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(12) **United States Patent**  
**Ketchel, III et al.**

(10) **Patent No.:** **US 11,030,665 B2**

(45) **Date of Patent:** **\*Jun. 8, 2021**

(54) **NETWORK-BASED MARKETPLACE  
SERVICE FOR FACILITATING PURCHASES  
OF BUNDLED SERVICES AND PRODUCTS**

(58) **Field of Classification Search**

CPC .. G06Q 30/0621; G06Q 20/381; G06Q 20/10;  
G06Q 30/0633; G06Q 30/0629;  
(Continued)

(71) Applicant: **MDSAVE SHARED SERVICES INC.**,  
Brentwood, TN (US)

(56) **References Cited**

(72) Inventors: **Paul J. Ketchel, III**, Nashville, TN  
(US); **Ani Osborne**, Nashville, TN  
(US); **Kar Martirosyan**, Nashville, TN  
(US); **Daniel Schmidt**, Albany, CA  
(US); **Ryan Aipperspach**, San  
Francisco, CA (US)

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(73) Assignee: **MDSAVE SHARED SERVICES INC.**,  
Brentwood, TN (US)

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(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 42 days.

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This patent is subject to a terminal dis-  
claimer.

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(Continued)

(21) Appl. No.: **16/520,906**

(22) Filed: **Jul. 24, 2019**

(65) **Prior Publication Data**

US 2020/0043070 A1 Feb. 6, 2020

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 15/055,076,  
filed on Feb. 26, 2016, now abandoned, which is a  
(Continued)

(51) **Int. Cl.**  
**G16H 40/20** (2018.01)  
**G06Q 30/06** (2012.01)

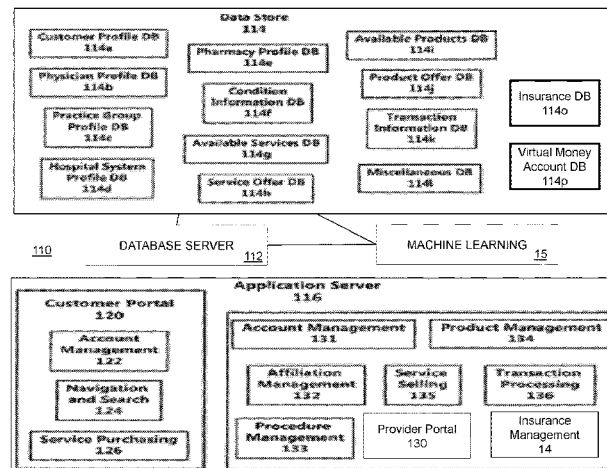
(Continued)

(52) **U.S. Cl.**  
CPC ..... **G06Q 30/0621** (2013.01); **G06Q 20/065**  
(2013.01); **G06Q 20/10** (2013.01);  
(Continued)

(57) **ABSTRACT**

An apparatus for pricing offers of healthcare services includes an application server providing a pricing tool, and a service pricing information database and a cost adjustment information database that are accessible by the application server. The pricing tool is operable to receive an indication of a healthcare service set that is respectively associated with a service detail information record included in the service pricing information database, determine a base physician fee for a primary service of the indicated healthcare service set based on base pricing metrics for the primary service included in the service detail information record, receive an indication specifying a location for performing the primary service, calculate an adjusted physician fee for

(Continued)



the primary service based on cost adjustment metrics for a geographic zone that corresponds to the specified location, and provide a recommended price for the indicated healthcare service set based on the calculated adjusted physician fee. The machine learning server instructs the service offer database to store each healthcare service provider service corresponding to the user selection and displays the bundled set of service offers including of pricing via the graphical user interface that matches the users' selection.

## 20 Claims, 15 Drawing Sheets

### Related U.S. Application Data

- continuation-in-part of application No. 14/874,004, filed on Oct. 2, 2015, now abandoned, which is a continuation of application No. 14/827,026, filed on Aug. 14, 2015, now abandoned, which is a continuation-in-part of application No. 14/461,209, filed on Aug. 15, 2014, now Pat. No. 9,123,072.
- (60) Provisional application No. 61/866,922, filed on Aug. 16, 2013.
- (51) **Int. Cl.**  
**G16H 10/60** (2018.01)  
**G06Q 20/38** (2012.01)  
**G06Q 20/10** (2012.01)  
**G06Q 30/02** (2012.01)  
**G06Q 50/22** (2018.01)  
**G06Q 20/06** (2012.01)
- (52) **U.S. Cl.**  
 CPC ..... **G06Q 20/381** (2013.01); **G06Q 30/0206** (2013.01); **G06Q 30/0239** (2013.01); **G06Q 30/0613** (2013.01); **G06Q 30/0629** (2013.01); **G06Q 30/0633** (2013.01); **G06Q 50/22** (2013.01); **G16H 10/60** (2018.01); **G16H 40/20** (2018.01)
- (58) **Field of Classification Search**  
 CPC ..... G06Q 30/0613; G06Q 30/0239; G06Q 30/0206; G06Q 50/22; G06Q 20/065; G06Q 20/3224; G06Q 20/12; G06Q 10/00; G06Q 20/201; G06Q 20/14; G16H 10/60; G16H 40/20  
 See application file for complete search history.

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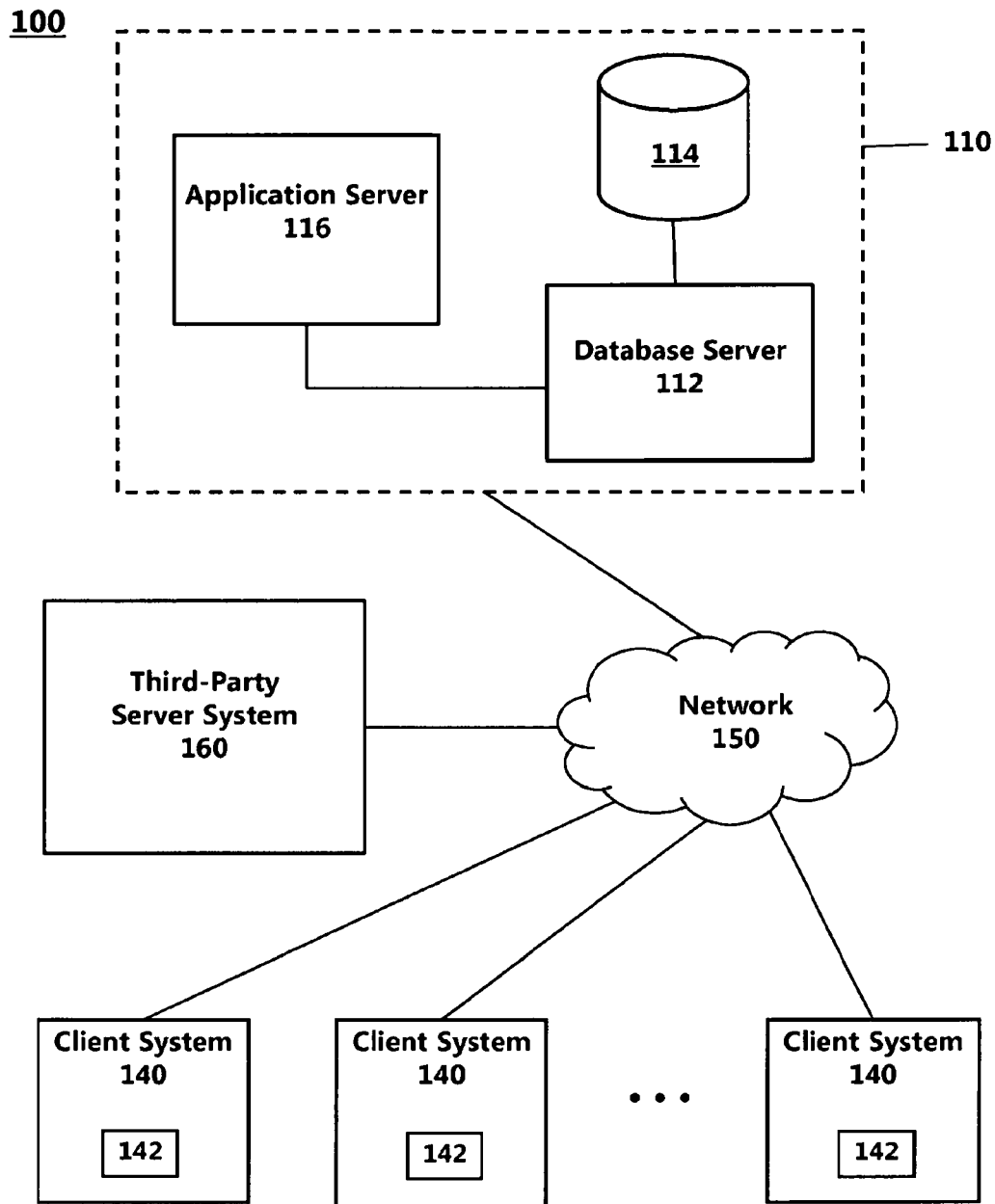
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**Figure 1**

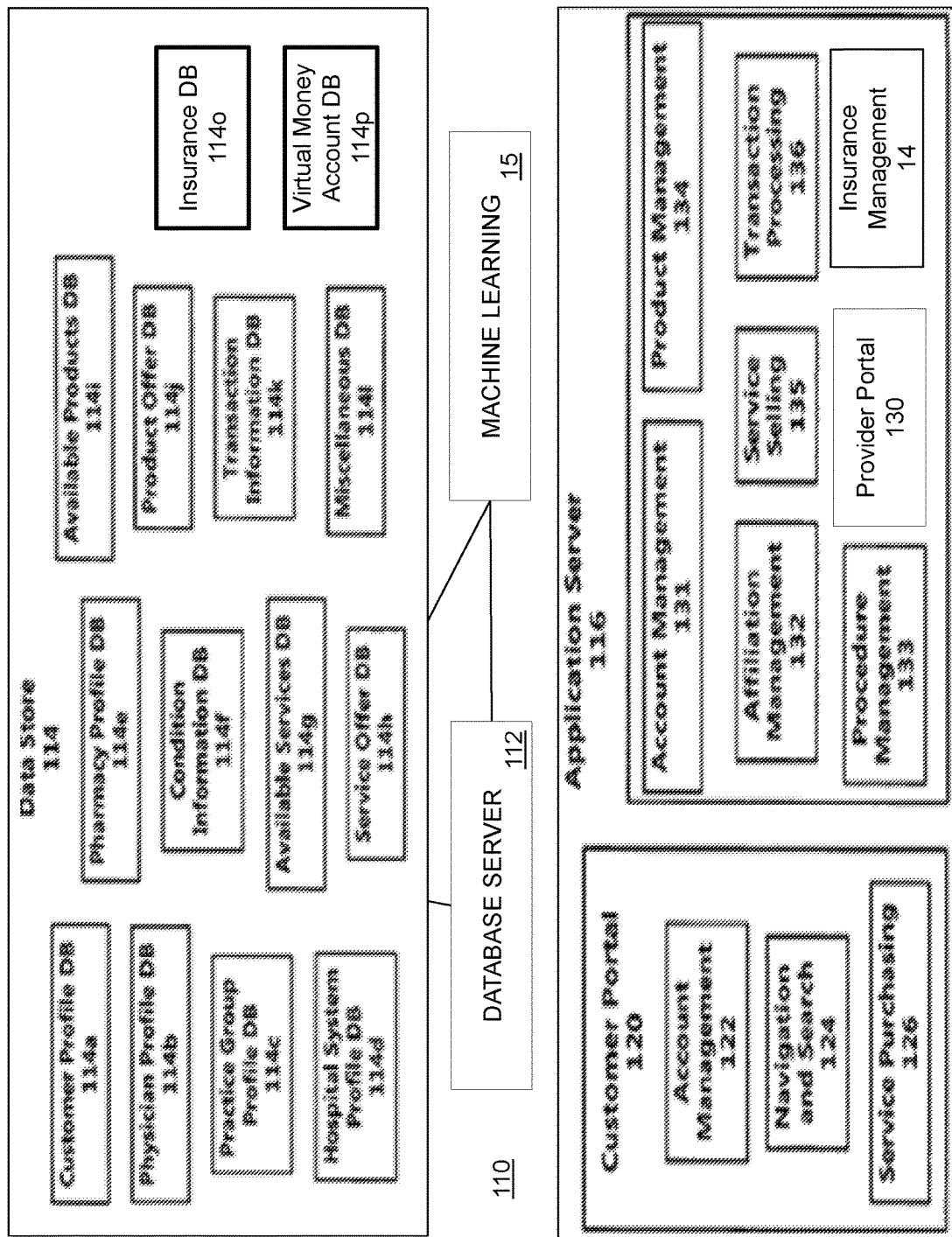


Figure 3A illustrates a search interface. The interface is contained within a rectangular frame. At the top, there is a header bar. Below the header, the main search area is divided into two primary sections. The left section is titled "What are you looking for?" and contains a dropdown menu labeled "Procedure". The right section is titled "Where?" and contains a text input field. To the right of the "Where?" section is a button labeled "Q Search »". Below the "Procedure" dropdown, a list of options is displayed: "Procedure", "Provider", "Specialty", "Diseases", and "Prescriptions".

Figure 3A

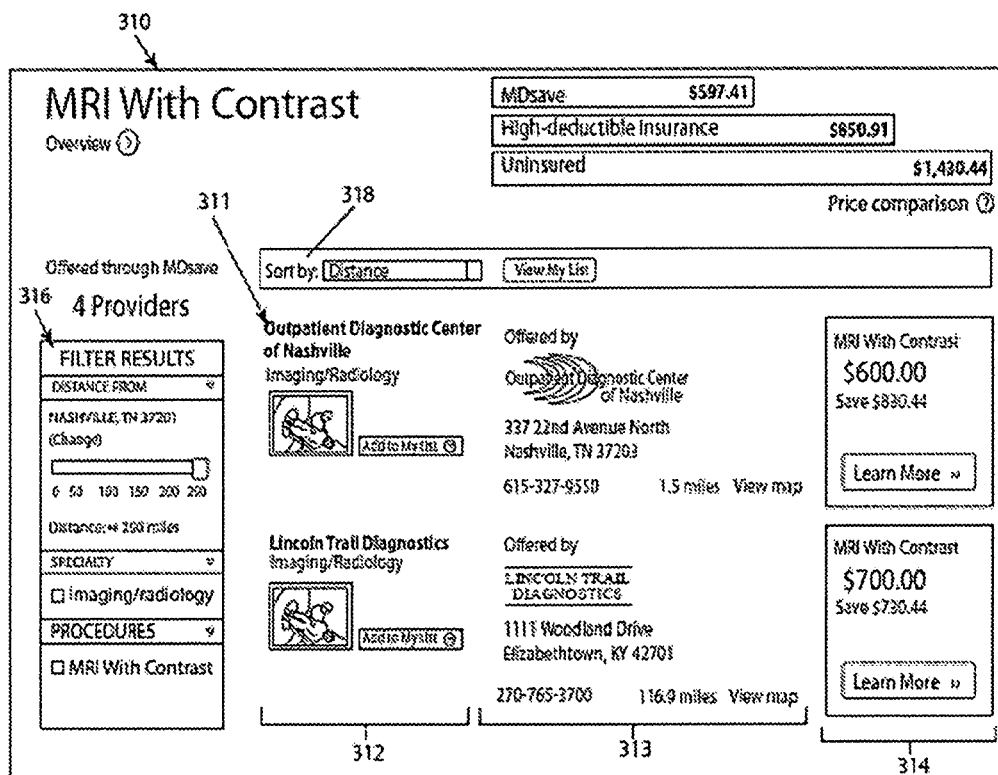
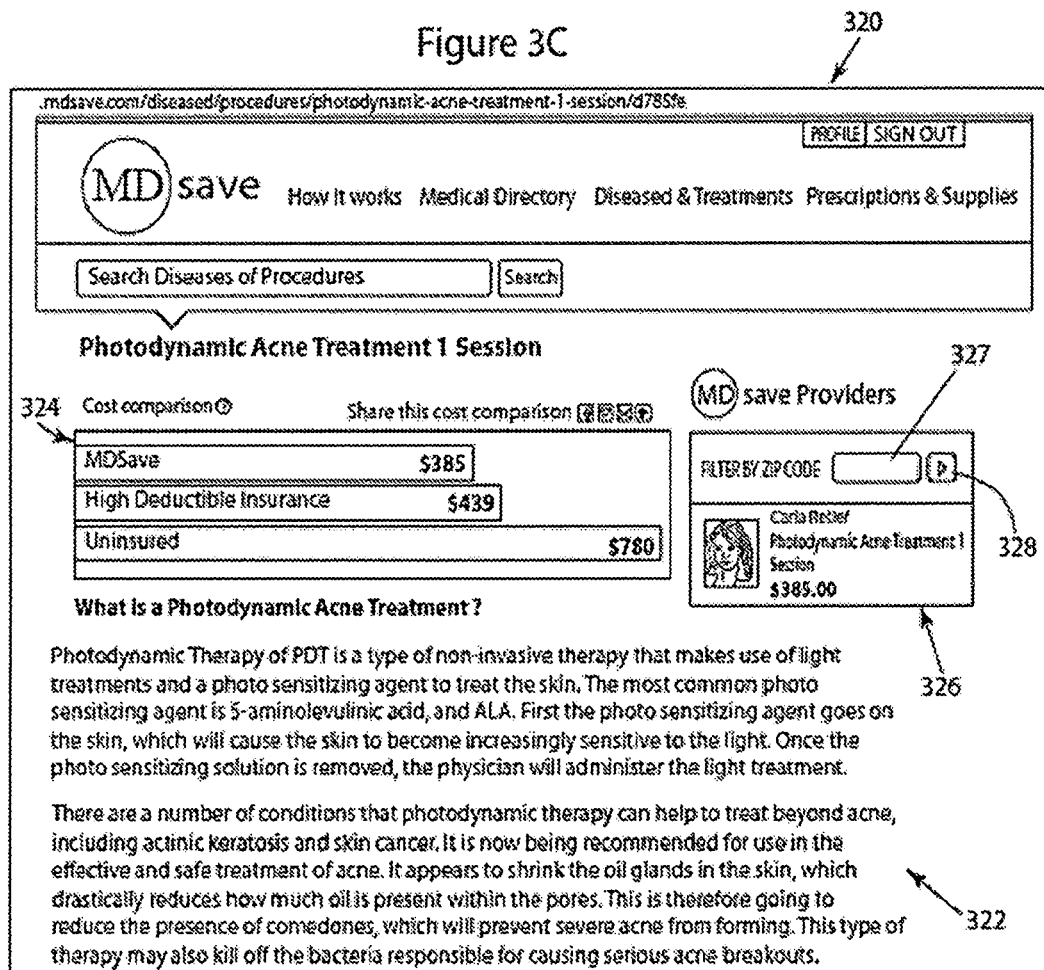



Figure 3B

Figure 3C




330



How it works Medical Directory Diseases & Treatments Prescriptions & Supplies

[SIGN IN](#) | [CREATE AN ACCOUNT](#)

332



**Dr. Cynthia Elizabeth Collins**

Internal Medicine

Practice Name:  
TEMPLE HEALTH & WELLNESS CENTER / Medical

Weight Loss of Cool Springs

Board Certification: Family Medicine

DOB: 10/03/1959

Practice Description: This is a faith-based Primary Care Office. We offer traditional and non-traditional medical treatments. The area's most affordable medically supervised weight loss program. Each visit will include a Wellness Exam.

Awards and Publications: You can watch Dr. Collins on the Christian Television Network WWTN - Saving Your Health Medical Ministry, every Saturday at 1pm. Dr. Collins offers Health Tips on Channel 4 WSMV Nashville-More At Midday. Dr. Collins publishes Health Tips in the Nashville Christian Family Magazine.

