. The host-based firewall 414 may prohibit and/or prevent communication (*e.g.*, direct communication) between the host computer system 412 and other devices within the network 430. For example, the host-based firewall 414 may be configured to block incoming traffic from the other devices within the network 430. The host-based firewall 414 may allow traffic to be received by the host computer system 412 via one or more predetermined devices and/or ports. For example, one or more

devices (*e.g.*, predetermined devices) on the network 430 may bypass the host-based firewall 414, for example, using a predetermined set of protocols and/or ports.

[0083] The host-based firewall 414 may be implemented using software and/or hardware. For example, the host-based firewall 414 may be implemented using software that is commercially available, for example, such as Symantec Endpoint Protection, MacAfee Host Based Security Systems, *etc.* The host-based firewall 414 may be implemented using software inherent in the operating system 426 of the host computer system 412, for example the Windows operating system firewall. The host-based firewall 414 may be implemented using software for configuring and/or implementing restrictive ingress and/or egress policies on the host computer system 412.

[0084] The workspace 416 may include one or more processes operating within the operating system 426 that are not restricted by the sandbox container process. The operating system 426 of the host computer system 412 may include a set of resources configured to enable operation of the workspace 416 and the sandbox container processes. A first memory space may be configured to enable storage and operation of a workspace configured to execute a first set of one or more applications and/or processes running on the operating system 426 of the host computer system 412.

[0085] The host computer system 412 may enable a plurality of sandboxed computing environments, for example, such as sandboxed computing environments 420A, 420B. For example, the host computer system 412 may run a first sandboxed computing environment 420A and a second sandboxed computing environment 420B. The host computer system may enable an untrusted memory space for each respective sandboxed computing environment. For example, the first sandboxed computing environment 420A may be configured to run within a second memory space of the host computer system 412 and the second sandboxed computing environment 420B may be configured to run within a third memory space of the host computer system 412. Each of the plurality of sandboxed computing environments may be configured for a different type of application. For example, the first sandboxed computing environment 420A may be configured to enable a browser application 422A to operate therein. As another example, the second sandboxed computing environment 420B may be configured to enable a collaboration software application 422B to operate therein.

[0086] The first sandboxed computing environment 420A may include resources (*e.g.*, a limited set of resources) allocated to operation of a first sandbox container process. The first sandboxed computing environment 420A may be enforced via the first sandbox container process. The sandbox container process may be a security mechanism used to separate resources

associated with the first sandboxed computing environment 420A from other applications and/or processes that may be running on any other memory space, for example the workspace 416 of the host computer system 412. The sandboxed container process may be configured to enable one or more applications and/or processes (*e.g.*, such as a browser application 422A) being executed within the first sandboxed computing environment 420A to access the resources allocated for operation of the first sandbox container process. For example, the one or more applications and/or processes being operated within the first sandboxed computing environment 420A may be allowed to access memory associated with the first sandboxed computing environment 420A. The memory associated with the first sandboxed computing environment 420A may be separate from memory that is configured to enable storage and operation of the workspace 416 and/or any other sandbox computing environments, for example 420B. Separation of the first sandboxed computing environment 420A and the workspace 416 and/or any other sandbox computing environments, for example 420B may be enforced by a first internal isolation firewall 418A.

[0087] The second sandboxed computing environment 420B may include resources (*e.g.*, a limited set of resources) allocated to operation of a second sandbox container process. The second sandboxed computing environment 420B may be enforced via the second sandbox container process. The second sandbox container process may be a security mechanism used to separate resources associated with the second sandboxed computing environment 420B from other applications and/or processes that may be running on any other memory space, for example the workspace 416 of the host computer system 412. The second sandboxed container process may be configured to enable one or more applications and/or processes (*e.g.*, such as a collaboration software application 422B) being executed within the second sandboxed computing environment 420B to access the resources allocated for operation of the second sandbox container process. For example, the one or more applications and/or processes being operated within the second sandboxed computing environment 420B may be allowed to access memory associated with the second sandboxed computing environment 420B. The memory associated with the second sandboxed computing environment 420B may be separate from memory that is configured to enable storage and operation of the workspace 416 and/or any other sandbox computing environments, for example 420A. Separation of the second sandboxed computing environment 420B and the workspace 416 and/or any other sandbox computing environments, for example 420A may be enforced by a second internal isolation firewall 418B.

[0088] The first internal isolation firewall 418A and/or the second internal isolation firewall 418B may enforce separation of the first sandboxed computing environment 420A and the

second sandboxed computing environment 420B. For example, the first internal isolation firewall 418A and/or the second internal isolation firewall 418B may prevent first sandboxed computing environment 420A and the second sandboxed computing environment 420B from exchanging data.

[0089] The collaboration software application 422B may be configured to enable a device (*e.g.*, a trusted device or an untrusted device) to view, via web protocols or other protocols, meeting data associated with the host computer system 412. The collaboration software application 422B may be configured to enable an untrusted device to present, via web protocols or other protocols, meeting data to the host computer system 412 and/or any other host computer systems (*e.g.*, trusted or untrusted) that may be participating in a meeting via web traffic and/or other protocols. The collaboration software application 422B may be configured to permit an untrusted device to interact with the host computer system 412 via web protocols or other protocols. For example, the untrusted device may use the collaboration software application 422B to control a pointer device, a keyboard input, a cut/paste capability, and/or a file transfer capability on the host computer system 412. Operating the collaboration software application 422B within the second sandboxed computing environment 420B may restrict command and control between the host computing system 412 and the untrusted device to the sandboxed computing environment 420B and/or the untrusted memory space of the host computing device 412.

[0090] For example, host computer system 410 may be configured to interact with the host computer system 412 via the collaboration software application 422B. The host computer system 410 may execute an instance of a collaboration software application (*e.g.*, such as the collaboration software application 422B). The host computer system 410 may be connected to a disparate network 432. The disparate network 432 may be trusted or untrusted. The host computer system 410 may access the Internet 442 via the disparate network 432. The host computer system 412 and the host computer system 410 may communicate via the respective collaboration software applications running thereon. The host computer system 412 may allow the host computer system 410 to access the second sandboxed computing environment 420B. For example, the host computer system 412 may allow the host computer system 410 to access meeting data within the second sandboxed computing environment 420B. The host computer system 412 (*e.g.*, the second internal isolation firewall 418B) may be configured to prevent the host computer system 410 from accessing the workspace 416. The host computer system 412 may be configured to prevent the host computer system 410 from accessing any other sandbox computing environment operating on the host computer system 412. Each sandboxed computing

environment operation on the host computer system 412 may be protected by a respective internal isolation firewall. For example, the respective internal isolation firewalls may prevent the host computer system 410 from accessing any of the sandboxed computing environments operating on the host computer system 412.

[0091] The termination device 440 may enable access to a public or private network. The termination device 440 may be associated with the collaboration software application 422B. The termination device 440 may be located at the edge of the public or private network and may enable remote access to the public or private network. The termination device 440 may provide authentication associated with the collaboration software application 422B. The termination device 440 may enable access to the second sandboxed computing environment 420B. For example, the second sandboxed computing environment 420B may authenticate with the termination device. The host computer system 412 may communicate with the host computer system 410 via the termination device 440, the border firewall 438, the Internet 442, and/or the disparate network 432.

[0092] If malware is transferred to the host computer system 412 due to interactions with the host computer system 410, the malware may be isolated to the second sandboxed computing environment 420B, which may make it difficult for the malware to infect the workspace 416 of the host computer system 412 and/or other devices on the network 430. For example, the second sandbox container process may prevent the malware toolset from performing a reconnaissance of the host computer system 412 to assess what data is available from the host computer system 412, such as computing resources, files, network information, additional network connectivity, *etc*. The second sandbox container process (*e.g.*, the second internal isolation firewall 418B) may prevent the data on the host computer system 412 and/or the network 430 from being reported back to the host computer system 410, another device that may have sent the malware to the host computer system 412, and/or any other remote devices. The sandbox container process may prevent the malware toolset from performing a reconnaissance of the network 430, for example, via host computing device 412. A reconnaissance of the network 430 may be used to assess what data is available from the network 430, such as computing resources, files, network information, additional network connectivity, *etc*

[0093] Browser solutions running within the workspace 416 of the host computer system 412 may be utilized for communication between the host computer system 412 and trusted network destinations. For example, the one or more applications or processes running within the workspace 416 of the host computer system 412 may enable access to the trusted network destinations.

[0094] The border firewall 438 may enable isolation of the host computer system 412 (*e.g.*, the workspace 416) from one or more untrusted network destinations. The border firewall 438 may be configured to restrict traffic to the untrusted network destinations (*e.g.*, the Internet 442) from the web proxy 436 and/or the network 430. The host computer systems 412 may access a whitelisted web server and/or an untrusted web server via a web proxy device 436, for example, via the border firewall 438. The border firewall 438 may be configured to block communication between the host computer system 412 and one or more untrusted network destinations, for example, the Internet 442. For example, the border firewall 438 may be configured to block untrusted traffic that is not routed through the web proxy 436. The border firewall 438 may be configured to block untrusted traffic that is not received from one or more predetermined devices. The border firewall 438 may be configured to block untrusted traffic that is not received via one or more predetermined network ports.

[0095] The terms used herein should be seen to be terms of description rather than of limitation. It is understood that those of skill in the art with this disclosure may devise alternatives, modifications, or variations of the principles of the invention. It is intended that all such alternatives, modifications, or variations be considered as within the spirit and scope of this invention, as defined by the following claims.

[0096] Embodiments may take the form of a tangible computer-usable or computer-readable medium providing program code for use by or in connection with a computer or any instruction execution system. Examples of a computer-usable or computer-readable medium include tangible computer media such as semiconductor or solid state memory, magnetic tape, a removable computer diskette, a random access memory (RAM), a read-only memory (ROM), a rigid magnetic disk and an optical disk. Current examples of optical disks include compact disk-read only memory (CD-ROM), compact disk-read/write (CD-R/W) and DVD. A processor may be configured to execute instructions stored in memory to perform the various functions and/or functional modules described herein.

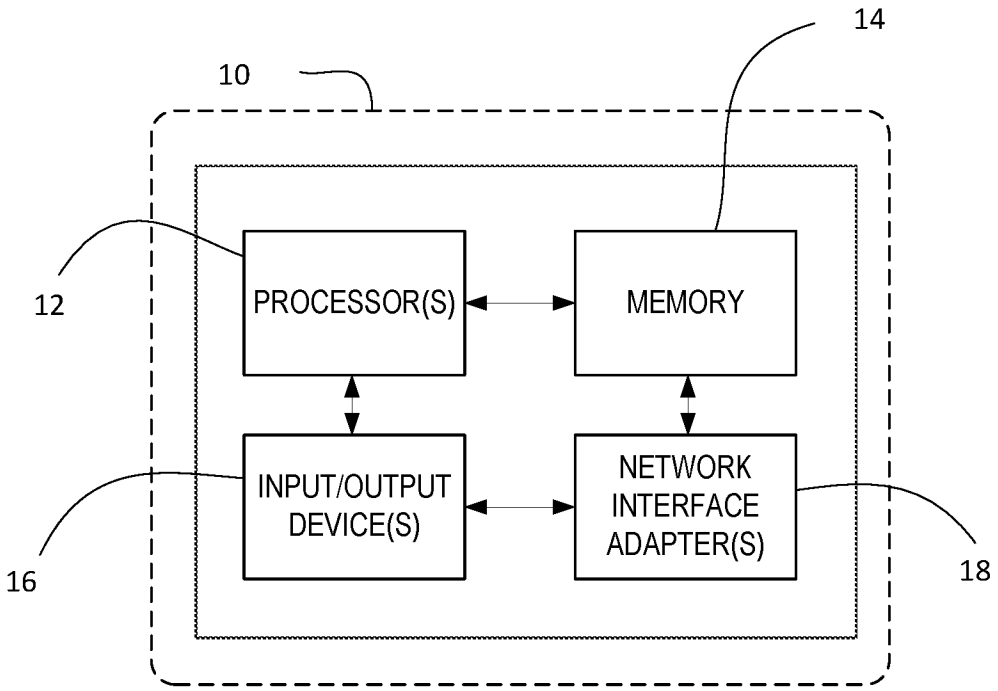

14
10
12
PROCESSOR(S)
MEMORY
INPUT/OUTPUT DEVICE(S)
NETWORK INTERFACE ADAPTER(S)
16
18

FIG. 1

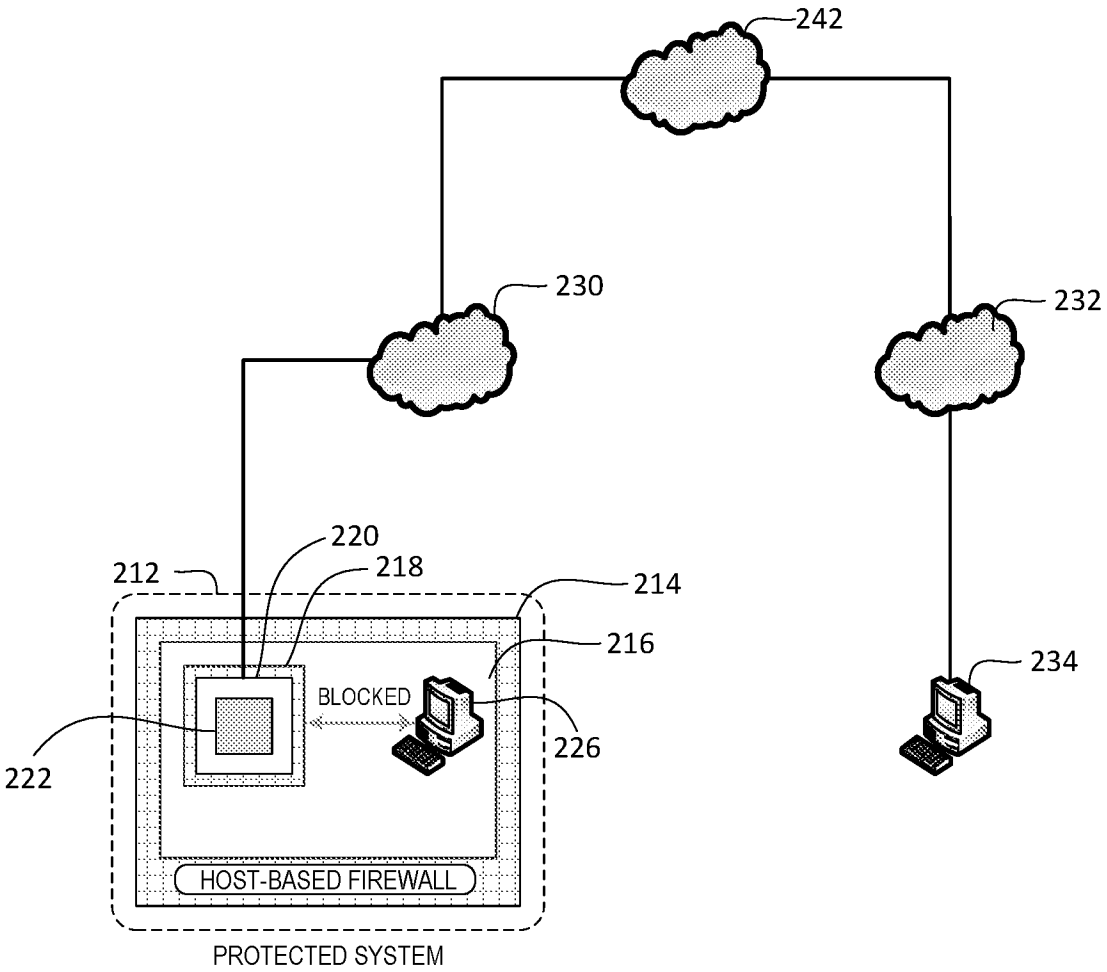

242
230
232
220
212
218
214
216
234
BLOCKED
226
222
HOST-BASED FIREWALL
PROTECTED SYSTEM

FIG. 2

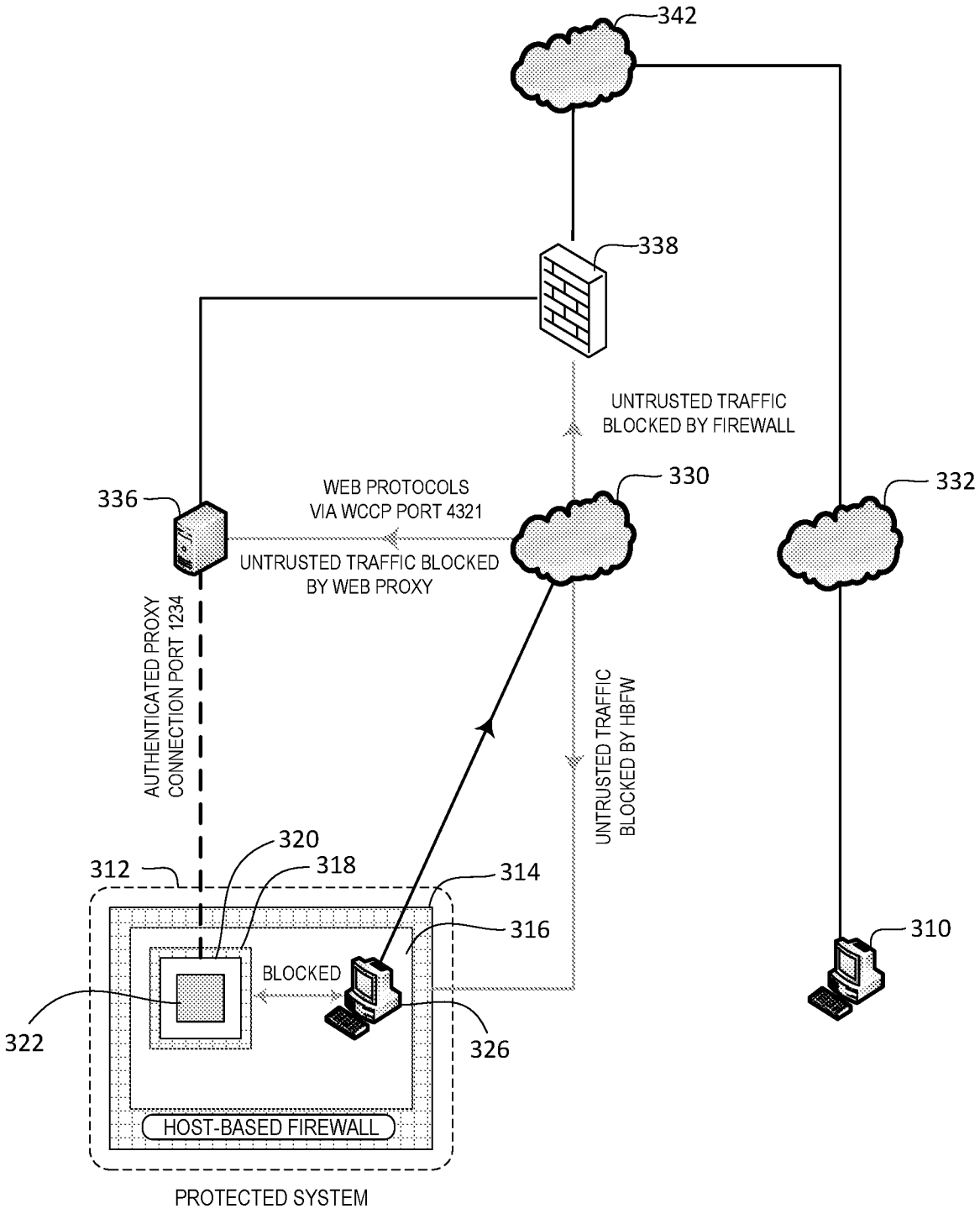

342
338
UNTRUSTED TRAFFIC
BLOCKED BY FIREWALL
336
WEB PROTOCOLS
VIA WCCP PORT 4321
330
332
UNTRUSTED TRAFFIC BLOCKED
BY WEB PROXY
AUTHENTICATED PROXY
CONNECTION PORT 1234
UNTRUSTED TRAFFIC
BLOCKED BY HBFW
320
312
318
314
316
310
BLOCKED
322
326
HOST-BASED FIREWALL
PROTECTED SYSTEM

FIG. 3

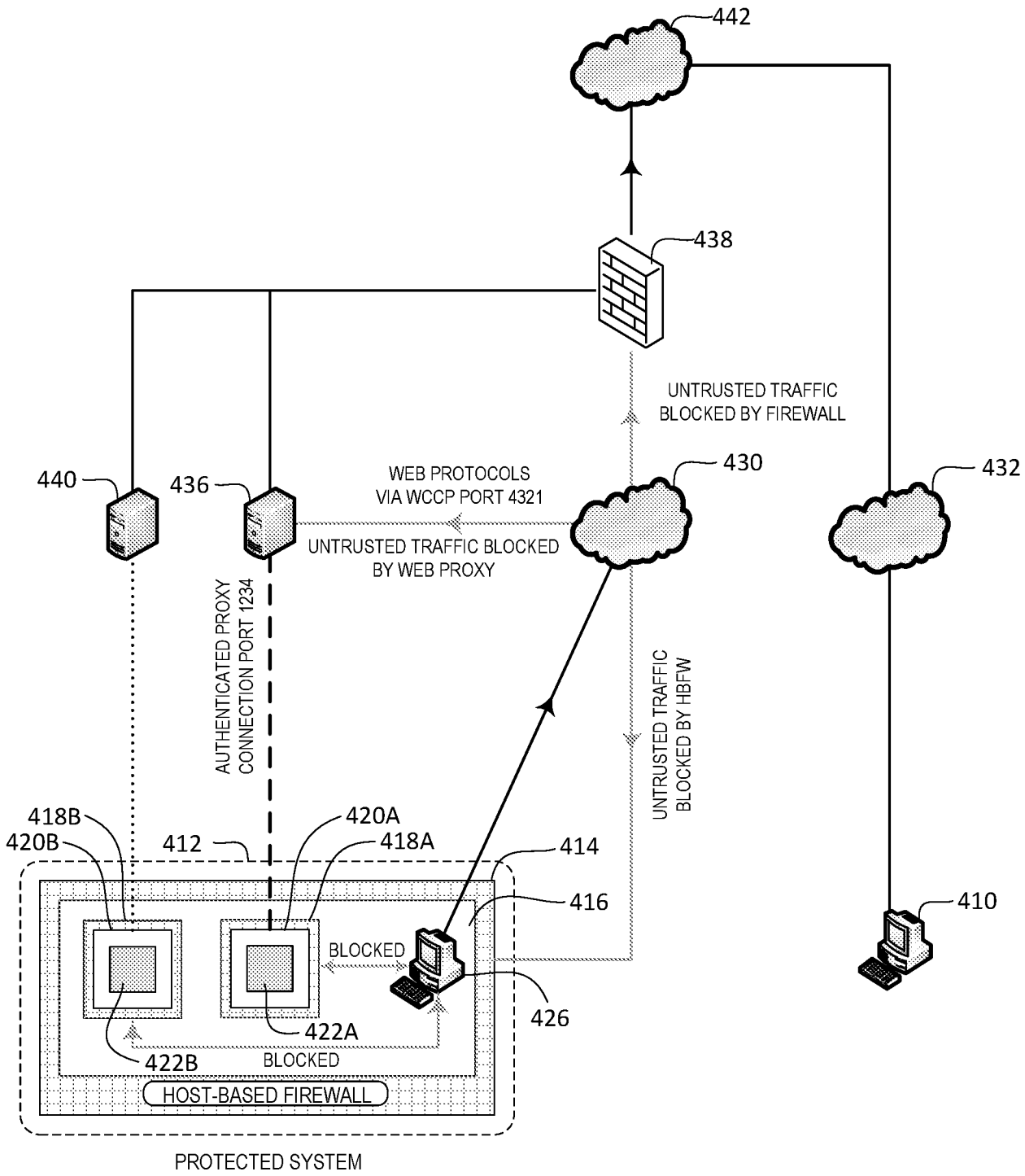

442
438
UNTRUSTED TRAFFIC
BLOCKED BY FIREWALL
440
436
WEB PROTOCOLS
VIA WCCP PORT 4321
430
432
UNTRUSTED TRAFFIC BLOCKED
BY WEB PROXY
AUTHENTICATED PROXY
CONNECTION PORT 1234
UNTRUSTED TRAFFIC
BLOCKED BY HBFW
418B
420B
412
420A
418A
414
416
410
BLOCKED
426
422A
422B
BLOCKED
HOST-BASED FIREWALL
PROTECTED SYSTEM

FIG. 4

PTO/AIA/14 (02-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	LCOM_ENT_Collab_US01
	Application Number	
Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

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☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

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Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	LCOM_ENT_Collab_US01
	Application Number	
Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	

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All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

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For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

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Application Information:

Title of the Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE		
Attorney Docket Number	LCOM_ENT_Collab_US01	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	4	**Suggested Figure for Publication (if any)**	2

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	LCOM_ENT_Collab_US01
	Application Number	
Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	

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This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	62564371	2017-09-28

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	LCOM_ENT_Collab_US01
	Application Number	
Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	LCOM_ENT_Collab_US01
	Application Number	
Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	LCOM_ENT_Collab_US01
	Application Number	
Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
◉ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	L3 Technologies, Inc.		
Mailing Address Information For Applicant:			
Address 1	600 Third Avenue		
Address 2			
City	New York	**State/Province**	NY
Country	US	Postal Code	10016
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	LCOM_ENT_Collab_US01
	Application Number	
Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	L3 Technologies, Inc.

