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(54) **SYSTEMS AND METHODS FOR MANAGING INVENTORY USAGE**

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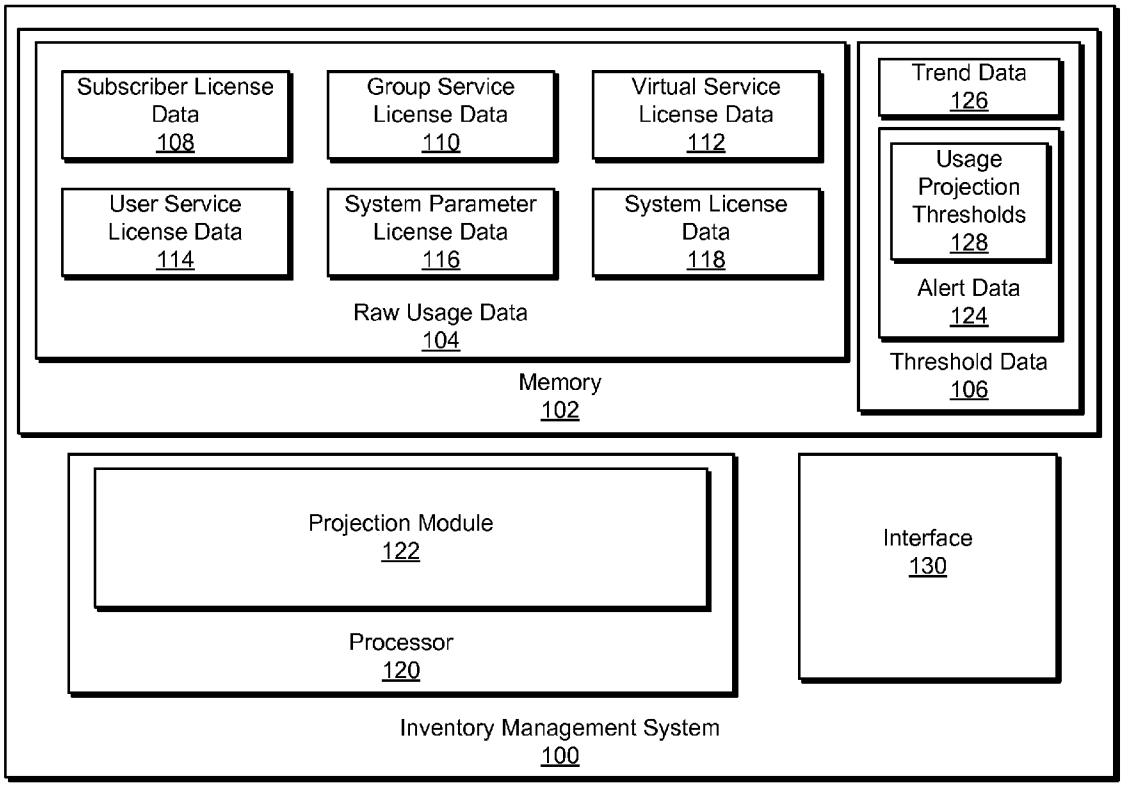
USPC **705/28**

(57) **ABSTRACT**

Implementations described and claimed herein provide systems and methods for managing inventory usage to predict when a pool of available inventory will become exhausted based on past usage trend data. In one implementation, raw usage data is extracted from a first data sample. The first data sample has a first input time, and the raw usage data specifies a total amount of inventory for one or more inventory types. The total amount of inventory is categorized for each of the inventory types into an amount of used inventory and an amount of available inventory. A projected inventory usage for each of the inventory types is generated based on the categorized total amount of inventory. The projected inventory usage defines an availability status of each of the inventory types.