Medical school: University of Cincinnati College of Medicine

Office Hours

Mon. 8:30am - 4:40pm  
Tue. 8:30am - 4:40pm  
Wed. 8:30am - 4:40pm  
Thu. 8:30am - 4:40pm  
Fri. 8:30am - 12:30pm  
Sat. 8:30am - 12:30pm

[Request an appointment](#)

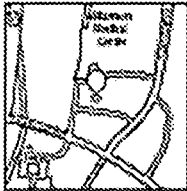
E-mail:  
[savingyourhealth@gmail.com](mailto:savingyourhealth@gmail.com)

Phone:  
(615) 771-8711

Website:  
<http://www.thwc.net>

Address:  
100 Coney Drive, Suite 112,  
Franklin, TN 37064

334



335

What patients are saying

"Thanks to Temple Health and wellness, I am on target to becoming a healthier me. Thanks Temple!"  
— Jerard Woods

"I have been a patient of THWC for several years. The professionalism, caring and above all the faith of the staff is second to none. I have always been satisfied with the care I have received there. I have even recommended family and friends to the THWC. They too are satisfied with Dr. Collins and the staff!"  
— Marilyn Wyatt Harris

"Temple Health & Wellness Center has been and still is the best care both physical, emotional and in every area help is needed. I recommend THWC to everyone I meet!"  
— Priscilla White

[Leave a review](#)

333

Procedure	Average	MDsave
Bladder Infection Exams	\$191.40	\$79.20

336

Figure 3D



400

MD save

404

Pre-Paid Medical Voucher  
Voucher Number: 755180000049

402

Patient Name: Sarah Smith (Test)  
Phone: (111) 222-3333

406

Medical Provider: John Smith  
Address: 100 Winners Circle  
Office Phone: 1-877-461-2491

408

Confirmation Number: 669920000049

Medical Procedure: Comprehensive Eye Exam - Eye Glasses Prescription

Pre-Paid Price: \$110.00

410

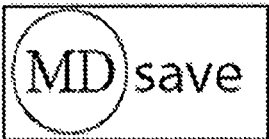
How to use your MDSave Medical Voucher:

You have three different options to present this voucher to the receptionist at the time of your appointment.

1. Pull up your MDSave email receipt on your smart phone.
2. Write down the Order Confirmation Number and the Voucher Number.
3. Or Simply print this page and take the copy with you.

Figure 4A

400



Pre-Paid Medical Voucher  
Confirmation Number: 979110096  
Voucher Number: 17605096  
Order Date: 08/15/2013

402

**Patient Information**

NAME	DOB	Phone Number	Email address
Sarah Doe	08/23/1989	619-915-8150	sample@sample.com

**Purchase Information**

404

Procedure	Provider	Phone Number
29877 - Surgical arthroscopy of knee with chondroplasty (I)	John Smith	1-877-461-2491
1382 Anesthesia for diagnostic arthroscopic procedure on knee (I)	David Jackson	1-877-461-2491
Facility Fee	Brentwood Surgery Center	615-915-9330
Total Pre-Paid Price: \$1554.1		

406

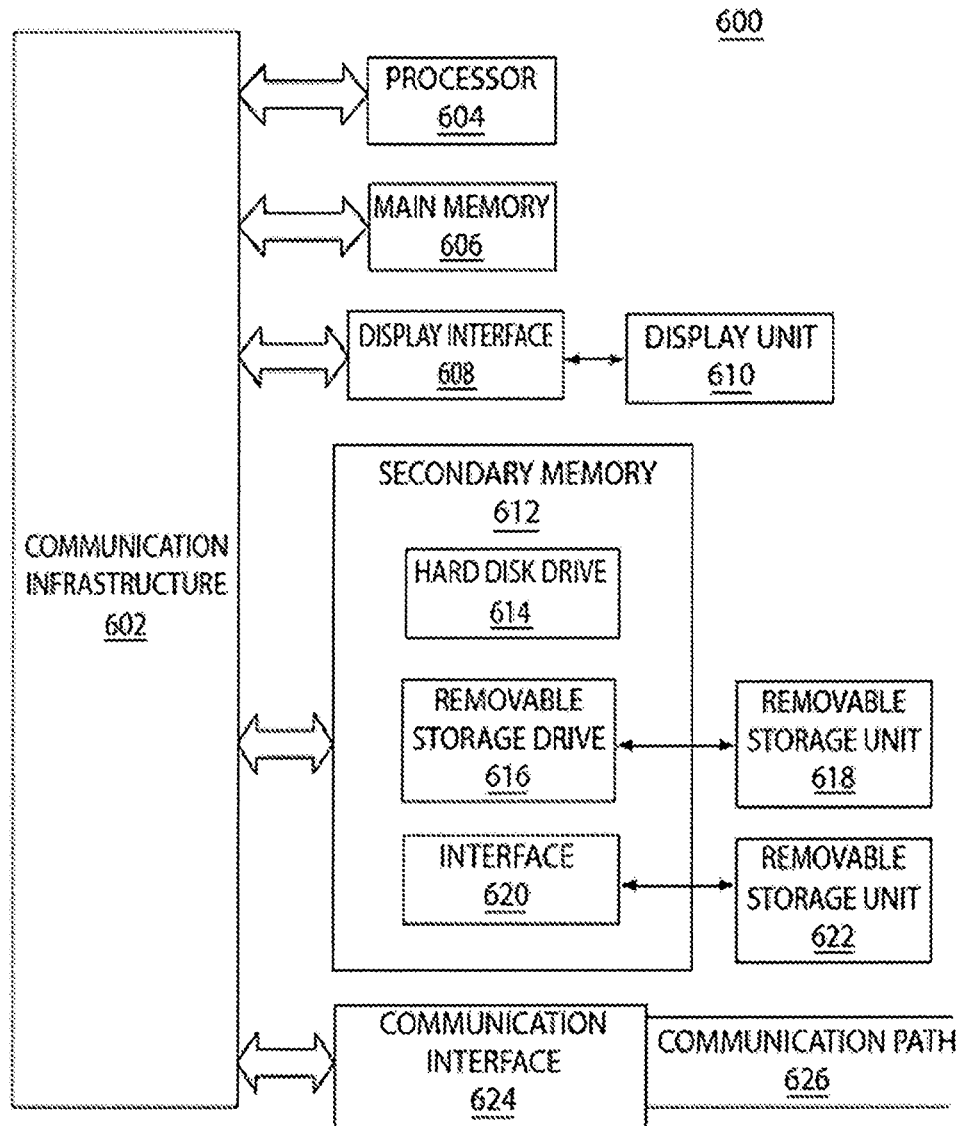
410

**How to use your MDSave Medical Voucher:**

You have three different options to present this voucher to the receptionist at the time of your appointment.

1. Pull up your MDSave email receipt on your smart phone.
2. Write down the Confirmation Number and the Voucher Number.
3. Or Simply print this page and take the copy with you.

Figure 4B

**Figure 5**

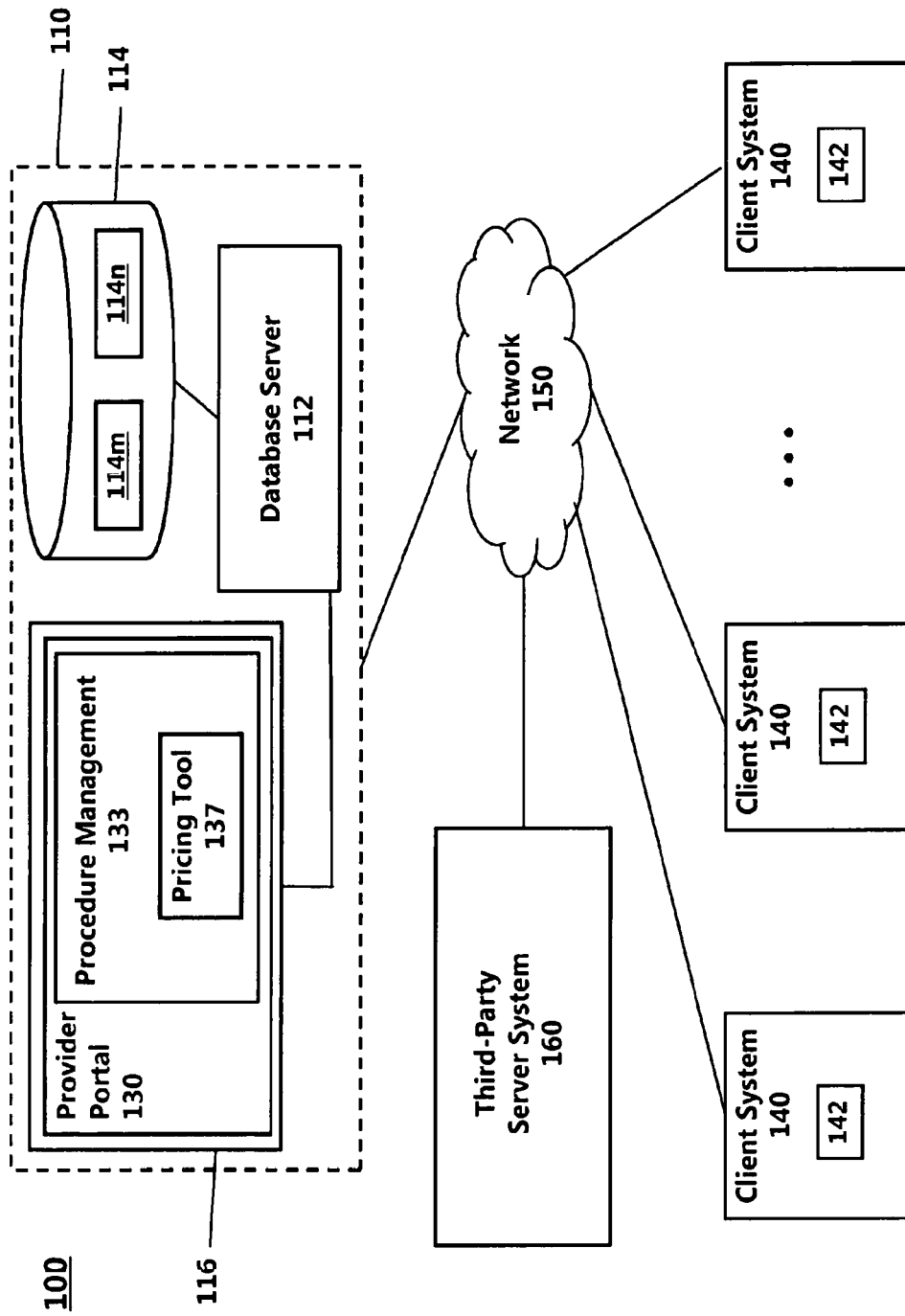


Figure 6

700

Radiology ☒

Payout rates listed are suggested rates only. All rates are to be determined by the hospital system.

702

Specific Locality 704c 704d 704

Facility Abilene Medical Center 0.773 704b

Physician REST OF TEXAS 0.97 704a

Recommended Rate 706

Facility 130% 706b

Physician 130% 706a

Advanced

☒ Select Mdsave Radiology Group Pricing 712 ☒ Expand all ☐ Collapse all ☐ Export to Excel 715

Procedure	Rec. Facility Price	Rec. Phys. Price	MDSave Fee	Total Amount
Bone Densitometry				
▼ Bone Density DXA Extremity	\$66.68	\$12.60	\$12.00	\$91.28

714

711

DESCRIPTION	CPT CODE	CMS FACILITY	CMS PHYSICIAN	FACILITY REC RATE 130%	PHYSICIAN REC RATE 130%
Dxa bone density/peripheral	77081	\$59.37	\$11.08	\$66.68	\$13.97
Fracture assessment via dxa	77086	\$59.37	\$8.90	\$66.68	\$11.22
Averages \$				66.68	12.60

711b

711a

► Bone Density DXA Scan	\$103.99	\$16.24	\$12.00	\$132.23
Fluoroscopy				
► Videofluoroscopic Swallowing Study	\$114.21	\$126.69	\$60.00	\$300.90
► Barium Enema with air	\$169.58	\$64.02	\$60.00	\$293.60
► Barium Swallow	\$114.21	\$29.76	\$60.00	\$203.97
► Cyscogram [VCYG]	\$297.90	\$78.45	\$60.00	\$436.35
► Fistulogram	\$378.52	\$33.82	\$60.00	\$472.04
► Hysterosalpingogram [HSG] Test	\$378.52	\$99.64	\$60.00	\$538.16
► Barium Enema	\$169.58	\$44.64	\$60.00	\$274.22
Radiology [X-ray]				
► X-ray	\$64.41	\$13.20	\$12.00	\$89.61
► Complex X-ray	\$102.08	\$18.49	\$12.00	\$132.57
CT				
► CT Scan With Contrast	\$279.65	\$79.66	\$60.00	\$419.31
► CT Scan With & Without Contrast	\$314.92	\$84.62	\$60.00	\$459.54
► CT Scan Without Contrast	\$142.04	\$69.15	\$60.00	\$271.19
► CT Scan of Abdomen & Pelvis Without Contrast	\$271.55	\$112.03	\$60.00	\$443.58
► CT Scan with Myelogram	\$689.90	\$59.05	\$60.00	\$808.95
► CT Scan of Abdomen & Pelvis With and Without Contrast	\$438.15	\$129.19	\$60.00	\$627.34
► CT Scan of Abdomen & Pelvis With Contrast	\$438.15	\$117.00	\$60.00	\$615.15
CTA				
► CT Angiography Cardiac Assessment	\$249.34	\$134.38	\$60.00	\$443.72
► CT Coronary Angiography	\$249.34	\$150.42	\$60.00	\$459.76
► CT Angiography With and Without Contrast	\$327.90	\$117.45	\$60.00	\$505.35

Email Prices 710a Save Changes 710b Take Live 710c

Fig. 7A

**700**

**702**

General Surgery

Payout rates listed are suggested rates only. All rates are to be determined by the hospital system.

**Specific Locality** **704e** **704f** **Recommended Rate**

Anesthesia **NATIONAL RATE** **1** **706c** Anesthesia **100%**

Facility **Abilene Medical Center** **0.773** Facility **130%**

Physician **REST OF TEXAS** **0.97** Physician **130%**

☐ Anesthesia **716** ☒ Expand all ☐ Collapse all ☐ Export to Excel **Advanced**

Procedure	Rec. Facility Price	Rec. Phys. Price	Rec. Anesthesia Price	MDsave Fee	Total Amount		
General Surgery							
> Colonoscopy	\$877.69	\$334.01	\$250.00	\$125.00	\$1,586.70		
> Inguinal Hernia Repair	\$3,004.76	\$787.49	\$250.00	\$125.00	\$4,167.25		
DESCRIPTION	CPT CODE	CMS FACILITY	CMS PHYSICIAN	CMS ANESTHESIA	FACILITY REC RATE 130%	PHYSICIAN REC RATE 130%	ANESTHESIA REC RATE 100%
Repair inguina hernia, sliding any age	49525	\$2,675.43	\$590.67	\$250.00	\$3,004.76	\$744.83	\$250.00
Surgical Repair of Inguinal Hernia	49505	\$2,675.43	\$536.68	\$250.00	\$3,004.76	\$676.75	\$250.00
Repair recurrent inguinal hernia	49520	\$2,675.43	\$652.17	\$250.00	\$3,004.76	\$822.39	\$250.00
Incarcerated or strangulated	49521	\$2,675.43	\$739.05	\$250.00	\$3,004.76	\$931.94	\$250.00
Incarcerated or strangulated	49507	\$2,675.43	\$603.90	\$250.00	\$3,004.76	\$761.52	\$250.00
Averages \$					<b>3004.76</b> <b>711b</b>	<b>787.49</b> <b>711a</b>	<b>250.00</b> <b>711c</b>
> Laparoscopic-assisted vaginal hysterectomy	\$6,153.59	\$1,047.82	\$250.00	\$125.00	\$7,576.41		
> Appendectomy	\$2,567.30	\$836.81	\$250.00	\$125.00	\$3,779.11		
> Hysterectomy Ablation	\$4,469.00	\$438.69	\$250.00	\$125.00	\$5,282.69		
> Total Abdominal Hysterectomy	\$0.00	\$1,384.16	\$250.00	\$125.00	\$1,759.16		
> Upper Endoscopy (EGD)	\$892.54	\$224.78	\$250.00	\$125.00	\$1,492.32		
> Vaginal Hysterectomy	\$4,469.00	\$1,169.70	\$250.00	\$125.00	\$6,013.70		
> Laparoscopic Cholecystectomy (Laparoscopic Gall Bladder Removal)	\$4,244.63	\$1,078.63	\$250.00	\$125.00	\$5,698.26		
> Laparoscopic Tubal Ligation	\$4,244.63	\$914.81	\$250.00	\$125.00	\$5,534.44		
> Laparoscopic Appendectomy	\$4,244.63	\$782.25	\$250.00	\$125.00	\$5,401.88		

**Email Prices** **Save Changes** **Take Live**

Fig. 7B

700

702

GI

Payout rates listed are suggested rates only. All rates are to be determined by the hospital system.

**Specific Locality** **Recommended Rate**

Facility   Facility

Physician   Physician

717

☐ Anesthesia ☒ Sedation ☐ Pathology

☒ Expand all ☐ Collapse all ☐ Export to Excel

Advanced

Procedure	Rec. Facility Price	Rec. Phys. Price	Pathology Price	MDsave Fee	Total Amount	
GI						
> Colonoscopy	\$877.69	\$334.01	\$130.00	\$125.00	\$1,466.70	
> Flexible Signoidoscopy	\$704.39	\$143.19	\$130.00	\$125.00	\$1,102.58	
✓ Transnasal Esophagoscopy(TNE)	\$837.38	\$119.03	\$0.00	\$125.00	\$1,081.41	
DESCRIPTION	CPT CODE	CMS FACILITY	CMS PHYSICIAN	FACILITY REC. RATE 130%	PHYSICIAN REC. RATE 130%	PATHOLOGY REC. RATE
Esophagoscopy flex doc brush	43197	\$745.60	\$85.81	\$837.38	\$108.21	\$0.00
Esophagoscopy flex tmsn biopsy	43198	\$745.60	\$102.97	\$837.38	\$129.03	\$0.00
Averages \$				<input type="text" value="837.38"/>	<input type="text" value="119.03"/>	<input type="text" value="0.00"/>
				\$125.00	711d	
> Esophageal Manometry	\$369.20	\$91.98	\$0.00	\$125.00	\$586.18	
> Hemorrhoid Banding	\$496.98	\$249.32	\$0.00	\$125.00	\$871.30	
> Bravo 48 Hour PH Monitor	\$369.20	\$107.31	\$0.00	\$125.00	\$601.51	
> Abdominal Paracentesis	\$549.59	\$120.15	\$130.00	\$125.00	\$924.74	
> Hemorrhoidectomy	\$2,180.41	\$513.44	\$0.00	\$125.00	\$2,818.85	
> Feeding Tube Placement	\$219.23	\$62.22	\$0.00	\$125.00	\$406.45	
> Capsule Endoscopy	\$957.36	\$246.17	\$0.00	\$125.00	\$1,328.53	
> Feeding Tube Placement (PEG)	\$1,195.94	\$275.48	\$0.00	\$125.00	\$1,596.42	
> Upper Endoscopy (EGD)	\$892.54	\$224.78	\$0.00	\$125.00	\$1,242.32	
> EGD with Colonoscopy	\$1,203.96	\$736.42	\$0.00	\$125.00	\$2,065.38	