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	600 Third Avenue		
Address 2			
City	New York	**State/Province**	NY
Country	US	Postal Code	10016
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Benjamin Chalfin/			Date (YYYY-MM-DD)	2018-09-25
First Name	Benjamin	Last Name	Chalfin	Registration Number	74181

Additional Signature may be generated within this form by selecting the Add button.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	LCOM_ENT_Collab_US01
	Application Number	
Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Substitute Form for PTO/AIA/01

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE

As the below named inventor, I hereby declare that:

This declaration is directed to: ☒ The attached application, or

☐ United States application or PCT international application number _____

filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I have reviewed and understand the contents of the above-identified application, including the claims.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT International filing date of the continuation-in-part application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Glenn Coleman Date : 1/5/2008

Signature: _____

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional Substitute Form for PTO/SB/AIA01 for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14.

Substitute Form for PTO/AIA/01

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE

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☐ United States application or PCT international application number_____

filed on_____.

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LEGAL NAME OF INVENTOR

Inventor: Peter Martz Date: 9/11/18

Signature: Peter J. Martz

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional Substitute Form for PTO/SB/AIA01 for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14.

Substitute Form for PTO/AIA/01

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	NETWORK ISOLATION FOR COLLABORATION SOFTWARE

As the below named inventor, I hereby declare that:

This declaration is directed to: ☒ The attached application, or

☐ United States application or PCT international application number_____

filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I have reviewed and understand the contents of the above-identified application, including the claims.

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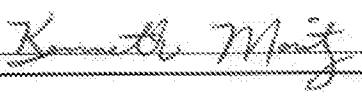
I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Kenneth Moritz Date : 9-11-18

Signature: 

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional Substitute Form for PTO/SB/AIA01 for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14.

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 16141535 Document Date: 09/25/2018

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via eDAN using the Supplemental Content tab, or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: August 26, 2013

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/141,535	09/25/2018	2447	1720	LCOM_ENT_Collab_US01	17	3

CONFIRMATION NO. 7622

FILING RECEIPT

15027
Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

OC000000103103933

Date Mailed: 10/17/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Glenn Coleman, Berwyn, PA;
Peter Martz, Marlton, NJ;
Kenneth Moritz, Lansdowne, PA;

Applicant(s)

L3 Technologies, Inc., New York, NY

Assignment For Published Patent Application

L3 Technologies, Inc., New York, NY

Power of Attorney: The patent practitioners associated with Customer Number 15027

Domestic Priority data as claimed by applicant

This appln claims benefit of 62/564,371 09/28/2017

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 10/16/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/141,535**

Projected Publication Date: 03/28/2019

Non-Publication Request: No

Early Publication Request: No
Title

NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Preliminary Class

709

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

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NOT GRANTED

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PATENT APPLICATION FEE DETERMINATION RECORD

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Application or Docket Number: 16/141,535

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	17 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

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16/141,535		2447	73876

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Signature:	/Joseph R. Klinicki/
Name:	Joseph R. Klinicki
Registration Number:	68505

Substitute for 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/141,535
				Filing Date	September 25, 2018
				First Named Inventor	Coleman, Glenn
				Art Unit	2491
(use as many sheets as necessary)				**Examiner Name**	PATEL, ASHOKKUMAR B
Sheet	1	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

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	18	RU 2406138 C1	12-10-2010	Samsung Electronics Co., Ltd.	X

Examiner Signature		**Date Considered**	

Substitute for 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/141,535
				Filing Date	September 25, 2018
				First Named Inventor	Coleman, Glenn
				Art Unit	2491
(use as many sheets as necessary)				**Examiner Name**	PATEL, ASHOKKUMAR B
Sheet	2	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

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Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
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Examiner Signature		**Date Considered**	

Espacenet

Bibliographic data: RU2406138 (C1) — 2010-12-10

SECURITY SYSTEM FOR VIRTUAL COMPUTER SYTEM

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Applicant(s): SAMSUNG ELECTRONICS CO LTD [KR] ± (KORPORATSIJA "SAMSUNG EHLEKTRONIKS KO., LTD.")

Classification: **- international:** ***G06F12/08; G06F21/20***
- cooperative:

Application number: RU20090123225 20090618

Priority number(s): RU20090123225 20090618

Abstract of RU2406138 (C1)

FIELD: information technology. ^ SUBSTANCE: security system for a virtual computer system having a hardware part connected to at least one virtual machine through a virtual machine monitor which has a security policy control module, connected to a security subsystem having connected adjustment module and at least one security module connected to the virtual machine. ^ EFFECT: high efficiency and short response time. ^ 3 dwg

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DESCRIPTION RU2406138

SYSTEM OF SECURITY OF THE VIRTUALIZED COMPUTER SYSTEM

The invention relates to the security of computer systems, namely, to the security systems of virtualized computer systems, and can be used in computer devices of various types with different architectural and operating systems that support virtualization capabilities.

The approach to virtualization capabilities associated with a virtual machine monitor (VMM) is in fact a typical way to create multiple virtual machines on a single real hardware platform. A virtual machine monitor is a computer program that performs full or partial monitoring of the resources of a real computer system. It provides an isolated environment by virtualizing hardware resource data. A virtualized environment is called a virtual machine (VM). A virtual machine can access virtual resources. Attempts to access virtual resources for virtual machines are controlled by the security subsystem. At the same time, from the point of view of the security subsystem, the virtual machine is the subject of the operation of circulation, and the resource to which it refers, the object. The security subsystem contains several (one or more) different elements, called security modules. When a virtual machine monitor organizes access to system resources, security modules decide to access subjects to objects based on the loaded security policy.

The security subsystem receives these decisions in a certain sequence and takes the final decision on their basis. In existing virtualization systems, the security module interrogation sequence is hard-coded. The performance aspect is not taken into account or it is determined empirically in determining this sequence. Since decisions can be made very often and the sequence of interrogation of security modules may not be optimal, this can lead to a significant deterioration in the system's performance: a reduction in overall performance and response time.

The Xen virtualization system with the sHype security subsystem, developed by IBM, is well known (cf. Research Report RC23629: R.Sailer, T.Jaeger, E.Valdez, R.Perez, S.Berger, JL Griffin, L. van Doorn: Building a MAC-based Security Architecture for the Xen Opensource Hypervisor [1] and the Research Report RC23511: R.Sailer, E.Valdez, T.Jaeger, R.Perez, L. van Doorn, JLGriffin, S.Berger: sHype: Secure Hypervisor Approach to Trusted Virtualized Systems [2]). The sHype architecture (IBM) supports the implementation of various security modules (Chinese Wall, Biba, Bell-LaPadula, etc.).

The closest to the claimed invention is the security system of a virtualized computer system described in patent EP 2,037,657 [3], comprising a hardware associated with at least one virtual machine via a virtual machine monitor, wherein the virtual machine is configured to forward an access request to a virtual machine monitor configured to process the access request. This system was chosen as a prototype of the claimed invention.

The architecture of the analog and prototype systems described above assumes that the sequence of obtaining solutions from the security modules is based on the required security and is hard-coded. The performance aspect is not taken into account or it is determined empirically, which may not correspond to the real state. In systems with this architecture, overall system performance and system response time may deteriorate, especially if several complex security modules are used. In addition, this architecture does not provide functionality for recording events that occur in the security system.

The aim of the claimed invention is to create a security system for a virtualized computer system with increased performance and reduced response time.

The task is solved by creating an optimized sequence of polling the security modules and interrogating the modules in this sequence, and all modules are not required to be polled, if, after polling some modules, the information received is sufficient to make a decision. In addition, the subsystem of security added the ability to register events occurring in it. Event logging functions facilitate the administration of the security subsystem.

The technical result is achieved by creating a security system of a virtualized computer system comprising a hardware associated with at least one virtual machine through a virtual machine monitor that includes a security policy management module connected to a security subsystem

comprising a tuning module connected to each other and, at least one security module connected to the virtual machine, wherein the virtual machine is configured to forward the request access to the virtual machine monitor configured to process the access request, wherein the security subsystem is configured to interrogate the security modules, obtain permission from them and, based on the received decisions on the admission of the final approval decision, and the tuning module is executed with the ability to implement the function to configure the collection of information on the number of polls of each security module and the time spent on each of the polls, and with the possibility of determining on

For a better understanding of the claimed invention, a detailed description thereof will now be given with the corresponding drawings.

1. General scheme of the security system of the virtualized computer system according to the invention.

Fig. 2. Detailed scheme of the security system of the virtualized computer system according to the invention.

FIG. 3. The algorithm of the security system operation of the virtualized computer system according to the invention.

Let us consider the principle of functioning of the claimed invention. The claimed security system of the virtualized computer system (FIGS. 1-3) comprises a hardware part 1 associated with at least one virtual machine 2 via a virtual machine monitor 3 that contains a security policy management module 4 connected to a security subsystem 5 comprising connected to each other by the tuning module 6 and at least one security module 7 connected to the virtual machine 2. The tuning module 6 provides functions for setting up and recording events. The functions of both types can be independently activated or deactivated by the security policy management module 4. The configuration functions have several modes.

Disabled - the security subsystem 5 operates in the normal mode (as if there were no configuration functions in the system).

Enabled - the security subsystem 5 constantly performs self-tuning (described later in this section).

Automatic mode - self-tuning of the subsystem 5 is initially enabled. The tuning module 6 checks the overhead for performing self-tuning. If the overhead of self-tuning exceeds its benefit (that is, determine the appropriateness of using self-tuning), self-tuning is turned off altogether or for a certain period of time.

For each access request, security modules 7 return an access decision. When the building function is enabled, the tuning module 6 collects information about the access decision requests. For each returned access decision, this information contains the number of polls of the security modules and the time spent by each module to determine its solution. Then, on demand or after a certain time interval (i.e., periodically), the tuning module determines the optimal polling sequence of the security modules 7, which has the minimum expected execution time. Thus, the frequently called security modules 7 and modules, for which time is wasted, will be called among the first in the security module polling sequence. At the same time, restrictions on the permutation of security modules 7 in the polling sequence can be imposed.

The event logging functions of the security subsystem 5 can be turned on or off depending on the needs. This makes it possible to collect some information: subjects, objects, module solutions and final solutions. This information can be used for profiling and tracing the security subsystem, as well as for determining the correct configuration of the security subsystem and its verification.

Let us consider a preferred embodiment of the claimed invention. The virtualization system (FIG. 1) is a set of virtual machines 2 operating on any equipment with any architecture 1 and in any operating system. Each virtual machine 2 is independent and protected from the rest. The virtual machine monitor 3 ensures that this set of virtual machines 2 works correctly. All security information for virtual machines 2 and other resources is located inside the virtual machine monitor 3 and is protected from virtual machines 2.

Each virtual machine 2 can access various objects (virtual resources) that correspond to the real resources of the hardware part 1 of the system. When the virtual machine 2 tries to access the object, the access request is sent to the security subsystem 5 of the virtual machine monitor 3 (FIG. 2). The security subsystem 5 polls the security modules 7 and makes the final decision. Interrogation of all security modules 7 in a certain sequence may not be required - the final decision is available from the moment when the information received from the interrogated security modules 7 becomes sufficient to make a final decision.

Security subsystem 5 contains a configuration module 6 that performs setup functions (for self-tuning of the security subsystem) and event logging functions (for profiling / tracing the security subsystem). The functions of both types can be independently activated or deactivated by the policy management module.

For each access request, security modules 7 return an access decision. When the tuning functions are turned on, the tuning module 6 collects information about the access decision requests. For each returned access decision, this information contains the number of polls of the security modules 7 and the time taken by each module to generate the solution. Then, on demand or after a time interval (i.e., periodically), the tuning module determines the optimal polling sequence of the security modules 7, which has the minimum expected execution time. Thus, frequently called modules 7 and modules 7, which are spent time consuming, will be interrogated among the first in the sequence of polling the security modules. At the same time, restrictions on the permutation of security modules 7 in the polling sequence can be imposed.

Thus, tuning functions increase the performance of the security subsystem.

If the registration of events is activated, it enables you to collect information: subjects, objects, module solutions and final decisions. This information can be used for profiling and tracing the security subsystem, and can also help in creating the correct configuration of the security subsystem.

The proposed system provides high performance of the security subsystem. In addition, it offers additional functionality - the ability to log events of the security subsystem. This information can be very useful for properly configuring the security subsystem in a virtualization system.

While the foregoing embodiment has been set forth to illustrate the present invention, it will be appreciated by those skilled in the art that various modifications, additions and substitutions are possible without departing from the scope and spirit of the present invention disclosed in the appended claims.

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CLAIMS RU2406138

A security system of a virtualized computer system comprising a hardware associated with at least one virtual machine through a virtual machine monitor that includes a security policy management module connected to a security subsystem comprising a connected setup module and at least one a security module coupled to the virtual machine, wherein the virtual machine is configured to direct the access request to the virtual machine monitor configured with the ability to process an access request, while the security subsystem is configured to interrogate security modules, obtain permission from them and, on the basis of decisions obtained, allow the final approval decision, and the configuration module is configured to: configure information gathering the number of polls of each security module and the time spent on each of the surveys, and the ability to determine, on the basis of the information collected, the optimal follower

РОССИЙСКАЯ ФЕДЕРАЦИЯ

(19) **RU** (11) **2 406 138** (13) **C1**

(51) МПК
G06F 21/20 (2006.01)
G06F 12/08 (2006.01)

ФЕДЕРАЛЬНАЯ СЛУЖБА
ПО ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ,
ПАТЕНТАМ И ТОВАРНЫМ ЗНАКАМ

(12) ОПИСАНИЕ ИЗОБРЕТЕНИЯ К ПАТЕНТУ

(21), (22) Заявка: **2009123225/08, 18.06.2009**

(24) Дата начала отсчета срока действия патента:
18.06.2009

(45) Опубликовано: **10.12.2010** Бюл. № **34**

(56) Список документов, цитированных в отчете о поиске: **RU 2007137570 A, 20.04.2009. US 2009133097 A1, 21.05.2009. CN 101425027 A, 06.05.2009. CN 101414913 A, 22.04.2009.**

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(54) СИСТЕМА БЕЗОПАСНОСТИ ВИРТУАЛИЗОВАННОЙ КОМПЬЮТЕРНОЙ СИСТЕМЫ

(57) Реферат:

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Фиг. 1

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(19) **RU** (11) **2 406 138** (13) **C1**

(51) Int. Cl.
G06F 21/20 (2006.01)
G06F 12/08 (2006.01)

(12) ABSTRACT OF INVENTION

(21), (22) Application: **2009123225/08, 18.06.2009**

(24) Effective date for property rights:
18.06.2009

(45) Date of publication: **10.12.2010 Bull. 34**

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(54) SECURITY SYSTEM FOR VIRTUAL COMPUTER SYTEM

(57) Abstract:

FIELD: information technology.

SUBSTANCE: security system for a virtual computer system having a hardware part connected to at least one virtual machine through a virtual machine monitor which has a security policy control module, connected to a security subsystem having connected adjustment module and at least one security module connected to the virtual machine.

EFFECT: high efficiency and short response time.

3 dwg



Фиг. 1

RU 2406138 C1

RU 2406138 C1

Изобретение относится к области безопасности компьютерных систем, а именно к системам безопасности виртуализованных компьютерных систем, и может применяться в компьютерных устройствах различного типа с разными архитектурными и операционными системами, которые поддерживают возможности виртуализации.

Подход к возможностям виртуализации, связанный с монитором виртуальной машины (VMM - virtual machine monitor), фактически является типичным путем для создания нескольких виртуальных машин на единой реальной аппаратной платформе. Монитор виртуальной машины - это компьютерная программа, которая осуществляет полный или частичный контроль ресурсов реальной компьютерной системы. Она предоставляет изолированное окружение путем виртуализации данных аппаратных ресурсов. Виртуализованное окружение называется виртуальной машиной (VM - virtual machine). Виртуальная машина может обращаться к виртуальным ресурсам. Попытки обращения виртуальных машин к виртуальным ресурсам контролируются подсистемой безопасности. При этом, с точки зрения подсистемы безопасности, виртуальная машина является субъектом операции обращения, а ресурс, к которому она обращается, объектом. Подсистема безопасности содержит несколько (один или более) различных элементов, называемых модулями безопасности. Когда монитор виртуальной машины организовывает доступ к ресурсам системы, модули безопасности принимают решение о доступе субъектов к объектам на основе загруженной политики безопасности. Подсистема безопасности получает эти решения в определенной последовательности и принимает на их основе окончательное решение. В существующих системах виртуализации последовательность опроса модулей безопасности жестко закодирована. Аспект производительности не учитывается или она определяется эмпирически при определении данной последовательности. Поскольку решения могут приниматься очень часто и последовательность опроса модулей безопасности может быть неоптимальной, то это может привести к значительному ухудшению характеристик системы: уменьшению общей производительности и времени отклика.

Известна система виртуализации Xen с sHype подсистемой безопасности, разработанной фирмой IBM (см. Research Report RC23629: R.Sailer, T.Jaeger, E.Valdez, R.Perez, S.Berger, J.L Griffin, L. van Doorn: Building a MAC-based Security Architecture for the Xen Opensource Hypervisor [1] и Research Report RC23511: R.Sailer, E.Valdez, T.Jaeger, R.Perez, L. van Doorn, J.L.Griffin, S.Berger: sHype: Secure Hypervisor Approach to Trusted Virtualized Systems [2]). Архитектура sHype (фирмы IBM) поддерживает реализацию различных модулей безопасности (Chinese Wall, Biba, Bell-LaPadula и т.д.).

Наиболее близкой к заявленному изобретению является система безопасности виртуализованной компьютерной системы, описанная в патенте EP 2037657 [3], содержащая аппаратную часть, связанную, по меньшей, с одной виртуальной машиной через монитор виртуальной машины, при этом виртуальная машина выполнена с возможностью направления запроса доступа в монитор виртуальной машины, выполненный с возможностью обработки запроса доступа. Данная система выбрана в качестве прототипа заявленного изобретения.

Описанная выше архитектура систем аналога и прототипа предполагает, что последовательность получения решений от модулей безопасности основана на требуемой безопасности и жестко закодирована. Аспект производительности не учитывается или она определяется эмпирически, что может не соответствовать реальному состоянию. В системах с такой архитектурой может произойти ухудшение

общей производительности системы и времени отклика системы, особенно если используется несколько сложных модулей безопасности. Кроме того, данная архитектура не обеспечивает функциональности для регистрации событий, происходящих в системе безопасности.

Задачей заявленного изобретения является создание системы безопасности виртуализованной компьютерной системы с увеличенной производительностью и уменьшенным временем отклика.

Поставленная задача решена за счет формирования оптимизированной последовательности опроса модулей безопасности и опроса модулей в данной последовательности, при этом опрос всех модулей не требуется, если после опроса некоторых модулей полученной информации достаточно для принятия решения. Кроме того, в подсистему безопасности добавлена возможность регистрации происходящих в ней событий. Функции регистрации событий облегчают администрирование подсистемы безопасности.

Технический результат достигается благодаря созданию системы безопасности виртуализованной компьютерной системы, содержащей аппаратную часть, связанную с, по меньшей мере, одной виртуальной машиной через монитор виртуальной машины, который содержит модуль управления политиками безопасности, соединенный с подсистемой безопасности, содержащей соединенные между собой настроечный модуль и, по меньшей мере, один модуль безопасности, соединенный с виртуальной машиной, причем виртуальная машина выполнена с возможностью направления запроса доступа в монитор виртуальной машины, выполненный с возможностью обработки запроса доступа, при этом подсистема безопасности выполнена с возможностью опроса модулей безопасности, получения от них решений о допуске и с возможностью принятия на основе полученных решений о допуске окончательного решения о допуске, а настроечный модуль выполнен с возможностью реализации функции настройки сбора информации о количестве опросов каждого модуля безопасности и времени, израсходованном на каждый из опросов, и с возможностью определения на основе собранной информации оптимальной последовательности опроса модулей безопасности, при которой часто вызываемые модули и модули, на которые тратится мало времени, вызывают в числе первых.

Для лучшего понимания заявленного изобретения далее приводится его подробное описание с соответствующими чертежами.

Фиг.1. Общая схема системы безопасности виртуализованной компьютерной системы согласно изобретению.

Фиг.2. Подробная схема системы безопасности виртуализованной компьютерной системы согласно изобретению.

Фиг.3. Алгоритм работы системы безопасности виртуализованной компьютерной системы согласно изобретению.

Рассмотрим принцип функционирования заявленного изобретения. Заявленная система безопасности виртуализованной компьютерной системы (Фиг.1-3) содержит аппаратную часть 1, связанную с, по меньшей мере, одной виртуальной машиной 2 через монитор 3 виртуальной машины, который содержит модуль 4 управления политиками безопасности, соединенный с подсистемой 5 безопасности, содержащей соединенные между собой настроечный модуль 6 и, по меньшей мере, один модуль 7 безопасности, соединенный с виртуальной машиной 2. Настроечный модуль 6 обеспечивает функции настройки и регистрации событий. Функции обоих типов могут быть независимо активированы или деактивированы модулем 4 управления

политиками безопасности. Функции настройки имеют несколько режимов.