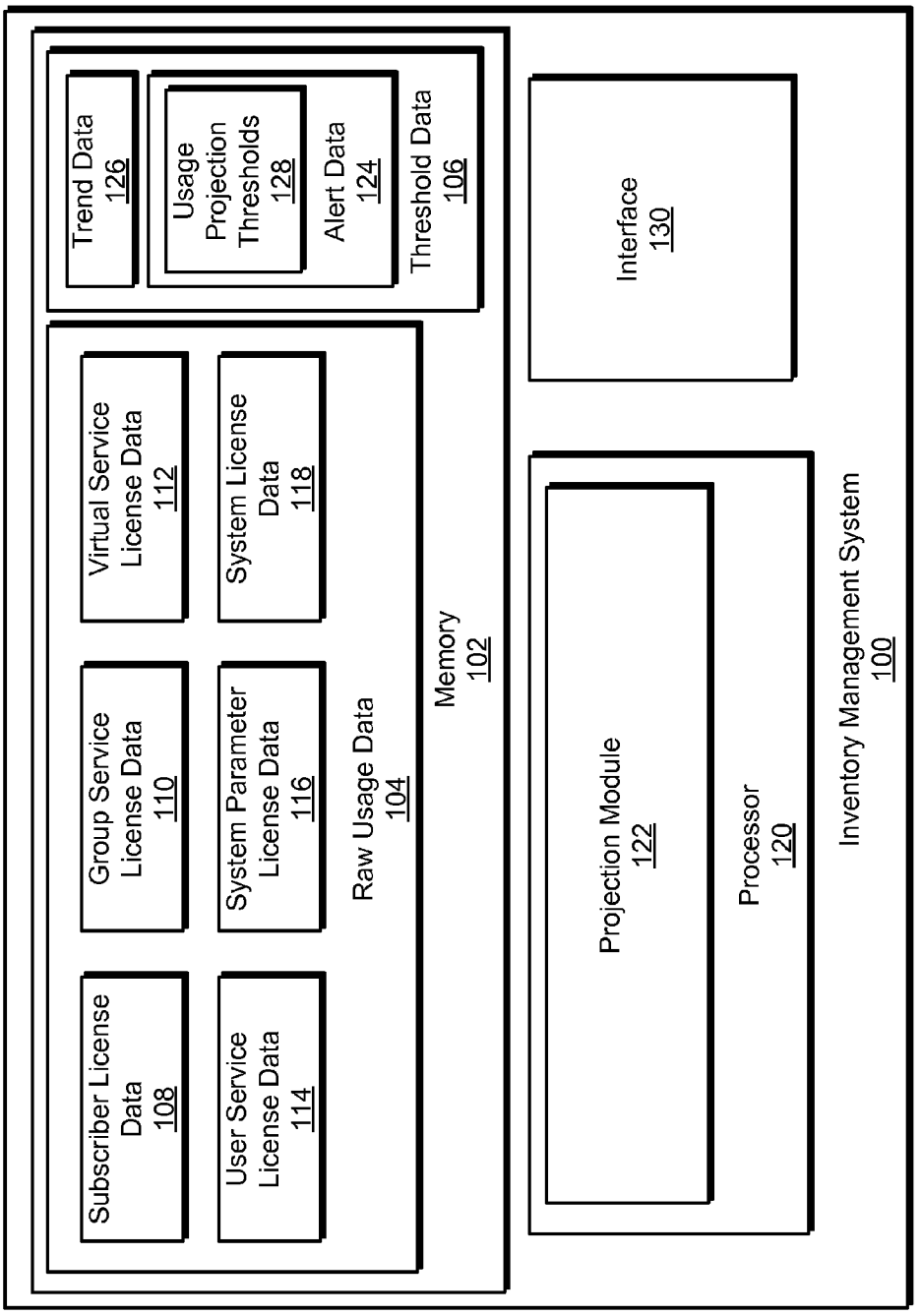

Inventory Management System
100
Memory
102
Raw Usage Data
104
Subscriber License Data
108
User Service License Data
114
Group Service License Data
110
System Parameter License Data
116
Virtual Service License Data
112
System License Data
118
Threshold Data
106
Alert Data
124
Usage Projection Thresholds
128
Trend Data
126
Processor
120
Projection Module
122
Interface
130