Email Prices Save Changes Take Live

Fig. 7C

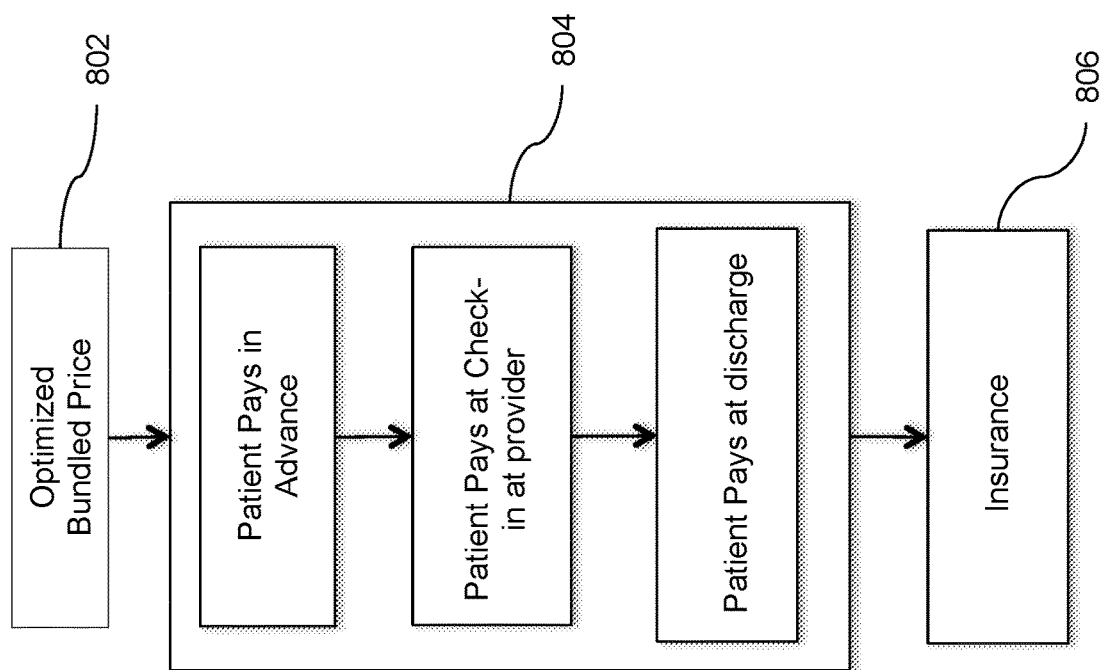


FIGURE 8



**100**

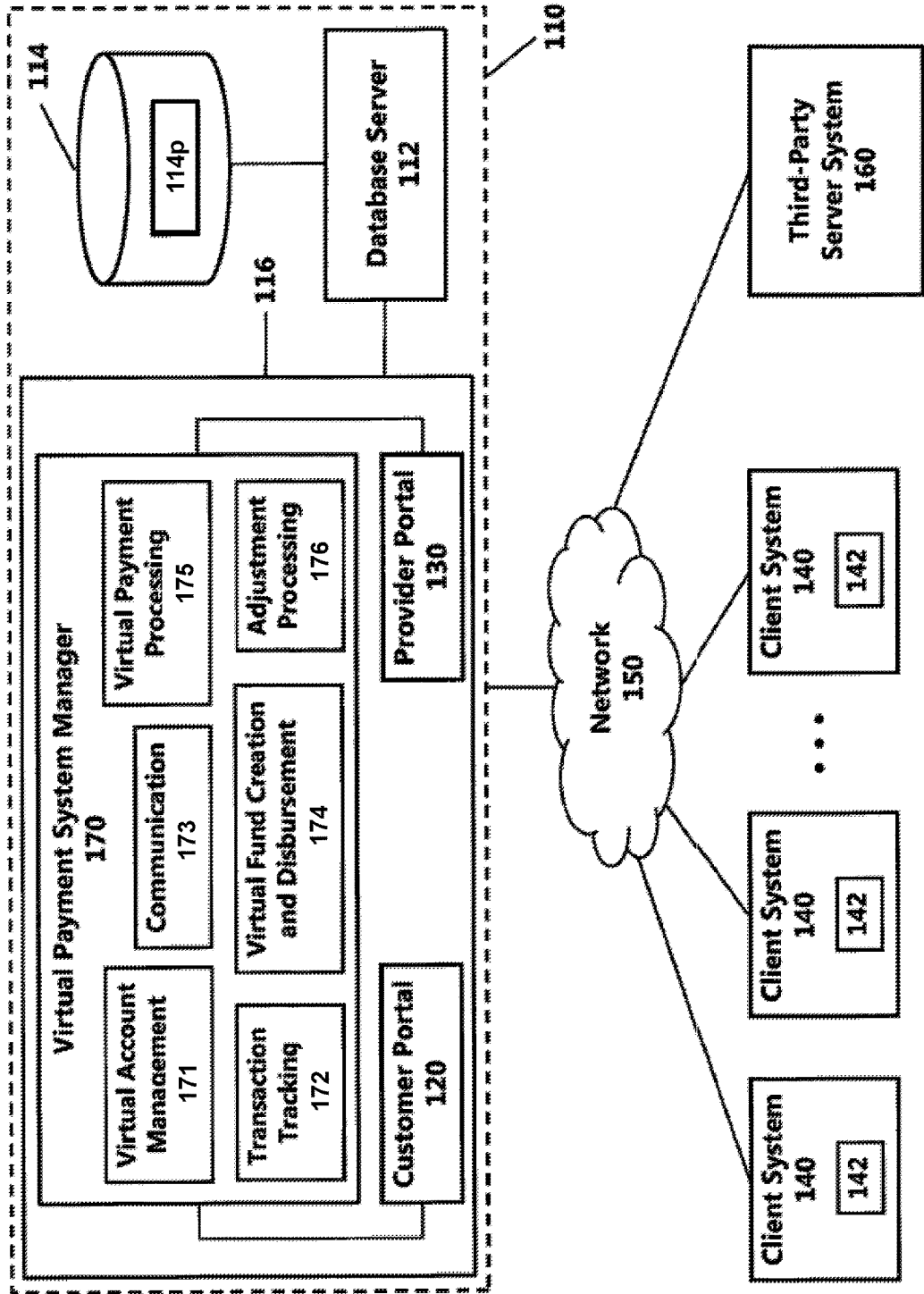


FIG. 9

# **NETWORK-BASED MARKETPLACE SERVICE FOR FACILITATING PURCHASES OF BUNDLED SERVICES AND PRODUCTS**

## **CROSS REFERENCE TO RELATED APPLICATIONS**

This application is a continuation-in-part of Ser. No. 15/055,076, filed Feb. 26, 2016, which is a continuation-in-part of U.S. patent application Ser. No. 14/874,004, filed Oct. 2, 2015, which is a continuation of Ser. No. 14/827,026, filed Aug. 14, 2015, which is a continuation-in-part of Ser. No. 14/461,209, filed Aug. 15, 2014, now U.S. Pat. No. 9,123,072, which claims the benefit of U.S. Provisional Patent Application Ser. No. 61/866,922, filed Aug. 16, 2013, the contents of all of which are incorporated herein in their entirety by reference thereto.

## **BACKGROUND OF THE INVENTION**

Exemplary embodiments of the present invention relate to the marketing and facilitating the sale of medical-related services and products. More specifically, exemplary embodiments relate to methods and apparatuses for providing a web-based mechanism allowing prospective patients to search for and compare healthcare services and products offered by local providers, including bundled sets of services from various providers and facilities combined with one or more products, and facilitating prepaid purchases of such healthcare services and products by prospective patients at discounted rates.

The price of healthcare services varies depending on specialty, procedure, and physician practice. In the United States, many patients do not have access to a simple way of shopping and comparing the prices of common medical procedures. Due to the current managed care based system in the US, the cost of treatment is often determined by managed care organizations. These managed care organizations have specific formularies for drugs and procedures designed specifically for patients' individual health plans, which often restrict the drugs and procedures available to patients based on their particular plans. Currently prospective patients who chose to compare medical procedures and costs are forced to conduct extensive, often inefficient, and time consuming research.

Healthcare costs continue to outpace pace inflationary growth, provider reimbursement rates continue to fall and the cost of patient insurance premiums are ever increasing. High deductible plans require patients to pay cash payments for medical services until the high deductible is satisfied. Once this deductible has been met, the insurance carrier begins to cover medical costs. As a result, many patients are seeing exponential increases in out-of-pocket expenses for medical procedures and services. As the number of patients who are uninsured, underinsured, or on high deductible plans grow, the need for a mechanism that allows patients to conduct comparable research and find affordable medical services increases.

## **SUMMARY OF THE INVENTION**

Exemplary embodiments of the present invention are related to an apparatus for facilitating purchases of bundled services offered by service providers. The apparatus includes an application server providing a network service that is accessible to a plurality of users through a plurality of client systems communicatively coupled to the application server

via a network and a data storage system storing a service offer database that is maintained by the application server. The service offer database comprises a plurality of service offer information records respectively associated with a plurality of service offers. The plurality of service offers includes at least one service offer for a bundled set of services. Each service offer information record comprises an indication of a primary service of the associated service offer, a purchase price for the associated service offer, a payment amount for the primary service, and compensation information for the primary service. Upon receiving purchase information for the user for purchasing the selected service offer from the client system, the network service is operable to process a purchase of the selected service offer by the user.

In exemplary embodiments, each service offer for a bundled set of services comprises a bundled set of healthcare services provided by corresponding healthcare service providers. In exemplary embodiments, at least one service offer information record associated with a service offer for a bundled set of services further comprises an indication of a facility for performing the primary service, a facility fee, and the provider's compensation information. In exemplary embodiments, at least one service offer information record associated with a service offer for a bundled set of services further comprises an indication that at least one secondary service is associated with the primary service. The secondary service may be an optional service. The network service is further operable to receive an indication from the user of the client system, for each secondary service of the service offer, of whether the secondary service is to be included in the purchase of the selected service offer.

In exemplary embodiments, the data storage system stores a customer profile database allowing users to register and provide personal information for purchasing healthcare services; a physician profile database to maintain records of individual physicians offering healthcare services; a condition information database to maintain information records for various health conditions and diseases for which corresponding healthcare services are offered; a hospital system profile database to maintain account information records for hospital system administrators to provide pre-paid healthcare services; an available service database to maintain records of various healthcare services offered by at least one of: a physician or hospital; and a transaction information database to maintain records of purchases made by registered users.

In exemplary embodiments, the network service, upon being accessed by a user of one of the client systems to process a purchase of a service offer, generates a voucher for the user that specifies a unique confirmation number for the purchase and the corresponding service provider for each of the services and/or products.

The above-described and other features and advantages realized through the techniques of the present disclosure will be better appreciated and understood with reference to the following detailed description, drawings, and appended claims. Other embodiments and aspects of the invention are described in detail herein and are considered a part of the claimed invention.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

The subject matter that is regarded as the invention is particularly pointed out and distinctly claimed in the claims at the conclusion of the specification. The foregoing and other objects, features, and advantages of the invention are

apparent from the following detailed description of exemplary embodiments of the present invention taken in conjunction with the accompanying drawings in which:

FIG. 1 is a schematic diagram illustrating an embodiment of the network architecture for a healthcare marketplace system configured to implement exemplary embodiments of the present invention;

FIG. 2 is a block diagram illustrating a server system in accordance with an embodiment of the present invention;

FIGS. 3A-3D are a number of screen shots illustrating graphical user interfaces that may be implemented by services provided within a customer portal in accordance with an embodiment of the present invention;

FIG. 4A is an illustration of a voucher that may be generated within a user interface by functions provided within a customer portal for a purchased service in accordance with the present invention;

FIG. 4B is an illustration of a voucher that may be generated within a user interface by functions provided within a customer portal for a purchased service that is offered as a bundled set in accordance with the present invention;

FIG. 5 is a block diagram of an exemplary computer system 600 that can be used for implementing exemplary embodiments of the present invention;

FIG. 6 is a schematic diagram illustrating a second embodiment of the network architecture for a healthcare marketplace system that can be configured to implement exemplary embodiments of the present invention;

FIGS. 7A-7C are a number of screen shots illustrating graphical user interfaces that may be implemented by services provided within a provider portal in accordance with an embodiment of the present invention;

FIG. 8 illustrates a flow chart of an insurance policy stored in the insurance database executed by the application server in accordance with exemplary embodiments of the present invention; and

FIG. 9 illustrates a block diagram of a virtual payment system manager communicating with the client system in a healthcare marketplace system.

The detailed description provides exemplary embodiments of the present invention, together with advantages, features, and drawings, in which similar numbers refer to similar parts throughout the drawings. The flow diagrams depicted herein are just examples. There may be many variations to these diagrams or the steps (or operations) described therein without departing from the spirit of the invention. For instance, the steps may be performed in a differing order, or steps may be added, deleted, or modified. All of these variations are considered to be within the scope of the claimed invention.

#### DETAILED DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims defining the features of the invention that are regarded as novel, it is believed that the invention will be better understood from a consideration of the description of exemplary embodiments in conjunction with drawings. Therefore, specific structural and functional details disclosed in relation to the exemplary embodiments described herein are not to be interpreted as limiting, but merely as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriate form. Further, the terms and phrases used herein are not intended to be limiting but rather to provide an understandable description of the invention.

Exemplary embodiments of a transactional marketplace system in accordance with the present invention will now be described with reference to the drawings. Exemplary embodiments of the present invention may be implemented to provide healthcare service providers and pharmacies with a mechanism to remotely offer healthcare services and products to prospective patients at discounted rates in exchange for prepayment of the costs for the services and products via a network-based application (for example, a web-based application). In this regard, exemplary embodiments may further be implemented to provide prospective patients with a mechanism to remotely search, compare, and make pre-paid purchases of such healthcare services and products offered by medical service providers and pharmacies via a network-connected device configured to access the network-based application. Exemplary embodiments may be further implemented to provide healthcare service providers with the ability to remotely offer a bundled set of healthcare services that are performed separately by multiple providers or a bundled set of one or more healthcare services and one or more products to prospective patients through such a network-based mechanism in which the patient is provided the opportunity to make a prepaid purchase of such a bundled set of service(s) and/or product(s) in a single transaction via the network-connected device, whereby the network-based application also facilitates an allocation and a disbursed distribution of the payment among the multiple healthcare service providers that perform the services or sell products included in the bundled set.

Exemplary embodiments may also be further implemented to provide a virtual payment system for facilitating and accounting for the exchange of payment for services and products purchased by (or otherwise on behalf of) patients and offered by healthcare providers within the transactional marketplace system in which a respective virtual money account is established and utilized for each participant in the transactions conducted within the marketplace system to manage and track the process of exchanging actual currency and/or credits used to pay for the transactions through the use of corresponding virtual funds created within the virtual payment system.

In such embodiments, the virtual funds may be allocated and distributed to, exchanged among, and redeemed for corresponding amounts of actual currency by various participants to each transaction for which payment is facilitated through the virtual payment system, and the participants to the transactions within the virtual payment system for which respective virtual money accounts are established and utilized may include, in addition to patients, healthcare providers, or other entities specified for receiving payments for services or products offered through the marketplace system, third party payers, and an entity that provides the transactional marketplace system.

Generally, in such exemplary embodiments, virtual funds are created within the virtual money accounts administered within the virtual payment system based on actual currency transferred into the system from external financial accounts (for example, at other financial institutions), transferred between virtual money accounts within the virtual payment system, and redeemed from virtual money accounts for corresponding amounts of real currency transferred to external financial accounts.

More particularly, such a virtual payment system may be implemented in exemplary embodiments to facilitate a tiered or staged disbursement of compensation for a prepaid payment made in a single transaction by a patient for a bundled set of healthcare service(s) and/or product(s) among the multiple

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healthcare service providers that sell or provide services or products included in the bundled set upon the purchase of the services and/or products being redeemed by the patient; as well as to enable and facilitate a number of useful actions within the virtual payment system such as, for example, seeding and managing of virtual funds for discounts for particular purchases or general credits issued within the marketplace system, handling cancellations, refunds, and other adjustments for purchases (including partially-redeemed purchases of bundled sets of service(s) and/or product(s)), and accounting for fees collected from users by the providers the marketplace system.

Exemplary embodiments may be further implemented to provide various types of healthcare service providers, which may include individual physicians, practice groups, hospital systems, and pharmacies, with the ability to establish affiliations with one another through such a network-based mechanism and provide various options allowing the service providers to remotely offer healthcare services and products in association with these affiliations.

It should further be noted that various aspects of exemplary embodiments of the present invention described herein are not limited to healthcare services (also referred to herein as procedures) and products but, rather, may be implemented with respect to any suitable classes and types of services and products that may be offered by any suitable classes and types of service providers and retailers that would benefit from bundling, shopping and paying for diverse services from diverse sources. In exemplary embodiments of the present invention, the products or services that are offered by providers for purchase within the transactional marketplace system may be real, virtual, digital, or a combination thereof.

Referring now to FIG. 1, a schematic diagram illustrating an example network architecture for a healthcare marketplace system **100** configured to implement exemplary embodiments of the present invention is provided. In the example illustrated in FIG. 1, healthcare marketplace system **100** is implemented as a client/server system that includes a central server system **110** that is commonly accessed by each user of the system through operation of any of a plurality of client systems **140** that are operatively coupled to the central server system via a communication network **150**. Central server system **110** further includes a database server **112** coupled to a data store **114**, a machine learning algorithm **15** and an application server **116**, and each client system **140** is a user terminal or other client device implementing software for and running a respective client application **142** for accessing services provided via a network-based application (also referred to herein as a network service) implemented by application server **116**. Such client applications may also be referred to as client modules, or simply clients, and may be implemented in a variety of ways. In exemplary embodiments, such client applications can be implemented as any of a myriad of suitable client application types, which range from proprietary client applications (thick clients) to web-based interfaces in which the user agent function is provided by a web server and/or a back-end program (for example, a CGI program).

As further illustrated, exemplary marketplace system **100** may also include at least one third-party server system **160** to enable other functionality that may be accessed and utilized by server system **110** to provide and/or enhance the network service discussed herein. In exemplary embodiments, marketplace system **100** can include additional servers, clients, and other devices not shown in FIG. 1. In exemplary embodiments, network **150** can be configured to

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facilitate communications between server system **110** and client systems **140**, as well as communications with and between other devices and computers connected together within marketplace system **100**, by any suitable wire (including optical fiber), wireless technology, or any suitable combination thereof, including, but not limited to, personal area networks (PANs), local area networks (LANs), wireless networks, wide-area networks (WAN), the Internet (a network of heterogeneous networks using the Internet Protocol, IP), and virtual private networks. The network may also utilize any suitable hardware, software, and firmware technology to connect devices such as, for example, optical fiber, Ethernet, ISDN (Integrated Services Digital Network), T-1 or T-3 link, FDDI (Fiber Distributed Data Network), cable or wireless LMDS network, Wireless LAN, Wireless PAN (for example, IrDA, Bluetooth, Wireless USB, Z-Wave and ZigBee), HomePNA, Power line communication, or telephone line network. Such a network connection can include intranets, extranets, and the Internet, may contain any number of network infrastructure elements including routers, switches, gateways, etc., can comprise a circuit switched network, such as the Public Service Telephone Network (PSTN), a packet switched network, such as the global Internet, a private WAN or LAN, a telecommunications network, a broadcast network, or a point-to-point network, and may utilize a variety of networking protocols now available or later developed including, but not limited to the Transmission Control Protocol/Internet Protocol (TCP/IP) suite of protocols for communication.

In exemplary embodiments, application server **116**, database server **112**, and any other servers employed within server system **110** and third-party servers utilized within marketplace system **100** can be implemented within any suitable computing system or systems such as a workstation computer, a mainframe computer, a server system (for example, SUN ULTRA workstations running the SUN operating system, IBM RS/6000 workstations and servers running the AIX operating system, or an IBM zSeries eServer running z/OS, z/VM, or LINUX OS), a server cluster, a distributed computing system, a cloud based computing system, or the like, as well as any of the various types of computing systems and devices described below with reference to the client systems **140**. Server system **110** may be implemented using any of a variety of architectures. For example, application server **116** and database server **112** may also be implemented independently or as a single, integrated device. While the exemplary embodiment illustrated in FIG. 1 depicts application server **116** and database server **112** as individual components, the applications provided by these servers, or various combinations of these applications, may actually be server applications running on separate physical devices. In this regard, server system **110** may comprise a number of computers connected together via a network and, therefore, may exist as multiple separate logical and/or physical units, and/or as multiple servers acting in concert or independently, wherein each server may be comprised of multiple separate logical and/or physical units. In exemplary embodiments, server system **110** can be connected to network **150** through a collection of suitable security appliances, which may be implemented in hardware, software, or a combination of hardware and software.

As illustrated in FIG. 1, application server **116** is communicatively coupled to database server **112**. Database server **112** is connected to data store **114**, which comprises a plurality of databases that are maintained by database server **112**, accessed by application server **116** via database services provided at a front end by database server **112**, and

store information on a variety of matters that is utilized in providing the services offered via the network service provided by the application server, as described below in greater detail.

Referring now to FIG. 2, a block diagram illustrating an exemplary embodiment of server system 110 is provided. As illustrated in FIG. 2, application server 116 is implemented to provide a plurality of services via a customer portal 120 and a plurality of services via a provider portal 130. As described herein, application server 116 can be implemented to provide a respective set of services for each of various types of users (for example, unregistered guests, customers, individual physicians, nurses, office staff, practice group administrators, hospital system administrators, pharmacy administrators, and the like), and some of the services offered by application server 116 can be commonly applicable to and accessible by all types of users, while other services can be applicable to and accessible only by specific types of users. For purposes of description, the terms “providers” and “provider users” are used herein to refer to the general class of users that register with the system to offer healthcare services or products for purchase by customer users registered with the system. As further illustrated in exemplary embodiment of FIG. 2, and as will be described in greater detail below, the services provided via customer portal 120 include a registration and account management service 122, a navigation and search service 124, and a purchasing service 126, and the services provided via provider portal 130 include a registration and account management service 131, an affiliation management service 132, a procedure management service 133, a product management service 134, a service selling service 135, an insurance management 14 and a transaction processing service 136.