Выключен - подсистема 5 безопасности работает в обычном режиме (как если бы в системе не существовало функций настройки).

Включен - подсистема 5 безопасности постоянно выполняет самонастройку (описанную ниже в этом разделе).

Автоматический режим - изначально включена самонастройка подсистемы 5. Настроечный модуль 6 проверяет накладные расходы на выполнение самонастройки. Если накладные расходы самонастройки превышают ее выгоду (то есть определяют целесообразность использования самонастройки), то самонастройку выключают совсем или на определенный период времени.

На каждый запрос доступа модули 7 безопасности возвращают решение о доступе. Когда функция застройки включена, настроечный модуль 6 собирает информацию о запросах решения о доступе. Для каждого возвращенного решения о доступе данная информация содержит количество опросов модулей безопасности и время, израсходованное каждым модулем на выработку его решения. Затем по запросу или через определенный временной интервал (то есть периодически) настроечный модуль определяет оптимальную последовательность опроса модулей 7 безопасности, которая имеет минимальное ожидаемое время выполнения. Таким образом, часто вызываемые модули 7 безопасности и модули, на выполнение которых тратится мало времени, будут вызваны в числе первых в последовательности опроса модулей безопасности. При этом на перестановку модулей 7 безопасности в последовательности опроса могут накладываться определенные ограничения.

Функции регистрации событий подсистемы 5 безопасности могут быть включены или выключены в зависимости от потребностей. Это дает возможность собирать некоторую информацию: субъекты, объекты, решения модулей и окончательные решения. Данная информация может быть использована для профилирования и трассировки подсистемы безопасности, а также для определения правильной конфигурации подсистемы безопасности и ее проверки.

Рассмотрим предпочтительный вариант выполнения заявленного изобретения. Система виртуализации (Фиг.1) представляет собой набор виртуальных машин 2, работающих на любом оборудовании с любой архитектурой 1 и в любых операционных системах. Каждая виртуальная машина 2 независима и защищена от остальных. Монитор 3 виртуальной машины обеспечивает правильную работу данного набора виртуальных машин 2. Вся информация по безопасности, предназначенная для виртуальных машин 2 и других ресурсов, находится внутри монитора 3 виртуальной машины и защищена от виртуальных машин 2.

Каждая виртуальная машина 2 может получить доступ к различным объектам (виртуальным ресурсам), которые соответствуют реальным ресурсам аппаратной части 1 системы. Когда виртуальная машина 2 пытается получить доступ к объекту, запрос доступа посылают в подсистему 5 безопасности монитора 3 виртуальной машины (Фиг.2). Подсистема 5 безопасности опрашивает модули 7 безопасности и принимает окончательное решение. Опрос всех модулей 7 безопасности в определенной последовательности может не требоваться - окончательное решение доступно с того момента, когда информации, полученной от опрошенных модулей 7 безопасности, становится достаточно для принятия окончательного решения.

Подсистема 5 безопасности содержит настроечный модуль 6, который выполняет настроечные функции (для самонастройки подсистемы безопасности) и функции регистрации событий (для профилирования/трассировки подсистемы безопасности).

Функции обоих типов могут быть независимо активированы или деактивированы модулем управления политиками безопасности.

На каждый запрос доступа модули 7 безопасности возвращают решение о доступе. Когда настроечные функции включены, настроечный модуль 6 собирает информацию о запросах решения о доступе. Для каждого возвращенного решения о доступе эта информация содержит количество опросов модулей 7 безопасности и время, затраченное каждым модулем на выработку решения. Затем по запросу или через временной интервал (то есть периодически) настроечный модуль определяет оптимальную последовательность опроса модулей 7 безопасности, которая имеет минимальное ожидаемое время выполнения. Таким образом, часто вызываемые модули 7 и модули 7, на выполнение которых тратится мало времени, будут опрашиваться в числе первых в последовательности опроса модулей безопасности. При этом на перестановку модулей 7 безопасности в последовательности опроса могут накладываться определенные ограничения.

Таким образом, настроечные функции повышают производительность подсистемы безопасности.

Если регистрация событий активирована, то она дает возможность собирать информацию: субъекты, объекты, решения модулей и окончательные решения. Данная информация может быть использована для профилирования и трассировки подсистемы безопасности, а также может помочь при создании правильной конфигурации подсистемы безопасности.

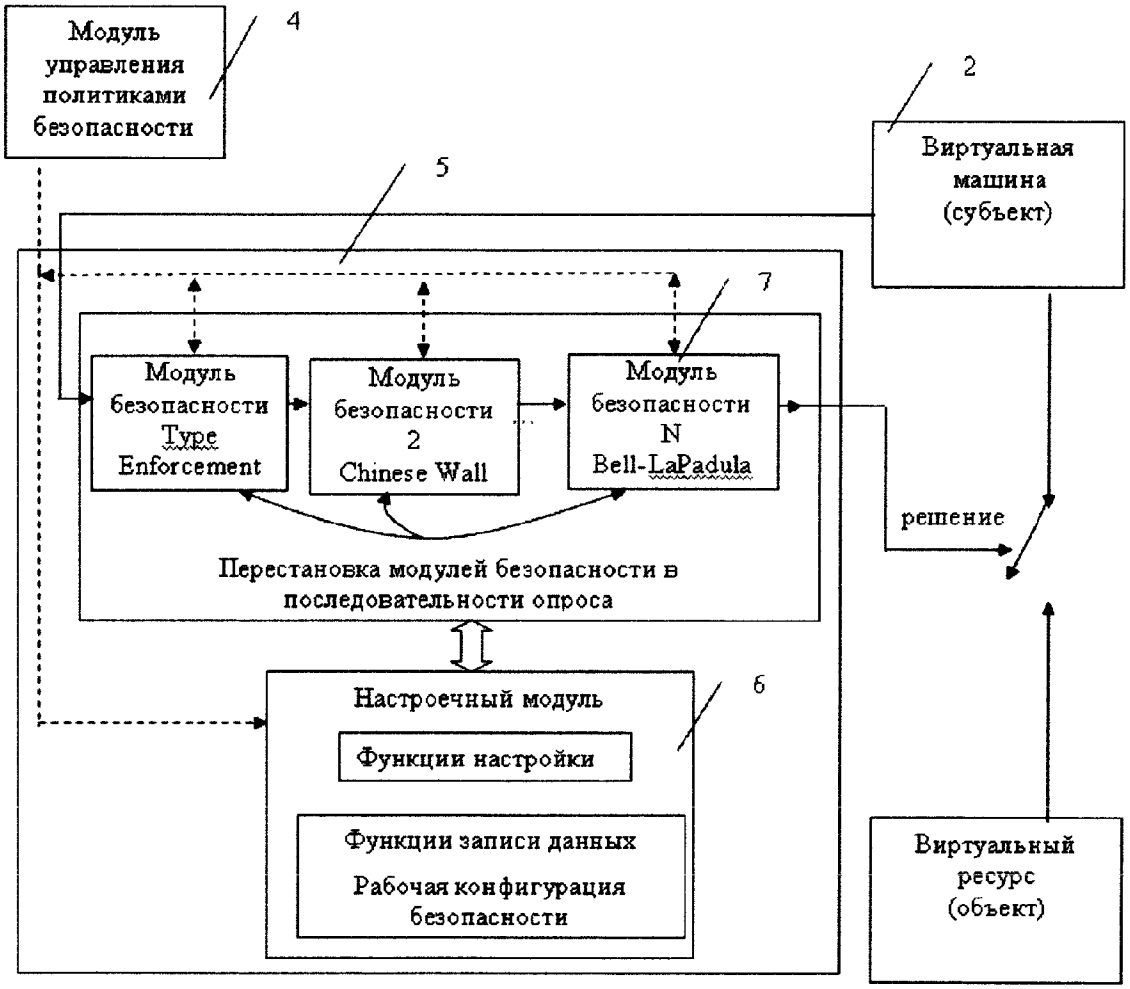
Предложенная система обеспечивает высокую производительность подсистемы безопасности. Кроме того, она предлагает дополнительную функциональность - возможность регистрации событий подсистемы безопасности. Данная информация может быть очень полезна для правильного конфигурирования подсистемы безопасности в системе виртуализации.

Хотя указанный выше вариант выполнения изобретения был изложен с целью иллюстрации настоящего изобретения, специалистам ясно, что возможны разные модификации, добавления и замены, не выходящие из объема и смысла настоящего изобретения, раскрытого в прилагаемой формуле изобретения.

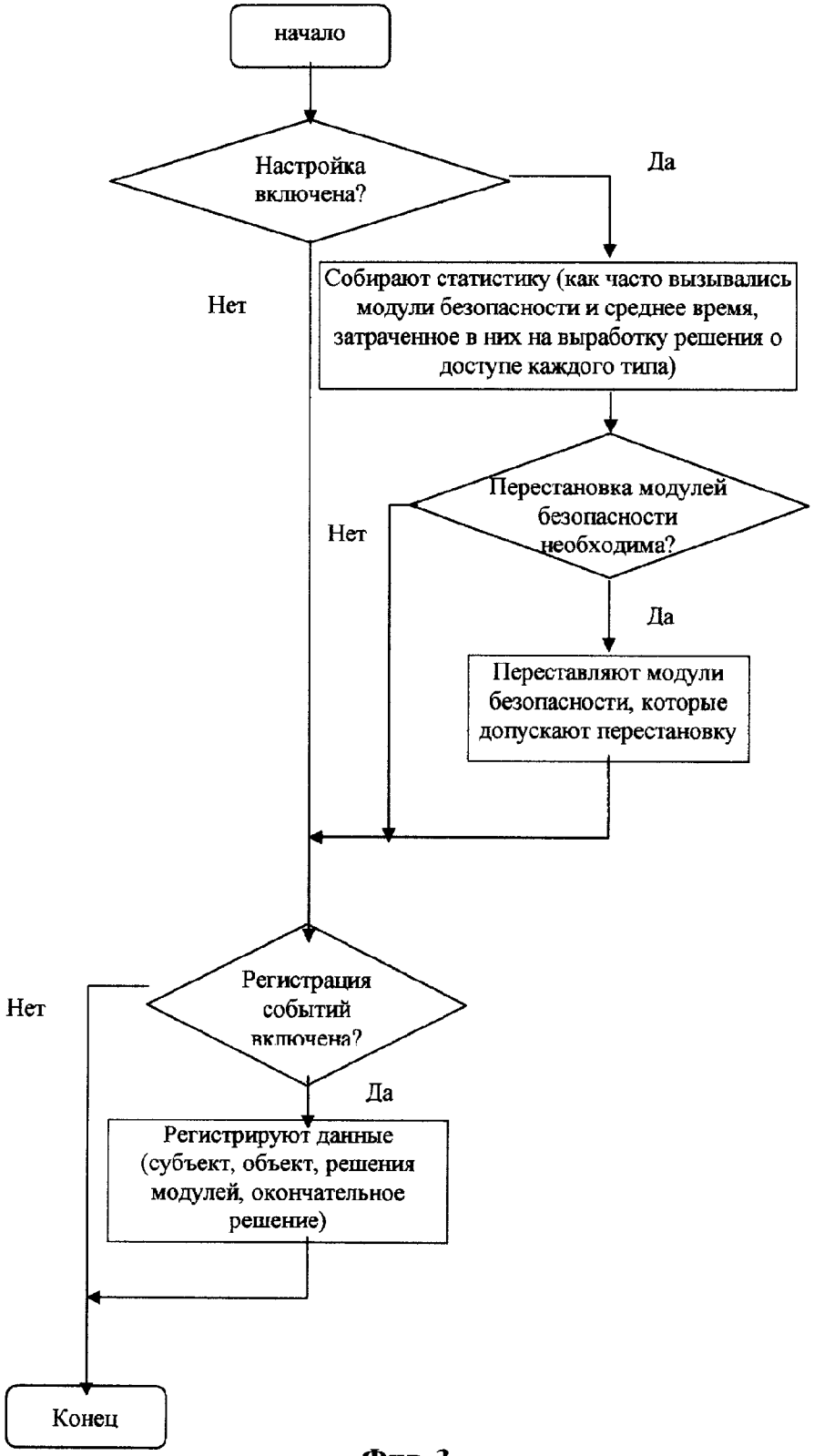
Формула изобретения

Система безопасности виртуализованной компьютерной системы, содержащая аппаратную часть, связанную с, по меньшей мере, одной виртуальной машиной через монитор виртуальной машины, который содержит модуль управления политиками безопасности, соединенный с подсистемой безопасности, содержащей соединенные между собой настроечный модуль и, по меньшей мере, один модуль безопасности, соединенный с виртуальной машиной, причем виртуальная машина выполнена с возможностью направления запроса доступа в монитор виртуальной машины, выполненный с возможностью обработки запроса доступа, при этом подсистема безопасности выполнена с возможностью опроса модулей безопасности, получения от них решений о допуске и с возможностью принятия на основе полученных решений о допуске окончательного решения о допуске, а настроечный модуль выполнен с возможностью реализации функции настройки: сбора информации о количестве опросов каждого модуля безопасности и времени, израсходованном на каждый из опросов, и с возможностью определения на основе собранной информации оптимальной последовательности опроса модулей безопасности, при которой часто вызываемые модули и модули, на которые тратится мало времени, вызывают в числе

первых.


Модуль управления политиками безопасности
4
2
Виртуальная машина (субъект)
5
7
Модуль безопасности Type Enforcement
Модуль безопасности 2 Chinese Wall
Модуль безопасности N Bell-LaPadula
решение
Перестановка модулей безопасности в последовательности опроса
Настроечный модуль
6
Функции настройки
Функции записи данных
Рабочая конфигурация безопасности
Виртуальный ресурс (объект)

Фиг. 2


начало
Настройка включена?
Да
Нет
Собирают статистику (как часто вызывались модули безопасности и среднее время, затраченное в них на выработку решения о доступе каждого типа)
Перестановка модулей безопасности необходима?
Нет
Да
Переставляют модули безопасности, которые допускают перестановку
Регистрация событий включена?
Нет
Да
Регистрируют данные (субъект, объект, решения модулей, окончательное решение)
Конец

Фиг. 3

Electronic Acknowledgement Receipt

EFS ID:	34448299
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	158266
Filer:	Benjamin S. Chalfin/MEISSA OVERLINE
Filer Authorized By:	Benjamin S. Chalfin
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	30-NOV-2018
Filing Date:	25-SEP-2018
Time Stamp:	13:11:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	LCOM_ENT_Collab_US01_AS_FILED_IDS_Trans.pdf	104096 0f0b17392cbb34d5a332f5499704ad6a6404f03c	no	3

Warnings:

Information:					
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Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	Barnet_PraktikumPoZaschiteSeti_2006_4pp.pdf	1463807 06a8f6293780f99f5b20e846b12afb1a817a1513	no	4
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Information:					
5	Non Patent Literature	Laverick_HypervisorManagementandOptimization_2010_13pp.pdf	1756069 6f30c9897fb3e8cc61accbf5bc9d9b28092b3d57	no	13
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Information:					
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Information:					
7	Non Patent Literature	Reuben_ASurveyOnVirtual_October2007_5pp.pdf	166324 2e25bae99cc76806ec95d0a838768294b776dfc0	no	5
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Information:					
8	Foreign Reference	RU_2406138.pdf	610079 f49a1d801e96e03b3c5f9bd46ef54a2fdc9d389f	no	17
Warnings:					
Information:					

9	Non Patent Literature	Villeneuve_CommandAndControl_October2010_3pp.pdf	568743 0dd5a8cc485426b990fe8fa4d32f6c866c84088a	no	3
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10	Non Patent Literature	Wikipedia_ComputerNetwork_December2010_19pp.pdf	338914 efee49dfae56aa0b62dbb4e921040f66e352fb01	no	19
Warnings:					
Information:					
11	Non Patent Literature	Wikipedia_ComputerSecurity_December2010_27pp.pdf	11144077 675376025595267e34c7f5ec69cb66f74c49f508	no	27
Warnings:					
Information:					
12	Non Patent Literature	Wikipedia_CyberSecurityStandards_December2010_9pp.pdf	3357214 3aa5722510ff7788c1783b5d4959fcb0561eef44	no	9
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13	Non Patent Literature	Wikipedia_HTTPSecure_December2010_9pp.pdf	3462519 91fc24dd223f426a04b2dfe5a166caf2022b9519	no	9
Warnings:					
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14	Non Patent Literature	Wikipedia_Hypervisor_December2010_6pp.pdf	2644963 c8488a9c05b02159ce31bbaab4546c4c168b80e1	no	6
Warnings:					
Information:					
15	Non Patent Literature	Wikipedia_InternetProtocol_December2010_5pp.pdf	1722989 4e335148d0f22707bc6fb77e2cf0660c33ce57ab	no	5
Warnings:					
Information:					

16	Non Patent Literature	Wikipedia_MultiprotocolLabel_December2010_8pp.pdf	3623978 980585c6659b1c0b07f81ff64bddffd6a44c0673	no	8
Warnings:					
Information:					
17	Non Patent Literature	Wikipedia_NetworkAddress_December2010_12pp.pdf	4552887 e30c024a04a3be41b6d9142d77b12fad61bbbb2f	no	12
Warnings:					
Information:					
18	Non Patent Literature	Wikipedia_SecurityFocused_December2010_9pp.pdf	2924141 843da85fbe967faee5a2990d59154a079211da32	no	9
Warnings:					
Information:					
19	Non Patent Literature	Wikipedia_VirtualDesktop_December2010_5pp.pdf	1734750 703a750edb76d6e5e40f3939e30d463ce9b684f5	no	5
Warnings:					
Information:					
20	Non Patent Literature	Wikipedia_VirtualPrivate_December2010_9pp.pdf	3017235 a5123ca641ac98777f0c9ed4eaa4855a20c926de	no	9
Warnings:					
Information:					
		Total Files Size (in bytes):	50055404		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DOCKET NO.: LCOM_ENT_Collab_US01 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

L3 Technologies, Inc. **Confirmation No.: 7622**

Application No.: 16/141,535 **Group Art Unit: 2491**

Filing Date: September 25, 2018 **Examiner: PATEL, ASHOKKUMAR B**

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Filed Via EFS

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).

☒ **IDS Filed Under 37 CFR 1.97(b)**

In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

☐ **IDS filed Under 37 CFR 1.97(c)**

In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.116 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

- ☐ Certification in Accordance with § 1.97(e) is attached; or
- ☐ The fee of **$240.00** as set forth in § 1.17(p) is attached.

☐ **IDS filed Under 37 CFR 1.97(d)**

In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of **$240.00** as set forth in § 1.17(p).

CONTENT OF IDS PURSUANT TO 37 CFR 1.98

☒ Copies of reference numbers 01-17 listed on the attached Form PTO-1449 are not required to be submitted pursuant to 37 CFR § 1.98(a)(2)(ii).

☒ Copies of reference numbers 18-35 listed on the attached Form PTO-1449 are enclosed herewith.

☐ Copies of reference numbers are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number , filed for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

REFERENCES IN A LANGUAGE OTHER THAN ENGLISH

☐ The following documents are not in the English language. Accordingly, a concise explanation of the relevance of the document was incorporated in the specification passages identified below, the document was identified in a foreign communication as identified below or an English language counterpart application has been provided as indicated below.

Foreign Language Document	Cite No.	Pages of Reference in Specification or Relevance of Document

Foreign Language Document	Cite No.	English Language Counterpart	Cite No.

☐ **CERTIFICATION IN ACCORDANCE WITH § 1.97(e)**

I hereby certify that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

Please charge any deficiency or credit any overpayment to Deposit Account No. 50-5519.

Date: November 30, 2018

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UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01

CONFIRMATION NO. 7622

158266
Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

PUBLICATION NOTICE

OC00000106952467

Title:NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Publication No.US-2019-0097971-A1
Publication Date:03/28/2019

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

158266 7590 05/07/2020

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EXAMINER	
PERUNGAVOOR, VENKATANARAY	

ART UNIT	PAPER NUMBER
2492	

MAIL DATE	DELIVERY MODE
05/07/2020	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 16/141,535	Applicant(s) Coleman et al.	
	Examiner VENKAT PERUNGAVOOR	Art Unit 2492	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 9/25/2018.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☑ An election was made by the applicant in response to a restriction requirement set forth during the interview on 04 May 2020; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-17 is/are pending in the application.

5a) Of the above claim(s) 17 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-16 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☑ Claim(s) 1-17 are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-16, drawn to method and system for computer having an separate space for first set of applications and second space for collaborative applications , classified in CPC class G06F 21/74.

II. Claims 17, drawn to system for first computer and second to interact over the network for multi-user interactive software, classified in CPC class G06T 2219/024.

The inventions are distinct(related as operation or design but can be patentable alone), each from the other because: Group I invention is related to computer having space for shared application and local trusted application and the dependent claims further refine the features of the computer like blocking/allowing communication(claim 2, 5-8, 10, 13-16) , while Group II inventions is related to first computer and second computer connecting over the network and enabling the communication between the two computers.

Inventions Group I and Group II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not

overlap in scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombination Group II has separate utility such as first and second computer being located with the same corporate network, i.e. not like an untrusted remote computer in Group I, having two functions for communications over the corporate/enterprise network with trusted devices. See MPEP § 806.05(d).

The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because at least the following reason(s) apply:

- the inventions have acquired a separate status in the art in view of their different classification
- the inventions have acquired a separate status in the art due to their recognized divergent subject matter
- the inventions require a different field of search (e.g., searching different classes /subclasses or electronic resources, or employing different search strategies or search queries).

In summary, the instant claims are restricted on the grounds of being distinctas combination/subcombination.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

The applicant is further reminded that evidence showing obvious variants or claiming restriction is not proper with statements that show groupings are not different on the record may be used as admission in upcoming Non-Final Rejection.

During a telephone conversation with Mr. Jeung Huh on 5/4/2020 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-16. Affirmation of this election must be made by applicant in replying to this Office action. Claim 17 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file

provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 1-16 provisionally rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-22 of copending Application No. 16/163884 (reference application). Although the claims at issue are not identical, they are not patentably distinct from each other because the instant claims are host computer having isolated space for executing untrusted applications, while claims of '884 application has an mobile device having isolated space for untrusted applications as taught in Design and Implementations of Sandbox Technique for Isolated Applications to Haq et al.

This is a provisional nonstatutory double patenting rejection because the patentably indistinct claims have not in fact been patented.

US App 16/141535	US App 16/163884	Comments
1. A host computer system comprising a processor and memory, the processor configured to: implement a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space; implement an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more	1. A mobile device comprising a processor and a memory, the processor configured to: implement a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications via a first memory space; implement an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein at least one application of the	The instant claim 1 and claim 1 + claim 4 of '884 application recites providing two different workspace, whereby isolated workspace is provided for trusted and untrusted application, including multi-user interactive software. However, the instant claims is an obvious variation of claims of '884 applications. It would have been obvious to modify the mobile device to host computer in order to provide an virtual machine environment for executing untrusted applications as

applications or processes comprises a multi-user interactive software application; isolate the isolated computing environment from the workspace using an internal isolation firewall; and communicate data associated with the multi-user interactive software application with at least one untrusted destination via a proxy device, wherein the multi-user interactive software application is unable to communicate the data until the isolated computing environment has authenticated with an authentication device.	second set of one or more applications or processes is configured to communicate with one or more untrusted network destinations; isolate the isolated computing environment from the workspace using an internal isolation firewall; and isolate the workspace and the isolated computing environment from at least one network using a host-based firewall. 4. The device of claim 1, wherein the processor is further configured to run one or more trusted applications in the workspace, and wherein the host-based firewall is configured to allow	taught in Haq see I. Introduction.

	the trusted applications to communicate with one or more destinations via the network based on determining that the destinations are trusted destinations.	