FIG. 1

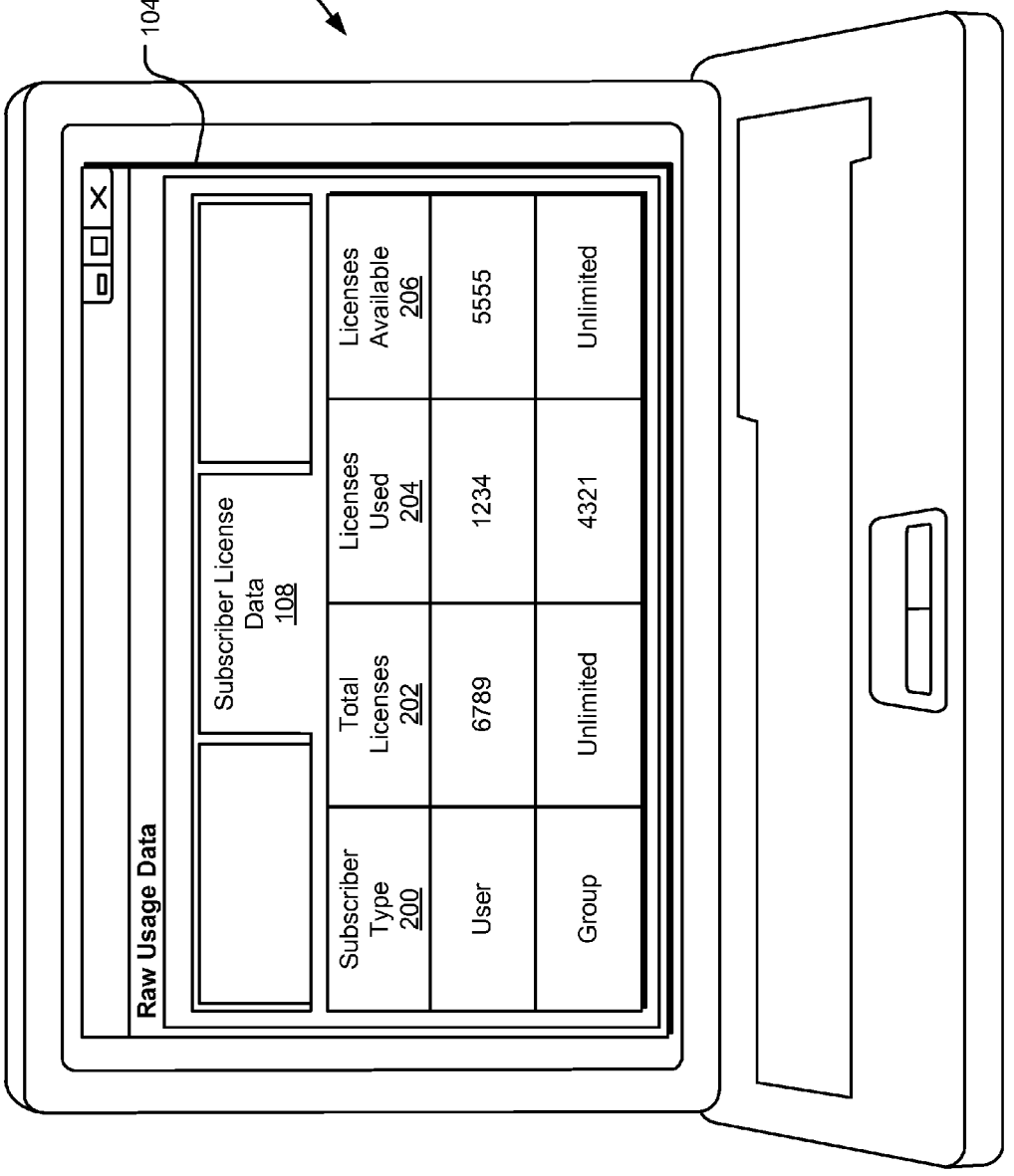

130
104
Raw Usage Data
Subscriber License Data 108
Subscriber Type 200
Total Licenses 202
Licenses Used 204
Licenses Available 206
User
6789
1234
5555
Group
Unlimited
4321
Unlimited