The machine learning algorithm 15 instructs the service offer database 114h to store each healthcare service provider service corresponding to the user selection and displays the bundled set of service offers via the graphical user interface/provider portal 130 that matches the users’ selection. Any machine-learning algorithm 15 can be employed, such as neural networks, expert systems, Bayesian belief networks, fuzzy logic, data fusion engines and the like. The system may also employ combinations of various artificial intelligence techniques to the service offer database 114h. The machine learning algorithm 15 takes into account of each and every parameter of user inputs such as type of disease, location, expertise, procedures, hospitals, pricing etc. Thus, the machine learning algorithm 15 displays the best results/hits based on the inputs and preferences of the user. The machine learning algorithm 15 further sets static prices based on historical payment data, or facilitating dynamic pricing for each individual patient based on the underlying pricing plus the patient’s ability to pay and insurance status.

As further illustrated in the exemplary embodiment of FIG. 2, a data store 114 comprises a plurality of databases that are maintained and accessible by application server 116 via database server 112, including a customer profile database 114a, a physician profile database 114b, a practice group profile database 114c, a hospital system profile database 114d, a pharmacy profile database 114e, a condition information database 114f, an available services database 114g, a service offer database 114h, an available products database 114i, a product offer database 114j, a transaction information database 114k, one or more additional databases 114l, and an insurance database 114o that may be used for storing any other suitable information that may be utilized by server system 110 (for example, system usage data, audit trail data, data used internally within the system by appli-

cation server 116, and the like). In the present exemplary embodiment, customer profile database 114a is used to maintain account information records for customer users that register with server system 110 to purchase healthcare services and products being offered by provider users registered with the system. For each customer for which an account is registered with server system 110, various items of information relevant to the customer, such as name, address or location information, contact information, billing information, and any other suitable identifying information, as well as a unique user name and password associated with the account that can be used to log into the account, can be included in the respective account information record for the customer that is maintained within customer profile database 114a. The account information record for each customer can also be associated with a unique customer account identifier within customer profile database 114a that is used by application server 116 for performing various operations.

Physician profile database 114b is used to maintain account information records for individual physician users that register with server system 110 to offer healthcare services for purchase by customer users registered with the system, as well as account information records for individual physicians that are registered with the system in association with a practice group or hospital system (as described in greater detail below). For each physician for which an account is registered with server system 110, various items of information relevant to the physician, such as name, practice specialty, office location(s) and hours, a profile picture, contact information, biographical information (such as awards, honors, publications, patient testimonials, and other information that can be helpful for marketing the physician to customers accessing the system), URLs or references to websites and social media profiles, group practice and hospital affiliation(s), pharmacy affiliation(s) (for example, on-site pharmacies at facilities or clinics that the physician uses for patient visits or particular procedures), outside facilities that are used for particular procedures performed by the physician (for example, particular hospitals or clinics), compensation information (indicating a financial account for receiving payment for purchases of services offered by the practice group and affiliated physician via the system and, in some embodiments, a financial account for receiving payment for purchases of products offered by affiliated pharmacies via the system, which may be the same as or different than the financial account specified for receiving payment for purchases of services), and any other suitable identifying information, as well as a unique user name and password associated with the account that can be used to log into the account, may be included in the respective account information record for the physician that is maintained within physician profile database 114b. The account information record for each physician can also be associated with an account status and a unique physician account identifier within physician profile database 114b that is used by application server 116 for performing various operations.

Practice group profile database 114c is used to maintain account information records for practice group administrator users that register with server system 110 to offer healthcare services provided by physicians affiliated with a practice group for purchase by customer users registered with the system. For each practice group for which an account is registered with server system 110, various items of information relevant to the practice, as disclosed in the physician profile database 114b.

Hospital system profile database **114d** is used to maintain account information records for hospital system administrator users that register with server system **110** to make on-site, in-person sales of pre-paid healthcare services provided by physicians affiliated with a hospital system for purchase by patients operating client systems within marketplace system **100**. For each hospital system for which an account is registered with server system **110**, various items of information relevant to the hospital system, such as contact information, practice group and physician affiliation(s), pharmacy affiliation(s) (for example, on-site pharmacies at facilities or clinics that affiliated physicians or practice groups use for patient visits or particular procedures), facilities that are used for particular procedures performed by physicians affiliated with the hospital system, compensation information (indicating a financial account for receiving payment for purchases of services offered by the hospital system and affiliated physicians and practice groups via the system and, in some embodiments, a financial account as disclosed in physician profile database **114b**). Pharmacy profile database **114e** is used to maintain account information records for pharmacy administrator users that register with server system **110** to offer healthcare products, such as prescription drugs and medical supplies, for purchase by customer users registered with the system, through a particular pharmacy. For each pharmacy for which an account is registered with server system **110**, various items of information relevant to the pharmacy, an indication of whether the pharmacy has agreed to accept vouchers for or otherwise honor pre-paid purchases of healthcare products made by customer users via healthcare marketplace system **100** (as will be discussed in greater detail below), and any other suitable identifying information, as well as a unique user name and password associated with the account that can be used to log into the account, may be included in the respective account information record for the pharmacy that is maintained within pharmacy profile database **114e**.

Condition information database **114f** is used to maintain information records for various health conditions and diseases for which corresponding healthcare services and products (for example, tests, treatments, and drugs) that can be offered by providers registered with server system **110** for purchase by customer users registered with the system. In exemplary embodiments, the various conditions and diseases for which respective information records are maintained in condition information database **114f** and the information that populates the respective information record for each condition or disease can be created and maintained by a back-end administrator of server system **110**. For each condition or disease for which an information record is created, various items of information relevant to the condition or disease, such as name, description, causes, risk factors, symptoms, common treatments, corresponding healthcare services and products that can be offered by providers registered with server system **110** (for example, each associated healthcare service may be identified within the information record using a unique procedure identifier that is used to identify an information record for the service within available services database **114g**, and each associated healthcare product may be identified within the information record using a unique product identifier that is used to identify an information record for the product within available products database **114i**, as discussed below), and any other suitable information may be included in the respective information record for the condition or disease that is maintained within condition information database **114f**.

Available services database **114g** is used to maintain information records for various healthcare services (for example, tests and treatments) that can be offered by providers registered with server system **110** for purchase by customer users registered with the server system. For each service for which an information record is created, various items of information relevant to the service, such as name, procedure detail, one or more medical specialties with which the procedure is commonly associated, any healthcare products (for example, drugs or medical supplies) with which the procedure is commonly associated, cost information (for example, average prices for the service for patients that are uninsured and/or have a high deductible insurance plan and an average price for purchasing the service that is offered by providers registered with server system **110**), a medical code number identifying the service according to the nomenclature used by a formal medical classification system (for example, a code that is used to identify the service according to the Current Procedural Terminology (CPT) code set), a unique procedure identifier that is used by application server **116** to uniquely identify the particular service, and any other suitable information may be included in the respective information record for the service that is maintained within available services database **114g**.

The insurance database **114o** and the insurance management **14** are explained in detail in conjunction with FIG. **8** of the present invention. Additionally, in exemplary embodiments, the information record for each service that is maintained within available services database **114g** may further include an indication of whether the service can be offered by providers within marketplace system **100** as an individual primary service or as a primary service of a bundled set of a plurality of services or one or more services and one or more products (for which a single payment for the bundled set will be disbursed to different provider for each of the services and products in the bundled set). Such items of information relevant to the bundled set included in the respective information record for a primary service may include, for example, items of information describing one or more secondary services associated with the primary service (such as name, a medical code number such as a CPT code identifying the service according to the nomenclature used by a formal medical classification system, and a secondary procedure identifier that is used by application server **116** to uniquely identify the particular secondary service in association with the unique procedure identifier for the primary service), items of information describing one or more products associated with the primary service (such as name(s), a list of dosage level options for prescription drugs, size options for certain medical supplies, an indication of whether a prescription is required to purchase the product, and a bundled product identifier that is used by application server **116** to uniquely identify the particular product in association with the unique procedure identifier for the primary service), one or more procedure identifiers for other services for which an information record is maintained within available services database **114g** that are considered to be secondary services associated with the primary service, one or more product identifiers for other products for which an information record is maintained within available products database **114i** that are included in the bundled set with the primary service, an indication of whether each of the products included in the bundled set or performance of each of the one or more secondary services (for which a single customer payment for the bundled set will be disbursed among different respective providers for the services and/or products in the bundled set) is optional or required in

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association with performance of the primary service, and an indication of whether the primary service is required to be performed at an outside facility. In addition, in such embodiments, for each service for which the information record includes an indication that the service is offered as a primary service of a bundled set, the cost information that is included in the respective information record for the primary service that is maintained within available services database **114g** can include respective cost information for each of the primary service and each of the one or secondary services, the one or more products, and, if required, the use of an outside facility for the primary service individually included in the bundled set (for example, average prices for each service, product, and facility of the bundled set for patients that are uninsured and/or have a high deductible insurance plan) in addition to an average price for purchasing the bundled set that is offered by providers registered with server system **110**.

Service offer database **114h** is used to maintain information records for healthcare services that are being offered by providers registered with the healthcare marketplace system **100** for purchase by customer users registered with the system. In this regard, it should be noted that the same service may be separately offered by multiple different providers registered with the system and, thus, service offer database **114h** can include multiple information records for the same service that are each associated with a different provider. For each offered service for which a respective information record is maintained within service offer database **114h**, various items of information relevant to the service being offered, such as the unique procedure identifier for the information record within available services database **114g** for the service, the unique account identifier for the account information record (within physician profile database **114b**, practice group profile database **114c**, or hospital system profile database **114d**) of the provider that is offering the service through the system, the unique physician account identifier for the account information record within physician profile database **114b** of the physician user that will perform the service, a location at which the service will be performed, a discounted price for purchasing the service within marketplace system **100**, a regular price for the service when the service is purchased outside of the system, the unique account identifier for the account information record (within physician profile database **114b**, practice group profile database **114c**, or hospital system profile database **114d**) of the provider for which payment for the service when purchased through the system is to be directed, the unique virtual money account identifier for the account information record for the provider for which payment for the service when purchased through the system is to be directed that is maintained within virtual money account database **114p** in exemplary embodiments in which a virtual payment system is implemented within server system **110**, a payment amount to be transferred to the provider for which payment for performing the service is to be directed, additional descriptive information that may be provided by the provider offering the service, a unique procedure offer identifier that is used by application server **116** to uniquely identify the offering of the particular service by the provider within the system, and any other suitable information may be included in the respective information record for the offered service that is maintained within service offer database **114h**.

The items of information included in the respective information record for each offered service that is maintained within service offer database **114h** can further include items

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of information describing a time limit or expiration date for redeeming purchases of the offered service made by customer users registered with the system and discounts that are available with respect to purchases of the offered service by customer users registered with the system. For example, the items of information describing available discounts for the offered service can include a table of one or more unique coupon codes that customer users may enter when making purchases of the offered service within the system and, for each coupon code included in such a table, a description of a discount associated with the coupon code and an indication of whether the coupon code is presently valid for use.

In exemplary embodiments in which a virtual payment system is implemented within server system **110**, the account information record that is maintained within the customer profile database **114a**, a physician profile database **114c**, the practice group profile database **114c**, the hospital system profile database **114d**, and the pharmacy profile database **114e** for each practice group provider that is registered with the system can further include a unique virtual money account identifier that is respectively associated with an account information record for the practice group that is maintained within virtual money account database **114p**.

In exemplary embodiments, the system has associated the service offer with one or more healthcare products (for example, a drug that is commonly prescribed in association with the service being offered) and, for each healthcare product that is indicated as having been associated with the service offer, a discounted price for purchasing the particular product from the non-registered, affiliated pharmacy in association with a purchase of the service from the provider offering the particular service within the system, a regular price for purchasing the product from the non-registered, affiliated pharmacy, the unique account identifier for the account information record (within physician profile database **114b**, practice group profile database **114c**, or hospital system profile database **114d**) of the provider for which payment for the product when purchased through the system in association with the service is to be directed, and a compensation amount to be transferred to the provider for which payment for purchasing the product is to be directed.

Additionally, in exemplary embodiments, the information records for offered services that are maintained within service offer database **114h** can include information records that include additional information for services that are offered by providers registered with the system as a bundled set of services or one or more services and one or more products. For example, the items of information relevant to the bundled set included in the respective information record for an offered service within service offer database **114h** that is indicated to be a primary service of a bundled set may further include, for example, an indication of whether the primary service is to be performed at an outside facility and, if the primary service is to be performed at an outside facility, items of information pertaining to each of one or more facilities that may be used to perform the primary service such as, for example, name, address, contact information, facility fee, and compensation information indicating a financial account that is used by the facility for receiving a facility fee, and, in exemplary embodiments in which a virtual payment system is implemented within server system **110**, a unique virtual money account identifier for the account information record for the facility that is maintained within virtual money account database **114p**.

Likewise, in another example, such items of information relevant to the bundled set included in the respective infor-

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mation record for an offered service within service offer database **114h** that is indicated to be a primary service of a bundled set of services or one or more services and one or more products may also include, for example, if a prescription is required to purchase the product (for example, the physician user that would be performing the primary service), a compensation amount to be transferred to the provider for which payment for performing the secondary service is to be directed, and an indication of whether the product is optional or required in association with performance of the primary service.

Available products database **114i** is used to maintain information records for various healthcare products (for example, prescription drugs and medical supplies) that can be offered by pharmacies registered with server system **110** (that is, pharmacies for which an account information record is maintained within pharmacy profile database **114e**) for purchase by customer users registered with the system. For each product for which an information record is created, various items of information relevant to the product, such as name(s), a list of dosage level options (for prescription drugs), size options (for certain medical supplies), and the like, a description of the product, an indication of whether a prescription is required to purchase the product, information for rendering a respective predefined fillable form for submitting prescription information for the product within a user interface, cost information (for example, average prices for the product for patients that are uninsured and/or have a high deductible insurance plan and a lowest price for purchasing the product that is offered by pharmacies registered with server system **110**). In exemplary embodiments, the respective information records for each particular product that is maintained in available products database **114i** can further include a list of alternative, equivalent, and generic products for the particular product along with the unique product identifier for the respective information record that is maintained in available products database **114i** for each of the alternative, equivalent, and generic products included in the list.

Product offer database **114j** is used to maintain information records for offers of healthcare products that are being made by pharmacies registered with the system for purchase by customer users registered with the system. In this regard, it should be noted that the same product might be separately offered by multiple different pharmacies registered with the system and, thus, product offer database **114j** can include multiple information records for the same product that are each associated with a different product offer by a different provider. For each product offered by a pharmacy for which a respective information record is maintained within product offer database **114j**, various items of information relevant to the offering of the product, such as the unique product identifier for the information record within available products database **114i** for the product, an indication of whether a prescription is required to purchase the product, the unique pharmacy account identifier for the account information record within pharmacy profile database **114e** of the pharmacy that is offering the product, a discounted price for purchasing the product from the identified pharmacy within marketplace system **100**, a regular price for the product when the service is purchased outside of the system from the identified pharmacy, the payment amount for purchases of the product by customer users registered with the system that is to be transferred to the pharmacy that is offering the product, the unique virtual money account identifier for the account information record for the pharmacy for which payment for the product when purchased through the system

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is to be directed that is maintained within virtual money account database **114p** in exemplary embodiments in which a virtual payment system is implemented within server system **110**.

Transaction information database **114k** is used to maintain information records for purchases that have been made via the system by registered customer users of healthcare services and products being offered by registered providers. In general, the items of information relevant to each purchase that is included in the respective information record for the purchase that is maintained within the transaction information database **114k** can include, for example, the unique customer account identifier of the account information record for the purchasing customer within customer profile database **114a**.

For each purchase of a service that has been made using the system, the items of information relevant to the purchase included in the respective information record for the purchase that is maintained within transaction information database **114k** may further include the unique physician account identifier for the account information record within physician profile database **114b** of the physician user that is designated as performing the purchased service in the information record for the purchased service within service offer database **114h**, an indication of any set expiration date by which the purchase must be redeemed, an indication of whether the purchase has been redeemed, if the purchase has been redeemed, a redemption date, and any other suitable accounting details pertaining to the purchase (such as indications of payment sources and details regarding purchase cancellations, refunds, or other adjustments).

In exemplary embodiments, the user interface can be a web-based user interface, implemented as a web-based software application hosting a corresponding website that provides a number of web pages (that is, screens) to offer the services implemented by application server **116** to users. For example, a user can access the corresponding website using a web browser implemented within a client application **142** executing on a client system **140**.

As noted above, in exemplary embodiments in which a virtual payment system is implemented within server system **110**, data store **114** may further comprise a virtual money account database **114p** that is used to maintain account information records for virtual money accounts that are respectively established by virtual payment system manager **170** for registered users of marketplace system **100** and other participants to transactions conducted within the marketplace system.

As also noted above, the participants to the transactions within the virtual payment system for which respective virtual money accounts are established and utilized may include, in addition to patients, healthcare providers, or other entities specified for receiving payments for services or products offered through the marketplace system, third party payers and an entity that provides the transactional marketplace system.

In general, virtual funds that are created by virtual payment system manager **170** (as described in greater detail below) may be exchanged for real currency and assigned to, allocated to, and exchanged among various participants within the virtual payment system in response to various actions being taken within the transactional marketplace system. In this regard, virtual money account database **114p** is accessed via database server **112** and utilized by virtual payment system manager **170** to organize, manage, and track information pertaining to virtual funds that are created by virtual payment system manager **170** with respect to



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transactions that are conducted within the marketplace system in relation to purchases of services and products being offered by providers within the system.

More specifically, in exemplary embodiments, for each registered user of or other participant to transactions conducted within the marketplace system, a set of general information and a container of virtual fund objects can be included in the respective account information record for the participant that is maintained within virtual money account database 114p.

For each participant that does not have a corresponding user account registered with the server system 110, the items of information included in the set of general information of the respective account information record for the participant may further include, for example, details such as name, address, contact information, and information indicative of an external financial account that is used for purposes of making payments (such as for third party payer participants), receiving disbursements (such as for facility participants), or holding actual funds (such as for the providers of marketplace system 100).

In exemplary embodiments, some or all of the information that may be included in the set of general information for each participant that does not have a corresponding account registered with the server system 110 may alternatively be stored within the one or more additional databases 114l of data store 114 in association with the unique virtual money account identifier that is associated with the account information record for the participant within virtual money account database 114p.

It should also be noted that, in exemplary embodiments, virtual money account database 114p can also maintain account information records for virtual money accounts that are respectively established for any number of various types of participants to transactions conducted within marketplace system 100 other than those explicitly referenced herein.

The containers of virtual fund objects included in the respective account information records for participants that are maintained within virtual money account database 114p are used to manage units of virtual funds that have been created within the virtual payment system by virtual payment system manager 170. In particular, each virtual fund object in the respective account information record maintained within virtual money account database 114p for each participant corresponds to an amount or value of virtual funds that are presently assigned to the participant and includes a plurality of attributes that define the virtual fund object.

More specifically, the plurality of attributes that define each virtual fund object include, as a primary attribute, an indication of the value of the corresponding virtual funds for the object. The value of a virtual fund object is the apparent value of the corresponding virtual funds that is represented to all participants within the system and corresponds to an amount of real currency that is held in an external financial account maintained by the providers of marketplace system 100.

In exemplary embodiments, the value of a virtual fund object can be represented within the virtual payment system as an actual value of the corresponding real currency that is held in the external financial account maintained by the providers of marketplace system 100 for the virtual fund object (for example, using a direct dollar-for-dollar correlation between the amount of corresponding real currency held in the external financial account for the virtual fund object and the value of a virtual fund object).

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In this regard, the items of information included in the set of general information of the respective account information record within virtual money account database 114p for each participant may include a balance value that is dynamically calculated by virtual payment system manager 170 in response to transactions conducted within the virtual payment system as an aggregate sum of the values of all virtual fund objects included in the container of the respective account information record.

In exemplary embodiments, the values of virtual fund objects may be permitted to be represented within the virtual payment system as negative values of corresponding real currency, and the balance values included in respective account information records within virtual money account database 114p for participants may also be permitted to be negative values. Virtual funds are thereby managed within the virtual payment system as digitally-recorded values that correlate to corresponding amounts of real currency that may be held in or owed from an external financial account and used to track transfers of value between participants within virtual payment system.