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over US Patent 8966464 to Christopher in view of US Patent Pub 2014/0040979 to Barton.

Regarding Claim 1, 9, Christopher discloses a host computer system comprising a processor and memory, the processor configured to: implement a workspace, wherein the workspace is configured to enable operation of a first set of one or more

applications or processes via a first memory space(Fig. 1 item 102, 112 & Fig. 4A item 406B); implement an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application(Col 24 Ln 16-33, the virtual machine has defined memory threshold separate from host memory) ; isolate the isolated computing environment from the workspace using an internal isolation firewall(Col 23 Ln 20-49, multi-tenant container & Col 21 Ln 49-65, the security isolation for multi-tenant container); the software application is unable to communicate the data until the isolated computing environment has authenticated with an authentication device(Col 22 LN 55-67, trusted identity is allowed access).

But Christopher does not disclose the multi-user interactive software. However, Barton discloses communicate data associated with the multi-user interactive software application with at least one untrusted destination via a proxy device(Fig. 25 item 2510, 2515 & Fig. 31 item 3106 & Par. 0535, applications that are managed and un-managed & Fig. 27 Conferencing app).

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Christopher invention of generating an multi-tenant container to include multi-user interactive software in order to provide for

enterprise software for conferencing and resources as taught in Barton see Fig. 23 item "Construct the application specific tunnel..."

Regarding Claim 2, 10, Christopher does not disclose the multi-interactive software. However, Barton discloses The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote machine to control one or more of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the one or more application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process(Fig. 333 item 3304, 3308, global clipboard has the uploaded content).

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Christopher invention of generating an multi-tenant container to include multi-user interactive software in order to provide for enterprise software for conferencing and resources as taught in Barton see Fig. 23 item "Construct the application specific tunnel..."

Regarding Claim 3, 11, Christopher does not disclose the multi-user interactive software. However, Barton discloses The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the host computer system(Fig. 23 " Access the Remote Computerized Resource...".

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Christopher invention of generating an multi-tenant container to include multi-user interactive software in order to provide for enterprise software for conferencing and resources as taught in Barton see Fig. 23 item "Construct the application specific tunnel..."

Regarding Claim 4, 12, Christopher discloses the host computer system is connected to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network(Fig. 12 item 1218).

Regarding Claim 5, 13, Christopher discloses the processor is further configured to implement a host- based firewall, the host based-firewall being configured to isolate the host computer system from communicating with one or more other devices on the network(Fig. 4A item "Container Logic", Host File system is spate from Container Logic).

Regarding Claim 6, 14, Christopher discloses the host-based firewall is configured to block incoming communications from the network that are sent to the workspace(Fig. 11, the prevent and intercept tenants).

Regarding Claim 7, 15, Christopher discloses the processor is further configured to run one or more trusted applications in the first memory space, and wherein the trusted applications are configured to communicate with one or more trusted machines via the network(Col 45-63, the multi-tenant set up for communications).

Regarding Claim 8, 16, Christopher discloses the internal isolation firewall is further configured to prompt a user of the host computer system to allow communication between the first memory space and the second memory space(Fig. 2A item "Interceptor", the operating system and container interface).

Conclusion

The Examiner notes that communication through email is permitted only after authorization with submission of PTO/SB/439 form. Please file this form in EFS or thorough central fax before proceeding to communicate via email with the examiner. The submission of the PTO/SB/439 form via email will NOT be accepted.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ***Venkat Perungavoor*** whose telephone number is (571)272-7213. The examiner can normally be reached on 9-5. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ***Saleh Najjar*** can

be reached on 571-272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VENKAT PERUNGAVOOR/
Primary Examiner, Art Unit 2492
Email: venkatanarayan.perungavoor@uspto.gov

Notice of References Cited	Application/Control No. 16/141,535	Applicant(s)/Patent Under Reexamination Coleman et al.	
	Examiner VENKAT PERUNGAVOOR	Art Unit 2492	Page 1 of 1

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*	B	US-20140108558-A1	04-2014	Borzycki; Andrew	H04L9/14	709/205
*	C	US-20140040979-A1	02-2014	Barton; Gary	G06F21/604	726/1
*	D	US-9921860-B1	03-2018	Banga; Gaurav	G06F9/445	1/1
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*	F	US-7694328-B2	04-2010	Joshi; Amit	G06F21/51	726/2
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	N					
	O					
	P					
	Q					
	R					
	S					
	T					

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	V	Impact & Analysis of Virtual Workspace on Grid Computing. Yadav et al. IJST. (Year: 2011)
	W	Design and Implementation of Sandbox Technique for Isolated Applications. Haq et al. IEEE. (Year: 2016)
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

CPC - Searched*		
Symbol	Date	Examiner
H04L69/329 , H04L67/10 , H04L63/10 , H04L63/0281 , H04L63/08 , H04L63/104 , H04L67/14 , H04L12/1818 , G06F2009/45587 , G06F2009/45583 , G06F2216/15 , G06F9/452 , G06Q50/01 limited by text and date	05/06/2020	VP

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Google Scholar	05/06/2020	VP
DERWENT limited by text and date	05/06/2020	VP
Inventor Name Search	05/06/2020	VP
Assignee Search	05/06/2020	VP
Global Dossier	05/06/2020	VP
InnovaQ	05/06/2020	VP
see EAST Notes	05/06/2020	VP
Google Patents(Find Similar, Prior Art Citations)	05/06/2020	VP

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/05/2020								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
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	7	✓								
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	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
	17	N								

Main Concept Document
==========
US20190097971
Title: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

(No Concept Modifiers)
==========

(No Filters)
==========

Options
=======
De-dup: None
Cut-off: None
Sort: Relevance

Content: Non-Patent Literature (25)
==========
IEEE Xplore Publications: IEEE Periodicals
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IEEE Xplore Publications: IEEE Standards
IEEE Xplore Publications: IEEE Early Access
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OnePetro.org: Periodicals at OnePetro.org
OnePetro.org: Conferences at OnePetro.org
OnePetro.org: Standards at OnePetro.org
Other Literature: IBM Redbooks
Other Literature: PubMed Central

Bibliographic Data

Application No: 16/141,535

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /VENKAT PERUNGAVOOR/ Examiner's Signature | Initials

Title: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/25/2018	726	2492	LCOM_ENT_Collab_US01
RULE			

APPLICANTS

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INVENTORS

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Peter Martz Marlton, NJ, UNITED STATES

Kenneth Moritz Lansdowne, PA, UNITED STATES

CONTINUING DATA

This application has PRO of 62564371 09/28/2017

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/16/2018

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UNITED STATES

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Application

16141535

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IP Office Type

- [x] All IP5 Offices
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  - [x] KIPO
  - [x] JPO
  - [x] USPTO
- [x] Non-IP5 Offices

()	Office ()	Application ()	Applicant	Title ()	App. Date ()	Priority #
()	US	16141535	1) Coleman, Glenn 2) Martz, Peter 3) Moritz, Kenneth	NETWORK ISOLATION FOR COLLABORATION SOFTWARE	09/25/2018	US 16141535 US 62564371

Most Recent Documents

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03/28/2019	Notice of Publication ()	...
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USPTO BACKGROUND

FEDERAL GOVERNMENT

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S190	36	((("L3") near3 ("TECHNOLOGIES") near3 ("INC"))).AS,AANM.	USPAT	OR	OFF	2020/04/29 09:33
S191	29	S190 and (isolated separate partition section)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/04/29 09:33
S192	7	S191 and (workspace collaboration share)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/04/29 09:34
S193	41	((("COLEMAN") near3 ("Glenn")) OR (("MARTZ") near3 ("Peter")) OR (("MORITZ") near3 ("Kenneth"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2020/04/29 09:36
S194	18	S193 and (isolated separate partition section).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/04/29 09:36
S195	17	S194 and (workspace collaboration share).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/04/29 09:36
S228	144	(workspace collaboration share mulit-user) same (separate isolate segegrate) with (firewall)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	OFF	2020/05/05 11:05

			DERWENT; IBM_TDB			
S229	126	S228 and (@ad<="2018" @py<="2018")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/05 11:06
S230	144	(workspace collaboration share mulit-user) same (separate isolate segegrate) with (firewall)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:44
S231	45	S230 AND ((H04L69/329 OR H04L67/10 OR H04L63/10 OR H04L63/0281 OR H04L63/08 OR H04L63/104 OR H04L67/14 OR H04L12/1818 OR G06F2009/45587 OR G06F2009/45583 OR G06F2216/15 OR G06F9/452 OR G06Q50/01).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:47
S232	153	(workspace collaboration share multi-user) same (separate isolate segegrate) with (firewall)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:47
S233	45	S232 AND ((H04L69/329 OR H04L67/10 OR H04L63/10 OR H04L63/0281 OR H04L63/08 OR H04L63/104 OR H04L67/14 OR H04L12/1818 OR G06F2009/45587 OR G06F2009/45583 OR G06F2216/15 OR G06F9/452 OR G06Q50/01).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:47
S234	32	S233 and (@ad<="2018" @py<="2018")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:48

S235	352111	((H04L69/329 OR H04L67/10 OR H04L63/10 OR H04L63/0281 OR H04L63/08 OR H04L63/104 OR H04L67/14 OR H04L12/1818 OR G06F2009/45587 OR G06F2009/45583 OR G06F2216/15 OR G06F9/452 OR G06Q50/01).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:49
S236	13	S235 and ((shar$3 collobrat$3) with (workspace screen) with (memory disk) with (partition seperat$3 isolat$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:50
S237	54	S235 and ((workspace screen (shared adj application)) with (memory disk) with (partition seperat$3 isolat$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:51
S238	38	S237 and (@ad<="2018" @py<="2018")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 07:52
S239	36	("20170353496" "9602524" "7694328" "9921860" "20140040979" "20140108558").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 08:29
S240	7	("20140351516" "8966464" "8931054").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/05/06 08:41

EAST Search History (Interference)

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Substitute for 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/141,535
				Filing Date	September 25, 2018
				First Named Inventor	Coleman, Glenn
				Art Unit	2491
(use as many sheets as necessary)				**Examiner Name**	PATEL, ASHOKKUMAR B
Sheet	1	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

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Examiner Signature	/VENKAT PERUNGAVOOR/	**Date Considered**	05/05/2020

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				Application Number	16/141,535
				Filing Date	September 25, 2018
				First Named Inventor	Coleman, Glenn
				Art Unit	2491
				Examiner Name	PATEL, ASHOKKUMAR B
Sheet	2	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

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Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
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Examiner Signature	/VENKAT PERUNGAVOOR/	**Date Considered**	05/05/2020

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P_ARPACK: An efficient portable large scale eigenvalue package for distributed **memory** parallel architectures

KJ Maschhoff, DC Sorensen - International workshop on applied parallel …, 1996 - Springer

… segment of the matrix-vector product Av that is consis- tent with the **partition** of V … to the calling sequence (the distributed matrix descriptors) as well as redefining the **workspace** data structure … In order to **isolate** the performance of the ARPACK routines from the per- formance of the …

☆ ❞❞ Cited by 139 Related articles All 6 versions »

Fast loads and queries

G Graefe, H Kuno - Transactions on large-scale data-and knowledge …, 2010 - Springer

… Key ranges never queried are never **partitioned** or optimized … **Partition** filters bring the advantages of all of these techniques to the logical **partitions** of a B … Zone filters integrate techniques previously intro- duced in **isolation** as small materialized aggregates, zone maps, data pack …

☆ ❞❞ Cited by 13 Related articles All 8 versions »

Grid operating systems/middlewares and new virtualization techniques

M Zabaljáuregui - 2009 - linux.linti.unlp.edu.ar

… **Isolation**: Applications / jobs can run **isolated** from each other … This problem is also known as **workspace** management … The account mapping approach is a simple but efficient way to **isolate** accesses to local nodes by different grid users …

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Abstract

V Hongisto - Indoor air, 2005 - Wiley Online Library

… Both forms of privacy were associated with **workspace** and job satisfaction … Sufficient **isolation** between workstations can be easily realized by a full **partition** wall … Office screens can produce significant **isolation** only when all ceiling and wall surfaces nearby are highly absorbing …

☆ ❞❞ Cited by 222 Related articles All 8 versions

Introducing MDA in a large IT consultancy organization

V Kulkarni, S Reddy - 2006 13th Asia Pacific Software …, 2006 - ieeexplore.ieee.org

… A **workspace** provides change **isolation** … into the modeler role, all coding related tasks are grouped in the programmer role, all **workspace** synchronization related … Independent **workspaces** coupled with support for process traceability enabled separate teams to be assigned for …

☆ ❞❞ Cited by 31 Related articles All 6 versions

Overhead matters: A model for virtual resource management

B Sotomayor, K Keahey, I Foster - First International Workshop …, 2006 - ieeexplore.ieee.org

… 2]. Virtual machines (VMs), such as Xen [3] and VMware [4], with their **isolation** and virtualization … Our work includes short-lived **workspaces** as a case that must perform efficiently under our model … we can use information about a VM image as defined in the **workspace** metadata to …

☆ ❞❞ Cited by 89 Related articles All 12 versions

Impact & Analysis of Virtual **Workspace** on Grid Computing

PS Yadav, P Sharma, D Singh, DOCSEV Ghaziabd… - 2011 - ijst.co.in

… We have described the abstraction of a virtual **workspace**, a customizable execution environment … **Workspaces** are defined in terms of client requirements, such as software and hardware … and are implemented in terms of technologies providing an **isolated** execution environment …

☆ ❞❞ Related articles All 2 versions »

Architecting SAS in a Modern World: Best Practices for Design, Configuration and Management of SAS® 9

G Nelson, J Loether - Invited paper presented at the SAS Global …, 2007 - phusewiki.org

… Compute Services –SAS/Connect, OLAP Server, Integration Technologies (Object Spawner, **Workspace** server), SAS … Thus there is **isolation** of instances and each is protected from one another … Users can be **isolated** or **partitioned** limiting access to the O/S, other users and …

☆ ❞❞ Cited by 1 Related articles All 4 versions »

Test generation and logic/fault simulation of programmable logic arrays: optimized **partitioning** techniques for parallel processing

A Cruz, D Sarma - ... of 1994 37th Midwest Symposium on ..., 1994 - ieeexplore.ieee.org

... Since PLAtano [l] assumes that growth and shrinkage test vectors constitute the majority of PLA test generation, the upper bound for non-**isolated** product terms is ... Once **workspace** has been chosen, each CPU can work independently ... 3 shows the **partitioned** task for this dataset ...

☆ 99 Related articles

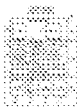
Transaction models for software engineering database

R Conradi, JO Larsen, NN Minh, AI Wang, C Liu - Databases, 1997 - idi.ntnu.no

... Transaction structure. Communication protocols: busy/lazy, to whom etc. Degree of **sharing**: **isolated**, **shared**, copy-on-read, copy-on-write ... 3 3 2 2 2 2 Figure 8: Organization of files in **workspaces**. Connectivity Rules: 1. copy file(F) to private-**Workspace**(X) :- file(F) 2WriteSet(X) ...

☆ 99 Cited by 7 Related articles »

Isolating tenants executing in multi-tenant **software** containers



US • US9244764B1 • Kelsin Christopher • Amazon Technologies, Inc.
Priority 2014-03-21 • Filed 2014-03-21 • Granted 2015-02-24 • Published 2015-02-24
... herein for per tenant 110 **isolation** of **disk** space utilization. In order to **isolate** the use of **disk** space by the tenants 110 on the **host computer** 102 , ... 204 of **shared** classes 410 in order to enable **program** code not specifically programmed for execution within the multi-tenant **software** container 108 to ...

Application is provided to **memory** distribution and the method and system used ...

WO EP US CN JP KR AP RU • CN103608786B • 英特尔公司 • 英特技术许可有限责任公司
Priority 2011-06-20 • Filed 2012-06-18 • Granted 2019-06-18 • Published 2019-06-18
New computing platform introduces new technology or requires old technology again to solve the finite **memory shared** between each **application** The ... system provides applied **host machine** and changes more effectively to manage **memory** using information provided by each **application** and using the hook ...

Performing a configuration virtual topology change and instruction therefore



WO EP US CN JP KR AT CY DK ES PL PT SI • US7739434B2 • Mark S. Farrell • International Business Machines Corporation
Priority 2008-01-11 • Filed 2008-01-11 • Granted 2010-06-15 • Published 2010-06-15
in emulating the function of the **host computer** 100 . U.S. patent **application** Ser. No. 11/972,734 "ALGORITHM TO **SHARE** PHYSICAL PROCESSORS TO MAXIMIZE ... system comprising: a **memory**; a logically **partitioned host computer** system comprising host processors (host CPUs) in communication with said **memory**;

Method and system for virtualization of **software applications**



US • US20140325516A1 • Stefan I. Larimore • Code Systems Corporation
Priority 2008-08-07 • Filed 2014-08-05 • Published 2014-11-27
illustrates the system **memory** 22 of the **host computing** device 12 . As discussed above, **application** virtualization involves **isolating** a virtualized ... naming the one or more files stored in the **shared memory** in accordance with a naming convention comprising a file identification and the **isolation** ...

Diagnose instruction for serializing processing



WO EP US CN JP • US8595469B2 • Lisa C. Heller • International Business Machines Corporation
Priority 2010-06-24 • Filed 2010-06-24 • Granted 2013-11-26 • Published 2013-11-26
in emulating the function of **host computer** 302 . To serialize processing in a computing environment, in one embodiment, a **shared** IPTE interlock (also ... is **partitioned** into a **host computer memory** 310 portion and an emulation routines 312 portion. **Host computer memory** 310 is available to **programs** of ...

Management of **shared** transactional resources

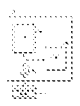


US • US20130332375A1 • Fadi Y. Busaba • International Business Machines Corporation
Priority 2012-06-15 • Filed 2013-04-23 • Published 2013-12-19
16 . A computer **program** product for management of **shared** transactional resources in a transactional facility, the computer **program** product comprising: ... . In the example embodiment, the **memory** 5094 is **partitioned** into a **host computer memory** 5096 portion and an emulation routines 5097 portion. The **host** ...

Secure access to **sharing** storage resource

WO US CN DE • CN104335181B • K D 许恩 • Hgst荷兰公司
Priority 2012-06-28 • Filed 2013-04-11 • Granted 2017-10-03 • Published 2017-10-03
... **shared** by public VS examples 80 Multiple guests in public documents system, but same VM main frames 102 are **isolated** from each other. Virtual **memory** ... Fictitious **host computer** can run the **software** layer of referred to as management **program** to support one or more VM.Management **program**, which is ...

Physical port **sharing** in a link aggregation group



US • US9300592B2 • Angelo MacChiano • International Business Machines Corporation
Priority 2014-03-14 • Filed 2014-03-14 • Granted 2016-03-29 • Published 2016-03-29
... **partitioned** into a **host computer memory** 2796 portion and an emulation routines 2797 portion. The **host computer memory** 2796 is available to **programs** ... The virtual switch ports of the **shared** port group **share** a single physical port of the physical network adapter as part of a common physical link ...

... devices for integrating end-host and network resources in distributed **memory**



US • US20160021032A1 • Andrew Warfield • Coho Data, Inc.
Priority 2012-07-17 • Filed 2015-07-08 • Published 2016-01-03
... to the network component, the consumer devices and the **memory** resources, including **applications**, libraries, operating systems, **host computing** ... Disclosed aspects provide a mechanism for **isolating** network resources and connectivity between tenants that **share** common physical servers and ...

... hybrid address space (EHAS) for allowing host kernel to access guest **memory**

Overall, how satisfied are you with Google Patents?

Very satisfied

Somewhat satisfied

Neither satisfied nor dissatisfied

Somewhat dissatisfied

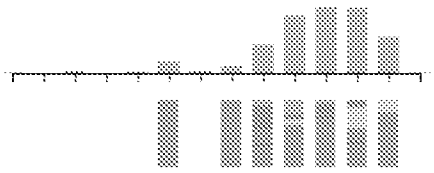
Very dissatisfied

Google

WO US · US10255082B2 · Sreekumar Nair · Qynaviog, Inc.
Priority 2013-11-26 · Filed 2018-01-25 · Granted 2019-04-09 · Published 2019-04-09
... efficient by removing the hardware abstraction such that guest **applications** in a virtual machine can see and **share** devices while honoring **isolation**. .. allowing the host kernel running on the **host computer** to access the guest **memory**; and allowing a guest process to access the host **memory**, wherein the ...

 About 34,292 results

Top 1000 results by filing date



Relative count of top 5 values

Assignees	Inventors	CPCs
International Business Machines Corporation		23.5%
Vmware, Inc.		5.6%
Citrix Systems, Inc.		5.3%
Microsoft Corporation		4%
Igt		3.1%

Expand

Main Concept Document
==========
US20190097971
Title: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

(No Concept Modifiers)
==========

Filters (2)
==========
Earliest Priority Date: From 1996-11-08 To 2018-09-24

Current Assignees excluded: "L3 TECH INC"

Options
==========
De-dup: None
Cut-off: 0.600
Sort: Relevance

Content: Patent Publications (164)
==========
US Patents
US Designs
US Applications
EPO Patents
EPO Applications
China Patents
China Applications
Japan Patents
Japan Applications
Korea Patents
Korea Applications
WIPO Applications
Argentina Patents
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Montenegro Applications
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Poland Applications
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Portugal Applications
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Republic of Moldova Applications
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Romania Applications
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San Marino Applications
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Serbia Applications
Slovakia Patents
Slovakia Applications
Slovenia Patents
Spain Patents
Spain Applications
Sweden Patents
Sweden Applications
Switzerland Patents
Switzerland Applications
Ukraine Patents
Yugoslavia/Serbia and Montenegro Patents
Yugoslavia/Serbia and Montenegro Applications
Armenia Patents
Australia Patents
Australia Applications
Cyprus Patents
Gulf Cooperation Council Patents

Hong Kong Patents
India Patents
India Applications
Indonesia Patents
Indonesia Applications
Israel Applications
Jordan Patents
Kyrgyzstan Patents
Macao Applications
Malaysia Patents
Mongolia Patents
New Zealand Patents
Philippines Patents
Philippines Applications
Saudi Arabia Patents
Singapore Patents
Singapore Applications
Taiwan Patents
Taiwan Applications
Tajikistan Patents
Tajikistan Applications
Thailand Applications
Uzbekistan Patents
Vietnam Patents
Algeria Patents
ARIPO Patents
ARIPO Applications
Egypt Patents
Kenya Patents
Malawi Patents
Morocco Patents
Morocco Applications
OAPI Patents
South Africa Patents
Tunisia Applications
Zambia Patents
Zimbabwe Patents
EAPO Patents
EAPO Applications
Georgia Patents
Georgia Applications
Kazakhstan Patents
Kazakhstan Applications
Russia Patents
Russia Applications
Turkey Patents
Turkey Applications

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **L3 Technologies, Inc.**	**Confirmation No.: 7622**
Application No.: 16/141,535	**Group Art Unit: 2492**
Filing Date: September 25, 2018	**Examiner: PERUNGAVOOR, VENKATANARAY**

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REPLY PURSUANT TO 37 CFR § 1.111

In response to the Official Action dated **May 7, 2020**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

☐ **Amendments to the Specification** begin on page N/.A of this paper.