FIG. 2A

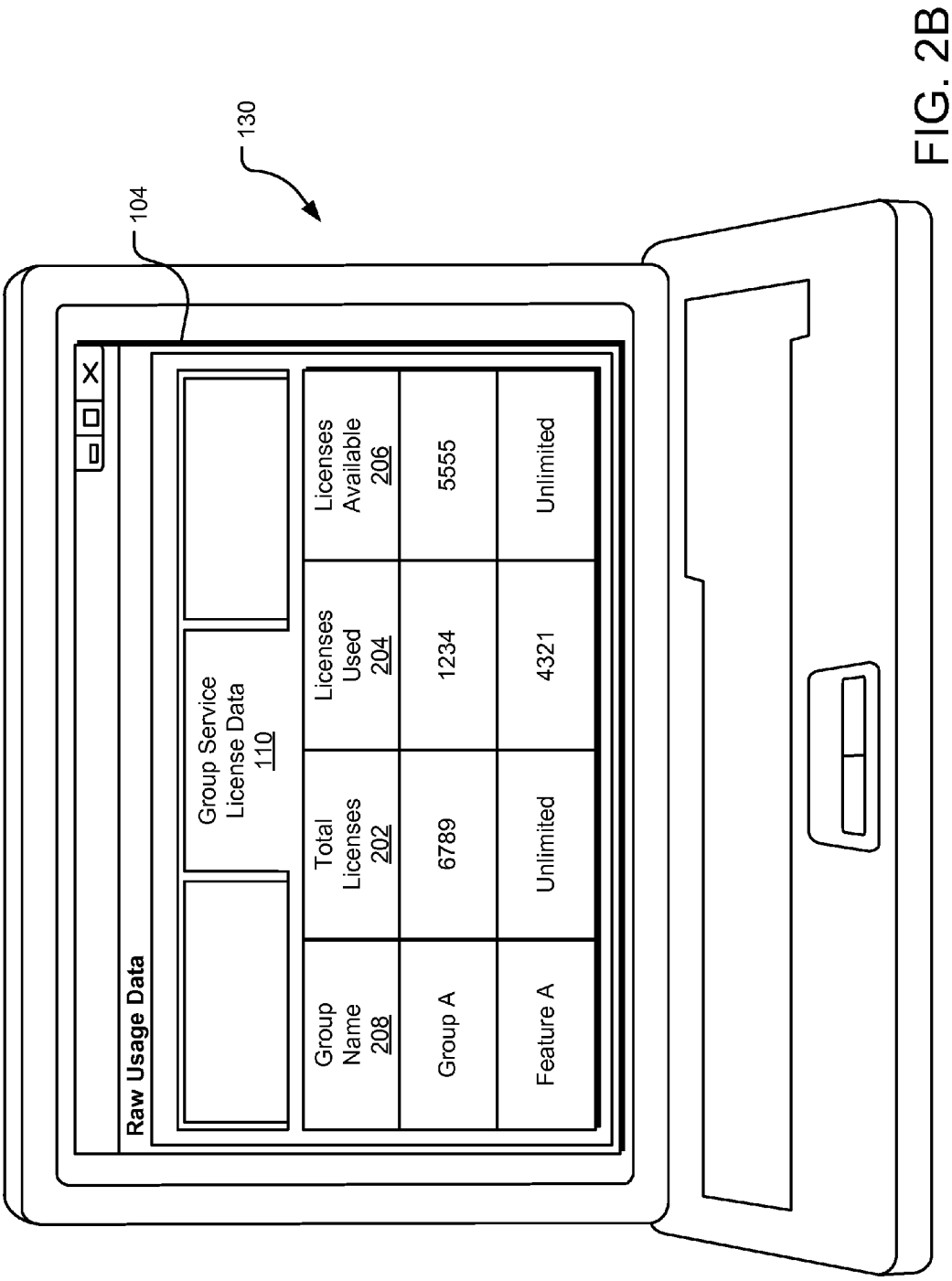

130
104
Raw Usage Data
Group Service License Data 110
Group Name 208
Total Licenses 202
Licenses Used 204
Licenses Available 206
Group A
6789
1234
5555
Feature A
Unlimited
4321
Unlimited