The plurality of attributes that define each virtual fund object can further include a unique identifier for the object that is used by virtual payment system manager 170 to track the object through transactions conducted within the virtual payment system, an indication of an original funding or debiting source based on which the object was created, a timestamp that includes details about the time and/or date when the bucket of funds was created, an indication of whether the corresponding virtual funds for the object are presently allocated to use as payment for an offered service or product purchased within the marketplace system by the participant for which the account information record within which the object is maintained was established in virtual money account database 114p in association with the unique transaction identifier for the respective information record for the purchase that is maintained within transaction information database 114k, and an indication of whether the corresponding virtual funds for the object have already been transferred to the participant for which the account information record within which the object is maintained was established as part of the payment process for an offered service or product purchased within the marketplace system for which the participant is specified as the entity for which payment for the purchased service or product is to be directed along with the unique transaction identifier for the respective information record for the purchase that is maintained within transaction information database 114k.

The indication of the original funding or debiting source based on which a virtual fund object was created may be, for example, an indication of an actual source of real currency that was used for purchasing the corresponding virtual funds (which may be, for instance, a bank account or other depository institution from which an Automated Clearing House (ACH) payment or the like was made, credit or debit card information, other electronic payment information such as information for utilizing an account with an online payment service such as PayPal, an online wallet provider such as Google Wallet, or any another entity facilitating payments and money transfers to be made through the Internet, cash, or a third party payer that submitted a payment on behalf of a participant), an indication of an actual source of real currency for which a negative value of corresponding virtual funds indicates an amount of real currency owed by a participant, an indication that the value of the virtual fund object is a credit that was conveyed by the providers of marketplace system 100 to a registered user of

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server system **110**, or an indication that the value of the virtual fund object corresponds to a discount made available by a provider registered with the system with respect to a purchase of a service or product offered by the provider by a customer user registered with the system (which may include indications of a particular coupon code input by the customer when making the purchase and the unique identifier for the information record for one of a corresponding provider profile database, service offer database **114h**, or product offer database **114j** within which information describing the discount is maintained).

With respect to the attribute defining a virtual fund object that indicates whether the corresponding virtual funds for the object are presently allocated to use as payment for an offered service or product purchased within the marketplace system by the participant for which the account information record within which the object is maintained was established in virtual money account database **114p**, the items of information included in the set of general information of the respective account information record within virtual money account database **114p** for each participant may include, in addition to the total balance value described above, an available balance value that is dynamically calculated by virtual payment system manager **170** in response to transactions conducted within the virtual payment system as an aggregate sum of the values of all virtual fund objects included in the container of the respective account information record for which there is not an indication that the corresponding virtual funds for the object are presently allocated to use as payment for a purchased service or product and an allocated balance value that is dynamically calculated by virtual payment system manager **170** in response to transactions conducted within the virtual payment system as an aggregate sum of the values of all virtual fund objects included in the container of the respective account information record for which there is an indication that the corresponding virtual funds for the object are presently allocated to use as payment for a purchased service.

As used herein, the terms “virtual funds,” “virtual money,” “electronic money,” “e-money,” and the like refer to units of virtual currency that are created and exchanged as value for transactions conducted in the virtual environment provided by the virtual payment system. In contrast, the terms “real currency,” “actual currency,” “real funds,” “actual funds,” and the like refer to any type of currency exchanged as value for transactions conducted outside of the virtual environment including, but not limited to, types of currency issued by sovereign nations such as, for example, United States Dollars, European Union Euros, Japanese Yen, British Pounds, Chinese Yuan, Swiss Francs, etc.

FIG. 3A is a screen shot illustrating an example of a graphical user interface provided by such a home page **300** for customer portal **120**. In the illustrated example, the search interface provided at home page **300** could include a drop-down menu **302**, a search entry field **304**, a location entry field **306**, and a search button **308**. Drop-down menu **302** provides a set of selectable options that allow the user to search for particular procedures offered by provider users registered with the system, particular products offered by pharmacy users registered with the system, information on providers registered with the system, and information on health conditions that is maintained within system. In exemplary embodiments, navigation and search service **124** can be configured to use location information that may be gathered by any suitable location determining functionality implemented on the client system to provide a default

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location entry (for instance, city name and/or zip code) within location entry field **306**. In such embodiments, navigation and search service **124** may be further configured to request permission from the user via the user interface to be able to access and utilize such location information for this purpose.

In one example, when the user selects the option within drop-down menu **302** to search for a particular service offered by provider users registered with the system, the user can then proceed to enter the name of the service within search entry field **304**. In exemplary embodiments, navigation and search service **124** can be configured to, as the user enters the name of the service to be searched, identify and provide corresponding suggested entry completions in association with search entry field **304** (for instance, by comparing the entered characters with the various service names included in the respective information records for healthcare services that are maintained in available services database **114g**). The user can then select one of the suggested entry completions at any point or continue to complete entry of the service name manually. In conjunction with selecting the particular service, the user can also enter a city name and/or zip code or opt to utilize a default location entry within location entry field **306** to localize a search radius for providers offering the selected service for purchase via marketplace system **100**.

Navigation and search service **124** can conduct such a location-based search by accessing, for example, service offer database **114h** in conjunction with physician profile database **114b**, practice group profile database **114c**, hospital system profile database **114d**, and/or any other suitable information and databases to which the application server has access to filter the information records included within available services database **114g** for healthcare services that match the specified search criteria, and then present the results of the search to user within a search result listing page.

FIG. 3B is a screen shot illustrating an example of a GUI provided by a search result listing page **310** for customer portal **120** that presents a list of providers offering the service specified within search entry field **304** within a default search radius (for example, 50 miles) of the location specified within location entry field **306** returned in the search conducted by navigation and search service **124**. In the illustrated example, search result listing page **310** includes a result listing section **311**, a result filtering section **316**, and a result sorting section **318**. Result listing section **311** presents an entry for each offered service for which a respective information record is maintained within service offer database **114h** that matches the specified search criteria. Result filtering section **316** provides various user interface controls for refining the results of the search presented within result listing section **311** by modifying the search criteria or inputting additional search criteria. In the illustrated example, result filtering section **316** includes a distance slide bar that is accessible to the user to increase or decrease the geographical search radius of searched providers offering the service specified within search entry field **302** and an option to refine the results according to one or more particular specialties of the physician that will perform the service. Result sorting section **318** provides user interface controls that can be accessed by a user to direct navigation and search service **124** to order the list of entries for offered services within result listing section **311** according to a specified criteria (for example, according to the price for purchasing the offered service via server system **110** or the distance between the location of the offered service and

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the location specified within location entry field **306**). In exemplary embodiments, such a search result listing page **310** can be implemented to present any other appropriate information relevant to the search criteria specified by the user, such as, for example, a graphic depicting the average cost information included in the information record for the service specified in the search criteria that is maintained in available services database **114g**.

In the example screen shot depicted in FIG. 3B, each entry for an offered service listed in result listing section **311** includes a first portion **312** presenting information from the account information record within physician profile database **114b** of the physician that will perform the service as specified in the information record for the offered service within service offer database **114h** (for example, the physician's name, specialty, and profile picture), a second portion **313** presenting information from the account information record of the provider that is offering the service through the system (for example, the name of the provider) and the location at which the offered service will be performed (for example, address and telephone number), and a third portion **314** presenting cost information for purchasing the offered service through application server **116** (for example, the discounted price for the service that is specified in the information record for the offered service within service offer database **114h** and a cost savings difference between the discounted price and the regular price for the service when the service is purchased outside of the system from the provider as specified in the information record for the offered service within service offer database **114h**), and an option to select to purchase the offered service listed in the entry (for example, via an "Add to Cart" button included within third portion **314**).

As will be described in greater detail below, upon selecting one or more services and/or products for purchase in association with a session with application server **116**, the user will then have an option to navigate to a customer purchase page (for example, a "Check-Out" page) to proceed with purchasing the selected item(s) with respect to an account information record maintained within customer profile database **114a** for a registered customer user.

Additionally, for each entry for an offered service listed in result listing section **311**, first portion **312** can further include a hyperlink or other reference that is accessible by the user via the user interface to navigate to a physician profile page that presents information regarding the physician that will perform the offered service (an example of such a physician profile page will be described below with reference to FIG. 3D). Referring again to example home page **300** illustrated in FIG. 3A, in another example in which the user selects the option within drop-down menu **302** to search for a particular product offered by pharmacies registered with the system, the user can then proceed to enter the name of the particular product within search entry field **304**.

Referring again to example home page **300** illustrated in FIG. 3A, in another example in which the user selects the option within drop-down menu **302** to search for information on health conditions maintained within server system **110**, the user can then proceed to enter the name of a particular health condition within search entry field **304**. In exemplary embodiments, navigation and search service **124** can be configured to, as the user enters the name of the condition to be searched, identify and provide corresponding suggested entry completions in association with search entry field **304** (for instance, by comparing the entered characters with the various condition names included in the respective

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information records for conditions that are maintained in condition information database **114f**). The user can then select one of the suggested entry completions at any point or continue to complete entry of the condition name manually. For example, upon the user selecting the search button, navigation and search service **124** can be configured to provide a list of suggested condition names that are determined to be similar to the text entered in search entry field **304** from which the user can select upon making a determination that the text entered in search entry field **304** does not more closely correspond to a particular condition for which a corresponding information record is maintained in condition information database **114f**.

The condition information page for a particular condition can be implemented to present a set of appropriate information relevant to condition based on the information that is maintained in the respective information record for the condition that is maintained in condition information database **114f** such as, for example, name, description, causes, risk factors, symptoms, and common treatments. In exemplary embodiments, the condition information page for a particular condition can be implemented to provide a list of corresponding healthcare services that can be offered by providers registered with server system **110** in conjunction with a respective hyperlink (or other reference) for each corresponding service that is accessible by the user within the user interface to navigate to a healthcare service information page that presents information regarding the specified service.

Referring now to FIG. 3C, a screen shot illustrating an example of a GUI provided by a healthcare service information page **320** implemented by navigation and search service **124** for a particular healthcare service is provided. In the illustrated example, healthcare service information page **320** includes a procedure overview section **322**, a cost comparison graphic **324**, and a provider listing section **326**. The information presented in procedure overview section **322** can be generated based on the procedure detail information included in the respective information record that is maintained for the particular service in available services database **114g**. Likewise, information that is presented in cost comparison graphic **324** can be generated based on the average cost information included in the respective information record that is maintained for the particular service in available services database **114g** (for example, to present a display of average prices for the service for patients that are uninsured and/or have a high deductible insurance plan in comparison with an average price for purchasing the service through offers from providers registered with server system **110**).

As noted above, for a particular healthcare service that is being offered as a bundled set of services or one or more services and one or more products, the cost information that is included in the respective information record for the primary service that is maintained within available services database **114g** can include respective cost information for each of the primary service, one or more secondary services and/or one or more products included in the bundled set, and, if required, the use of an outside facility for the primary service individually. In this regard, the information that is presented in cost comparison graphic **324** for such a bundled set can be generated to present a display of the aggregate sum of the respective individual prices for each of the primary service, the one or more secondary services and/or one or more products included in the bundled set.

In the present example, provider listing section **326** further includes a location entry field **327** that, in conjunction

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with a “submit” button **328**, allows a user to specify a particular location (for example, a city name and/or zip code) and submit a request for navigation and search service **124** to conduct a search and update the information presented in provider listing section **326** to present a list of providers offering the particular service within the default search radius of the newly specified location. Navigation and search service **124** can also be configured to, in response to such a request, update the location that is maintained within the session data object for the session with application server **116** that is presently being maintained for the user.

Additionally, a screen shot illustrating an example of a GUI provided by a physician profile page **330** implemented by navigation and search service **124** for a particular physician user registered with server system **110** is provided in FIG. **3D**.

In the illustrated example, physician profile page **330** includes a physician information section **332** and an offered procedures section **336**. The information presented in physician information section **332** can be generated based on the information that is included in the respective account information record that is maintained for the particular physician user in physician profile database **114b** and may include various items of information relevant to the physician, such as name, practice specialty, office location(s) and hours, a profile picture, contact information, biographical information (such as awards, honors, publications, patient testimonials, and other information that may be of interest to prospective customers accessing the system), URLs or references to websites and social media profiles, and group practice, hospital, and pharmacy affiliation(s).

In exemplary embodiments, as further illustrated in FIG. **3D**, physician information section **332** can further include additional user interface elements such as a “Leave a review” button **333**, a “Request an appointment” button **334**, and a map element **335** depicting a mapped location of an office location included within respective account information record that is maintained for the particular physician user in physician profile database **114b** (which navigation and search service **124** may be configured to generate by remotely accessing a third-party mapping service). In response to a user selecting “Leave a review” button **333**, navigation and search service **124** can be configured to implement suitable user interface controls for allowing the user to post or submit a review of the particular physician to server system **110**. In response to receiving such a review, navigation and search service **124** can be configured to, for example, include information pertaining to the review within the respective account information record that is maintained for the particular physician user in physician profile database **114b** or send an electronic message to the physician user pertaining to the review, for example, by way of email utilizing the contact information specified in the respective account information record for the physician.

In response to a user selecting “Request an appointment” button **334**, navigation and search service **124** can be configured to implement suitable user interface controls for allowing the user to submit a request for scheduling an appointment to the particular physician user (for example, by sending a notification to the physician user by utilizing the contact information specified in the respective account information record for the physician that includes contact information for the user). Navigation and search service **124** may also be configured to implement suitable user interface controls for allowing the user to schedule an appointment with the particular physician user. Navigation and search

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service **124** may provide this functionality by, for example, accessing an appointment scheduling service with which the particular physician user is associated, which may be a service offered by application server **116** or offered by a third-party service provider.

In the present example, as illustrated in FIG. **3D**, the information presented in offered procedures section **336** of physician profile page **330** can include a listing of healthcare services offered by the particular physician for purchase through marketplace system **100**. More specifically, offered procedures section **336** presents an entry for each offered service for which a respective information record is maintained within service offer database **114h**.

In exemplary embodiments, each entry for an offered service listed in offered procedures section **336** for which the respective information record for the offered service within service offer database **114h** includes an indication that the provider offering the service through the system has associated the service offer with one or more healthcare products.

Referring again to example home page **300** illustrated in FIG. **3A**, in another example in which the user selects the option within drop-down menu **302** to search for providers registered with the system, the user can then proceed to enter the name of a particular provider within search entry field **304**. The respective practice group profile page for the corresponding practice group may further include a listing of healthcare services offered by the particular practice group for purchase through marketplace system **100** that presents an entry for each offered service for which a respective information record is maintained within service offer database **114h** that identifies, as the provider that is offering the service through the system. The respective hospital system profile page for the corresponding hospital system may further include a listing of healthcare services offered by the particular hospital system for purchase through marketplace system **100** that presents an entry for each offered service for which a respective information record is maintained within service offer database **114h** that identifies, as the provider that is offering the service through the system, the unique account identifier for the account information record within hospital system profile database **114d** of the particular hospital system.

Alternatively, when a user selects the option within drop-down menu **302** to search for providers registered with the system, the user, rather than searching for a specific provider by name, conducts a search for local providers by entering a city name and/or zip code or opt to utilize a default location entry within location entry field **306** to localize a search radius. Navigation and search service **124** can conduct such a location-based search by accessing physician profile database **114b**, practice group profile database **114c**, and hospital system profile database **114d** to filter the account information records for providers maintained by database server **112** for local providers, and then present the results of the search to user within a provider search result listing page.

Similarly, and referring again to FIG. **3A**, when a user selects the option within drop-down menu **302** to conduct a search with respect to a particular specialty, the user can then proceed to enter the name of a particular practice specialty within search entry field **304**. In exemplary embodiments, navigation and search service **124** can be configured to provide a drop-down within search entry field **304** that allows the user to select one of a plurality of specialties recognized by server system **110**.

The payment information input by the user may be an instruction to use the billing information included within the

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respective account information record established for the user within customer profile database **114a** or submission of an alternative payment information such as, for example, information pertaining to a bank account or other depository institution from which an ACH payment or the like was made, credit or debit card information, or other electronic payment information (such as information for utilizing an account the user has with an online payment service such as PayPal, an online wallet provider such as Google Wallet, or any another entity facilitating payments and money transfers to be made through the Internet), which may be for an account maintained for the user or an account maintained for another person or entity that the user is authorized to utilize for this purpose. Account management service **122** can be configured to, upon the authorization and appropriate payment information being provided by the user, access a corresponding third-party payment servicing system and utilize the payment information to direct the payment servicing system to transfer the amount for the payment authorized by the user from the account servicer of the external funding source specified by the user to a financial account maintained by the providers of marketplace system **100**. Generally, electronic financial transactions conducted in association with any third-party payment servicing systems, external funding sources, and external financial accounts as described herein can be encrypted and performed in association with appropriate mechanisms to authenticate users and determine whether users are authorized to perform an indicated financial transaction. In this regard, the respective account information record established for the user within customer profile database **114a** can further include an account status that is managed by account management service **122** for the user indicating whether the user is presently provided with the ability to make prepaid purchases of healthcare services and products offered within marketplace system **100**.

Purchasing service **126** may be configured, for example, to implement a user interface that includes one or more pages with user interface controls accessible by the user to guide the user through the purchasing process and prompt the user to input and make selections of various types of information. For example, a purchase information section may be included within a payment page provided within the user interface that includes a respective entry for each offered item indicated as having been selected by the user in the session data object. For each offered product for which a respective entry is included in the purchase information section, the entry may include, for example, information retrieved from pharmacy profile database **114e**, available products database **114i**, product offer database **114j**, service offer database **114h** and the session data object such as pharmacy name, product name along with any dosage level, form of the medicine, and quantity for a prescription drug or size option for a medical supply, and an indication of whether a prescription is required to purchase the product.

The purchase information section included within the user interface implemented for the payment page may further include a total price for the purchase that is equal to a sum of the respective price for purchasing the corresponding offered item included for each entry included in the purchasing information section. In exemplary embodiments, purchasing service **126** may be configured to adjust the total price based on any applicable state taxes or any discount codes submitted by the user. In this regard, purchasing service **126** may be further implemented to provide a user interface element allowing a user to submit any application discount codes to application server **116**.

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Upon the user reviewing the information provided in the purchase information section and making any desired modifications and selections via the user interface controls implemented within the payment page, the user may then proceed to access further user interface controls implemented within a payment section of the payment page to make a prepaid purchase of the one or more offered items for which respective entries are included in the purchase information section in a single transaction with purchasing service **126** by submitting customer purchase information specifying a funding source to use for purchasing the one or more offered items and providing an authorization for server system **110** to issue a request to the funding source for funds in the amount of the total price for the purchase listed in the purchase information section.

In exemplary embodiments in which a virtual payment system is implemented within server system **110**, the purchase information may also, for example, specify a corresponding amount of virtual funds to utilize from the respective virtual money account established for the user within the virtual payment system.

Purchasing service **126** can be further configured to credit or otherwise direct a disbursement of funds to be made to, if the product offer being purchased is offered through a pharmacy registered with server system **110**, the financial account specified by the compensation information included in the account information record within pharmacy profile database **114e** of the pharmacy that is offering the product with the corresponding payment amount that is specified to be transferred to the pharmacy indicated by the respective information record in product offer database **114j** for the offered product. Upon receiving reimbursement for the invoiced amount from the funding source, a financial account maintained by the providers of marketplace system **100** can be credited with any negotiated or contracted commission fee for offering the product for purchase via the system (which may be, for example, a fixed percentage of the payment amount and/or a flat fee).

For processing payment for each offered product that is being offered through a pharmacy registered within server system **110** for which a prescription is required for the purchase, purchasing service **126** may be configured to navigate the user interface to a prescription submission page prior to processing the payment for the offered prescription product. Prescription submission page can be implemented by purchasing service **126** to provide user interface controls for allowing the user to submit the required prescription information for purchasing the offered product. The plurality of options for submitting prescription may include, for example, emailing an image of a prescription document to an email address for an account maintained in association with server system **110** for such a purpose, faxing a copy of a prescription document to a fax number utilized in association with server system **110** for such a purpose, uploading a copy of a prescription document to application server **116**, completing information fields of a respective predefined fillable form for generating a prescription document for the particular product within the user interface, and indicating that the prescription will be submitted by the customer user or a physician user at a later time to a pharmacy.

Upon receiving the prescription document, the pharmacy can perform a verification of the prescription document, for example, by contacting the medical specialist listed as having prescribed the product.