☒ **Amendments to the Claims** are reflected in the listing of the claims which begins on page 2 of this paper.

☐ **Amendments to the Drawings** begin on page N/A of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 7 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 50-5519.

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Current Amended) A ~~host computer~~ system comprising a processor and memory, the processor configured to:

implement a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implement an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolate the isolated computing environment from the workspace using an internal isolation firewall; and

send ~~communicate~~ data to an untrusted destination from ~~associated with~~ the multi-user interactive software application associated with the isolated computing environment ~~at least one untrusted destination~~ via a proxy device, wherein the multi-user interactive software application is unable to send ~~communicate~~ the data until the isolated computing environment has authenticated with an authentication device.

2. (Currently Amended) The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote machine to control an application or process ~~one or more~~ of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the ~~one or more~~ application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process.

3. (Currently Amended) The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the ~~host computer~~ system.

4. (Currently Amended) The system of claim 1, wherein the ~~host computer~~ system is connected to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

5. (Currently Amended) The system of claim 4, wherein the processor is further configured to implement a host-based firewall, the host-based firewall ~~host based firewall~~ being configured to isolate the ~~host computer~~ system from communicating with one or more other devices on the network.

6. (Original) The system of claim 5, wherein the host-based firewall is configured to block incoming communications from the network that are sent to the workspace.

7. (Original) The system of claim 4, wherein the processor is further configured to run one or more trusted applications in the first memory space, and wherein the trusted applications are configured to communicate with one or more trusted machines via the network.

8. (Currently Amended) The system of claim 1, wherein the internal isolation firewall is further configured to prompt a user of the ~~host computer~~ system to allow communication between the first memory space and the second memory space.

9. (Currently Amended) A method comprising:

implementing a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implementing an isolated computing ~~computed~~ environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolating the isolated computing environment from the workspace using an internal isolation firewall; and

send ~~communicating~~ data to an untrusted destination from ~~associated with~~ the multi-user interactive software application associated with the isolated computing environment ~~at least one untrusted destination~~ via a proxy device, wherein the multi-user interactive software application is unable to send ~~communicate~~ the data until the isolated computing environment has authenticated with an authentication device.

10. (Currently Amended) The method of claim 9, wherein the multi-user interactive software application is configured to allow a remote machine to control an application or process ~~one or more~~ of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the ~~one or more~~ application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process.

11. (Original) The method of claim 9, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the isolated computing environment.

12. (Original) The method of claim 9, further comprising connecting to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

13 (Currently Amended) The method of claim 12, further comprising implementing a host-based firewall, the host-based firewall ~~host based firewall~~ being configured to isolate the first memory space and the second memory space from communicating with one or more devices on the network.

14. (Original) The method of claim 13, wherein the host-based firewall is configured to block incoming communications from the network that are sent to the workspace.

15. (Original) The method of claim 12, further comprising running one or more trusted applications in the first memory space, wherein the trusted applications are configured to communicate with one or more trusted machines via the network.

16. (Original) The method of claim 9, wherein the internal isolation firewall is further configured to prompt a user of the workspace to allow communication between the first memory space and the second memory space.

17. (Withdrawn) A system comprising:

a network;

an authentication device;

a first computer configured to connect to the network, the first computer comprising a first processor and a first memory, wherein the first processor is configured to:

implement a first workspace, wherein the first workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implement a first isolated computing environment, the first isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application; and

isolate the first isolated computing environment from the first workspace using a first internal isolation firewall; and

a second computer configured to connect to the first computer via the network, the second computer comprising a second processor and a second memory, wherein the second processor is configured to:

implement a second workspace, wherein the second workspace is configured to enable operation of a third set of one or more applications or processes via a third memory space;

implement a second isolated computing environment, the second isolated computing environment being configured to enable operation of a fourth set of one or more applications or processes via a fourth memory space, wherein the fourth set of one or more applications or processes comprises a multi-user interactive software application; and

isolate the second isolated computing environment from the second workspace using a second internal isolation firewall;

wherein the first computer and the second computer are configured to communicate data associated with the multi-user interactive software application via a proxy device, and wherein the multi-user interactive software application is unable to communicate the data until the first isolated computing environment and the second isolated computing environment have authenticated with the authentication device.

REMARKS

Claims 1-16 will be pending in the application. Claims 1-5, 8-10, and 13 have been amended. No claims have been canceled or added. Claim 17 has been withdrawn without prejudice. Support for the amendments can be found throughout the Specification and Figures, such as at paragraphs [0025]-[0030], for example. No new matter has been added.

Election/Restrictions

The Office Action dated May 7, 2020, restricts the claim of the application into the following groups:

Group I – Claims 1-16; and

Group II – claim 17.

In an effort to further prosecution and as previously discussed with Examiner Perungavoor on May 4th, 2020, Applicant elects Group I without traversal. Applicant understands that this election is being made to aid the Examiner in conducting a search and examination of the claimed subject matter, and, is not to be construed as limiting the scope of Applicant's claims.

Double Patenting Rejections

Claims 1-16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being obvious over claims 1-22 of U.S. Patent Application No. 16/163,884.

Applicant requests that the Examiner hold the rejection of the pending claims in abeyance until the pending claims of the present application are allowed, as the pending claims may have been or may be amended in such a way as to render this rejection meaningless. Applicant asserts that the present request is fully responsive to the non-statutory type double patenting rejection. And Applicant retains the right to file a terminal disclaimer at a later stage of prosecution.

Rejections of independent claims 1 and 9 under 35 U.S.C. § 103

Claims 1-16 were rejected under 35 U.S.C. § 103 for allegedly being unpatentable over Christopher[1] in view of Barton.[2] Applicant disagrees with the rejections.

Christopher and Barton, whether alone or in combination, fail to teach or suggest sending "data to an untrusted destination from the multi-user interactive software application associated with the isolated computing environment via a proxy device…," as recited in amended claim 1.

First, Christopher does not teach or suggest this feature. As admitted in the Office Action, Christopher does not teach or suggest communicating "data associated with the multi-user interactive software application with at least one untrusted destination via a proxy device…."[3] So it follows that Christopher cannot be said to teach or suggest sending "data to an untrusted destination from the multi-user interactive software application associated with the isolated computing environment via a proxy device…," as recited in amended claim 1.

Second, Barton also does not teach or suggest this feature. For example, the system in Barton cannot send data to an untrusted destination. Rather, Barton prevents data from being sent to an unmanaged application.

Figure 35 of Barton demonstrates that the Barton system prevents data from being sent to an unmanaged application.[4] The unmanaged application in Figure 35 is a personal application. The personal application is separated from the from a managed set of applications. The managed set of applications are managed using a policy from an enterprise mobility management (EMM) server. The policy from the EMM server allows the managed set of applications to share data. But the policy prevents the managed set of applications from sharing the data with the personal application.[5] That is, the Barton system prevents data from being sent from the managed set of applications to an unmanaged application.[6]

---

[1] U.S. Patent No. 8,966,464.
[2] U.S. Publication No. 2014/0040979.
[3] Office Action dated 05/07/2020, at pages 11-12.
[4] Barton at paras. [0535]-[0538], and [0549]; FIG. 35.
[5] *Id.*
[6] *See Id.*

And preventing data from being sent to an unmanaged application is not the equivalent of sending "data to an untrusted destination from the multi-user interactive software application associated with the isolated computing environment via a proxy device…," as recited in amended claim 1. The system in Barton simply cannot send data to an untrusted destination. Barton explicitly states that the "managed set of applications… are selectively prohibited from sharing files and/or data with applications that are not part of the managed set."[7] That is, the "data are prevented from leaking out of the managed set…."[8] Further, Barton states that unmanaged application "may not access secure data" or "may not communicate with a secure server."[9] That is, Barton does not allow the data to be sent to an untrusted destination. So, Barton does not teach or suggest sending "data to an untrusted destination from the multi-user interactive software application associated with the isolated computing environment via a proxy device," as claim 1 recites.

Accordingly, claim 1 is patentable over Christopher and Barton for at least the reasons above. Because claim 9 recites features that are similar to claim 1, claim 9 is also patentable over Christopher and Barton. Further, at least due to their respective dependence on independent claims 1 and 9, dependent claims 2-8 and 10-16 are also patentable over Christopher and Barton.

[7] Barton at paras. [0535].
[8] *Id.*
[9] *Id.*at para. [0549].

CONCLUSION

Applicant submits that the present application is in condition for allowance and a Notice of Allowance is requested. Examiner Perungavoor is invited to call Applicant's undersigned representative to discuss the application should the Examiner determine that such a discussion may advance prosecution.

Date: August 7, 2020

/Jeung Huh/
Jeung (Jacob) Huh
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Electronic Acknowledgement Receipt

EFS ID:	40222641
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	158266
Filer:	Jeung Huh/melissa overline
Filer Authorized By:	Jeung Huh
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	07-AUG-2020
Filing Date:	25-SEP-2018
Time Stamp:	11:41:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		LCOM_ENT_Collab_US01_AS_FILED_Reply_to_NFOA_Dated_05_07_20.pdf	169552 47ee292222b66624b7c8fd6c997f9f4cc6936b68	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	10
Warnings:			
Information:			
	Total Files Size (in bytes):	169552	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/141,535	Filing Date 09/25/2018	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	08/07/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/TRACEY M YOUNG/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

158266 7590 09/09/2020

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1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

EXAMINER	
PERUNGAVOOR, VENKATANARAY	

ART UNIT	PAPER NUMBER
2492	

MAIL DATE	DELIVERY MODE
09/09/2020	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 16/141,535	Applicant(s) Coleman et al.	
	Examiner VENKAT PERUNGAVOOR	Art Unit 2492	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 9/25/2018.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☑ An election was made by the applicant in response to a restriction requirement set forth during the interview on 04 May 2020; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-17 is/are pending in the application.

5a) Of the above claim(s) 17 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-16 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☑ Claim(s) 1-17 are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

Response to Arguments

The applicant request to hold the double patenting rejection in abeyance is granted.

The applicant election of Group I without traverse is acknowledged in reply filed.

Applicant's arguments filed 5/7/2020 have been fully considered but they are not persuasive.

The applicant arguments relating to managed application not communicating with unmanaged application is not persuasive.

As Barton discloses permitting applications to run in an untrusted environment based on being containerized see Par. 0095 & Par. 0097.And further preventing access to highly classified data, i.e isolated environment see Par. 0095. And further Barton also discloses the managed data applications interacting with other applications that are not managed see Par. 0170. The clipboard data is sent to an second untrusted application

via an copy-paste operation see Par. 0157. The remote application access is also sending data to an untrusted destination see Par. 0076.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over US Patent 8966464 to Christopher in view of US Patent Pub 2014/0040979 to Barton.

Regarding Claim 1, 9, Christopher discloses a host computer system comprising a processor and memory, the processor configured to: implement a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space(Fig. 1 item 102, 112 & Fig. 4A item 406B); implement an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one

or more applications or processes comprises a multi-user interactive software application(Col 24 Ln 16-33, the virtual machine has defined memory threshold separate from host memory) ; isolate the isolated computing environment from the workspace using an internal isolation firewall(Col 23 Ln 20-49, multi-tenant container & Col 21 Ln 49-65, the security isolation for multi-tenant container); the software application is unable to communicate the data until the isolated computing environment has authenticated with an authentication device(Col 22 LN 55-67, trusted identity is allowed access).

But Christopher does not disclose the multi-user interactive software. However, Barton discloses send data to an untrusted destination from the multi-user interactive software application associated with the isolated computing environment with via a proxy device(Fig. 25 item 2510, 2515 & Fig. 31 item 3106 & Par. 0535, applications that are managed and un-managed & Fig. 27 Conferencing app).

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Christopher invention of generating an multi-tenant container to include multi-user interactive software in order to provide for enterprise software for conferencing and resources as taught in Barton see Fig. 23 item "Construct the application specific tunnel..."

Regarding Claim 2, 10, Christopher does not disclose the multi-interactive software. However, Barton discloses The system of claim 1, wherein the multi-user interactive

software application is configured to allow a remote machine to control one or more of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the one or more application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process(Fig. 333 item 3304, 3308, global clipboard has the uploaded content).

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Christopher invention of generating an multi-tenant container to include multi-user interactive software in order to provide for enterprise software for conferencing and resources as taught in Barton see Fig. 23 item "Construct the application specific tunnel..."

Regarding Claim 3, 11, Christopher does not disclose the multi-user interactive software. However, Barton discloses The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the host computer system(Fig. 23 " Access the Remote Computerized Resource...".

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Christopher invention of generating an multi-tenant container to include multi-user interactive software in order to provide for

enterprise software for conferencing and resources as taught in Barton see Fig. 23 item "Construct the application specific tunnel..."

Regarding Claim 4, 12, Christopher discloses the host computer system is connected to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network(Fig. 12 item 1218).

Regarding Claim 5, 13, Christopher discloses the processor is further configured to implement a host- based firewall, the host based-firewall being configured to isolate the host computer system from communicating with one or more other devices on the network(Fig. 4A item "Container Logic", Host File system is spate from Container Logic).

Regarding Claim 6, 14, Christopher discloses the host-based firewall is configured to block incoming communications from the network that are sent to the workspace(Fig. 11, the prevent and intercept tenants).

Regarding Claim 7, 15, Christopher discloses the processor is further configured to run one or more trusted applications in the first memory space, and wherein the trusted applications are configured to communicate with one or more trusted machines via the network(Col 45-63, the multi-tenant set up for communications).

Regarding Claim 8, 16, Christopher discloses the internal isolation firewall is further configured to prompt a user of the host computer system to allow communication between the first memory space and the second memory space(Fig. 2A item "Interceptor", the operating system and container interface).

Conclusion

The Examiner notes that communication through email is permitted only after authorization with submission of PTO/SB/439 form. Please file this form in EFS or thorough central fax before proceeding to communicate via email with the examiner. The submission of the PTO/SB/439 form via email will NOT be accepted.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ***Venkat Perungavoor*** whose telephone number is (571)272-7213. The examiner can normally be reached on 9-5. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ***Saleh Najjar*** can be reached on 571-272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VENKAT PERUNGAVOOR/
Primary Examiner, Art Unit 2492
Email: venkatanarayan.perungavoor@uspto.gov

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04L69/329 , H04L67/10 , H04L63/10 , H04L63/0281 , H04L63/08 , H04L63/104 , H04L67/14 , H04L12/1818 , G06F2009/45587 , G06F2009/45583 , G06F2216/15 , G06F9/452 , G06Q50/01 limited by text and date	05/06/2020	VP
G06F21/53, G06F2221/2149, G06F21/604, G06F2009/45587 limited by text and date	09/04/2020	VP

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

Search Notes		
Search Notes	**Date**	**Examiner**
Google Scholar	05/06/2020	VP
DERWENT limited by text and date	05/06/2020	VP
Inventor Name Search	05/06/2020	VP
Assignee Search	05/06/2020	VP
Global Dossier	05/06/2020	VP
InnovaQ	05/06/2020	VP
see EAST Notes	05/06/2020	VP
Google Patents(Find Similar, Prior Art Citations)	05/06/2020	VP
see EAST Notes	09/04/2020	VP

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/05/2020	09/04/2020							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9	✓	✓							
	10	✓	✓							
	11	✓	✓							
	12	✓	✓							
	13	✓	✓							
	14	✓	✓							
	15	✓	✓							
	16	✓	✓							
	17	N	N							

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L5	5	("8966464" "20140040979").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/09/04 11:09
L6	958	(workspace screen) with (memory disk) with (partition seperat$3 isolat$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/09/04 11:33
L7	0	6 same (collaboration remote screenshot) with (untrusted unauthenticated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/09/04 11:34
L8	14	6 same (untrusted unauthenticated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/09/04 11:34
L9	68	6 AND ((G06F21/53 OR G06F2221/2149 OR G06F21/604 OR G06F2009/45587).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2020/09/04 11:37

EAST Search History (Interference)

<This search history is empty>

9/4/2020 11:39:08 AM
C:\Users\vperungavoor\Documents\EAST\Workspaces\September2020.wsp

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16141535	Filing Date	2018-09-25	Docket Number (if applicable)	LCOM_ENT_Collab_US01	Art Unit	2492
First Named Inventor	Glenn Coleman			Examiner Name	PERUNGAVOOR, VENKATANARAY		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☒ Other PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 505519

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Jeung Huh/	Date (YYYY-MM-DD)	2021-03-08
Name	Jeung (Jacob) Huh	Registration Number	76913

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	16141535
Filing Date:	25-Sep-2018
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Filer:	Jeung Huh/melissa overline
Attorney Docket Number:	LCOM_ENT_Collab_US01

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	1253	1	1480	1480
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1360	1360
		Total in USD ($)		**2840**

Electronic Acknowledgement Receipt

EFS ID:	42116884
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	158266
Filer:	Jeung Huh/melissa overline
Filer Authorized By:	Jeung Huh
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	08-MAR-2021
Filing Date:	25-SEP-2018
Time Stamp:	15:32:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$2840
RAM confirmation Number	E202138F32124321
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		LCOM_ENT_Collab_US01_AS_FILED_Reply_to_FOA_Dated_09_09_20.pdf	147508 0b060c54b982213da6472c2e1360170499ab6945	yes	9

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	6
Applicant Arguments/Remarks Made in an Amendment	7	9

Warnings:

Information:

2	Extension of Time	LCOM_ENT_Collab_US01_AS_FILED_EOT.pdf	144739 8538ab839d0c7fd6cb8449d0f6e90f878de091a8	no	2

Warnings:

Information:

3	Request for Continued Examination (RCE)	LCOM_ENT_Collab_US01_AS_FILED_RCE.pdf	88139 bbbac26dc546dfced13c4fec0b652e069d7e2e2d	no	3

Warnings:

This is not a USPTO supplied RCE SB30 form.

Information:

4	Fee Worksheet (SB06)	fee-info.pdf	32680 4a5fc09ed659b599766b805cdf963dee23a99aaa	no	2

Warnings:

Information:

Total Files Size (in bytes):	413066

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **L3 Technologies, Inc.**	**Confirmation No.: 7622**
Application No.: 16/141,535	**Group Art Unit: 2492**
Filing Date: September 25, 2018	**Examiner: PERUNGAVOOR, VENKATANARAY**

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REPLY PURSUANT TO 37 CFR § 1.114

In response to the Official Action dated **September 9, 2020**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

☐ **Amendments to the Specification** begin on page N/A of this paper.

☒ **Amendments to the Claims** are reflected in the listing of the claims which begins on page 2 of this paper.

☐ **Amendments to the Drawings** begin on page N/A of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 7 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 50-5519.

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A system comprising a processor and memory, the processor configured to:

implement a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implement an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolate the isolated computing environment from the workspace using an internal isolation firewall; [[and]]

authenticate the isolated computing environment with an authentication device; and

send data to an untrusted destination from the multi-user interactive software application ~~associated with the isolated computing environment~~ via a proxy device when ~~, wherein the multi-user interactive software application is unable to send the data until~~ the isolated computing environment has been authenticated ~~with an authentication device~~.

2. (Previously Presented) The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote machine to control an application or process of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process.

3. (Previously Presented) The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the system.

4. (Previously Presented) The system of claim 1, wherein the system is connected to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

5. (Previously Presented) The system of claim 4, wherein the processor is further configured to implement a host-based firewall, the host-based firewall being configured to isolate the system from communicating with one or more other devices on the network.

6. (Original) The system of claim 5, wherein the host-based firewall is configured to block incoming communications from the network that are sent to the workspace.

7. (Original) The system of claim 4, wherein the processor is further configured to run one or more trusted applications in the first memory space, and wherein the trusted applications are configured to communicate with one or more trusted machines via the network.

8. (Previously Presented) The system of claim 1, wherein the internal isolation firewall is further configured to prompt a user of the system to allow communication between the first memory space and the second memory space.

9. (Currently Amended) A method comprising:

implementing a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implementing an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolating the isolated computing environment from the workspace using an internal isolation firewall; [[and]]

authenticating the isolated computing environment with an authentication device; and

sending data to an untrusted destination from the multi-user interactive software application ~~associated with the isolated computing environment~~ via a proxy device when~~,~~ ~~wherein the multi-user interactive software application is unable to send the data until~~ the isolated computing environment has been authenticated ~~with an authentication device~~.

10. (Previously Presented) The method of claim 9, wherein the multi-user interactive software application is configured to allow a remote machine to control an application or process of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process.

11. (Original) The method of claim 9, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the isolated computing environment.

12. (Original) The method of claim 9, further comprising connecting to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

13. (Previously Presented) The method of claim 12, further comprising implementing a host-based firewall, the host-based firewall being configured to isolate the first memory space and the second memory space from communicating with one or more devices on the network.

14. (Original) The method of claim 13, wherein the host-based firewall is configured to block incoming communications from the network that are sent to the workspace.

15. (Original) The method of claim 12, further comprising running one or more trusted applications in the first memory space, wherein the trusted applications are configured to communicate with one or more trusted machines via the network.

16. (Original) The method of claim 9, wherein the internal isolation firewall is further configured to prompt a user of the workspace to allow communication between the first memory space and the second memory space.

17. (Withdrawn) A system comprising:

a network;

an authentication device;

a first computer configured to connect to the network, the first computer comprising a first processor and a first memory, wherein the first processor is configured to:

implement a first workspace, wherein the first workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implement a first isolated computing environment, the first isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application; and

isolate the first isolated computing environment from the first workspace using a first internal isolation firewall; and

a second computer configured to connect to the first computer via the network, the second computer comprising a second processor and a second memory, wherein the second processor is configured to:

implement a second workspace, wherein the second workspace is configured to enable operation of a third set of one or more applications or processes via a third memory space;

implement a second isolated computing environment, the second isolated computing environment being configured to enable operation of a fourth set of one or more applications or processes via a fourth memory space, wherein the fourth set of one or more applications or processes comprises a multi-user interactive software application; and

isolate the second isolated computing environment from the second workspace using a second internal isolation firewall;

wherein the first computer and the second computer are configured to communicate data associated with the multi-user interactive software application via a proxy device, and wherein the multi-user interactive software application is unable to communicate the data until the first isolated computing environment and the second isolated computing environment have authenticated with the authentication device.

REMARKS

Claims 1-16 are pending in the application. Claims 1 and 9 have been amended. No claims have been canceled or added. Support for the amendments to the claims can be found throughout the as-filed specification, such as in paragraphs [0007], [0008], and [0027]-[0029], for example. No new matter has been added.

Rejections of independent claims 1 and 9 under 35 U.S.C. § 103

Claims 1-16 were rejected under 35 U.S.C. § 103 for allegedly being unpatentable over Christopher[1] in view of Barton.[2] Applicant disagrees with the rejections.

Independent claim 1 has been amended to recite sending "data to an untrusted destination from the multi-user interactive software application via a proxy device when the isolated computing environment has been authenticated." But Christopher and Barton, whether alone or in combination, do not teach or suggest these features.