FIG. 2B

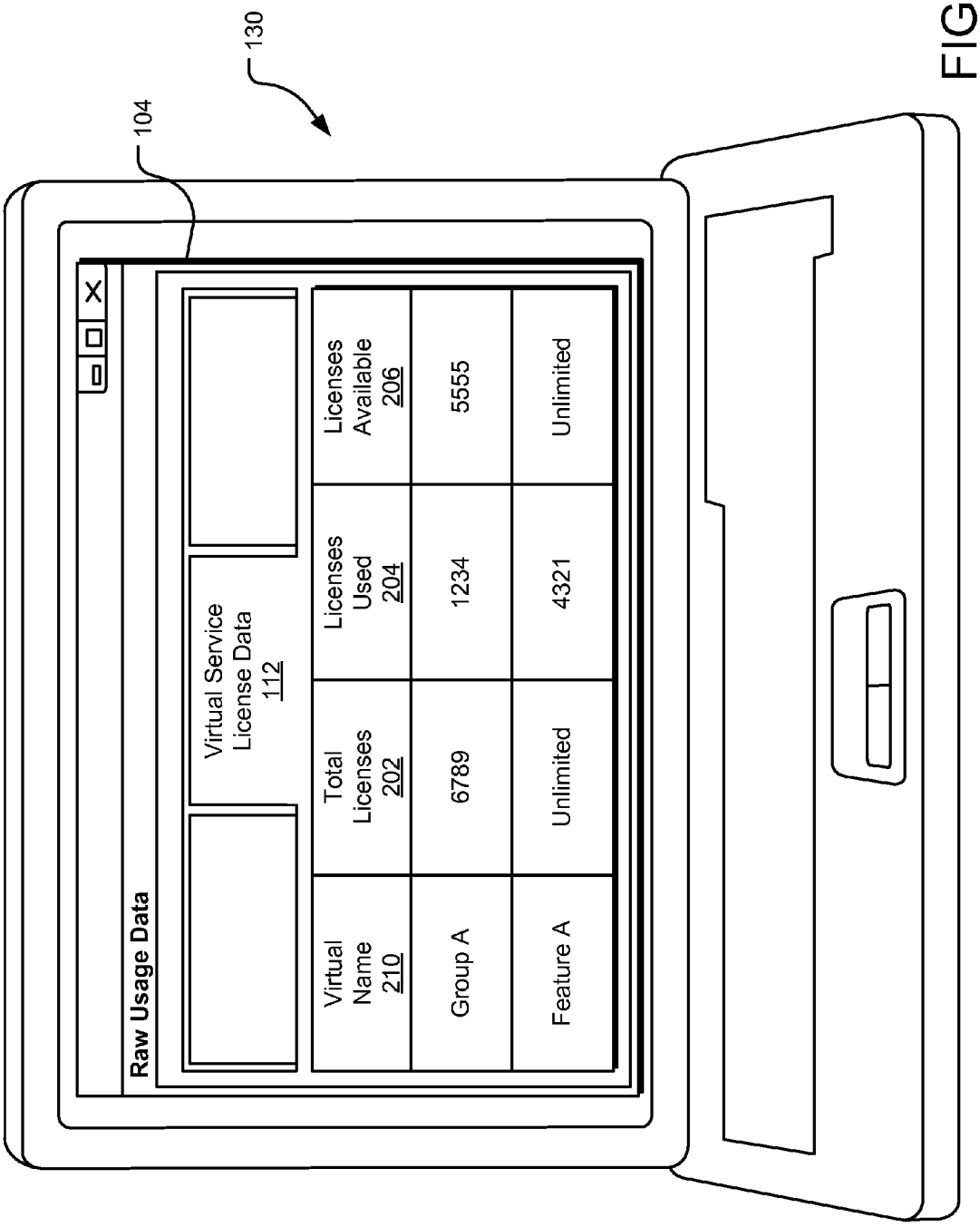

130
104
Raw Usage Data
Virtual Service License Data 112
Virtual Name 210
Total Licenses 202
Licenses Used 204
Licenses Available 206
Group A
6789
1234
5555
Feature A
Unlimited
4321
Unlimited