Purchasing service **126** can also be configured to, upon processing the payment for the purchase of the offered service, generate a voucher for the customer user within the

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user interface for the purchased service utilized by the customer user to redeem the purchase and receive the service from the physician specified for the offered service (the providers of marketplace system **100** can have pre-arranged agreements with providers registered with the system that the providers will agree to honor such vouchers generated by purchasing service **126** for purchased services). An example of such a voucher is illustrated in FIG. **4A**. As depicted in the example, example voucher **400** can be generated to include identifying information for the customer user **402**, identifying and contact information for the physician specified for the offered service **404**, a description of the purchased service **406**, a confirmation number **408** for the purchase, which may be generated by purchasing service **126** based on the unique transaction identifier that is included in the respective information record for the purchase that is maintained within transaction information database **114k**, and instructions for redeeming the voucher **410**. The confirmation number may also be provided in the electronic confirmation message to the customer user and electronic notifications to the physician user that will be performing the service and the provider user for the offered service sent by purchasing system **126** to the customer user. The voucher can be presented to the user within the user interface, for example, as printable and/or machine-readable form.

Similarly, for processing payment for each offered service that is being offered as a primary service in conjunction with a bundled set of services or one or more services and one or more products, purchasing service **126** may be configured to utilize the purchase information provided by the user to issue a request for the portion of the total purchase price authorized by the user that is allocated for the offered service to the funding source specified in the purchase information. In contrast to the processing performed by purchasing service **126** for offered services or offered products that are not being offered in conjunction with a bundled set, however, a respective sub-portion of the payment amount for the offered service is held separately with respect to the primary service, each secondary service, each bundled product, and any facility specified for the purchased offered service.

Purchasing service **126** can be configured to, upon processing the payment for the purchase of the offered service that is being offered as a primary service in conjunction with a bundled set, navigate the user interface to a purchase confirmation page and send an electronic confirmation message to the customer user and electronic notifications to the each physician that will perform a service of the bundled set, each pharmacy from which a purchased product is offered within the bundled set. Purchasing service **126** can be also configured to generate a respective information record for the completed purchase with corresponding information within transaction information database **114k**, which initially indicates that the purchase has not yet been redeemed with respect to the primary service.

In another example, for exemplary embodiments in which a virtual payment system is implemented within server system **110**, purchasing service **126** can be configured to, if the purchase information submitted by the customer user specifies a corresponding amount of available virtual funds to utilize from the respective virtual money account established for the user within the virtual payment system for the purchase, initiate the payment processing by providing a notification of such a specification in the purchase information to virtual payment system manager **170**.

Upon receiving such a notification from purchasing service **126**, virtual payment system manager **170** then operates

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to access the respective account information record for the customer within virtual money account database **114p** to select one or more of the virtual fund objects presently assigned to the user in the respective account information record to use for facilitating the processing of payment of the purchase price for the offered product.

Purchasing service **126** can also be configured to, upon processing the payment for the purchase of the offered service that is being offered as a primary service in conjunction with a bundled set, generate a voucher for the customer user within the user interface for the purchased service that can be utilized by the customer user to redeem the purchase and thereby receive the service from the corresponding physician specified for each of the services of the bundled set and receive the product from the corresponding pharmacy specified for each of the products of the bundled set (the providers of marketplace system **100** can have pre-arranged agreements with providers registered with the system that the providers will agree to honor such vouchers generated by purchasing service **126** for purchased services and products). An example of such a voucher that is generated for a purchase of a bundled set is illustrated in FIG. **4B**. As depicted in the example, example voucher **400** can be generated to include identifying information for the customer user **402**, identifying and contact information for each physician specified for a service, each pharmacy specified for a product, and any facility included in the offered service **404**, a description of each service and product of the purchased service **406**, a confirmation number **408** for the purchase, which may be generated by purchasing service **126** based on the unique transaction identifier that is included in the respective information record for the purchase that is maintained within transaction information database **114k**, and instructions for redeeming the voucher **410**. The confirmation number (or any other suitable redemption information such as a one or two dimensional bar code, a QR code, or any other form of machine readable information) may also be provided in the electronic confirmation message to the customer user and electronic notifications to each physician user that will be performing a service, each pharmacy that will be providing a product, and the provider user for the offered service sent by purchasing service **126** to the customer user. The voucher can be presented to the user within the user interface, for example, as printable and/or machine-readable form. In exemplary embodiments, for each purchased product included in the bundled set for which a prescription is required to purchase the product, the redemption information included in the voucher for receiving the product from the corresponding pharmacy specified for the product may not become valid until a notification of any necessary submission and verification of the prescription document has been received by purchasing service **126**.

For example, such a profile management interface may be implemented to allow the customer user to manage personal information, view a history of purchase transactions performed by the user within server system **110** (and relevant information for each purchase including voucher redemption status), submit any required prescriptions for purchases of offered products that have been made, manage and review any continuing prescriptions, and print vouchers generated for services and products purchased and otherwise access voucher redemption information.

Upon the user indicating an intention to register as a physician user, the user will be able to initiate a registration session with account management service **131** to register a physician account with server system **110**. The user interface

may also be implemented by account management service **131** to prompt the user to specify any affiliated pharmacies or for any group practice or hospital affiliation codes. In this regard, account management service **131** may be implemented to provide user interface controls allowing the user to search for pharmacies registered with server system **110** (for example, by name), access pharmacy profile database **114e** to locate account information records for pharmacies matching the search criteria, and provide user interface controls allowing the user to register an affiliation within server system **110** with any pharmacy returned in the search.

Account management service **131** can be configured to access database server **112** to create the respective account information record for the user within physician profile database **114b** based on the information input by the user during the registration process. In exemplary embodiments, the user interface implemented by account management service **131** may be further configured to provide user interface controls for requesting authorization for payment of a predetermined fee to gain access to the ability to offer healthcare services for purchase within marketplace system **100**. Such a fee may be, for example, a one-time charge or a periodic charge (such as a monthly, biannual, or annual fee).

Upon the user indicating an intention to offer a healthcare service for purchase (for example, by selecting a "Offer Service" tab within the physician account page implemented by provider portal **130**), the user will be able to initiate a service offering with procedure management service **133** to offer a healthcare service for purchase via server system **110**. For example, the user may be provided with a drop-down menu providing a list of selectable medical specialties and, upon selecting a particular medical specialty, the user can be presented with a list of selectable healthcare services for which an information record for the service is maintained within available services database **114g** in association with the specialty.

As discussed above, when a payment for an offered service is processed by purchasing service **126**, a financial account maintained by the providers of marketplace system **100** holds the payment amount to be transferred to the provider for which payment for the service is to be directed until an indication is received that the purchased service has been performed by the physician that is specified in service offer database **114h** for performing the service. Purchasing service **126** can also be a voucher for the customer user to use with respect to the purchased service to redeem the purchase by receiving the service from the physician specified for each service included in the purchase. Such a voucher can include a confirmation number or other redemption code for the purchase.

Upon the user indicating an intention to request payment for a purchased service that has been performed (for example, by selecting a "Voucher Processing" tab within the physician account page implemented by provider portal **130**), the user will be able to initiate a voucher processing session with transaction processing service **136**. In particular, transaction processing service **136** may be configured, for example, to implement a voucher history page within the user interface that presents information relevant to the physician user for a list of purchases for which the respective information record for the purchase that is maintained within transaction information database **114k** includes the unique physician account identifier for the physician user within physician profile database **114b** as the physician user that is designated as performing a service included the purchase (for example, a primary or secondary service for a bundled

set of services or one or more services and one or more products). The relevant information for each listed purchase may include, for example, the voucher confirmation number or redemption code, name and contact information for the customer user, a description of the service the physician user is designated as performing for the purchase, a purchase date, and a voucher redemption status. Such a voucher history page may also be accessed in association with the user account for the physician user to verify vouchers presented by customers requesting to have a service performed in association with a voucher.

The voucher history page can also provide a user interface element in association with each of the listed purchases for which the voucher redemption status for the service the physician user is designated as performing indicates the service has not been performed that is accessible by the physician user to submit a verification to application server **116** that the physician user has performed the service for the customer user in accordance with the purchase. Transaction processing service **136** can be configured to, upon such a verification being submitted, initiate a transfer of the payment amount specified for the service performed by the physician user in service offer database **114h** and held in the financial account maintained by the providers of marketplace system **100** to the financial account listed for receiving the payment amount for service that is specified in service offer database **114h**. Additionally, if the service performed by the physician is a primary service of a bundled set for which a particular outside facility that has been selected for performing the primary service, transaction processing service **136** can be configured to initiate a transfer or otherwise direct a disbursement of the facility fee specified for the service performed by the physician user in service offer database **114h** and held in the financial account maintained by the providers of marketplace system **100** to the financial account for the facility that is indicated by the compensation information for the facility.

In exemplary embodiments, transaction processing service **136** can further be configured to, for each purchase of an offered product for which a prescription is required for the purchase that is being offered through a pharmacy registered within server system **110** or a pharmacy that is not registered with the system but affiliated with the physician, and for which the respective information record in transaction information database **114k** for the purchase indicates that the physician user will be writing the prescription or otherwise providing an offered service purchased through the system with which the purchase of the offered product is associated, allow the physician user to navigate the user interface to a prescription submission page that is implemented to provide user interface controls for allowing the physician user to submit the required prescription information for purchasing the offered product on behalf of the purchasing customer user (for example, by selecting a "Prescription Submission" tab within the physician account page implemented by provider portal **130**).

Likewise, account management service **131** may be implemented to provide user interface controls allowing the user to search for pharmacies registered with server system **110** (for example, by name), access pharmacy profile database **114e** to locate account information records for pharmacies matching the search criteria, and provide user interface controls allowing the user to register an affiliation within server system **110** with any pharmacy returned in the search.

In exemplary embodiments, the user interface implemented by account management service **131** may be further

configured to provide user interface controls for requesting authorization for payment of a predetermined fee to gain access to the ability to offer healthcare services for purchase within marketplace system **100**. Such a fee may be, for example, a one-time charge or a periodic charge (such as a monthly, biannual, or annual fee). The fee may also be assessed for each new physician account registered with server system **110** by the user as an affiliated physician of the practice group. Alternatively, the user interface implemented by account management service **131** may be configured to provide user interface controls for receiving an activation code to gain access to the ability to offer healthcare services for purchase within marketplace system **100** or may be configured to provide such access to the user (and/or any new physician accounts registered for affiliated physicians by the user with server system **110**) in response to receiving a particular group or hospital affiliation code from the user. Upon a user registering a practice group account with server system **110** to establish an account information record within practice group profile database **114c** and logging into his or her practice group account (for example, by accessing a login user interface element or a login screen within the user interface implemented by navigation and search service **124** to provide the user name and password associated with the account), the user may be directed to a practice group account page implemented by provider portal **130** that provides a set of user interface controls that can be accessed by the user to access functionality provided by procedure management service **133** to offer healthcare services performed by affiliated physicians for purchase by customer users registered with the system, functionality provided by transaction processing service **136** to request payment for purchased services that have been performed, and to access various account management functions provided by account management service **131**.

For example, the user may be provided with a drop-down menu providing a list of selectable medical specialties and, upon selecting a particular medical specialty, the user can be presented with a list of selectable healthcare services for which an information record for the service is maintained within available services database **114g** in association with the specialty.

In exemplary embodiments, procedure management service **133** can be further configured to assist the user with offering one or more healthcare products for purchase in association with the offered service for purchase and further populate the respective information record for the offered service within service offer database **114h**. In exemplary embodiments, procedure management service **133** can also assist the practice group administrator with offering services for purchase as a bundled set of services or one or more services and one or more products within marketplace system **100** and establishing the respective information record for the service offered as a bundled set within service offer database **114h**.

For a selected service for which such an indication is provided, procedure management service **133** may be configured, for example, to implement user interface controls accessible by the user to guide the user through the process for offering the selected service as a primary service of a bundled set and prompt the user to input various types of information to populate a respective information record that is established in association with the unique practice group account identifier for the practice group within service offer database **114h**. Upon the user indicating an intention to request payment for a purchased service that have been performed (for example, by selecting a "Voucher Process-

ing" tab within the practice group account page implemented by provider portal **130**), the user will be able to initiate a voucher processing session with transaction processing service **136**. The user interface may also be implemented by account management service **131** to prompt the user to specify affiliated physician users and enter any practice group affiliation codes.

In exemplary embodiments, the user interface implemented by account management service **131** may be further configured to provide user interface controls for requesting authorization for payment of a predetermined fee to gain access to the ability to offer healthcare services for purchase within marketplace system **100**. Such a fee may be, for example, a one-time charge or a periodic charge (such as a monthly, biannual, or annual fee). In exemplary embodiments, healthcare marketplace system **100** may be further implemented to provide an interactive pricing tool **137** for use by healthcare service providers in setting prices for healthcare services being offered to prospective patients through the system, including bundled sets of services for which the network-based application facilitates a disbursed distribution of the payment among multiple service providers that perform services (or provide use of a health care facility for performing a service) included in a bundled set of services. Exemplary embodiments can thereby assist in reducing the amount of overhead necessary to establish and monitor a well-developed and maintained fee schedule that is market sensitive, fiscally responsible, and organizationally sound, particularly for bundled payment arrangements for services that are delivered by two or more providers during a single episode of care for a patient.

FIG. 5 is a block diagram of an exemplary computer system **600** that can be used for implementing exemplary embodiments of the present invention. Computer system **600** includes one or more processors, such as processor **604**. Processor **604** is connected to a communication infrastructure **602** (for example, a communications bus, cross-over bar, or network). Various software embodiments are described in terms of this exemplary computer system. After reading this description, it will become apparent to a person of ordinary skill in the relevant art(s) how to implement the invention using other computer systems and/or computer architectures.

Exemplary computer system **600** can include a display interface **608** that forwards graphics, text, and other data from the communication infrastructure **602** (or from a frame buffer not shown) for display on a display unit **610**. Computer system **600** also includes a main memory **606**, which can be random access memory (RAM), and may also include a secondary memory **612**. Secondary memory **612** may include, for example, a hard disk drive **614** and/or a removable storage drive **616**, representing a floppy disk drive, a magnetic tape drive, an optical disk drive, etc. Removable storage drive **616** reads from and/or writes to a removable storage unit **618** in a manner well known to those having ordinary skill in the art. Removable storage unit **618**, represents, for example, a floppy disk, magnetic tape, optical disk, etc. which is read by and written to by removable storage drive **616**. As will be appreciated, removable storage unit **618** includes a computer usable storage medium having stored therein computer software and/or data.

In exemplary embodiments, secondary memory **612** may include other similar means for allowing computer programs or other instructions to be loaded into the computer system. Such means may include, for example, a removable storage unit **622** and an interface **620**. Examples of such may include a program cartridge and cartridge interface (such as that



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found in video game devices), a removable memory chip (such as an EPROM, or PROM) and associated socket, and other removable storage units **622** and interfaces **620** which allow software and data to be transferred from the removable storage unit **622** to computer system **600**.

Computer system **600** may also include a communications interface **624**. Communications interface **624** allows software and data to be transferred between the computer system and external devices. Examples of communications interface **624** may include a modem, a network interface (such as an Ethernet card), a communications port, a PCMCIA slot and card, etc. Software and data transferred via communications interface **624** are in the form of signals which may be, for example, electronic, electromagnetic, optical, or other signals capable of being received by communications interface **624**. These signals are provided to communications interface **624** via a communications path (that is, channel) **626**. Channel **626** carries signals and may be implemented using wire or cable, fiber optics, a phone line, a cellular phone link, an RF link, and/or other communications channels.

In this document, the terms “computer program medium,” “computer usable medium,” and “computer readable medium” are used to generally refer to media such as main memory **606** and secondary memory **612**, removable storage drive **616**, a hard disk installed in hard disk drive **614**, and signals. These computer program products are means for providing software to the computer system. The computer readable medium allows the computer system to read data, instructions, messages or message packets, and other computer readable information from the computer readable medium. The computer readable medium, for example, may include non-volatile memory, such as Floppy, ROM, Flash memory, Disk drive memory, CD-ROM, and other permanent storage. It can be used, for example, to transport information, such as data and computer instructions, between computer systems. Furthermore, the computer readable medium may comprise computer readable information in a transitory state medium such as a network link and/or a network interface including a wired network or a wireless network that allow a computer to read such computer readable information.

Computer programs (also called computer control logic) are stored in main memory **606** and/or secondary memory **612**. Computer programs may also be received via communications interface **624**. Such computer programs, when executed, can enable the computer system to perform the features of exemplary embodiments of the present invention as discussed herein. In particular, the computer programs, when executed, enable processor **604** to perform the features of computer system **600**. Accordingly, such computer programs represent controllers of the computer system.

Referring now to FIG. 6, a schematic diagram illustrating example network architecture for healthcare marketplace system **100** within which an exemplary embodiment of a provider pricing tool **137** in accordance with the present invention is implemented. It should of course be understood that FIG. 6 is intended as an example, not as an architectural limitation for different embodiments of the present invention, and therefore, the particular elements depicted in FIG. 6 should not be considered limiting with regard to the environments within which exemplary embodiments of the present invention may be implemented.

In the example illustrated in FIG. 6, the particular components that are utilized for providing the provider pricing tool **137** are integrated within system **100** in conjunction with the components of the system as described above with

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reference to the exemplary embodiments illustrated FIGS. 1 and 2. More specifically, the pricing tool **137** is shown in FIG. 6 as being implemented within procedure management service **133** included within provider portal **130**, and data store **114** further comprises a service pricing information database **114m** and a cost adjustment information database **114n** that are maintained by database server **112**, are accessed by application server **116** via database services provided at a front end by database server **112**, and retain information collected from a variety of data sources that is utilized in providing the services offered via the provider pricing tool **137** within the network service provided by the application server, as described below in greater detail.

In the present exemplary embodiment, service pricing information database **114m** is used to maintain information records with extensive medical cost data for an exhaustive set of healthcare services that can be offered by providers registered with server system **110** for purchase by customer users registered with the server system, and cost adjustment information database **114n** is used to maintain a comprehensive set of data pertaining to location-based pricing adjustments that can be applied to the medical cost data maintained in service pricing information database **114m** based on, for example, geographic zones or particular facilities within which healthcare services may be performed. In exemplary embodiments, the respective information records for healthcare services that are maintained in service pricing information database **114m** and the information that populates the respective information record for each service can be created and maintained by a back-end administrator of server system **110**.

The cost adjustment data can, for instance, be compiled from and/or determined based upon the Geographic Practice Cost Indices (GPCIs), which is used along with RVUs in Medicare Physician Fee Schedule (PFS) provided by CMS to determine allowable payment amounts for medical procedures in a manner that reflects geographical variations in practice cost. In exemplary embodiments, a specific cost adjustment factor can be determined based on the GPCI information for each designated locality area and maintained within cost adjustment information database **114n**. For example, a standard rate adjustment factor for each designated locality area can be determined by calculating an average (or any other suitable aggregate- or composite-based) factor by which the corresponding GPCIs for the locality impact the standard national rate derived for each service. To account for geographic differences in input prices in determining allowable payment amounts for facility outpatient services, CMS further adjusts a labor portion of the national unadjusted payment rate (60 percent) by a facility wage index for the area where payment is being made (the remaining 40 percent non-labor portion is not adjusted).

In another example, for each service for which the information record within service pricing information database **114m** includes an indication that the service is offered as a primary service of a bundled set of services along with an indication that a secondary service associated with the primary service is an anesthesia procedure, the respective pricing information that is included in the information record for the associated anesthesia procedure can be compiled from the anesthesia pricing information that is maintained by CMS. For this purpose, different types of services involving administration of anesthesia are assigned corresponding CPT codes, and each anesthesia code is assigned a base unit that reflects the difficulty of the procedure and

inherent risks. For determining allowable payment amounts for anesthesia services, CMS utilizes the following formula:

$$\begin{aligned} &(\text{Time Units} + \text{Base Units}) \times \text{Conversion} \\ &\text{Factor} = \text{Anesthesia Fee Amount.} \end{aligned}$$

As described above, healthcare marketplace system **100** is implemented as a client/server system that includes central server system **110**, which is commonly accessed by each user of the system through operation of any of client systems **140** that are operatively coupled to the central server system via a communication network **150**. Each client system **140** is a user terminal or other client device implementing software for and running a respective client application **142** for accessing services provided via a network-based application (also referred to herein as a network service) implemented by application server **116**, and application server **116** can implement a user interface on the client application within which the client application renders the information served by the application server so that users of connected client systems **140** can access various services provided by the application server with relative ease by operating a corresponding client application **142**. In exemplary embodiments, the user interface can be a web-based user interface, implemented as a web-based software application hosting a corresponding website that provides a number of web pages (that is, screens) to offer the services implemented by application server **116** to users. For example, a user can access the corresponding website and, thereby, the services provided by the application server using a web browser implemented within a client application **142** executing on a client system **142**.