Christopher does not teach or suggest this feature. As admitted in the Office Action, Christopher does not teach or suggest sending "data to an untrusted destination from the multi-user interactive software application associated with the isolated computing environment ...."[3] So, it follows that Christopher cannot be said to teach or suggest sending "data to an untrusted destination from the multi-user interactive software application via a proxy device when the isolated computing environment has been authenticated," as recited in amended claim 1.

Barton also does not teach or suggest this feature. In Barton, a managed application cannot send data to an unmanaged application.

Figure 35 of Barton shows that the Barton managed application cannot send data to the unmanaged application.[4] The unmanaged application in Figure 35 is separate from the managed application.[5] The managed application is "restricted to only be able to communicate with other

[1] U.S. Patent No. 8,966,464.
[2] U.S. Publication No. 2014/0040979.
[3] Office Action dated 09/09/2020, at page 4.
[4] Barton at paras. [0535]-[0538]; FIG. 35.
[5] *Id.*

managed apps…."[6] That is, the managed application can only communicate with another managed application. But the managed application cannot send data to an unmanaged application.[7]

Barton even further clarifies that the managed application cannot send data to the unmanaged application. Specifically, Barton states that the "managed set of applications… are selectively prohibited from sharing files and/or data with applications that are not part of the managed set."[8] In this way, "data are prevented from leaking out of the managed set…," as the managed set of applications are "blocked from exporting data to unmanaged applications."[9] That is, the Barton managed application cannot send data to an unmanaged application.[10] So Barton cannot be said to teach or suggest sending "data to an untrusted destination from the multi-user interactive software application via a proxy device when the isolated computing environment has been authenticated," as recited in amended claim 1.

Accordingly, claim 1 is patentable over Christopher and Barton for at least the reasons above. Because claim 9 recites features that are similar to claim 1, claim 9 is also patentable over Christopher and Barton. Further, at least due to their respective dependence on independent claims 1 and 9, dependent claims 2-8 and 10-16 are also patentable over Christopher and Barton.

[6] Barton at para. [0075].
[7] *See Id.* at paras. [0535]-[0538]; FIG. 35.
[8] *Id.* at para. [0535].
[9] *Id.* at paras. [0170] and [0535].
[10] *Id.*

CONCLUSION

Applicant submits that the present application is in condition for allowance and a Notice of Allowance is requested. Examiner Perungavoor is invited to call Applicant's undersigned representative to discuss the application should the Examiner determine that such a discussion may advance prosecution.

Date: March 8, 2021

/Jeung Huh/
Jeung (Jacob) Huh
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PTO/AIA/22 (10-20)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): LCOM_ENT_Collab_US01

Application Number: 16/141,535

Filed: September 25, 2018

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Art Unit: 2492

Examiner: PERUNGAVOOR, VENKATANARAY

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	Micro Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$220	$110	$55	$
☐ Two months (37 CFR 1.17(a)(2))	$640	$320	$160	$
☑ Three months (37 CFR 1.17(a)(3))	$1,480	$740	$370	$ 1,480.00
☐ Four months (37 CFR 1.17(a)(4))	$2,320	$1,160	$580	$
☐ Five months (37 CFR 1.17(a)(5))	$3,160	$1,580	$790	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-5519.

☑ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 76,913.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Jeung Huh/ — Signature

March 8, 2021 — Date

Jeung (Jacob) Huh — Typed or printed name

215-558-5740 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/141,535	Filing Date 09/25/2018	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/08/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/SHERRY A DAVIS/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

158266 7590 03/18/2021

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EXAMINER	
PERUNGAVOOR, VENKATANARAY	

ART UNIT	PAPER NUMBER
2492	

MAIL DATE	DELIVERY MODE
03/18/2021	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 16/141,535	Applicant(s) Coleman et al.	
	Examiner VENKAT PERUNGAVOOR	Art Unit 2492	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 3/8/2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-17 is/are pending in the application.

5a) Of the above claim(s) 17 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-16 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/8/2021 has been entered.

Response to Arguments

Applicant's arguments with respect to claim(s) 116 have been considered but are moot because the new ground of rejection does not rely on any reference applied in the prior rejection of record for any teaching or matter specifically challenged in the argument.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-8 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Claim limitation “workspace configured to”, “isolated computing environment configured to” , “multi-user interactive software application is configured to”(Claim 2 and Claim 3), “host-based firewall is configured to” (Claim 5 and Claim 6) , “ trusted applications are configured to”(Claim 7), invokes 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph. However, the written description fails to disclose the corresponding structure, material, or acts for performing the entire claimed function and to clearly link the structure, material, or acts to the function. Therefore, the claim is indefinite and is rejected under 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph.

Applicant may:

(a) Amend the claim so that the claim limitation will no longer be interpreted as a limitation under 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph;

(b) Amend the written description of the specification such that it expressly recites what structure, material, or acts perform the entire claimed function, without introducing any new matter (35 U.S.C. 132(a)); or

(c) Amend the written description of the specification such that it clearly links the structure, material, or acts disclosed therein to the function recited in the claim, without introducing any new matter (35 U.S.C. 132(a)).

If applicant is of the opinion that the written description of the specification already implicitly or inherently discloses the corresponding structure, material, or acts and clearly links them to the function so that one of ordinary skill in the art would recognize what structure, material, or acts perform the claimed function, applicant should clarify the record by either:

(a) Amending the written description of the specification such that it expressly recites the corresponding structure, material, or acts for performing the claimed function and clearly links or associates the structure, material, or acts to the claimed function, without introducing any new matter (35 U.S.C. 132(a)); or

(b) Stating on the record what the corresponding structure, material, or acts, which are implicitly or inherently set forth in the written description of the specification, perform the claimed function. For more information, see 37 CFR 1.75(d) and MPEP §§ 608.01(o) and 2181.

The ***Diebold Nixdorf v. ITC*** case illustrates the black box implementation of the structure is not sufficient to overcome the 35 USC §112(f). The case involved an cheque standby unit being understood to be not sufficiently described to have structure in the disclosure and a black box disclosure of this unit in the drawings was deemed insufficient.

And in the case of generic computer being the structure then an algorithm for the generic computer must be disclosed is specifications. See MPEP 2181, II, B[R-10.2019] see citation below with underline for emphasis.

II. DESCRIPTION NECESSARY TO SUPPORT A CLAIM LIMITATION WHICH INVOKES 35 U.S.C. 112(f) or Pre-AIA 35 U.S.C. 112, SIXTH PARAGRAPH

B. *Computer-Implemented Means-Plus-Function Limitations*

The Federal Circuit case law regarding special purpose computer-implemented means-plus-function claims is divided into two distinct groups. The first group includes cases in which the specification discloses no algorithm, and the second group includes cases in which the specification does disclose an algorithm, but an issue exists as to whether the disclosure is adequate to perform the entire claimed function(s). The sufficiency of the algorithm is determined in view of what one of ordinary skill in the art would understand as sufficient to define the structure and make the boundaries of the claim understandable. See *Noah*, 675 F.3d at 1313, 102 USPQ2d at 1417.

Mere reference to a general purpose computer with appropriate programming without providing an explanation of the appropriate programming, or simply reciting "software" without providing detail about the means to accomplish a specific software function, would not be an adequate disclosure of the corresponding structure to satisfy the requirements of 35 U.S.C. 112(b) or pre-AIA 35 U.S.C. 112, second paragraph. *Aristocrat*, 521 F.3d at 1334, 86 USPQ2d at 1239; *Finisar*, 523 F.3d at 1340-41, 86 USPQ2d at 1623. In addition, merely referencing a specialized computer (e.g., a "bank computer"), some undefined component of a computer system (e.g., "access control manager"), "logic," "code," or elements that are essentially a black box designed to perform the recited function, will not be sufficient because there must be some explanation of how the computer or the computer component performs the claimed function. *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1383-85, 91 USPQ2d 1481, 1491-93 (Fed. Cir. 2009); *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1366-67, 88 USPQ2d 1751, 1756-57 (Fed. Cir. 2008); *Rodriguez*, 92 USPQ2d at 1405-06.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having

ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over SICE : A Hardware-Level Strongly Isolated Computing Environment for x86 Multi-core Platforms to Azab in view of US Patent 8566398 to Barnier.

Regarding Claim 1, 9, Azab discloses a host computer system comprising a processor and memory, the processor configured to: implement a workspace, wherein the workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space(Fig. 1 item Protected Memory SMRAM); implement an isolated computing environment, the isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application(Fig. 1 item Isolated Environment) ; isolate the isolated computing environment from the workspace using an internal isolation firewall(Fig. 1 Security Manager); authenticate the isolated computing environment with an authentication device(4.3 Attestation and Secure Communication, attesting to integrity of isolated workload); and send data to an untrusted destination from the multi-user interactive software application via a proxy device when , the isolated computing environment has been authenticated(5.1. Preparing and Initializing the VM).

But Azab does not disclose the multi-user interactive software. However, Barnier discloses send data to an untrusted destination from the multi-user interactive software application associated with the isolated computing environment with via a proxy device(Col 5 Ln 18-43, the collaborate the emails, documentations and exchanges).

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Azab invention of a secure execution in isolated environment to include multi-user interactive software in order to provide for collaboration as taught in Barnier see Col 5 Ln 18-43.

Regarding Claim 2, 10, Azab does not disclose the multi-interactive software. However, Barnier discloses The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote machine to control one or more of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the one or more application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process(Col 5 Ln 18-43, the collaborate the emails, documentations and exchanges).

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Azab invention of a secure execution in isolated environment to include multi-user interactive software in order to provide for collaboration as taught in Barnier see Col 5 Ln 18-43.

Regarding Claim 3, 11, Azab does not disclose the multi-user interactive software. However, Barnier discloses The system of claim 1, wherein the multi-user interactive software application is configured to allow a remote device to control one or more of a pointer device, a keyboard input, or a display of the host computer system(Col 3 Ln 1-11, the plurality of participants participating in workgroup application).

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify Azab invention of generating an multi-tenant container to include multi-user interactive software in order to provide for enterprise software for conferencing and resources as taught in Barton see Fig. 23 item "Construct the application specific tunnel…"

Regarding Claim 4, 12, Azab discloses the host computer system is connected to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network(1. Introduction, hardware, BIOS and cloud service provider).

Regarding Claim 5, 13, Azab discloses the processor is further configured to implement a host- based firewall, the host based-firewall being configured to isolate the host computer system from communicating with one or more other devices on the network(1.3 SICE Overview, the isolated workload).

Regarding Claim 6, 14, Azab discloses the host-based firewall is configured to block incoming communications from the network that are sent to the workspace(1.3 SICE overview, the isolation between environments).

Regarding Claim 7, 15, Azab discloses the processor is further configured to run one or more trusted applications in the first memory space, and wherein the trusted applications are configured to communicate with one or more trusted machines via the network(1.3 SICE Overview, the communication channel with multi-core systems).

Regarding Claim 8, 16, Azab discloses the internal isolation firewall is further configured to prompt a user of the host computer system to allow communication between the first memory space and the second memory space(1.3 SICE Overview, the memory range communications with VMs).

Conclusion

The Examiner notes that communication through email is permitted only after authorization with submission of PTO/SB/439 form. Please file this form in EFS or thorough central fax before proceeding to communicate via email with the examiner. The submission of the PTO/SB/439 form via email will NOT be accepted.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ***Venkat Perungavoor*** whose telephone number is (571)272-7213. The examiner can normally be reached on 9-5. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ***Saleh Najjar*** can be reached on 571-272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VENKAT PERUNGAVOOR/
Primary Examiner, Art Unit 2492
Email: venkatanarayan.perungavoor@uspto.gov

Notice of References Cited	Application/Control No. 16/141,535	Applicant(s)/Patent Under Reexamination Coleman et al.	
	Examiner VENKAT PERUNGAVOOR	Art Unit 2492	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-8566398-B2	10-2013	Barnier; Brian Glen	H04L67/02	709/204
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	SICE: A Hardware-Level Strongly Isolated Computing Environment for x86 Multi-core Platforms. Azab. ACM. (Year: 2011)
	V	Native Client: A Sandbox for Portable, Untrusted x86 Native Code. Yee. IEEE. (Year: 2009)
	W	Enforcing Least Privilege Memory Views for Multithreaded Applications. Hsu. ACM. (Year: 2016)
	X	Thwarting Memory Disclosure with Efficient Hypervisor-enforced Intra-domain Isolation. Liu. ACM. (Year: 2015)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/05/2020	09/04/2020	03/11/2021						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	✓	✓						
	4	✓	✓	✓						
	5	✓	✓	✓						
	6	✓	✓	✓						
	7	✓	✓	✓						
	8	✓	✓	✓						
	9	✓	✓	✓						
	10	✓	✓	✓						
	11	✓	✓	✓						
	12	✓	✓	✓						
	13	✓	✓	✓						
	14	✓	✓	✓						
	15	✓	✓	✓						
	16	✓	✓	✓						
	17	N	N	N						

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04L69/329 , H04L67/10 , H04L63/10 , H04L63/0281 , H04L63/08 , H04L63/104 , H04L67/14 , H04L12/1818 , G06F2009/45587 , G06F2009/45583 , G06F2216/15 , G06F9/452 , G06Q50/01 limited by text and date	05/06/2020	VP
G06F21/53, G06F2221/2149, G06F21/604, G06F2009/45587 limited by text and date	09/04/2020	VP
G06F2009/45583 , G06F21/53 , G06F21/62 , G06F2009/45587 , G06F2212/1052 , G06F9/45516 , G06F9/5077 limited by text and date	03/11/2021	VP

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

Search Notes		
Search Notes	**Date**	**Examiner**
Google Scholar	05/06/2020	VP
DERWENT limited by text and date	05/06/2020	VP
Inventor Name Search	05/06/2020	VP
Assignee Search	05/06/2020	VP
Global Dossier	05/06/2020	VP
InnovaQ	05/06/2020	VP
see EAST Notes	05/06/2020	VP
Google Patents(Find Similar, Prior Art Citations)	05/06/2020	VP
see EAST Notes	09/04/2020	VP
see EAST Notes	03/11/2021	VP
Google Scholar	03/11/2021	VP

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

Web Search History

date, time	web site	search string
3/11/2021 8:07:05 AM	Google Scholar	(~multi-user OR collaborative) AND (isolated) AND (memory) AND (process software)
3/11/2021 8:07:32 AM	Google Scholar	(~multi-user OR collaborative) AND (isolated) AND (memory) AND (process software) [before:2016]
3/11/2021 8:08:27 AM	Google Scholar	[before:2016] (~multi-user OR collaborative) AND (seperated) AND (memory) AND (process software)
3/11/2021 8:08:54 AM	Google Scholar	[before:2016] (~multi-user OR collaborative) AND (separated) AND (memory) AND (process software) AND (untrust)
3/11/2021 8:09:06 AM	Google Scholar	[before:2016] (~multi-user OR collaborative) AND (separated) AND (memory) AND (process software) AND (trust)
3/11/2021 8:09:18 AM	Google Scholar	(~multi-user OR collaborative) AND (separated) AND (memory) AND (process software) AND (trust) [before:2016]
3/11/2021 8:09:40 AM	Google Scholar	[before:2016] (collaboration) AND (separated) AND (memory) AND (software) AND (trust)
3/11/2021 8:10:01 AM	Google Scholar	[before:2016] (separated) AND (memory) AND (software)
3/11/2021 8:10:19 AM	Google Scholar	[before:2016] (separated) AND (~memory storage) AND (software)
3/11/2021 8:10:28 AM	Google Scholar	(separated) AND (~memory storage) AND (software) [before:2016]
3/11/2021 8:11:39 AM	Google Scholar	[before:2016] (separated isolated) AND (~memory storage)
3/11/2021 8:11:54 AM	Google Scholar	[before:2016] (separated isolated) AND (~memory storage) AND (tust untrust)
3/11/2021 8:13:59 AM	Google Scholar	[before:2016] (separated isolated) AND (~memory storage) AND (trusted untrusted)
3/11/2021 8:14:32 AM	Google Scholar	(separated isolated) AND (~memory storage) AND (trusted untrusted) [before:2016]
3/11/2021 8:18:07 AM	Google	Ahmed M. Azab NC state

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S146	32	((multi-user collaborat$3 shar$3) same (memory disk storage) with (separat$2 isolat$3 divid$3) with (trust$3 untrust$3 safe) with (authenticat$3 verif$5 author$5))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 08:22
S147	33	((multi-user collaborat$3 shar$3 workspace) same (memory disk storage) with (separat$2 isolat$3 divid$3) with (trust$3 untrust$3 safe) with (authenticat$3 verif$5 author$5))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 08:22
S148	20	S147 and (@rlad<"20170928")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 08:23
S149	10	S147 AND ((G06F2009/45583 OR G06F21/53 OR G06F21/62 OR G06F2009/45587 OR G06F2212/1052 OR G06F9/45516 OR G06F9/5077).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 08:25
S150	68,516	((multi-user collaborat$3 shar$3 workspace) same (memory disk storage) with (separat$2 isolat$3 divid$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 09:26
S151	12,273	S150 same (firewall block$3 prevent$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 09:33
S152	4,853	S151 and (@rlad<"20170928")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 09:36
S153	4,832	S152 and (multi-user shar$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 09:37

S154	270	S152 and ((authenticat$3 verif$5 authori$5) adj (software process))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 09:38
S155	4	(multi-user shar$3) same (memory) with (secur trust$3) with (firewall)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 09:42
S156	25	(multi-user shar$3) same (memory) with (secure trust$3) with (firewall)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 09:42
S157	16	S156 and (@rlad<"20170928")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/03/11 09:42

EAST Search History (Interference)

<This search history is empty>

3/11/2021 11:57:18 AM
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UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

158266 7590 04/01/2021

Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

EXAMINER	
PERUNGAVOOR, VENKATANARAY	

ART UNIT	PAPER NUMBER
2492	

MAIL DATE	DELIVERY MODE
04/01/2021	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Examiner-Initiated Interview Summary	**Application No.** 16/141,535	**Applicant(s)** Coleman et al.		
	Examiner VENKAT PERUNGAVOOR	**Art Unit** 2492	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
VENKAT PERUNGAVOOR	Primary Examiner	Telephonic
N/A	Attorney	

Date of Interview: 22 March 2021

Issues Discussed:

Other

The attorney contacted the examiner and mentioned that page 10 of last office action sent on 3/18/2021 says it is an Final Rejection. The examiner pointed out that the last office action is an Non-Final Rejection and not an Final Rejection. And the conclusion section is wrong, and it is an mistake in drafting the office action. The first page of the office action and the coding within the PAIR correctly identifies the action as an Non-Final. The applicant requested an interview summary to make the record clear, this interview summary is being sent for that purpose.

/VENKAT PERUNGAVOOR/ Primary Examiner, Art Unit 2492	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **L3 Technologies, Inc.**	**Confirmation No.: 7622**
Application No.: 16/141,535	**Group Art Unit: 2492**
Filing Date: September 25, 2018	**Examiner: PERUNGAVOOR, VENKATANARAY**

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REPLY PURSUANT TO 37 CFR § 1.111

In response to the Official Action dated **March 18, 2021**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

☐ **Amendments to the Specification** begin on page N/A of this paper.

☒ **Amendments to the Claims** are reflected in the listing of the claims which begins on page 2 of this paper.

☐ **Amendments to the Drawings** begin on page N/A of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 7 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 50-5519.

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A system comprising ~~a processor and memory, the processor configured to~~:

a memory; and

a processor configured to:

implement a workspace that uses a host operating system, wherein the workspace enables ~~is configured to enable~~ operation of a first set of one or more applications or processes via a first memory space;

implement an isolated computing environment that uses the host operating system, wherein the isolated computing environment enables ~~being configured to enable~~ operation of a second set of one or more applications or processes via a second memory space, and wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolate the isolated computing environment from the workspace using an internal isolation firewall;

authenticate the isolated computing environment with an authentication device; and

send data to an untrusted destination from the multi-user interactive software application via a proxy device when the isolated computing environment has been authenticated.

2. (Currently Amended) The system of claim 1, wherein the multi-user interactive software application allows ~~is configured to allow~~ a remote machine to control an application or process of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the application or process comprises at least one of

viewing, interacting with, modifying, uploading data to, or downloading data from the application or process.

3. (Currently Amended) The system of claim 1, wherein the multi-user interactive software application allows ~~is configured to allow~~ a remote device to control one or more of a pointer device, a keyboard input, or a display of the system.

4. (Previously Presented) The system of claim 1, wherein the system is connected to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

5. (Currently Amended) The system of claim 4, wherein the processor is further configured to:

implement a host-based firewall, wherein the host-based firewall isolates ~~being configured to isolate~~ the system from communicating with one or more other devices on the network.

6. (Currently Amended) The system of claim 5, wherein the host-based firewall blocks ~~is configured to block~~ incoming communications from the network that are sent to the workspace.

7. (Currently Amended) The system of claim 4, wherein the processor is further configured to:

run one or more trusted applications in the first memory space, and wherein the one or more trusted applications ~~are configured to~~ communicate with one or more trusted machines via the network.

8. (Currently Amended) The system of claim 1, wherein the internal isolation firewall prompts ~~is further configured to prompt~~ a user of the system to allow communication between the first memory space and the second memory space.

9. (Currently Amended) A method comprising:

implementing a workspace that uses a host operating system, wherein the workspace enables ~~is configured to enable~~ operation of a first set of one or more applications or processes via a first memory space;

implementing an isolated computing environment that uses the host operating system, wherein the isolated computing environment enables ~~being configured to enable~~ operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolating the isolated computing environment from the workspace using an internal isolation firewall;

authenticating the isolated computing environment with an authentication device; and

sending data to an untrusted destination from the multi-user interactive software application via a proxy device when the isolated computing environment has been authenticated.

10. (Currently Amended) The method of claim 9, wherein the multi-user interactive software application allows ~~is configured to allow~~ a remote machine to control an application or process of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or process.

11. (Currently Amended) The method of claim 9, wherein the multi-user interactive software application allows ~~is configured to allow~~ a remote device to control one or more of a pointer device, a keyboard input, or a display of the isolated computing environment.

12. (Original) The method of claim 9, further comprising connecting to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

13. (Currently Amended) The method of claim 12, further comprising:

implementing a host-based firewall, wherein the host-based firewall isolates ~~being configured to isolate~~ the first memory space and the second memory space from communicating with one or more devices on the network.

14. (Currently Amended) The method of claim 13, wherein the host-based firewall blocks ~~is configured to block~~ incoming communications from the network that are sent to the workspace.

15. (Currently Amended) The method of claim 12, further comprising:

running one or more trusted applications in the first memory space, wherein the one or more trusted applications ~~are configured to~~ communicate with one or more trusted machines via the network.

16. (Currently Amended) The method of claim 9, wherein the internal isolation firewall prompts ~~is further configured to prompt~~ a user of the workspace to allow communication between the first memory space and the second memory space.