FIG. 2C

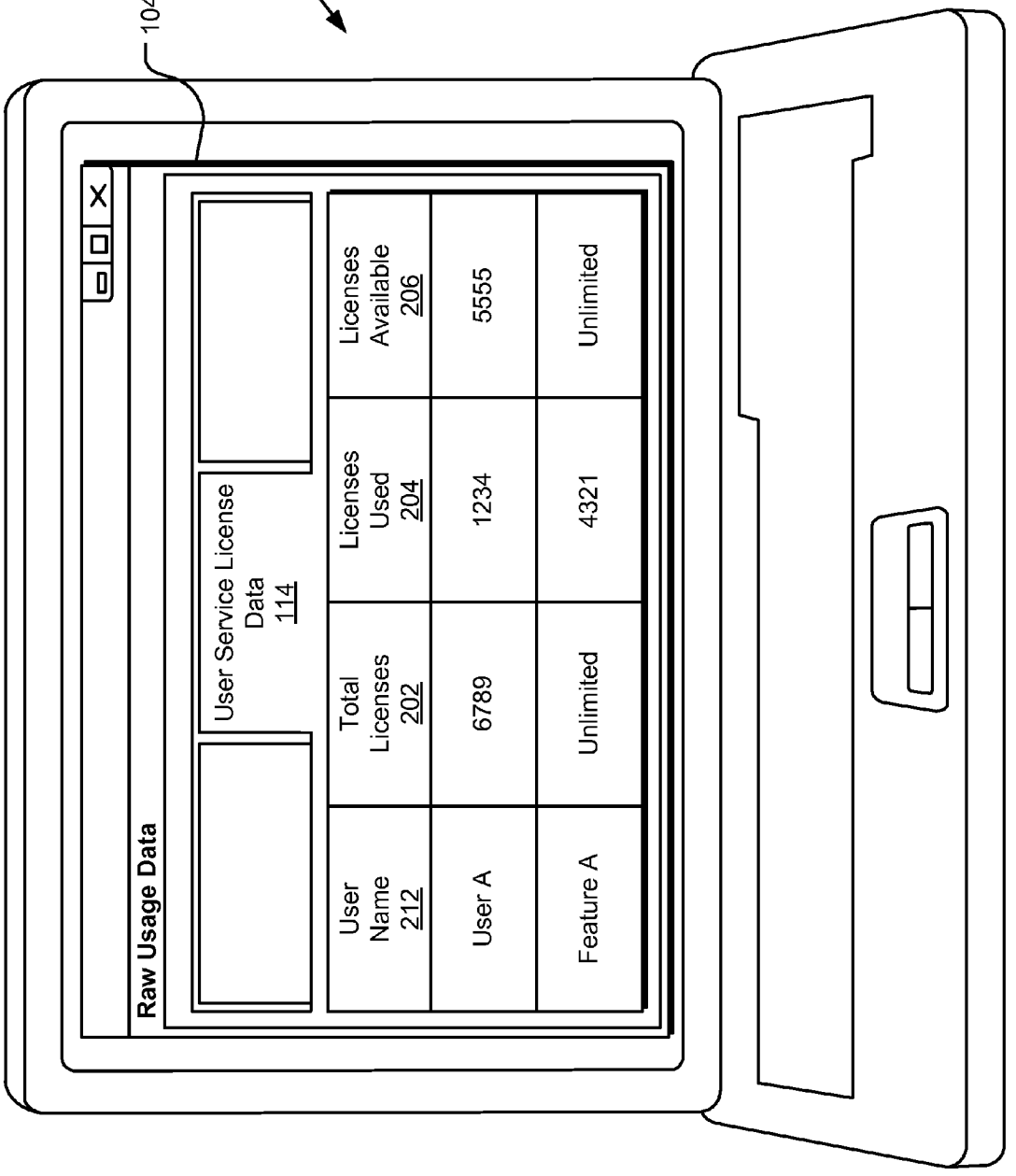

130
104
Raw Usage Data
User Service License Data 114
User Name 212
Total Licenses 202
Licenses Used 204
Licenses Available 206
User A
6789
1234
5555
Feature A
Unlimited
4321
Unlimited

