504169513 01/09/2017

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT4216191

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
REPLAY SOLUTIONS, INC.	06/05/2012

RECEIVING PARTY DATA

Name:	CA, INC.
Street Address:	520 MADISON AVE.
City:	NEW YORK
State/Country:	NEW YORK
Postal Code:	10022

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	15401387

CORRESPONDENCE DATA

Fax Number: (415)489-4150

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent

using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

415-489-4100 Phone:

Email: wgoy@vierramagen.com **Correspondent Name:** RONALD M. POMERENKE Address Line 1: VIERRA MAGEN MARCUS LLP Address Line 2: **575 MARKET ST., SUITE 3750**

Address Line 4: SAN FRANCISCO, CALIFORNIA 94105

ATTORNEY DOCKET NUMBER:	WILY-03008US2-REPLAY-CA
NAME OF SUBMITTER:	RONALD M. POMERENKE
SIGNATURE:	/RonaldMPomerenke#43009/
DATE SIGNED:	01/09/2017

Total Attachments: 6

source=Patent Assignment-Replay to CA#page1.tif source=Patent Assignment-Replay to CA#page2.tif source=Patent Assignment-Replay to CA#page3.tif source=Patent Assignment-Replay to CA#page4.tif source=Patent Assignment-Replay to CA#page5.tif

> **PATENT** REEL: 040902 FRAME: 0794 504169513

source=Patent Assignment-Replay to CA#page6.tif

PATENT REEL: 040902 FRAME: 0795 PATENT ASSIGNMENT

WHEREAS, REPLAY SOLUTIONS, INC. (hereafter "Assignor"), a Delaware

corporation, having an address of Suite 400, 2100 Seaport Boulevard, Redwood City, California

94063, is the owner of the patents and patent applications set forth on Exhibit A hereto and the

inventions described and claimed therein (hereafter the "Patent Property"); and

WHEREAS, CA, INC. (hereafter "Assignee"), a Delaware corporation, having an

address of One CA Plaza, Islandia, New York 11749, desires to acquire all right, title and interest

in and to the Patent Property.

NOW, THEREFORE, for good and valuable consideration, the receipt and

sufficiency of which is hereby acknowledged, Assignor does hereby sell, assign, transfer and set

over to Assignee, all its right, title and interest in and to the Patent Property, as well as all

provisionals, continuations, divisions, continuations-in-part, of said Patent Property, and all

reissues, reexaminations, and extensions thereof, the same to be held and enjoyed by Assignee

for its own use and benefit, and for the use and benefit of its successors, assigns, or legal

representatives, to the end of the term or terms for which such Patent Property may be granted or

reissued, as fully and entirely as the same would have been held and enjoyed by Assignor if this

assignment and sale had not been made.

Assignor also assigns to Assignee, all right, title and interest in and to the

inventions disclosed in said Patent Property throughout the world, including the right to file

applications and obtain patents, utility models, industrial models and designs for said Patent

Property in its own name throughout the world, including all rights to publish cautionary notices

reserving ownership of said inventions and all rights to register said Patent Property in

appropriate registries; and Assignor further agrees to execute any and all powers of attorney,

applications, assignments, declarations, affidavits, and any other papers in connection therewith

necessary to perfect such right, title and interest in Assignee.

PATENT

REEL: 040902 FRAME: 0796

Assignor also assigns unto Assignee all claims for damages by reason of infringement prior to the assignment date of the Patent Property throughout the world, with the right to sue for and collect the same for its own use and benefit, and for the use and benefit of its successors, assigns and other legal representatives.

Assignor, at the expense of Assignee, will testify in any legal proceedings, sign all lawful papers, execute all provisional, divisional, continuation, continuation-in-part, reissue and substitute applications, make lawful oaths and declarations, and generally do everything possible to vest title in Assignee and to aid Assignee to obtain and enforce proper protection for said Patent Property in all countries.

IN WITNESS WHEREOF, the parties have caused this Patent Assignment to be executed on the dates and in the capacities shown below.

REPLAY SO	DLUTIONS,	, INC.			
***	-Rb	P	4		
Ву:		1/4	ett/	<i>5</i>	
Its: <u>C</u>	<u> </u>			Larry 1	smette
Date:	we 5	201	2_		
CA, INC.			,		
Ву:			······································		
Its:	<u> </u>				
Date:					

Assignor also assigns unto Assignee all claims for damages by reason of infringement prior to the assignment date of the Patent Property throughout the world, with the right to sue for and collect the same for its own use and benefit, and for the use and benefit of its successors, assigns and other legal representatives.

Assignor, at the expense of Assignee, will testify in any legal proceedings, sign all lawful papers, execute all provisional, divisional, continuation, continuation-in-part, reissue and substitute applications, make lawful oaths and declarations, and generally do everything possible to vest title in Assignee and to aid Assignee to obtain and enforce proper protection for said Patent Property in all countries.