17. (Withdrawn) A system comprising:

a network;

an authentication device;

a first computer configured to connect to the network, the first computer comprising a first processor and a first memory, wherein the first processor is configured to:

implement a first workspace, wherein the first workspace is configured to enable operation of a first set of one or more applications or processes via a first memory space;

implement a first isolated computing environment, the first isolated computing environment being configured to enable operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application; and

isolate the first isolated computing environment from the first workspace using a first internal isolation firewall; and

a second computer configured to connect to the first computer via the network, the second computer comprising a second processor and a second memory, wherein the second processor is configured to:

implement a second workspace, wherein the second workspace is configured to enable operation of a third set of one or more applications or processes via a third memory space;

implement a second isolated computing environment, the second isolated computing environment being configured to enable operation of a fourth set of one or more applications or processes via a fourth memory space, wherein the fourth set of one or more applications or processes comprises a multi-user interactive software application; and

isolate the second isolated computing environment from the second workspace using a second internal isolation firewall;

wherein the first computer and the second computer are configured to communicate data associated with the multi-user interactive software application via a proxy device, and wherein the multi-user interactive software application is unable to communicate the data until the first isolated computing environment and the second isolated computing environment have authenticated with the authentication device.

REMARKS

Claims 1-16 are pending in the application. Claims 1-3, 5-11, and 13-16 have been amended. No claims have been canceled or added. Support for the claim amendments can be found throughout the as-filed application, such as in paragraphs [0026], [0027], [0048], and [0051] of the specification and Figures 2-4, for example. No new matter has been added.

Claim Interpretation under 35 U.S.C. § 112

The Office Action rejects claims 1-8 under 35 U.S.C. § 112(b) and § 112(f) as indefinite for allegedly reciting functional language that is not tied to a structure.[1] Specially, it appears that the Office Action takes issue with the terms "workspace configured to enable," "isolated computing environment configured to enable," "multi-user interactive software application is configured to allow," "host-based firewall is configured to isolate," "host-based firewall is configured to block," and "trusted applications are configured to communicate." Claims 1-8 have been amended to recite "workspace enables," "isolated computing environment enables," "multi-user interactive software application allows," "host-based firewall isolates," "host-based firewall blocks," and "trusted applications communicate." Accordingly, Applicant requests withdrawal and reconsideration of the rejections.

Rejections of independent claims 1 and 9 under 35 U.S.C. § 103

Claims 1-16 were rejected under 35 U.S.C. § 103 for allegedly being unpatentable over Azab[2] in view of Barnier.[3] Applicant disagrees with the rejections.

Independent claim 1 has been amended to recite, in part, implementing "an isolated computing environment that uses the host operating system …." But Azab and Barnier do not teach or suggest these features.

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[1] Office Action dated 03-18-2021, pp. 2-5.
[2] A. Azhab, et el. "Azab: A hardware-level strongly isolated computing environment for x86 multi-core platforms" 17 Oct. 2011.
[3] U.S. Patent No. 8566398.

Azab does not teach or suggest this feature. For example, Azab does not implement an isolated computing system using a host operating system. Rather, Azab does isolates an environment without using the host operating system (OS).

Figure 2 of Azab shows that Azab's isolated environment does not use a host operating system.[4] Specifically, the isolated environment in Figure 2 is separate and independent from the host. And the isolated environment does not use any software component in the host environment to execute an isolated environment. Azab even states that Azabit "does not rely on any software component in the host environment (i.e., an OS or a hypervisor)."[5] Thus, Azab merely isolates an environment without using the host OS.

But isolating an environment without using a host OS is not equivalent to implementing "an isolated computing environment ***that uses the host operating system*** …," as recited in amended claim 1 (emphasis added). For one thing, the isolated environment in Azab does intentionally avoids using the host operating. Specifically, Azab states that when "the legacy host requires the isolated workload to run," Azab triggers system management interrupt (SMI) to switch the processor's execution environment from the host OS to the isolated environment.[6] That is, using the host OS, the security manager for the isolated environment runs.[7] And the security manager for the isolated environment is separate and independent from the host OS. So, Azab does not teach or suggest implementing "an isolated computing environment that uses the host operating system …," as claim 1 recites.

Further, Barnier does not teach or suggest implementing "an isolated computing environment that uses the host operating system …," as claim 1 recites. Barnier is directed towards an extranet that includes a network.[8] And there is no discussion of Barnier of operating systems, let alone a host operating system. In fact, the term "operating system" does not even appear in Barnier. So, Barnier does not teach or suggest implementing "an isolated computing environment that uses the host operating system …," as claim 1 recites.

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[4] *See* Azab FIG 2; *see also* FIG. 1.
[5] *Id.* at p. 375.
[6] *Id.* at pp. 379-380; *see also* FIG. 2.
[7] *Id.*
[8] Barnier at *Abstract.*

Accordingly, claim 1 is patentable over Azab and Barnier for at least the reasons above. Because claim 9 recites features that are similar to claim 1, claim 9 is also patentable over Azab and Barnier. Further, at least due to their respective dependence on independent claims 1 and 9, dependent claims 2-8 and 10-16 are also patentable over Azab and Barnier.

CONCLUSION

Applicant submits that the present application is in condition for allowance and a Notice of Allowance is requested. Examiner Perungavoor is invited to call Applicant's undersigned representative to discuss the application should the Examiner determine that such a discussion may advance prosecution

Date: September 13, 2021

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Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Glenn Coleman
				Art Unit	2492
				Examiner Name	Perungavoor, Venkatanaray
Sheet	1	of	10	**Attorney Docket Number**	LCOM_ENT_Collab_US01

U.S. PATENTS						
Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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Examiner Initials*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T
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Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
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NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T
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EXAMINER SIGNATURE			
Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

DOCKET NO.: LCOM_ENT_Collab_US01 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **L3 Technologies, Inc.**	**Confirmation No.: 7622**
Application No.: 16/141,535	**Group Art Unit: 2492**
Filing Date: September 25, 2018	**Examiner: PERUNGAVOOR, VENKATANARAY**

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Filed Via EFS

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).

☐ **IDS Filed Under 37 CFR 1.97(b)**

In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

☒ **IDS filed Under 37 CFR 1.97(c)**

In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.116 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

- ☐ Certification in Accordance with § 1.97(e) is attached; or
- ☒ The fee of **$260.00** as set forth in § 1.17(p) is attached.

☐ **IDS filed Under 37 CFR 1.97(d)**

In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of **$240.00** as set forth in § 1.17(p).

CONTENT OF IDS PURSUANT TO 37 CFR 1.98

☒ Copies of reference numbers 36-120 listed on the attached Form PTO-1449 are not required to be submitted pursuant to 37 CFR § 1.98(a)(2)(ii).

☒ Copies of reference numbers 121-128 listed on the attached Form PTO-1449 are enclosed herewith.

☐ Copy of reference number is not being submitted because it was previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number , filed for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

REFERENCES IN A LANGUAGE OTHER THAN ENGLISH

☐ The following documents are not in the English language. Accordingly, a concise explanation of the relevance of the document was incorporated in the specification passages identified below, the document was identified in a foreign communication as identified below or an English language counterpart application has been provided as indicated below.

Foreign Language Document	Cite No.	Pages of Reference in Specification or Relevance of Document

Foreign Language Document	Cite No.	English Language Counterpart	Cite No.

☐ **CERTIFICATION IN ACCORDANCE WITH § 1.97(e)**

I hereby certify that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

Please charge any deficiency or credit any overpayment to Deposit Account No. 50-5519.

Date: September 13, 2021

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PTO/AIA/22 (10-20)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)

Docket Number (Optional): LCOM_ENT_Collab_US01

Application Number: 16/141,535

Filed: September 25, 2018

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Art Unit: 2492

Examiner: PERUNGAVOOR, VENKATANARAY

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	Micro Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$220	$110	$55	$
☐	Two months (37 CFR 1.17(a)(2))	$640	$320	$160	$
☑	Three months (37 CFR 1.17(a)(3))	$1,480	$740	$370	$ 1480
☐	Four months (37 CFR 1.17(a)(4))	$2,320	$1,160	$580	$
☐	Five months (37 CFR 1.17(a)(5))	$3,160	$1,580	$790	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-5519.

☑ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 76,913.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Jeung Huh/ — Signature

September 14, 2021 — Date

Jeung (Jacob) Huh — Typed or printed name

215-558-5740 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 (one) forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	16141535
Filing Date:	25-Sep-2018
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Filer:	Jeung Huh/Melissa Inzaris
Attorney Docket Number:	LCOM_ENT_Collab_US01

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	1253	1	1480	1480
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
		Total in USD ($)		**1740**

Electronic Acknowledgement Receipt

EFS ID:	43758770
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	158266
Filer:	Jeung Huh/Melissa Inzaris
Filer Authorized By:	Jeung Huh
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	14-SEP-2021
Filing Date:	25-SEP-2018
Time Stamp:	12:47:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1740
RAM confirmation Number	E20219DC48073806
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IMS-MT-C5-0150_LCOM_ENT_Collab_US01_Reply_to_NFOA_Dated_03_18_2021.pdf	170754 1b73a9e7880788b018fc4f594438b203e9434f29	yes	9

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	6
Applicant Arguments/Remarks Made in an Amendment	7	9

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	LCOM_ENT_Collab_US01_AS_FILED_IDS_1449.pdf	207281 90cc7a9f688845769ee6214b9f6afcbda52a681d	no	10

Warnings:

Information:

This is not an USPTO supplied IDS fillable form

3	Transmittal Letter	LCOM_ENT_Collab_US01_AS_FILED_IDS_Transmittal.pdf	93680 f7f2ec2bc95013a8ead104e89c261fd86af928fd	no	3

Warnings:

Information:

4	Non Patent Literature	121_NPL_search_terms.pdf	72923 77098bd7c7c90f55d6d351fd7318485ed7890f6b	no	1

Warnings:

Information:

5	Non Patent Literature	122_Bruckman_Georgia_computes_Improving_the_Computing_Education.pdf	690911 801587ca5f04f91ea307bd8e5091fc178b9eda67	no	5
Warnings:					
Information:					
6	Non Patent Literature	123_Comodo_Internet_Security_ver7_user_guide.pdf	17419094 b1ff2a8b57c42c2a44aa506edea100bcecdea97f	no	579
Warnings:					
Information:					
7	Non Patent Literature	124_Jauernig_Trusted_Execution_Environments.pdf	1072002 446f14f89b4cfaa2d908dc85fefee262b477b74f	no	5
Warnings:					
Information:					
8	Non Patent Literature	125_Jung_AnArchitectureFor_2014_8pp.pdf	4131524 a3f128711eccbd57c10c6c1b55ba4f3e64cbd176	no	8
Warnings:					
Information:					
9	Non Patent Literature	126_Kostiainen_Dedicated_Security_Chips_in_the_Age.pdf	2053917 0516025b109fe79f89fad08f720dd2d7c04129e4	no	9
Warnings:					
Information:					
10	Non Patent Literature	127_Phuoc_Le_Computing_the_Real_Isolated_Points.pdf	554321 012a33383f3ef8eaac72d5cde43f87ee3a269483	no	12
Warnings:					
Information:					
11	Non Patent Literature	128_Srivastava_TamperResistant_2008_20pp.pdf	3825849 68fe4ec13956549ff1b2e959b60c7d3e96f06644	no	20
Warnings:					
Information:					

12	Extension of Time	LCOM_ENT_Collab_US01_AS_FILED_EOT.pdf	140781 14afb614bcda31ebed608a755f426fcae096f176	no	2
Warnings:					
Information:					
13	Fee Worksheet (SB06)	fee-info.pdf	40685 b84a91cdac7f8ac25e919991238a4489095f0d04	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	30473722		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Peter Martz
				Art Unit	2492
				Examiner Name	PERUNGAVOOR, VENKATANARAY
Sheet	1	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

U.S. PATENTS						
Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

U.S. PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	129	9560081	B1	2017-01-31	Woolward, Marc	
	130	10375111	B2	2019-08-06	Schultz, Benjamin M., et al.	

FOREIGN PATENT DOCUMENTS								
Examiner Initials*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Peter Martz
				Art Unit	2492
				Examiner Name	PERUNGAVOOR, VENKATANARAY
Sheet	2	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T

EXAMINER SIGNATURE			
Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Patent Application Fee Transmittal

Application Number:	16141535
Filing Date:	25-Sep-2018
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Filer:	Jeung Huh/melissa overline
Attorney Docket Number:	LCOM_ENT_Collab_US01

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
		Total in USD ($)		**260**

Electronic Acknowledgement Receipt

EFS ID:	43982895
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	158266
Filer:	Jeung Huh/melissa overline
Filer Authorized By:	Jeung Huh
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	08-OCT-2021
Filing Date:	25-SEP-2018
Time Stamp:	11:46:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$260
RAM confirmation Number	E202108B46120089
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	LCOM_ENT_Collab_US01_AS_FILED_SIDS_Transmittal.pdf	93748 50a1c501ef6c8637e86f08e5ba5eff744e835d6b	no	3
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	LCOM_ENT_Collab_US01_AS_FILED_SIDS_1449.pdf	163001 7dc44779d0b0ef19cf7bfa058d1ae118f1fd39e8	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Fee Worksheet (SB06)	fee-info.pdf	38212 e467bf31202251ed8023cf1c22027fa9ddcf7237	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	294961		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DOCKET NO.: LCOM_ENT_Collab_US01 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **L3 Technologies, Inc.**	**Confirmation No.: 7622**
Application No.: 16/141,535	**Group Art Unit: 2492**
Filing Date: September 25, 2018	**Examiner: PERUNGAVOOR, VENKATANARAY**

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Filed Via EFS

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).

☐ **IDS Filed Under 37 CFR 1.97(b)**

In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

☒ **IDS filed Under 37 CFR 1.97(c)**

In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.116 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

- ☐ Certification in Accordance with § 1.97(e) is attached; or
- ☒ The fee of **$260.00** as set forth in § 1.17(p) is attached.

☐ **IDS filed Under 37 CFR 1.97(d)**

In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of **$240.00** as set forth in § 1.17(p).

CONTENT OF IDS PURSUANT TO 37 CFR 1.98

☒ Copies of reference numbers 129-130 listed on the attached Form PTO-1449 are not required to be submitted pursuant to 37 CFR § 1.98(a)(2)(ii).

☐ Copies of reference numbers listed on the attached Form PTO-1449 are enclosed herewith.

☐ Copy of reference number is not being submitted because it was previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number , filed for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

REFERENCES IN A LANGUAGE OTHER THAN ENGLISH

☐ The following documents are not in the English language. Accordingly, a concise explanation of the relevance of the document was incorporated in the specification passages identified below, the document was identified in a foreign communication as identified below or an English language counterpart application has been provided as indicated below.

Foreign Language Document	Cite No.	Pages of Reference in Specification or Relevance of Document

Foreign Language Document	Cite No.	English Language Counterpart	Cite No.

☐ **CERTIFICATION IN ACCORDANCE WITH § 1.97(e)**

I hereby certify that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

Please charge any deficiency or credit any overpayment to Deposit Account No. 50-5519.

Date: October 7th, 2021

/Jeung Huh/
Jeung (Jacob) Huh
Registration No. 76,913

CONDO ROCCIA KOPTIW LLP
1800 JFK Blvd., Suite 1700
Philadelphia, PA 19103
Telephone: (215) 558-5740
Facsimile: (215) 558-5676

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

158266 7590 10/12/2021

Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

EXAMINER	
PERUNGAVOOR, VENKATANARAY	

ART UNIT	PAPER NUMBER
2492	

MAIL DATE	DELIVERY MODE
10/12/2021	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 16/141,535	Applicant(s) Coleman et al.	
	Examiner VENKAT PERUNGAVOOR	Art Unit 2492	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 9/14/2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☑ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-17 is/are pending in the application.

5a) Of the above claim(s) 17 is/are withdrawn from consideration.

6) ☑ Claim(s) 1-16 is/are allowed.

7) ☐ Claim(s) _____ is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

And Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

Quayle Action

This application is in condition for allowance except for the following formal matters:

Claim 17 which is in withdrawn status needs to be cancelled when it is passed to allowance.

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 25 USPQ 74, 453 O.G. 213, (Comm'r Pat. 1935).

A shortened statutory period for reply to this action is set to expire **TWO (2) MONTHS** from the mailing date of this letter. Extensions of time may be granted under 37 CFR 1.136 but in no case can any extension carry the date for reply to this Office action beyond the maximum period of SIX MONTHS set by statute (35 U.S.C. 133).

Allowable Subject Matter

Claims 1-16 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The applicant's amendments to claims 1-8 overcomes the 35 USC 112(b) rejection and thus withdrawn.

The Applicant argument(s) regarding " an isolated computing environment that uses the host operating system" is persuasive. See Reply filed on 9/14/2021 Page 8-9.

The primary reason for the allowance of the claims is the inclusion of the limitation in all the claims which is not found in the prior art references.

The closest prior art found is Shreds: Fine-grained Execution Units with Private Memory to Chen which discloses an private memory being used for execution of threads see Fig. 2 & Abstract & C. S-complier: automatic toolchain for shred verification and instrumentation. However, Chen does not disclose " an isolated computing environment that uses the host operating system".

The next closest prior art found is US Patent Pub 2015/0106822 to Lei which discloses the memory segment isolation and inter-processing cores OS isolation Abstract & Par. 0016 & Par. 0075 & Fig. 1a. However, Lei does not disclose " an isolated computing environment that uses the host operating system".

The next closest prior art found is US Patent Pub 2010/0217916 to Gao which discloses the allocating of shared memory for VMs using Guest OS see Abstract & Par. 0044-0046 & Fig. 3. However, Gao does not disclose " an isolated computing environment that uses the host operating system".

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ***Venkat Perungavoor*** whose telephone number is (571)272-7213. The examiner can normally be reached on 9-5.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ***Saleh Najjar*** can be reached on 571-272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see https://ppairmy.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VENKAT PERUNGAVOOR/
Primary Examiner, Art Unit 2492
Email: venkatanarayan.perungavoor@uspto.gov

Notice of References Cited	Application/Control No. 16/141,535	Applicant(s)/Patent Under Reexamination Coleman et al.	
	Examiner VENKAT PERUNGAVOOR	Art Unit 2492	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20140380403-A1	12-2014	Pearson; Adrian	G06F21/57	726/1
*	B	US-20120266149-A1	10-2012	Lebert; Berthold M.	G06F9/44563	717/166
*	C	US-20170293432-A1	10-2017	Oldcorn; David	G06F3/064	1/1
*	D	US-20150248554-A1	09-2015	DUMITRU; Bogdan C.	G06F9/45558	726/1
*	E	US-20150106822-A1	04-2015	LEI; Xiaosong	G06F9/4405	718/104
*	F	US-20100217916-A1	08-2010	Gao; Zhi Guo	G06F12/1036	711/6
	G					
	H					
	I					
	J					
	K					
	L					
	M					

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Shreds: Fine-grained Execution Units with Private Memory. Chen. IEEE. (Year: 2016)
	V	Trellis: Privilege Separation for Multi-user Applications Made Easy. Mambretti. Springer. (Year: 2016)
	W	Iso-X: A Flexible Architecture for Hardware-Managed Isolated Execution. Evtyushkin. IEEE. (Year: 2014)
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04L69/329 , H04L67/10 , H04L63/10 , H04L63/0281 , H04L63/08 , H04L63/104 , H04L67/14 , H04L12/1818 , G06F2009/45587 , G06F2009/45583 , G06F2216/15 , G06F9/452 , G06Q50/01 limited by text and date	05/06/2020	VP
G06F21/53, G06F2221/2149, G06F21/604, G06F2009/45587 limited by text and date	09/04/2020	VP
G06F2009/45583 , G06F21/53 , G06F21/62 , G06F2009/45587 , G06F2212/1052 , G06F9/45516 , G06F9/5077 limited by text and date	03/11/2021	VP

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

Search Notes		
Search Notes	**Date**	**Examiner**
Google Scholar	05/06/2020	VP
DERWENT limited by text and date	05/06/2020	VP
Inventor Name Search	05/06/2020	VP
Assignee Search	05/06/2020	VP
Global Dossier	05/06/2020	VP
InnovaQ	05/06/2020	VP
see EAST Notes	05/06/2020	VP
Google Patents(Find Similar, Prior Art Citations)	05/06/2020	VP
see EAST Notes	09/04/2020	VP
see EAST Notes	03/11/2021	VP
Google Scholar	03/11/2021	VP
see EAST Notes	09/29/2021	VP
Google Scholar	09/29/2021	VP

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	General interference search of claims (USPAT, USPGPUBS)	09/29/2021	VP

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/05/2020	09/04/2020	03/11/2021	10/04/2021					
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Web Search History

date, time	web site	search string
9/29/2021 3:21:08 PM	Google Scholar	multi-user AND interactive AND software AND ~isolate AND memory AND OS
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EAST Search History

EAST Search History (Prior Art)

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S113	2	(multi-user adj workspace).ab.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/09/29 15:14
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S116	51	S115 same ((operating adj system) OS)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/09/29 15:17
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S120	5	S118 and S115	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/09/29 15:52

S121	14	S119 and (isolat$3 segerat$3 seperat$3) and (memory adj space)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/09/29 15:53
S122	9	S121 and (@rlad<"20170928" @ad<"20170928")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2021/09/29 15:53

EAST Search History (Interference)

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Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Glenn Coleman
				Art Unit	2492
				Examiner Name	Perungavoor, Venkatanaray
Sheet	1	of	10	**Attorney Docket Number**	LCOM_ENT_Collab_US01

U.S. PATENTS						
Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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	37	7467408	B1	2008-12-16	O'Toole Jr., James W.	
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	45	9294492	B1	2016-03-22	Martini et al.	
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U.S. PATENTS						
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				Examiner Name	Perungavoor, Venkatanaray
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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	59	10521612	B2	2019-12-31	Arad et al.	
	60	10554475	B2	2020-02-04	Weinstein et al.	
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U.S. PATENT APPLICATION PUBLICATIONS						
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	67	20060282795	A1	2006-12-14	Clark et al.	
	68	20070136579	A1	2007-06-14	Levy et al.	
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	75	20110299515	A1	2011-12-08	Robertson et al.	
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	77	20120054744	A1	2012-03-01	Singh et al.	
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	79	20130132948	A1	05-23-2013	Hari, et al.	
	80	20130145463	A1	2013-06-06	Ghosh et al.	
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	85	20140282890	A1	2014-09-18	Li et al.	
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Sheet	6	of	10	**Attorney Docket Number**	LCOM_ENT_Collab_US01

U.S. PATENT APPLICATION PUBLICATIONS						
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	89	20160057167	A1	2016-02-25	Bach, Timothy	
	90	20160134549	A1	2016-05-12	Abel et al.	
	91	20160226834	A1	2016-08-04	Dawson, Martin	
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	93	20160248754	A1	2016-08-25	Jahr, Jeffrey Stephen	
	94	20160292694	A1	2016-10-06	Goldschlag et al.	
	95	20170034174	A1	2017-02-02	Jagers, Stefan	
	96	20170076092	A1	2017-03-16	Kashyap et al.	
	97	20170142144	A1	2017-05-18	Weinberger et al.	
	98	20170180413	A1	2017-06-22	Petry et al.	