In particular, upon the provider user indicating an intention to utilize the pricing tool **137** in conjunction with offering healthcare services for purchase via server system **110** (for example, by selecting a "Service Pricing Tool" tab within the provider account page implemented by provider portal **130**), the user will be directed to an interactive service pricing page with information that is generated based on the information maintained in the respective information record for the provider within the corresponding profile database maintained within data store **114** and the respective information records for healthcare services that are maintained in service pricing information database **114m**. Pricing tool **137** may be configured, for example, to implement the interactive service pricing page to provide the provider user with detailed pricing information and recommended rates for services that may be offered by the provider for purchase via server system **110**, as well as various user interface controls accessible by the user to perform adjustments to the recommended rates as desired.

FIG. 7A is a screen shot illustrating a first example of a graphical user interface provided by such a service pricing page **700** for a user accessing provider portal **130** in association with a registered hospital system account. In the example illustrated in FIG. 7A, the user interface provided at service pricing page **700** includes a medical specialty drop-down menu **702**, a locality adjustment section **704**, a recommended rate adjustment section **706**, a detailed pricing information section **708**, and a set of selectable buttons **710a** ("Email Prices"), **710b** ("Save Changes"), and **710c** ("Take Live"), the use of which will be described in greater detail below. Drop-down menu **702** provides a list of selectable medical specialties (for example, orthopedics, general surgery, cardiac imaging, etc.), and pricing tool is implemented to, in response to the user selecting a particular medical specialty using drop-down menu **702**, configure the user interface options and populate the information displayed

within locality adjustment section **704**, recommended rate adjustment section **706**, and detailed pricing information section **708** in accordance with the selected medical specialty and further based on information maintained in the respective information record for the provider that is maintained within hospital system profile database **114d**, information that is maintained in the respective information records for each service indicated as being commonly associated with the selected medical specialty within service pricing information database **114m**, and information maintained within cost adjustment information database **114n**, which, as discussed above, can be accessed by pricing tool **137** via database services provided at a front end by database server **112**.

For instance, in the example screen shot illustrated in FIG. 7A, the user has selected "Radiology" from medical specialty drop-down menu **702**, and pricing tool **137** has, in response to this selection, configured the user interface options and populated the information displayed within locality adjustment section **704**, recommended rate adjustment section **706**, and detailed pricing information section **708** in accordance with the selection of "Radiology" from drop-down menu **702**. More specifically, as shown in FIG. 7A, locality adjustment section **704** has been configured to include a physician locality section and a facility section in response to the selection of "Radiology" from drop-down menu **702**. The physician locality section is provided for making pricing adjustments based on the locality of a physician that is affiliated with the hospital system and would be performing the radiology services being priced. The facility section is included within locality adjustment section **704** in response to pricing tool **137** recognizing that the respective information records for services indicated as being commonly associated with the selected medical specialty of radiology within service pricing information database **114m** include information records having an indication that the service is a primary service of a bundled set of services that is required to be performed at an outside facility and is provided for making pricing adjustments based on the facility that is affiliated with the hospital system at which the radiology services being priced would be performed.

In the present example, the physician locality section includes a physician location field **704a** and a physician location rate field **704b**, and the facility section includes a facility field **704c** and a facility rate field **704d**. The physician location field **704a** is for receiving and displaying an entry specifying the location of a physician that would be performing the services indicated as being commonly associated with the selected medical specialty of radiology within service pricing information database **114m**, and the physician location rate field **704b** is configured to provide a rate adjustment factor for the pricing information included in detailed pricing information section **708** for the services indicated as being commonly associated with radiology. In exemplary embodiments, pricing tool **137** can be configured to derive an initial physician location entry based on the location associated with physician affiliation(s) included in hospital system profile database **114d** and include this derived physician location entry as a default value within physician location field **704a**. Physician location rate field **704b** is provided for receiving and displaying a geographic adjustment rate for physician services that, by default, is derived based on information maintained in cost adjustment information database **114n** and provided by pricing tool **137** in correspondence with the physician location entry that is currently specified within physician location field **704a**. More particularly, in exemplary embodiments, pricing tool

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137 can be configured to access the physician rate cost adjustment data in cost adjustment information database 114n that corresponds to the physician location entry that is currently specified within physician location field 704a (for example, a standard rate adjustment factor determined for a designated locality area that encompasses the specified physician location entry) and derive a corresponding geographic adjustment rate that is displayed as a default value within physician location rate field 704b.

In the present example, pricing tool 137 is further configured to allow the provider user accessing service pricing page 700 to proceed to enter text corresponding to a desired location of the physician that would perform the services associated with the selected medical specialty within physician location field 704a. In this regard, pricing tool 137 may be configured to require that the text entered by the user in physician location field 704a correspond to a particular locality area for which corresponding physician rate adjustments are maintained in cost adjustment information database 114n. In exemplary embodiments, the list of suggested physician locations provided by pricing tool 137 can further include an option for the user to select a standard, national physician rate rather than a particular geographic location. In response to a specification of a new physician location within physician location field 704a, pricing tool 137 can be configured to dynamically access the physician rate cost adjustment data in cost adjustment information database 114n that corresponds to the newly-specified physician location entry that is currently specified within physician location field 704a and derive a corresponding geographic adjustment rate that is displayed as the current value within physician location rate field 704b. In exemplary embodiments, pricing tool 137 can be configured to derive an initial outside facility entry based on the facility affiliation(s) included the respective information record for the hospital system account in hospital system profile database 114d being used to access the pricing tool 137 functionality via provider portal 130 and include this derived facility entry as a default value within facility field 704c. Facility rate field 704d is provided for receiving and displaying an adjustment rate for facility services that, by default, is derived and provided by pricing tool 137 in correspondence with the characteristics of the facility that is currently specified as the entry within facility field 704c.

In the present example, pricing tool 137 is further configured to allow the provider user accessing service pricing page 700 to proceed to enter text corresponding to a name of a desired outside facility at which the services associated with the selected medical specialty would be performed within facility field 704c. In this regard, pricing tool 137 may be configured to require that the text entered by the user in facility field 704c correspond to the name of a particular facility specified in the facility affiliations included the respective information record for the hospital system account in hospital system profile database 114d being used to access the pricing tool 137 functionality via provider portal 130.

With continued reference to the example screen shot illustrated in FIG. 7A, pricing tool 137 has, in response to the user selection "Radiology" from medical specialty drop-down menu 702, configured the user interface options and populated the information displayed within rate adjustment section 706. More specifically, as shown in FIG. 7A, rate adjustment section 706 has been configured to include a physician rate adjustment field 706a and a facility rate adjustment field 706b in response to the selection of "Radiology" from drop-down menu 702. Physician rate adjust-

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ment field 706a is provided for making a general pricing adjustment to the pricing information included in detailed pricing information section 708 for physician fees for the services indicated as being commonly associated with radiology as desired by the provider user that may be based on any budgetary considerations specific to the provider and/or physician.

With continued reference to the example screen shot illustrated in FIG. 7A, as noted above, pricing tool 137 has, in response to the user selection "Radiology" from medical specialty drop-down menu 702, configured the user interface options and populated the information displayed within detailed pricing information section 708. In general, as shown in FIG. 7A, detailed pricing information section 708 is generated by pricing tool 137 as a table with various interactive user interface controls that includes a procedure column 711, a facility price column 712, a physician price column 713, an additional fee column 714, and a total amount column 715.

The information in procedure column 711 is generated by pricing tool 137 to include a row entry for each procedure category listed in the respective information records for services that are maintained in service pricing information database 114m and include an indication that the service is commonly associated with the medical specialty selected via drop-down menu 702, which is "Radiology" for the example screen shot depicted in FIG. 7A. For instance, the procedure categories listed in procedure column 711 in the present example include "Bone Density DXA Extremity" radiology procedures, "Bone Density DXA Scan" radiology procedures, and "Videofluoroscopic Swallowing Study" radiology procedures. As further illustrated in FIG. 7A for the example of the "Bone Density DXA Extremity" radiology procedures listing in in procedure column 711, detailed pricing information section 708 is implemented to include user interface elements that are accessible by the user.

In the present example, the expanded information for the "Bone Density DXA Extremity" radiology procedures listing includes row entries for a "Dxa bone density/peripheral" service and a "Fracture assessment via dxa" service. As further illustrated in FIG. 7A, the expanded information for a particular procedure category further includes, for each service categorized as a sub-procedure of the procedure category, a medical code number used to identify the service (for example, a CPT code), a base facility rate, a base physician rate, an adjusted facility rate, and an adjusted physician rate. The base physician rate for each service listed in the expanded display is obtained by pricing tool 137 from standard national physician rate derived for the service, and the adjusted physician rate for each service listed in the expanded display is calculated by pricing tool 137 for display within detailed pricing information section 708 by multiplying the corresponding base physician rate by both the current value that is specified in physician location rate field 704b of locality adjustment section 704 and the current percentage value that is specified in physician rate adjustment field 706a of recommended rate adjustment section 706. In the present example, as further illustrated in FIG. 7A, the expanded information for a particular procedure category further includes a physician price field 711a that specifies a price that will be set by the provider user for each of the services that have been categorized under the expanded procedure category and a facility price field 711b that specifies a price that will be applied by the provider user for the use of an outside facility for each of the services that have been categorized under the expanded procedure category.

In exemplary embodiments, pricing tool 137 can be configured to derive and include initial, default price values within physician price field 711a and physician price field 711a. As further indicated in the example screen shot illustrated in FIG. 7A, the row entry for a particular procedure category will include a pricing value under physician price column 713 that corresponds to the pricing value that is specified within physician price field 711a in the expanded display for the procedure category, and, likewise, the row entry for a particular procedure category will include a pricing value under facility price column 712 that corresponds to the pricing value that is specified within facility price field 711b in the expanded display for the procedure category. In this regard, pricing tool 137 can be configured to dynamically update the pricing values provided under physician price column 713 and facility price column 712 in response to changes to the price values within physician price field 711a and facility price field 711b respectively.

As further illustrated in FIG. 7A, the row entry for a particular procedure category can include a pricing value under total amount column 715 that is provided as a sum of the price values listed under facility price column 712, physician price column 713, and, if included, additional fee column 714 in the row entry for a particular procedure category. This represents the actual price at which each service listed in the expanded display for a procedure category would be offered for purchase via marketplace system 100 as a bundled set of services from the provider user accessing service pricing page 700 via provider portal 130.

As noted above and further illustrated in FIG. 7A, the user interface provided at service pricing page 700 in the present example also includes a set of accessible user interface controls 710a ("Email Prices"), 710b ("Save Changes"), and 710c ("Take Live"). For purposes of the present example, these user interface controls are provided within service pricing page 700 as selectable buttons. In the present exemplary embodiment, pricing tool 137 can be configured to, in response to a provider user selecting "Save Changes" button 710b, generate an information record that includes indications of all of the information. In the present exemplary embodiment, pricing tool 137 can be configured to, in response to a provider user selecting "Email Prices" button 710a, provide user interface controls for allowing the user to specify an email address and send an electronic document that includes indications of the pricing information.

Finally, with reference to the present example, pricing tool 137 can be configured to, in response to a provider user selecting "Take Live" button 710c, automatically initiate, on behalf of the provider user, a service offering with procedure management service 133 to offer each of the services currently included within detailed pricing information section 708 of service pricing page 700 for the particular medical specialty presented selected by the user from drop-down menu 702 for purchase via server system 110. In this manner, pricing tool 137 can provide a mechanism for a provider to offer a large number of services for purchase via marketplace system 100 by customer users registered with the system without having to perform full set of operations described above for accessing functionality provided by procedure management service 133 to offer each of the services individually.

FIG. 7B is a screen shot illustrating a second example of a graphical user interface provided by service pricing page 700 for a user accessing provider portal 130 in association with a registered hospital system account. In the example illustrated in FIG. 7B, the user has selected "General Sur-

gery" from medical specialty drop-down menu 702, and pricing tool 137 has, in response to this selection, configured the user interface options and populated the information displayed within locality adjustment section 704, rate adjustment section 706, and detailed pricing information section 708 in accordance with the selection of "General Surgery" from drop-down menu 702. More specifically, as shown in FIG. 7B, locality adjustment section 704 has been configured to include, in addition to the physician locality section and the facility section described above with reference to the example illustrated in FIG. 7C, an anesthesia locality section in response to the selection of "General Surgery" from drop-down menu 702. The anesthesia locality section is included within locality adjustment section 704 in response to pricing tool 137 recognizing the respective information records for services.

In the present example, the anesthesia locality section includes an anesthesia location field 704e and an anesthesia location rate field 704f. The anesthesia location field 704e is for receiving and displaying an entry specifying the location at which the services indicated as being commonly associated with the selected medical specialty of general surgery within service pricing information database 114m would be performed, and the anesthesia location rate field 704f is configured to provide a rate adjustment factor for the pricing information included in detailed pricing information section 708 for the services indicated as being commonly associated with radiology. Anesthesia location rate field 704f is provided for receiving and displaying a geographic adjustment rate for physician services that, by default, is derived and provided by pricing tool 137 in correspondence with the anesthesia location entry that is currently specified within anesthesia location field 704e. More particularly, in exemplary embodiments, pricing tool 137 can be configured to access the information pertaining to anesthesia rate adjustments in service pricing information database 114n corresponding to the anesthesia location entry that is currently specified within anesthesia location field 704e and derive a corresponding geographic adjustment rate that is displayed as a default value within anesthesia location rate field 704e. The corresponding geographic adjustment rate can be derived, for example, based on a ratio of the CMS anesthesia conversion factor to a standard, national anesthesia conversion factor.

In response to a specification of a new location within anesthesia location field 704e, pricing tool 137 can be configured to dynamically access the information pertaining to physician rate adjustments in geographic factors database 114n corresponding to the newly-specified physician location entry within anesthesia location field 704e and derive a corresponding geographic adjustment rate that is displayed as the current value within anesthesia location rate field 704f. With continued reference to the example screen shot illustrated in FIG. 7B, as noted above, pricing tool 137 has, in response to the user selection "General Surgery" from medical specialty drop-down menu 702, configured the user interface options and populated the information displayed within rate adjustment section 706. More specifically, as shown in FIG. 7B, rate adjustment section 706 has been configured to include, in addition to a physician rate adjustment field 706a and a facility rate adjustment field 706b as described above with reference to the example screen shot shown in FIG. 7A, an anesthesia rate adjustment field 706c in response to the selection of "Radiology" from drop-down menu 702. Anesthesia rate adjustment field 706c is included within rate adjustment section 706 in response to pricing tool 137 recognizing that the respective information records

for services indicated as being commonly associated with the selected medical specialty of general surgery within service pricing information database 114m include information records having an indication that the service is a primary service of a bundled set of services for which a secondary service associated with the primary service in the bundled set is an anesthesia procedure and is provided for making a general pricing adjustment to the pricing information included in detailed pricing information section 708 for anesthesia fees for the services indicated as being commonly associated with general surgery as desired by the provider user that may be based on any budgetary considerations specific to the provider or physician.

With continued reference to the example screen shot illustrated in FIG. 7B, as noted above, pricing tool 137 has, in response to the user selection "General Surgery" from medical specialty drop-down menu 702, configured the user interface options and populated the information displayed within detailed pricing information section 708. In general, as shown in FIG. 7B, detailed pricing information section 708 is generated by pricing tool 137 as a table with various interactive user interface controls that includes, in addition to procedure column 711, facility price column 712, physician price column 713, additional fee column 714, and total amount column 715, an anesthesia price column 716. As illustrated in FIG. 7B, the expanded information for a particular procedure category further includes, for each service categorized as a sub-procedure of the procedure category, in addition to a medical code number used to identify the service, a base facility rate, a base physician rate, an adjusted facility rate, and an adjusted physician rate as described above with reference to FIG. 7A, a base anesthesia rate and an adjusted anesthesia rate. In the present example, as further illustrated in FIG. 7B, the expanded information for a particular procedure category further includes, in addition to physician price field 711a and facility price field 711b, an anesthesia price field 711c that specifies a price that will be applied by the provider user for each anesthesia service performed in association with the services that have been categorized under the expanded procedure category. For example, pricing tool 137 can be configured to enable the user select between using the average of the corresponding adjusted anesthesia rates for all services listed in the expanded display for a procedure category for the price values within anesthesia price field 711c or the highest of the corresponding adjusted anesthesia rates for all services listed in the expanded display for a procedure category for the price values within anesthesia price field 711c. In exemplary embodiments, pricing tool 137 can be further configured to allow the provider user accessing service pricing page 700 to access anesthesia price field 711c to input a particular price value within this field.

As further indicated in the example screen shot illustrated in FIG. 7B, the row entry for a particular procedure category will include a pricing value under anesthesia price column 716 that corresponds to the pricing value that is specified within anesthesia price field 711c in the expanded display for the procedure category. As further illustrated in FIG. 7B, the row entry for a particular procedure category can include a pricing value under total amount column 715 that is provided as a sum of the price values listed under facility price column 712, physician price column 713, anesthesia price column 716, and, if included, additional fee column 714 in the row entry for a particular procedure category. FIG. 7C is a screen shot illustrating a third example of a graphical user interface provided by service pricing page 700 for a user accessing provider portal 130 in association

with a registered hospital system account. In the example illustrated in FIG. 7C, the user has selected "GI" (gastroenterology) from medical specialty drop-down menu 702, and pricing tool 137 has, in response to this selection, configured the user interface options and populated the information displayed within locality adjustment section 704, rate adjustment section 706, and detailed pricing information section 708 in accordance with the selection of "GI" from drop-down menu 702. In general, as shown in FIG. 7C, detailed pricing information section 708 is generated by pricing tool 137 as a table with various interactive user interface controls that includes, in addition to procedure column 711, facility price column 712, physician price column 713, additional fee column 714, and total amount column 715, a pathology price column 717.

As illustrated in FIG. 7C, the expanded information for a particular procedure category further includes, for each service categorized as a sub-procedure of the procedure category, in addition to a medical code number used to identify the service, a base facility rate, a base physician rate, an adjusted facility rate, and an adjusted physician rate as described above with reference to FIG. 7A, a base pathology rate. The base pathology rate for each service listed in the expanded display is obtained by pricing tool 137 from the pathology rate for the service that is stored within the respective information record maintained for the service within service pricing information database 114m for display within detailed pricing information section 708.

In the present example, as further illustrated in FIG. 7C, the expanded information for a particular procedure category further includes, in addition to physician price field 711a and facility price field 711b, a pathology price field 711d that specifies a price that will be applied by the provider user for each pathology service performed in association with the services that have been categorized under the expanded procedure category. For example, pricing tool 137 can derive and set the default price value within pathology price field 711d as the average of the base pathology rates for all services listed in the expanded display for a procedure category. In exemplary embodiments, pricing tool 137 can be further configured to allow the provider user accessing service pricing page 700 to access pathology price field 711d to input a particular price value within this field.

As further indicated in the example screen shot illustrated in FIG. 7C, the row entry for a particular procedure category will include a pricing value under pathology price column 717 that corresponds to the pricing value that is specified within pathology price field 711d in the expanded display for the procedure category. In this regard, pricing tool 137 can be configured to dynamically update the pricing value provided under pathology price column 717 in response to changes to the price value within pathology price field 711d. As further illustrated in FIG. 7B, the row entry for a particular procedure category can include a pricing value under total amount column 715 that is provided as a sum of the price values listed under facility price column 712, physician price column 713, pathology price column 717, and, if included, additional fee column 714 and anesthesia price column 716 in the row entry for a particular procedure category. This represents the actual price at which each service listed in the expanded display for a procedure category would be offered for purchase as a bundled set of services via marketplace system 100 from the provider user accessing service pricing page 700 via provider portal 130. In this regard, service selling service 135 may provide functionality allowing a user of a hospital system account to

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sell, in addition to services that are offered for purchase by the hospital within server system **100**, services that are constructed by a user of a hospital system account, including bundled sets of services.

In exemplary embodiments, the user interface implemented by account management service **131** may be further configured to provide user interface controls for requesting authorization for payment of a predetermined fee to gain access to the ability to offer healthcare products for purchase within marketplace system **100**. Such a fee may be, for example, a one-time charge or a periodic charge (such as a monthly, biannual, or annual fee). Upon the user indicating an intention to offer a healthcare product for purchase (for example, by selecting a "Offer Service" tab within the pharmacy account page implemented by provider portal **130**), the user will be able to initiate a product offering with product management service **134** to offer a healthcare product for purchase via server system **110**.