IN WITNESS WHEREOF, the parties have caused this Patent Assignment to be executed on the dates and in the capacities shown below.

REPLAY SOLUTIONS, INC.

By:	
Its:	
Date:	
CA, IN	IC.
By: —	
Its:	1/5VP
Date:	5 JUNE 2012

STATE OF	
COUNTY OF	
Before me, the undersigned, a Not	ary Public on this day personally appeared to me to be the person and officer whose name
is subscribed to the foregoing instrument and a the said Replay Solutions, Inc., a corporation, a	acknowledged to me that the same was the act of nd that he/she had executed the same as the act of on therein expressed, and in the capacity therein
Given under my hand and seal of office	this, 2012.
	Notary Public in and for
STATE OF Cari Give 8	
STATE OF Carifolia 8 COUNTY OF San Warton 8	
Before spe, the undersigned, a Not	tary Public on this day personally appeared wn to me to be the person and officer whose name
is subscribed to the foregoing instrument and a	acknowledged to me that the same was the act o
	e/she had executed the same as the act of sucl rein expressed, and in the capacity therein stated.
Given under my hand and seal of office,	, this $\sqrt{\frac{\text{day of }}{\sqrt{\frac{1}{2}}}}$, 2012.
	112 5/121
WILLIAM E. BUCY	vouces p
COMM. #1897667 Notary Public - California Santa Clara County	Notary Public in and for
My Comm. Expires July 30, 2014	Cultartet

EXHIBIT A

Patents

Title	Country	Appln. No.	Filing Date	Reg. No.	Reg. Date
Advancing and	USA	11/943,889	11/21/2007	8,079,019	12/13/2011
Rewinding a Replayed					
Program Execution.					
Detecting Race	USA	11/449,157	06/07/2006	7,673,181	03/02/2010
Conditions in Computer					
Programs.					
Recording and Replaying	USA	11/169,522	06/28/2005	7,506,318	03/17/2009
Computer Programs.					

Patent Applications

Title	Country	Appln. No.	Filing Date
Advancing and Rewinding a Replayed Virtual	USA	12/825,923	06/29/2010
Machine Application Program Execution.			
Ensuring Determinism During Programmatic Replay	USA	12/826,447	06/29/2010
in a Virtual Machine.			
Ensuring Determinism During Programmatic Replay	USA	12/826,435	06/29/2010
in a Virtual Machine.			
Ensuring Deterministic Thread Context Switching in	USA	12/825,932	06/29/2010
Virtual Machine Applications.			
Recording and Replaying Computer Program	USA	12/890,449	09/24/2010
Execution with Recorded Execution Event			
Breakpoints.			
State Synchronization in Recording and Replaying	USA	11/449,156	06/07/2006
Computer Programs.			
Thread Management to Prevent Race Conditions in	USA	11/449158	06/07/2006
Computer Programs.			