FIG. 2D

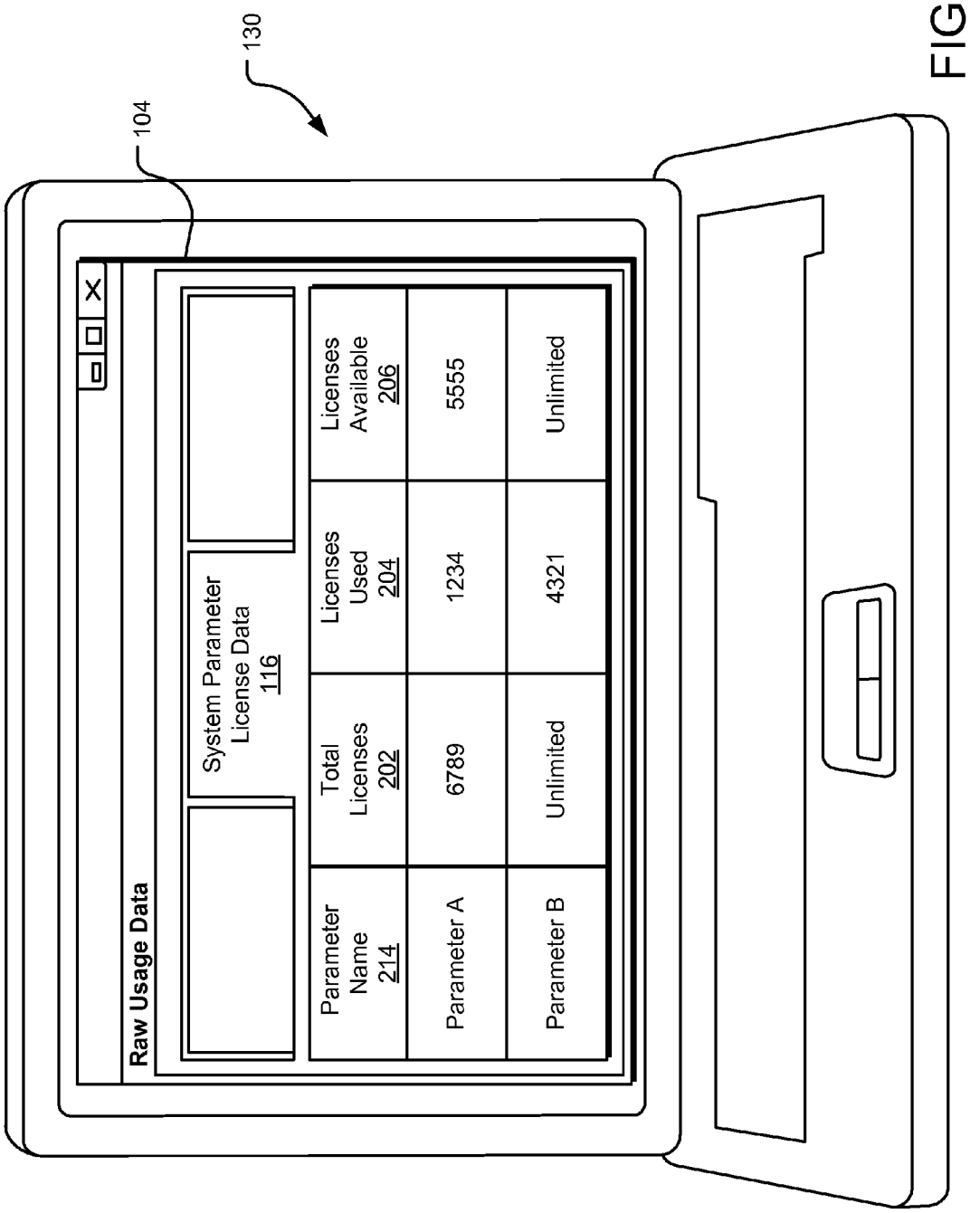

130
104
Raw Usage Data
System Parameter License Data 116
Parameter Name 214
Total Licenses 202
Licenses Used 204
Licenses Available 206
Parameter A
6789
1234
5555
Parameter B
Unlimited
4321
Unlimited