Purchasing service **126** can be also be configured to generate a respective information record for the completed purchase with corresponding information within transaction information database **114k**, which may, in some exemplary embodiments, initially indicate that the purchase has not yet been redeemed with respect to a purchase of an individual product or with respect to each product that is included in a purchase of a bundled set, and generate a voucher for the customer user to use with respect to the purchased product to redeem the purchase by receiving the product from the pharmacy. Such a voucher can include a confirmation number or other redemption code for the purchase.

Upon the user indicating an intention to request processing of payment for a purchased product that has been provided (for example, by selecting a "Voucher Processing" tab within the pharmacy account page implemented by provider portal **130**), the user will be able to initiate a voucher processing session with transaction processing service **136**.

FIG. **8** illustrates a flow chart of insurance policy stored in the insurance database (**114o**, shown in FIG. **2**) executed by the application server (**116**, shown in FIG. **2**). The insurance database is programmed to provide optimized bundled price **802**. For exemplary purposes, the system maximizes collections at each phase in the care cycle.

For various phases there is an option for paying the payment **804**. The patient is referred or scheduled for a procedure, where the patient may receive a push notification to pay prospectively. Alternatively, the patient checks-in at provider and the patient pays at the point of service either via cash, card, digital wallet etc. Alternatively, the patient is made to pay at discharge wherein, the patient receives a push notification to pay retrospectively.

Further, each of the patient information is monitored such as doctor's order/schedule (for example, CHC Redox), propensity to pay data (CHC-Vendor), benefit status (CHC-ribbon health) and carecredit pre-approval. Based on the patient information, doctor's order is matched. Further, the price is set based on the patient's capacity/willingness to pay for the service/product. Further, each payment is monitored to check if patient is paying out-of-pocket. The system compares the bundle price to the remaining patient deductible to determine the patient's capacity to pay for the services/product. Furthermore, the patients are allowed to pay either in full or through CareCredit.

The system makes sure to pay the optimal price in full every time to the hospital/physician/pharmacy and any associated service provider. The procedure is transparent and acceptable to both patients and the hospital. The service

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providers collect the maximum data of patients who are willing to pay. Further, The hospital leaves revenue on the table by charging less than what patients are willing to pay.

The application server (**116**, shown in FIG. **2**) processes the data stored in the insurance database **114o** and allow the user to excess the insurance information via an insurance management (**14**, shown in FIG. **2**). The hospital sends an electronic claim to the system after care is delivered to the patient. The system then distributes payment and sends electronic remittance file based on the information stored in the insurance database **114o**. The system passes the electronic claim to the insurance company **806** to update patient's accumulator (not for reimbursement). The insurance **806** then notifies the system of accumulator status. The system then sends update to the patients.

FIG. **9** illustrates a block diagram of a virtual payment system manager **170** communicating with client system in a healthcare marketplace system in accordance with another exemplary embodiment of the present invention. As noted above, exemplary embodiments of the present invention may be implemented to provide a virtual payment system for facilitating and accounting for the exchange of payment for services and products purchased by (or otherwise purchased on behalf of) patients and offered by healthcare providers via the creation, transfer, and redemption of virtual funds within central server system **110**.

In some exemplary embodiments, virtual payment system manager **170** is configured to facilitate the tracking and management of promotional credits that may be offered by the providers of healthcare marketplace system **100** to registered users of server system **110** for taking certain actions within the system in association with their registered accounts.

For example, the providers of marketplace system **100** may offer a promotion to potential customer users in which each user, upon completing registration of a respective customer account with server system **110**, will receive a credit of a specified amount of funds (for instance, a credit of \$25) that the customer user may use to purchase services and/or products offered within marketplace system **100** by provider users that are registered with server system **110**.

Virtual payment system manager **170** is configured to, in such an example, upon accessing database server **112** to create the respective account information record for the virtual money account for the customer within virtual money account database **114p**, also access database server **112** to instantiate a new virtual fund object corresponding to the specified amount of funds for the promotional credit within the container of virtual fund objects included in the respective account information record.

In this regard, virtual payment system manager **170** generates a unique identifier for the new virtual fund object being created and define the attributes of the object to include an indication of the value of the corresponding virtual funds, the unique identifier generated for the object, an indication that the original funding source is a credit that was conveyed by the providers of marketplace system **100**, a creation timestamp for the object, an indication that the corresponding virtual funds for the object are not presently allocated to use as payment for an offered service or product purchased within the marketplace system, and, optionally, an indication of an expiration date for the promotional credit by which the customer user must use the credited funds to purchase services and/or products offered within marketplace system **100**.

In such an example, virtual payment system manager **170** is configured to further access database server **112** to also

instantiate a corresponding new virtual fund object for the promotional credit within the container of virtual fund objects included in the respective account information record for a respective virtual money account that is being maintained within virtual money account database **114p** for an entity that provides the marketplace system (which may have already been established, for example, by a backend administrator of server system **110**). More specifically, virtual payment system manager **170** generates a unique identifier for the new virtual fund object being created and define the attributes of the object to include an indication of the value of the corresponding virtual funds as a negative value, the unique identifier generated for the object, an indication that the original funding source is a corresponding amount of real currency held within an external financial account maintained by the providers of marketplace system **100** (and thereby owed to the virtual payment system by the marketplace system providers), and a creation timestamp for the object.

Virtual payment system manager **170** is also configured to, upon creating the corresponding virtual fund objects for the promotional credit within the respective account information records for the virtual money accounts for the customer user and the entity that provides the marketplace system within virtual money account database **114p**, update the total balance values and available balance values included in the sets of general information within the respective account information records for the respective virtual money accounts appropriately to reflect the newly-created virtual fund objects.

The virtual payment system manager **170** is configured to making a determination that the promotional credit will ultimately not be used by the customer user (for instance, in response to the customer user deleting customer account or to recognize an expiration date for the promotional credit within the respective account information record for the virtual money account for the customer has passed).

For example, virtual payment system manager **170** can be configured to sequentially select virtual fund objects from the virtual fund objects that are presently assigned to the user in the respective account information record for user to use for facilitating the processing of payment of the purchase price for the offered product until the indicated values of the corresponding virtual funds for the sequentially selected objects sum to an amount of virtual funds that is at least equal to the corresponding amount of available virtual funds specified in the purchase information submitted by the customer user for the purchase according to a chronological order in which the objects from which the selection is being made were assigned to the user.

For this purpose, virtual payment system manager **170** can be configured to identify the respective account information record of the pharmacy to which payment for the purchased product is to be directed based on the unique virtual money account identifier for the respective account information record for the virtual money account for the pharmacy, and virtual payment system manager **170** can be configured to perform the transfer of the selected virtual fund objects in the respective account information record for the customer.

In the example illustrated in FIG. 9, the particular components that are utilized for providing the virtual payment system are integrated within system **100** in conjunction with the components of the system as described above and herein below with reference to the exemplary embodiments illustrated FIGS. 1 and 2. In particular, as depicted in FIG. 9, application server **116** is further implemented to include

virtual payment system manager **170**. As also depicted in FIG. 9, data store **114** further comprises virtual money account database **114p**, which is maintained by database server **112**, is accessed by application server **116**.

In the present exemplary embodiment, virtual payment system manager **170** is shown in FIG. 8 as including a virtual account management module **171**, a transaction tracking module **172**, a communication module **173**, a virtual fund creation and disbursement module **174**, a virtual payment processing module **175**, and an adjustment processing module **176**. In general, the various modules implemented within virtual payment system manager **170** in the present exemplary embodiments are configured to interact with one another, customer portal **120**, provider portal **130**, and data store **114** via database server **112** to perform the various operations described in the examples provided above pertaining to exemplary embodiments in which a virtual payment system is implemented within server system **110**.

The virtual account management module **171** is configured to access virtual money account database **114p** to create respective account information records for respective virtual money accounts of participants to transactions conducted within marketplace system **100**. The virtual account management module **171** retrieves, maintains, performs modifications to respective information account records as necessary in response to participants that are logged-in to server system **110** accessing the account management functions provided by account management service **122** or account management service **131** to manage and view information pertaining to the respective virtual money accounts for the participants within the virtual payment system.

Transaction tracking module **172** can, for example, be configured to dynamically perform updates to the accounting details pertaining to transactions conducted within the virtual payment system. The module **172** dynamically calculates and performs updates to the balance values that are included within the general information in the respective account information records for the respective virtual money accounts in response to transactions conducted within the virtual payment system.

Further, module **172** dynamically performs processing for handling virtual fund objects that have been created within the virtual money account based on promotional credits that have expired in response to such expirations occurring, and dynamically perform processing for reversing payment processing operations performed within the virtual payment system for purchases of offered services and products that have not been redeemed within expiration periods specified for such purchases in response to the end of such expiration periods being reached.

Communication module **173** can, for example, be configured to generate notifications and reports with respect to virtual money accounts managed and transactions conducted within the virtual payment system, transmit generated notifications and reports to corresponding components of customer portal **120** and provider portal **130**, receive notifications and information from corresponding components of customer portal **120** and provider portal **130**, and process such received notifications and information.

Virtual fund creation and disbursement module **174** can, for example, be configured to implement functionality for creating or instantiating new virtual fund objects within respective account information records for virtual money accounts as needed for transactions conducted within the virtual payment system, processing disbursement requests within the virtual payment system (including functionality for



deleting virtual fund objects), and performing automatic periodic disbursements for virtual money accounts within the virtual payment system.

Virtual payment processing module 175 can, for example, be configured to implement functionality for performing operations for facilitating payment processing within the virtual payment system for purchases of offered services and products by customers users registered with server system 110, as well as to perform corresponding updates to the attributes defining the virtual fund objects within the respective account information records in response to performing such operations for facilitating payment processing within the virtual payment system. Adjustment processing module 176 can, for example, be configured to implement functionality for performing operations for processing cancellation requests, refund requests, and other modifications to purchases of offered services and products for which payment processing is handled within the virtual payment system, as well as to perform corresponding updates to the attributes defining the virtual fund objects within the respective account information records in response to performing such operations for processing cancellation requests, refund requests, and other modifications to purchases within the virtual payment system.

In exemplary embodiments disclosed herein, because certain healthcare information may be considered highly confidential, marketplace system 100 can be implemented to provide for a high-level of security for information transferred between client applications executing on client systems 142 and application server 116. For illustration, whenever applicable, marketplace system 100 (for example, for operations and functionalities) may be implemented to comply with requirements under the Health Insurance Portability and Accountability Act (HIPAA). As another example, to protect patient privacy, information transmitted over a computer or communication network, such as information transmitted between application server 116 and any client system 140 and electronic messages transmitted by server system 110, can be encrypted. In exemplary embodiments, system 100 can be HIPAA-validated to ensure privacy and comply with all requirements.

Aspects of exemplary embodiments of the present invention described herein can be implemented using one or more program modules and data storage units. As used herein, the term “modules”, “program modules”, “components”, “systems”, “tools”, “utilities”, and the like include routines, programs, objects, components, data structures, and instructions, or instructions sets, and so forth that perform particular tasks or implement particular abstract data types. As can be appreciated, the modules refer to computer-related entities that can be implemented as software, hardware, firmware and/or other suitable components that provide the described functionality, and which may be loaded into memory of a machine embodying an exemplary embodiment of the present invention. Aspects of the modules may be written in a variety of programming languages, such as C, C++, Java, etc. The functionality provided by modules used for aspects of exemplary embodiments described herein can be combined and/or further partitioned.

As used herein, the terms “data storage unit,” “data store”, “storage unit”, and the like can refer to any suitable memory device that may be used for storing data, including manual files, machine readable files, and databases. The modules and/or storage units can all be implemented and run on the same computing system (for example, the exemplary computer system illustrated in FIG. 5 and described below) or they can be implemented and run on different computing

systems. For example, one or modules can be implemented on a personal computer operated by a user while other modules can be implemented on a remote server and accessed via a network.

Exemplary embodiments of the present invention can be realized in hardware, software, or a combination of hardware and software. Exemplary embodiments can be realized in a centralized fashion in one computer system or in a distributed fashion where different elements are spread across several interconnected computer systems. Any kind of computer system—or other apparatus adapted for carrying out the methods described herein—is suited. A typical combination of hardware and software could be a general-purpose computer system with a computer program that, when being loaded and executed, controls the computer system such that it carries out the methods described herein.

A computer system in which exemplary embodiments can be implemented may include, inter alia, one or more computers and at least a computer program product on a computer readable medium, allowing a computer system, to read data, instructions, messages or message packets, and other computer readable information from the computer readable medium. The computer readable medium may include non-volatile memory, such as ROM, Flash memory, Disk drive memory, CD-ROM, and other permanent storage. Additionally, a computer readable medium may include, for example, volatile storage such as RAM, buffers, cache memory, and network circuits. Furthermore, the computer readable medium may comprise computer readable information in a transitory state medium such as a network link and/or a network interface, including a wired network or a wireless network, that allow a computer system to read such computer readable information. While the invention has been described in detail with reference to exemplary embodiments, it will be understood by those skilled in the art that various changes and alternations may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention as defined by the appended claims. In addition, many modifications may be made to adapt a particular application or material to the teachings of the invention without departing from the essential scope thereof.

Variations described for exemplary embodiments of the present invention can be realized in any combination desirable for each particular application. Thus particular limitations, and/or embodiment enhancements described herein, which may have particular limitations, need be implemented in methods, systems, and/or apparatuses including one or more concepts describe with relation to exemplary embodiments of the present invention.

Therefore, it is intended that the invention not be limited to the particular embodiments disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the present application as set forth in the following claims, wherein reference to an element in the singular, such as by use of the article “a” or “an” is not intended to mean “one and only one” unless specifically so stated, but rather “one or more.” Moreover, no claim element is to be construed under the provisions of 35 U.S.C. § 112, sixth paragraph, unless the element is expressly recited using the phrase “means for” or “step for.” These following claims should be construed to maintain the proper protection for the present invention.



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What is claimed is:

1. An apparatus comprising:

a processor; and a memory operably coupled with the processor, wherein the memory comprises processor executable program instructions configured that when executed by the processor cause the apparatus to implement a database server communicatively coupled to an application server configured with a machine learning algorithm, and a data store;

the application server comprising: a customer portal; a provider portal; and a virtual payment system manager linked to the customer portal and the provider portal; the application server providing a network service to a plurality of users through a plurality of client systems via a communication network, the network service being accessible via a graphical user interface provided by a client application implemented on each of the client systems;

the data store maintained by the application server comprising: a service offer database storing a bundled set of healthcare service offers linked to at least one of:

a customer profile database configured to register users thereby providing user's personal information for purchasing healthcare services;

a physician profile database configured to register and maintain records of individual physician offering healthcare services;

a condition information database configured to register and maintain information records for various health conditions and diseases for which corresponding healthcare services are offered;

a hospital system profile database configured to register and maintain account information records for hospital system administrators providing pre-paid healthcare services;

an available service database configured to register and maintain records of various healthcare services offered by at least one of: a physician; and a hospital; and

a transaction information database configured to maintain records of purchases made by registered users; and

a virtual money account database configured to maintain records of virtual funds of each of the registered users, physicians and hospitals involved in a virtual payment in a transaction marketplace system; the application server using the machine learning algorithm instructs the service offer database to store each healthcare service provider service corresponding to the user selection via a graphical user interface, and the application server displays via the customer portal the bundled set of service offers including pricing of associated service offer via the graphical user interface that matches the users' selection;

the customer portal is configured to allow the user to select a healthcare service offer from the bundled set of service offers for purchase by the user via the graphical user interface on a selected date, time and location, wherein the purchase comprises payment comprising a plurality of selected virtual funds assigned to the user, the virtual funds comprise at least one funding source comprising promotional credit having an expiration date, and the virtual funds are selected in chronological order in which the funds were assigned to the user until the sum of selected virtual funds values is at least equal to the purchase price;

the service offer database is configured to store the information retrieved from the user and the application server displays via the customer portal a purchase price

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for the associated service offer, an indication of a corresponding healthcare provider for the healthcare service, a corresponding payment amount for the healthcare service, wherein the price is an optimized price set based on the user's capacity to pay determined as a function of the user's remaining insurance deductible;

the virtual payment system manager is configured to allocate and distribute the virtual funds in the transaction marketplace system to the virtual accounts of at least one of: a physician; a hospital; and a customer; the provider portal upon receiving purchase information from the user for purchasing the selected service offer for the optimized price generates a voucher specifying a unique confirmation number within a user interface configured in the customer portal, the voucher comprising a description of the purchase specifying the corresponding healthcare provider for the healthcare service for the purchased service offer redeemable from the corresponding healthcare service provider, wherein the voucher is configured to remain invalid to redeem the purchased offer until a prescription for the purchased offer is received and verified.

2. The data store of claim 1 further comprising a pharmacy profile database to maintain account information records for pharmacy administrator offering healthcare products.

3. The provider portal of claim 2 upon receiving purchase information from the user for purchasing the selected service offer issues a prescription document to be submitted to the pharmacy.

4. The data store of claim 1, further comprising an available products database to maintain information records for various healthcare products offered by pharmacies registered with the application server.

5. The data store of claim 2, further comprising a product offer database to maintain records for offers of healthcare products offered by the registered pharmacies.

6. The apparatus of claim 1, wherein the network service is configured to allow a user accessing the network service from one of the client systems in association with a provider account to create a service offer for purchase via the network service by submitting, via graphical user interface controls included within the graphical user interface provided by the client application implemented on the client system, a set of information for the service offer to the network service and in response to receiving the set of information for the service offer, establish a service offer information record associated with the service offer and the provider account within the service offer database.

7. The apparatus of claim 1, wherein the transaction information database comprises a respective purchase information record for each processed purchase, by a user accessing the network service from one of the client systems in association with a customer account.

8. The apparatus of claim 1, wherein the network service is configured to indicate for each healthcare service and healthcare product of the purchased service offer, whether the purchased service and product have been redeemed.

9. The apparatus of claim 8, wherein for each purchase redeemed the network service is configured to access a servicer for a financial account, said servicer indicated by the corresponding compensation information for the healthcare product in the service offer information record associated with the selected service offer, to direct a disbursement of funds corresponding to the payment amount for the redeemed purchase to the financial account.

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10. The service offer database of claim 1, further linked to a practice group profile database to maintain account information records for registered practice group administrator users offering healthcare services.

11. The apparatus of claim 1, wherein at least one service offer for a corresponding bundled set includes one or more primary and secondary healthcare services.

12. The apparatus of claim 1, wherein at least one service offer information record associated with a service offer for a corresponding bundled set that includes an indication of a facility for performing the primary healthcare service, a facility fee for the facility, and compensation information for the facility fee.

13. The apparatus of claim 1, wherein the virtual payment system manager implemented by the processor executable program instructions executed by the application server further comprises:

- a virtual account management module configured to access the virtual money account database to maintain virtual money accounts;
- a communication module configured to generate notifications and reports with respect to the virtual money accounts;
- a virtual payment module configured to implement functionality for performing operations for facilitating payment processing;
- a transaction tracking module configured to dynamically perform updates to the accounting details pertaining to transactions;
- a virtual fund creation and disbursement module configured to implement functionality for creating or instantiating virtual fund objects within respective account information records for the virtual money accounts; and
- an adjustment module configured to implement functionality for performing operations for processing cancel-

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lation requests, refund requests, and other modifications to purchases of offered services and products.

14. The apparatus of claim 1, wherein the virtual payment system manager allocate to distribute funds to the virtual account of at least one of: the physician; and the hospital; on request raised by the customer on purchasing of the bundled set of healthcare services.

15. The apparatus of claim 13, wherein the virtual payment system manager is configured to allocate and distribute virtual fund objects to the virtual account of the customer on request raised by at least one of the physician; and the hospital.

16. The apparatus of claim 1, wherein in response to receiving the prescription for the purchased offer, verifying the prescription.

17. The apparatus of claim 16, wherein in response to determining the prescription is verified, configuring the voucher to be valid for redeeming the purchased offer.

18. The apparatus of claim 1, wherein the voucher is generated for a bundled set, and wherein the voucher is configured to permit the user to redeem each purchase of the bundled set.

19. The apparatus of claim 18, wherein in response to determining a purchased offer of the bundled set has been redeemed, based on determining the user received the purchased offer of the bundled set, configure the voucher to indicate the purchased offer has been redeemed.

20. The apparatus of claim 1, wherein in response to reaching the end of a promotional credit virtual funds expiration period, reverse virtual funds payment for a purchased service that has not been redeemed within the expiration period.

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