PATENT REEL: 040902 FRAME: 0800

State of California Countly of SANTA CLARA On JUNE 5, 2012 bigitors mis. CHUCK C. KIM, NOTARY PUBLIC The beart term and the basis of satisfactory evidence to be the personnelly appeared. White proved to me on the basis of satisfactory evidence to be the personnelly whose national plans authorized capacity(e), and that by his/her/thris suprouted to the writin instrument are actional signature (e) on the instrument in personnelly instrument and acknowledged to me that he/sherithry executed the same in his/her/thris suprouted on the instrument. NOTARY RELIGIOLATION TO THE INSTRUMENT OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct. WITNESS my hand and official easi. Signation of California that the foregoing paragraph is true and correct. VITNESS my hand and official easi. Signation of California that the foregoing hand and manachromen of mis form to accome reging of the document and manachromen of mis form to accome reging of the document and manachromen of mis fo	CALIFORNIA ALL-PURPOSE ACK	NOWLEDGMENT	
County of SANTA CLARA On JUNE 5, 2012 before me, CHUCK C. KIM NOTARY PUBLIC Notation of the basis of satisfactory evidence to be the person(e) street and accorded of the within instrument and acknowledged to me that he sheethey executed the assme in historetheir authorized expansity(size), and that by historetheir signature(e) on the instrument the person(e), or the entity upon behalf of which the person(e) access, executed the instrument. Onthe county float flows Though the instrument accorded by law, it may prove valuable to persone relying on the document and correct. With the person of call the foregoing personal is true and correct. With the person of call the true to call the foregoing personal is true and correct. With the person of call the true to call the foregoing personal is true and correct. With the person of call the true to call the foregoing personal is true and correct. With the person of call the true to call the foregoing personal is true and correct. With the person of call the true to call the foregoing personal is true and correct. With the person of call the true to call the foregoing person of the entity upon behalf of which the person of call the true to call the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing person of the entity upon behalf of the foregoing pe	State of California	1	
who proved to me on the basis of satisfactory evidence to be the person(e) is/are subscribed to the within instrument and acknowledged to me that he/sheathey executed the same in his/architech suthorized capacity(ise), and that by his/architeris signature(e) on the instrument incoming signature (e) on the instrument incomi	SALITA CLARA	}	
who proved to me on the basis of satisfactory evidence to be the person(e) is/are subscribed to the within instrument and acknowledged to me that he/sheathey executed the serine in his/architect authorized capacity(ise), and that by his/architect signature(e) on the instrument the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e) and that the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e), or the entity upon behalf of which the person(e). Description of Attached Document Title or Type of Document Signet's Name: Description of Attached Document Descripti	County of SAN A CLARA	J	
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is an expected to the within instrument and acknowledged to the within instrument and acknowledged to me that he sheather evecuted the same in his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument. COMMISSION & 180409 SANTA CARA COUNTY MY Comm. Box May 21, 2014 I certify under PENALTY OF PERJURY under the laws of the State of Cellifornia that the foregoing paragraph is true and correct. WITNESS my hand and official eval. Signature ————————————————————————————————————	- TUNE 5 2012 CHI	ICK C KIM NOTARY PUBLIC	
who proved to me on the basis of satisfactory evidence to be the person(e) is/are subscribed to the within instrument and acknowledged to me that he/sheathey executed the same in his/architech suthorized capacity(ise), and that by his/architeris signature(e) on the instrument incoming signature (e) on the instrument incomi	On JUNE 5, 2-1- Deport me, W/V	Have beent Name and Title of the Officer	
who proved to me on the basis of satisfactory evidence to be the person(e) is/are subscribed to the within instrument and acknowledged to me that he/sheathey executed the same in his/architech suthorized capacity(ise), and that by his/architeris signature(e) on the instrument incoming signature (e) on the instrument incomi	personally appeared LARRY LUN	NETTA	
be the person(s) whose name(s) lafare subscribed to the writini instrument and authorized to me that heakethery executed the same in his/heafther authorized capacity(see), and that by his/heafther authorized capacity(see). Description of Atlached Document Tatle or Type of Document	bearing with the same of the s	Name(a) of Signato	
capacity(ise), and that by his/hen/their signature(e) on the instrument the personney, or the entity upon behalf of which the personney, or the entity upon behalf of which the personney, or the entity upon behalf of which the personney, and that by his/hen/their signature(e) on the instrument. **Commission** et according to the entity upon behalf of which the personney, acted, executed the instrument. **Commission** et according to the which the personney acted, executed the instrument. **Instrument** entity upon behalf of which the personney acted, executed the instrument. **Instrument** entity upon behalf of which the personney acted, executed the instrument. **Instrument** entity upon behalf of which the personney acted, executed the instrument. **Instrument** entity upon behalf of which the personney acted, executed the instrument. **Instrument** entity upon behalf of which the personney, acted, executed the instrument. **Instrument** entity upon behalf of which the personney, acted, executed the instrument. **Instrument** entity upon behalf of which the personney, acted, executed the instrument. **Instrument** entity upon behalf of which the personney has called the instrument. **Instrument** entity upon behalf of which the personney has called the instrument. **Instrument** entity upon behalf of which the personney has called the instrument. **Instrument** entity upon behalf of which the personney has called the instrument. **Instrument** entity upon behalf of which the personney has called the instrument. **Instrument** entity upon behalf of which the personney has called the instrument. **Instrument** entity upon behalf of which the personney has called the state of Callfornia that the foreage acted, executed the instrument. **Instrument** entity upon behalf of the State of Callfornia that the foreage acted the state of Callfornia that the foreage acted the state of the State of Callfornia that the foreage acted the state of the State of Callfornia that the foreage acted the state of th		ed the person(e) whose name(e) la/are subscribed to the within instrument and acknowledged to me that	