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U.S. PATENT APPLICATION PUBLICATIONS						
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	99	20170206351	A1	2017-07-20	Jay et al.	
	100	20170208067	A1	2017-07-20	Sriramakrishnan, Sarma	
	101	20170250997	A1	2017-08-31	Rostamabadi et al.	
	102	20170317978	A1	2017-11-02	Diaz-Cuellar et al.	
	103	20170359309	A1	2017-12-14	Bolte et al.	
	104	20180027006	A1	2018-01-25	Zimmermann et al.	
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /V.P/

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Glenn Coleman
				Art Unit	2492
				Examiner Name	Perungavoor, Venkatanaray
Sheet	8	of	10	**Attorney Docket Number**	LCOM_ENT_Collab_US01

U.S. PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	110	20180234422	A1	2018-08-16	Odom et al.	
	111	20180276396	A1	2018-09-27	Yablokov et al.	
	112	20180330257	A1	2018-11-15	Dodson et al.	
	113	20180367528	A1	2018-12-20	Schwarz et al.	
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	120	20190213325	A1	2019-07-11	McKerchar et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /V.P/

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Glenn Coleman
				Art Unit	2492
				Examiner Name	Perungavoor, Venkatanaray
Sheet	9	of	10	**Attorney Docket Number**	LCOM_ENT_Collab_US01

FOREIGN PATENT DOCUMENTS								
Examiner Initials*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T
	121	"NPL Search Term", Web Search History, 1 page	
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	124	JAUERNIG et al., "Trusted Execution Environments: Properties, Applications, and Challenges", IEEE Computer and Reliability Societies, Resilient Security, March-April 2020, pp. 56-60	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /V.P/

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Glenn Coleman
				Art Unit	2492
				Examiner Name	Perungavoor, Venkatanaray
Sheet	10	of	10	**Attorney Docket Number**	LCOM_ENT_Collab_US01

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T
	125	JUNG et al., "An Architecture for Virtualization-Based Trusted Execution Environment on Mobile Devices", 2014 IEEE 11th International Conference on Ubiquitous Intelligence and Computing and 2014 IEEE 11th International Conference on Autonomic and Trusted Computing and 2014 IEEE 14th International Conference on Scalable Computing and Communications and, Associated Symposia/Workshops, 2014, pp. 540-547	
	126	KOSTIAINEN et al., "Dedicated Security Chips in the Age of Secure Enclaves", IEEE Computer and Reliability Societies; Hardware-Assisted Security, September-October 2020, pp. 38-46	
	127	LE et al., "Computing the Real Isolated Points of an Algebraic Hypersurface", International Symposium on Symbolic and Algebraic Computation, August 24, 2020, 12 pages	
	128	SRIVASTAVA et al., "Tamper-Resistant, Application-Aware Blocking of Malicious Network Connections", School of Computer Science, Georgia Institute of Technology, 2008, pp. 39-58	

EXAMINER SIGNATURE			
Examiner Signature	/VENKAT PERUNGAVOOR/	Date Considered	09/29/2021
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /V.P/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **L3 Technologies, Inc.**	**Confirmation No.: 7622**
Application No.: 16/141,535	**Group Art Unit: 2492**
Filing Date: September 25, 2018	**Examiner: PERUNGAVOOR, VENKATANARAY**

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REPLY PURSUANT TO 37 CFR § 1.111

In response to the Official Action dated **October 12, 2021**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

☐ **Amendments to the Specification** begin on page N/A of this paper.

☒ **Amendments to the Claims** are reflected in the listing of the claims which begins on page 2 of this paper.

☐ **Amendments to the Drawings** begin on page N/A of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 6 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 50-5519.

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously Presented) A system comprising:

a memory; and

a processor configured to:

implement a workspace that uses a host operating system, wherein the workspace enables operation of a first set of one or more applications or processes via a first memory space;

implement an isolated computing environment that uses the host operating system, wherein the isolated computing environment enables operation of a second set of one or more applications or processes via a second memory space, and wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolate the isolated computing environment from the workspace using an internal isolation firewall;

authenticate the isolated computing environment with an authentication device; and

send data to an untrusted destination from the multi-user interactive software application via a proxy device when the isolated computing environment has been authenticated.

2. (Currently Amended) The system of claim 1, wherein the multi-user interactive software application allows a remote machine to control an application or a process of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or the process.

3. (Previously Presented) The system of claim 1, wherein the multi-user interactive software application allows a remote device to control one or more of a pointer device, a keyboard input, or a display of the system.

4. (Previously Presented) The system of claim 1, wherein the system is connected to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

5. (Previously Presented) The system of claim 4, wherein the processor is further configured to:

implement a host-based firewall, wherein the host-based firewall isolates the system from communicating with one or more other devices on the network.

6. (Previously Presented) The system of claim 5, wherein the host-based firewall blocks incoming communications from the network that are sent to the workspace.

7. (Previously Presented) The system of claim 4, wherein the processor is further configured to:

run one or more trusted applications in the first memory space, and wherein the one or more trusted applications communicate with one or more trusted machines via the network.

8. (Previously Presented) The system of claim 1, wherein the internal isolation firewall prompts a user of the system to allow communication between the first memory space and the second memory space.

9. (Previously Presented) A method comprising:

implementing a workspace that uses a host operating system, wherein the workspace enables operation of a first set of one or more applications or processes via a first memory space;

implementing an isolated computing environment that uses the host operating system, wherein the isolated computing environment enables operation of a second set of one or more applications or processes via a second memory space, wherein the second set of one or more applications or processes comprises a multi-user interactive software application;

isolating the isolated computing environment from the workspace using an internal isolation firewall;

authenticating the isolated computing environment with an authentication device; and

sending data to an untrusted destination from the multi-user interactive software application via a proxy device when the isolated computing environment has been authenticated.

10. (Currently Amended) The method of claim 9, wherein the multi-user interactive software application allows a remote machine to control an application or a process of the second set of one or more applications or processes running in the isolated computing environment, wherein controlling the application or process comprises at least one of viewing, interacting with, modifying, uploading data to, or downloading data from the application or the process.

11. (Previously Presented) The method of claim 9, wherein the multi-user interactive software application allows a remote device to control one or more of a pointer device, a keyboard input, or a display of the isolated computing environment.

12. (Original) The method of claim 9, further comprising connecting to a network, the network corresponding to one or more of a local area network (LAN), a wide area network (WAN), a cellular network, a Wi-Fi network, a digital subscribers line (DSL) network, a cloud computing network, a data center, or a satellite network.

13. (Previously Presented) The method of claim 12, further comprising:

implementing a host-based firewall, wherein the host-based firewall isolates the first memory space and the second memory space from communicating with one or more devices on the network.

14. (Previously Presented) The method of claim 13, wherein the host-based firewall blocks incoming communications from the network that are sent to the workspace.

15. (Previously Presented) The method of claim 12, further comprising:

running one or more trusted applications in the first memory space, wherein the one or more trusted applications communicate with one or more trusted machines via the network.

16. (Previously Presented) The method of claim 9, wherein the internal isolation firewall prompts a user of the workspace to allow communication between the first memory space and the second memory space.

17. (Canceled)

REMARKS

Claims 1-16 are pending in the application. Claims 2 and 10 have been amended to address minor antecedent basis issues. Claim 17 has been canceled. No claims have been added. No new matter has been added.

Allowable Subject Matter

Applicant thanks Examiner Perungavoor for the indication that Claims 1-16 are allowable.[1]

Ex Parte Quayle

In the Ex Parte Quale dated October 12, 2021, Examiner Perungavoor stated that this application is in condition for allowance except claim 17, which is in withdrawn status, needs to be canceled for allowance.[2] Applicant has canceled claim 17. Applicant believes that the current application is in condition for allowance and such action is respectfully requested

CONCLUSION

Applicant believes the present application is in condition for allowance and respectfully requests Examiner Perungavoor to allow the application.

Date: October 12, 2021

/Jeung Huh/
Jeung (Jacob) Huh
Registration No. 76,913

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1800 JFK Blvd., Suite 1700
Philadelphia, PA 19103
Telephone: (215) 558-5740
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[1] Ex Parte Quale dated 10/12/2021 at pages 2-4
[2] *Id.*, at page 2.

Electronic Acknowledgement Receipt

EFS ID:	44009739
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	158266
Filer:	Jeung Huh/melissa overline
Filer Authorized By:	Jeung Huh
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	12-OCT-2021
Filing Date:	25-SEP-2018
Time Stamp:	16:00:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		LCOM_ENT_Collab_US01_AS_FILED_Reply_to_Ex_Parte_Quayle_Action.pdf	137923 4dd7d2fda3ad9069d7d4405fd828fcac268ea5c2	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response after Ex Parte Quayle Action	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	6
Warnings:			
Information:			
	Total Files Size (in bytes):	137923	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Peter Martz
				Art Unit	2492
				Examiner Name	PERUNGAVOOR, VENKATANARAY
Sheet	1	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

U.S. PATENTS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	131	8832833	B2	2014-09-09	Demopoulos, et al.	

U.S. PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T

EXAMINER SIGNATURE

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Peter Martz
				Art Unit	2492
				Examiner Name	PERUNGAVOOR, VENKATANARAY
Sheet	2	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

Examiner Signature		Date Considered	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

Electronic Patent Application Fee Transmittal

Application Number:	16141535
Filing Date:	25-Sep-2018
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Filer:	Jeung Huh/melissa overline
Attorney Docket Number:	LCOM_ENT_Collab_US01

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
		Total in USD ($)		**260**

Electronic Acknowledgement Receipt

EFS ID:	44132835
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	158266
Filer:	Jeung Huh/melissa overline
Filer Authorized By:	Jeung Huh
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	27-OCT-2021
Filing Date:	25-SEP-2018
Time Stamp:	09:52:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$260
RAM confirmation Number	E20210Q052312872
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	LCOM_ENT_Collab_US01_AS_FILED_SIDS_Transmittal.pdf	93724 bda5e11cc6b060a2cf5594d4401a69e33f91646b	no	3
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	LCOM_ENT_Collab_US01_AS_FILED_SIDS_1449.pdf	160597 c8a29e4014bdd42fd4bfb94960cf9f9d09884185	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Fee Worksheet (SB06)	fee-info.pdf	38212 54cf372119990c069782ae6644eb226e3de928d0	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	292533		

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DOCKET NO.: LCOM_ENT_Collab_US01 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **L3 Technologies, Inc.**	**Confirmation No.: 7622**
Application No.: 16/141,535	**Group Art Unit: 2492**
Filing Date: September 25, 2018	**Examiner: PERUNGAVOOR, VENKATANARAY**

For: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Filed Via EFS

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).

☐ **IDS Filed Under 37 CFR 1.97(b)**

In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

☒ **IDS filed Under 37 CFR 1.97(c)**

In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.116 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

- ☐ Certification in Accordance with § 1.97(e) is attached; or
- ☒ The fee of **$260.00** as set forth in § 1.17(p) is attached.

☐ **IDS filed Under 37 CFR 1.97(d)**

In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of **$240.00** as set forth in § 1.17(p).

CONTENT OF IDS PURSUANT TO 37 CFR 1.98

☒ Copy of reference number 131 listed on the attached Form PTO-1449 is not required to be submitted pursuant to 37 CFR § 1.98(a)(2)(ii).

☐ Copies of reference numbers listed on the attached Form PTO-1449 are enclosed herewith.

☐ Copy of reference number is not being submitted because it was previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number , filed for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

REFERENCES IN A LANGUAGE OTHER THAN ENGLISH

☐ The following documents are not in the English language. Accordingly, a concise explanation of the relevance of the document was incorporated in the specification passages identified below, the document was identified in a foreign communication as identified below or an English language counterpart application has been provided as indicated below.

Foreign Language Document	Cite No.	Pages of Reference in Specification or Relevance of Document

Foreign Language Document	Cite No.	English Language Counterpart	Cite No.

☐ **CERTIFICATION IN ACCORDANCE WITH § 1.97(e)**

I hereby certify that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of this information disclosure statement.

Please charge any deficiency or credit any overpayment to Deposit Account No. 50-5519.

Date: October 26, 2021

/Jeung Huh/
Jeung (Jacob) Huh
Registration No. 76,913

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UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

158266 7590 11/18/2021

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1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

EXAMINER
PERUNGAVOOR, VENKATANARAY

ART UNIT	PAPER NUMBER
2492	

DATE MAILED: 11/18/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

TITLE OF INVENTION: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/18/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

158266 7590 11/18/2021

Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

TITLE OF INVENTION: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/18/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
PERUNGAVOOR, VENKATANARAY	2492	726-012000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

158266 7590 11/18/2021

Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

EXAMINER	
PERUNGAVOOR, VENKATANARAY	
ART UNIT	PAPER NUMBER
2492	

DATE MAILED: 11/18/2021

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/141,535	Applicant(s) Coleman et al.	
	Examiner VENKAT PERUNGAVOOR	Art Unit 2492	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the reply of 10/27/2021.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-16 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/VENKAT PERUNGAVOOR/
Primary Examiner, Art Unit 2492

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	**Art Unit**
	VENKAT PERUNGAVOOR	2492

CPC						
Symbol					**Type**	**Version**
H04L	/	63	/	0209	F	2013-01-01
H04L	/	63	/	0876	I	2013-01-01
H04L	/	63	/	0281	I	2013-01-01
G06F	/	21	/	606	I	2013-01-01
G06F	/	21	/	629	I	2013-01-01
G06F	/	21	/	53	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/VENKAT PERUNGAVOOR/ Primary Examiner, Art Unit 2492	27 October 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

U.S. Patent and Trademark Office — Part of Paper No.: 202110271

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	**Art Unit**
	VENKAT PERUNGAVOOR	2492

INTERNATIONAL CLASSIFICATION					
CLAIMED					
G06F21/53	/	21	/	53	
G06F	/	21	/	51	

NON-CLAIMED					
G06F	/	21	/	71	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/VENKAT PERUNGAVOOR/ Primary Examiner, Art Unit 2492	27 October 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

U.S. Patent and Trademark Office — Part of Paper No.: 202110271

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	**Art Unit**
	VENKAT PERUNGAVOOR	2492

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10												
	2		11												
	3		12												
	4		13												
	5		14												
	6		15												
	7		16												
	8														
	9														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	16	
/VENKAT PERUNGAVOOR/ Primary Examiner, Art Unit 2492	27 October 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

U.S. Patent and Trademark Office Part of Paper No.: 202110271

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04L69/329 , H04L67/10 , H04L63/10 , H04L63/0281 , H04L63/08 , H04L63/104 , H04L67/14 , H04L12/1818 , G06F2009/45587 , G06F2009/45583 , G06F2216/15 , G06F9/452 , G06Q50/01 limited by text and date	05/06/2020	VP
G06F21/53, G06F2221/2149, G06F21/604, G06F2009/45587 limited by text and date	09/04/2020	VP
G06F2009/45583 , G06F21/53 , G06F21/62 , G06F2009/45587 , G06F2212/1052 , G06F9/45516 , G06F9/5077 limited by text and date	03/11/2021	VP

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/141,535	Coleman et al.
	Examiner	Art Unit
	VENKAT PERUNGAVOOR	2492

Search Notes		
Search Notes	**Date**	**Examiner**
Google Scholar	05/06/2020	VP
DERWENT limited by text and date	05/06/2020	VP
Inventor Name Search	05/06/2020	VP
Assignee Search	05/06/2020	VP
Global Dossier	05/06/2020	VP
InnovaQ	05/06/2020	VP
see EAST Notes	05/06/2020	VP
Google Patents(Find Similar, Prior Art Citations)	05/06/2020	VP
see EAST Notes	09/04/2020	VP
see EAST Notes	03/11/2021	VP
Google Scholar	03/11/2021	VP
see EAST Notes	09/29/2021	VP
Google Scholar	09/29/2021	VP

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	General interference search of claims (USPAT, USPGPUBS)	09/29/2021	VP

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Peter Martz
				Art Unit	2492
				Examiner Name	PERUNGAVOOR, VENKATANARAY
Sheet	1	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

U.S. PATENTS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

U.S. PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	129	9560081	B1	2017-01-31	Woolward, Marc	
	130	10375111	B2	2019-08-06	Schultz, Benjamin M., et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /V.P/

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Peter Martz
				Art Unit	2492
				Examiner Name	PERUNGAVOOR, VENKATANARAY
Sheet	2	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T

EXAMINER SIGNATURE			
Examiner Signature	/VENKAT PERUNGAVOOR/	Date Considered	10/27/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /V.P/

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Peter Martz
				Art Unit	2492
				Examiner Name	PERUNGAVOOR, VENKATANARAY
Sheet	1	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

U.S. PATENTS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	131	8832833	B2	2014-09-09	Demopoulos, et al.	

U.S. PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T

EXAMINER SIGNATURE

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /V.P/

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				**Application Number**	16/141,535
				Filing Date	Sep 25, 2018
				First Named Inventor	Peter Martz
				Art Unit	2492
				Examiner Name	PERUNGAVOOR, VENKATANARAY
Sheet	2	of	2	**Attorney Docket Number**	LCOM_ENT_Collab_US01

Examiner Signature	/VENKAT PERUNGAVOOR/	Date Considered	10/27/2021
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /V.P/

PART B - FEE(S) TRANSMITTAL

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By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

158266 7590 11/18/2021

Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01	7622

TITLE OF INVENTION: NETWORK ISOLATION FOR COLLABORATION SOFTWARE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/18/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
PERUNGAVOOR, VENKATANARAY	2492	726-012000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Condo Roccia Koptiw LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: L3 Technologies, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): New York, New York

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 50-5519

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Jeung Huh/ Date November 30, 2021

Typed or printed name Jeung Huh Registration No. 76,913

Electronic Patent Application Fee Transmittal

Application Number:	16141535
Filing Date:	25-Sep-2018
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Filer:	Jeung Huh/Darleen Yacovone
Attorney Docket Number:	LCOM_ENT_Collab_US01

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1200**

Electronic Acknowledgement Receipt

EFS ID:	44397680
Application Number:	16141535
International Application Number:	
Confirmation Number:	7622
Title of Invention:	NETWORK ISOLATION FOR COLLABORATION SOFTWARE
First Named Inventor/Applicant Name:	Glenn Coleman
Customer Number:	158266
Filer:	Jeung Huh/Darleen Yacovone
Filer Authorized By:	Jeung Huh
Attorney Docket Number:	LCOM_ENT_Collab_US01
Receipt Date:	30-NOV-2021
Filing Date:	25-SEP-2018
Time Stamp:	16:15:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1200
RAM confirmation Number	E2021ATG16110174
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	LCOM_ENT_Collab_US01_Issue_Fee_Transmittal_NOA_Dated_11_18_2021.pdf	1618379 4a0625423e55e45ce31a28cc3653600493b3c0d1	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38286 884d6b0cebe3a137da48b8d2af1eaad6d2170626	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1656665		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/141,535	01/11/2022	11223601	LCOM_ENT_Collab_US01	7622

158266 7590 12/21/2021

Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Glenn Coleman, Berwyn, PA;
Peter Martz, Marlton, NJ;
Kenneth Moritz, Lansdowne, PA;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

L3 Technologies, Inc., New York, NY

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and TrademarkOffice; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork ReductionAct of 1995, no personsare required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: CROGA INNOVATIONS LIMITED

Application No./Patent No.: 11,223,601 Filed/Issue Date: 1/11/2022

Titled: Network isolation for collaboration software

CROGA INNOVATIONS LIMITED, a Limited Liability Company

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Inventors To: L3 Technologies, Inc.

   The document was recorded in the United States Patent and Trademark Office at
   Reel 058179, Frame 0803, or for which a copy thereof is attached.

2. From: L3 Technologies, Inc. To: Croga Innovations Limited

   The document was recorded in the United States Patent and Trademark Office at
   Reel 066001, Frame 0843, or for which a copy thereof is attached.

This collectionof information is required by 37CFR 3.73(b). The informationis required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application.Confidentiality isgoverned by 35U.S.C. 122 and37 CFR 1.11and 1.14.This collection is estimated to take 12 minutes to complete, including gathering,preparing, and submitting the completed applicationform to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should besent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETEDFORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA22313-1450** .

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Antonio Papageorgiou/	May 1, 2024
Signature	Date
Antonio Papageorgiou	53431
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requiresthat you begiven certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirementsof the Act, please be advised that: (1)the general authority for the collectionof this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary;and (3) the principalpurpose for whichthe informationis used by the U.S. Patent and Trademark Office is to process and/or examine your submission related toa patent application or patent. If you do not furnishthe requested information, the U.S. Patent and Trademark Officemay not be able to process and/or examine yoursubmission, which may result in termination of proceedings orabandonment of the application or expiration of the patent.

Theinformation provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need forthe information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. Arecord related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further,a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. Arecord from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/AIA/81A (02-15)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT - POWER OF ATTORNEY OR REVOCATION OF POWER OF ATTORNEY WITH A NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Patent Number	11,223,601
Issue Date	1/11/2022
First Named Inventor	Coleman, Glenn (Berwyn, PA, US)
Title	Network isolation for collaboration software
Attorney Docket No.	

I hereby revoke all previous powers of attorney given in the above-identified patent.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint Practitioner(s) associated with the Customer Number identified in the box at right as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith: 199393

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s) with respect to the patent identified above, and to transact all business in the United States Patent and Trademark Office connected therewith:

Practitioner(s) Name	Registration Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-identified Customer Number.

OR

☐ The address associated with the Customer Number identified in the box at right: 199393

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the:

☐ Applicant.

OR

☒ Patent owner.

Statement under 37 CFR 3.73(c) (Form PTO/AIA/96) submitted herewith or filed on _____.

SIGNATURE of Applicant or Patent Owner

Signature	/Ciaran O'Gara/	Date	May 1, 2024
Name	Ciaran O'Gara	Telephone	
Title and Company	Director CROGA INNOVATIONS LIMITED		

NOTE: Signatures of all the applicants or patent owners of the entire interest or their representative(s) are required. If more than one signature is required, submit multiple forms, check the box below, and identify the total number of forms submitted in the blank below.

☐ A total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/141,535	**05/17/2024 02:49:46 PM Z ET**	**LCOM_ENT_Collab_US01**

Title of Invention

NETWORK ISOLATION FOR COLLABORATION SOFTWARE

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	11223601
CONFIRMATION #	7622	FILED BY	Laura Alto
PATENT CENTER #	65574563	FILING DATE	09/25/2018
CUSTOMER #	158266	FIRST NAMED INVENTOR	Glenn Coleman
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Antonio Papageorgiou

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
aia0081a_template__4.pdf	2	Power of Attorney	142 KB
aia0096_template__4.pdf	3	Assignee showing of ownership per 37 CFR 3.73	118 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
aia0081a_template__4.pdf	4F6AE9176544F20206EBA42CDE5B5DBD39B8D3FFFCA681DF ABE2D7F26446BA9AE32047C6DA693D6F4D232F2C2281BAFC 88BDB52C35E5DEC1998B6D5A5128A5EE

aia0096_template___4.pdf F8CC416403E8681AB617B5871322F6525368DCFD8402B3338B391ABB16C28F38655F633A3624D23513ADD8CF7AD42268B1469C814ECBF08282D8A7B7E48DE6DB

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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New International Application Filed with the USPTO as a Receiving Office

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/141,535	09/25/2018	Glenn Coleman	LCOM_ENT_Collab_US01

CONFIRMATION NO. 7622

158266
Condo Roccia Koptiw LLP
1800 JFK Boulevard
Suite 1700
Philadelphia, PA 19103

POWER OF ATTORNEY NOTICE

OC000000074358549

Date Mailed: 06/25/2024

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/17/2024.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/agizaw/

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CONFIRMATION NO. 7622

199393
Atlantic IP
c/o Lombard Geliebter LLP
1325 Avenue of the Americas
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New York, NY 10019

POA ACCEPTANCE LETTER

OC000000074358563

Date Mailed: 06/25/2024

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/17/2024.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/agizaw/