NOTATY PUBLIC - CALIFORNIA COMMISSION # 1890469 SANTA CLARA COUNTY My Comm. By May 21, 2014 In gertify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct. WITNESS my hand and official eeel. Signature Though the information below is not required by law, it may prove valuable to persons relying on the document and mataschnount of this form to another document. Description of Attached Document Title or Type of Document Patron Signer(s) Claimed by Signer(s) Signer(s) Other Than Named Above: Capacity(iee) Claimed by Signer(s) Signer's Name: Individual Corporate Officer — Title(s): Patron — Umited General Attorney in Pact Trustee Guardian or Conservator Other: Other: Cother: Cothers Cot			
NOTARY PUBLIC CALIFORNIA COMMISSION # 199469 SANTA CLARA COUNTY My Comm. Bop. May 21: 2014 In cartify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct. WITNESS my hand and official eeal. Signature WITNESS my hand and official eeal. Signature Signature Signature of wirmy haste Signature of wirmy function to the form to another document and manuscriment of this form to another document. Description of Attached Document Title or Type of Document Pattern Signature Number of Pages: 3 Pages (Ac.). The companies of the Manuscriment of the form to another document. Decument Date: Signature Signature of wirmy haste Individual Corporate Officer Title(s): Partner Composite Officer Title(s): Other: Other:	PULLDANO MISS	instrument the person(e), or the entity upon behalf of	
Common Rep. May 21: 2014 It certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct. Witness my hand and official seek.	NOTARY PUBLIC - CALIFORNIA	which the person(a) acted, executed the instrument.	
cf the State of Cellifornia that the foregoing paragraph is true and correct. WITNESS my hand and official eeal. Signature	SANTA CLARA COUNTY	Land's under BOMMTY OF BED HIEV under the laws	
Though the information below is not required by two, it may prove valuable to persons relying on the document ent could prevent fractivitient remained and manuscriment of this form to snother document. Description of Attached Document Title or Type of Document Parts 150 150 150 150 150 Decument Date:	My Comm. Exp. May 21, 2014		
WITNESS my hand and official seed. Signature		. , , , , , , , , , , , , , , , , , , ,	
Signeture		Value (a) Commission	
Though the information below is not required by low, it may prove valuable to persons relying on the document and could prevent includent removal and reasonation of this form to another document. Description of Attached Document Title or Type of Document Partant ASSIGNAR A Document Date:		WITNESS my hand and official seal.	
Though the information below is not required by lew, it may prove valuable to persons relying on the document and counter fractional and manuscriment of this form to another document. Description of Attached Document Title or Type of Document: Document Date:		Abriel Ktw	
Though the information below is not required by lew, it may prove valuable to persons relying on the document end could provent foundation removal and matthetenent of this form to another document. Description of Attached Document Title or Type of Document: Particular Signer Signer of Pages: 3 Pages (Act. of the Act Signer) Other Than Marned Above: Capacity(ies) Claimed by Signer(s) Signer's Name: Individual Corporate Officer — Title(s): Particular Officer — Title(s): Particular Officer — Companies of Fages (Act. of the Act Signer's Name) Particular Officer — Title(s): Particular Officer — Companies Officer — Title(s): Particular Officer — Companies Officer — Title(s): Particular Officer — Companies Offi	Pinon Motory Said Alasm	Signature Signature of Natury Produc	
Percent Counter the content of this form to section of comment. Description of Attached Document Title or Type of Document Particular Assignment Decument Date:	*	TIONAL —	
Title or Type of Document	Though the information below is not required by law, is कार्य could provent freuchlight removal and n	R may prove valuable to persons relying on the document examplement of this form to snother document.	
Document Date:	Description of Attached Document		
Document Date:	Title or Type of Document Parts of ASS	iqurent	
Signer's Name:		3 0000 (1) 14	
Capacity(ies) Claimed by Signer(s) Signer's Name:	Document Date: Quine 3, 20(2	Number of rages: S PAGES CIACL CTIN	نجري يميه
Signer's Name:	Signer(s) Other Than Named Above:		
Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Individual Ind	Capacity(ies) Claimed by Signer(s)	•	
Individual Individual	(1 -	.	
Corporate Officer — Title(s): Partner — Umited © General Atterney in Fact Thustee Gwardian or Conservator Other: CEO Corporate Officer — Title(s): Partner — Umited © General Atterney in Fact Trustee Gwardian or Conservator Other: Other:	profit part of a second		
☐ Partner — ☐ Limited ☐ General ☐ Atterney in Fact ☐ Thustee ☐ Guardian or Conservator ☐ Other: ☐ Other: ☐ Conservator	· · · · · · · · · · · · · · · · · · ·		
☐ Atterney in Fact ☐ Thustee ☐ Guardian or Conservator ☐ Other: ☐ Other: ☐ Other:	□ Portner □ Limited □ General	☐ Portner — ☐ Imited ☐ General	
☐ Thustee ☐ Trustee ☐ Trustee ☐ Guardian or Conservator ☐ Other: ☐ Other:	PROJECT II (GILLEN POR	☐ Attorney in Fact	
☐ Guardian or Conservator ☐ Other: ☐ O	The of there's have	Tons of Discours 1	
		☐ Guardian or Conservator	
Signer is Representing: Signer is Representing: Signer is Representing:	☐ Other:	Cities:	
Signer is Representing: Signer is Representing: Signer is Representing:		Oleman to Oleman when	
	Signer is Hepreserring:	orgner is Hepreserang:	
Neutron Neutron	the second second		
	3844445344		

PATENT REEL: 040902 FRAME: 0801

RECORDED: 01/09/2017