FIG. 2E

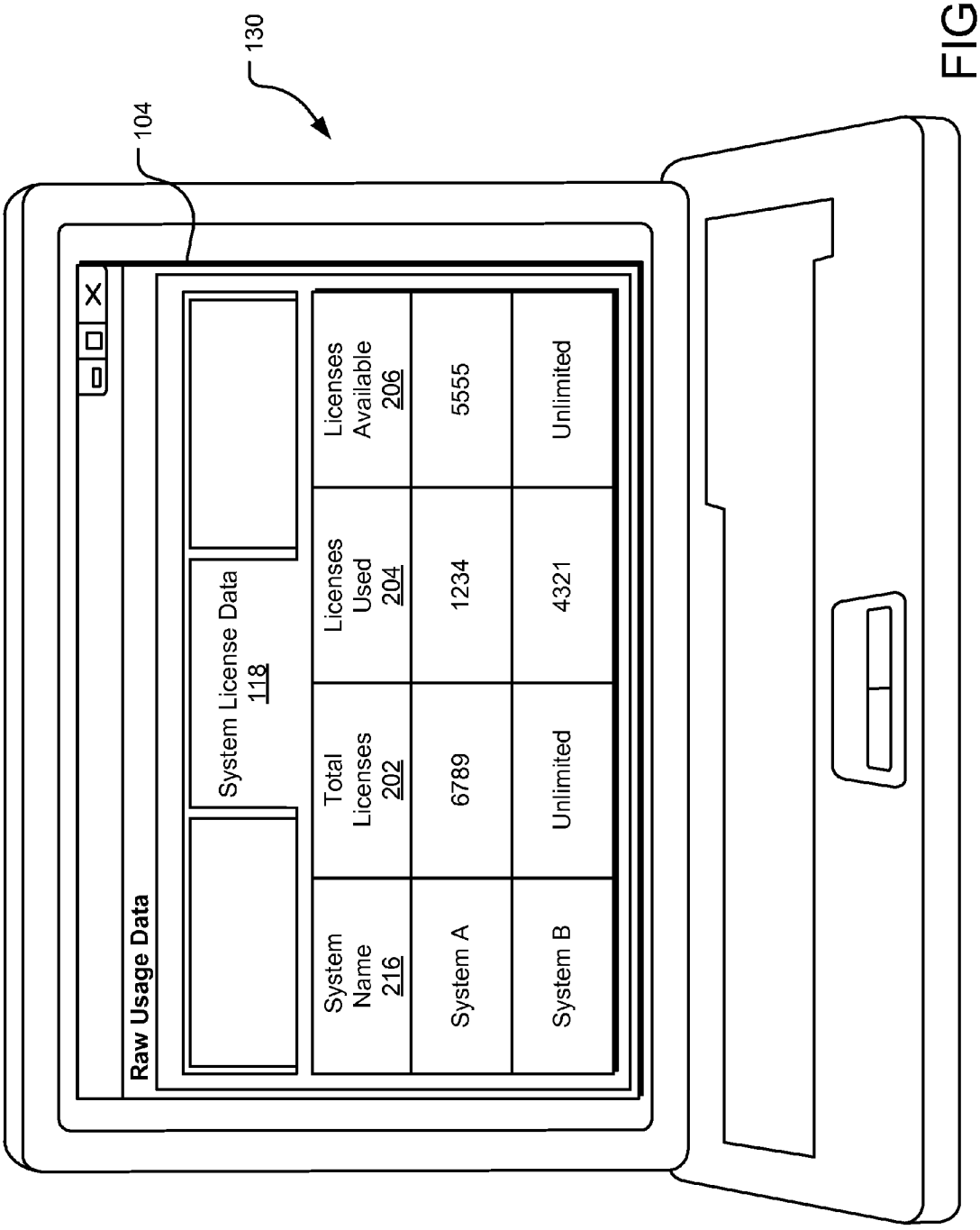

130
104
Raw Usage Data
System License Data
118
System Name 216
Total Licenses 202
Licenses Used 204
Licenses Available 206
System A
6789
1234
5555
System B
Unlimited
4321
Unlimited

FIG. 2F

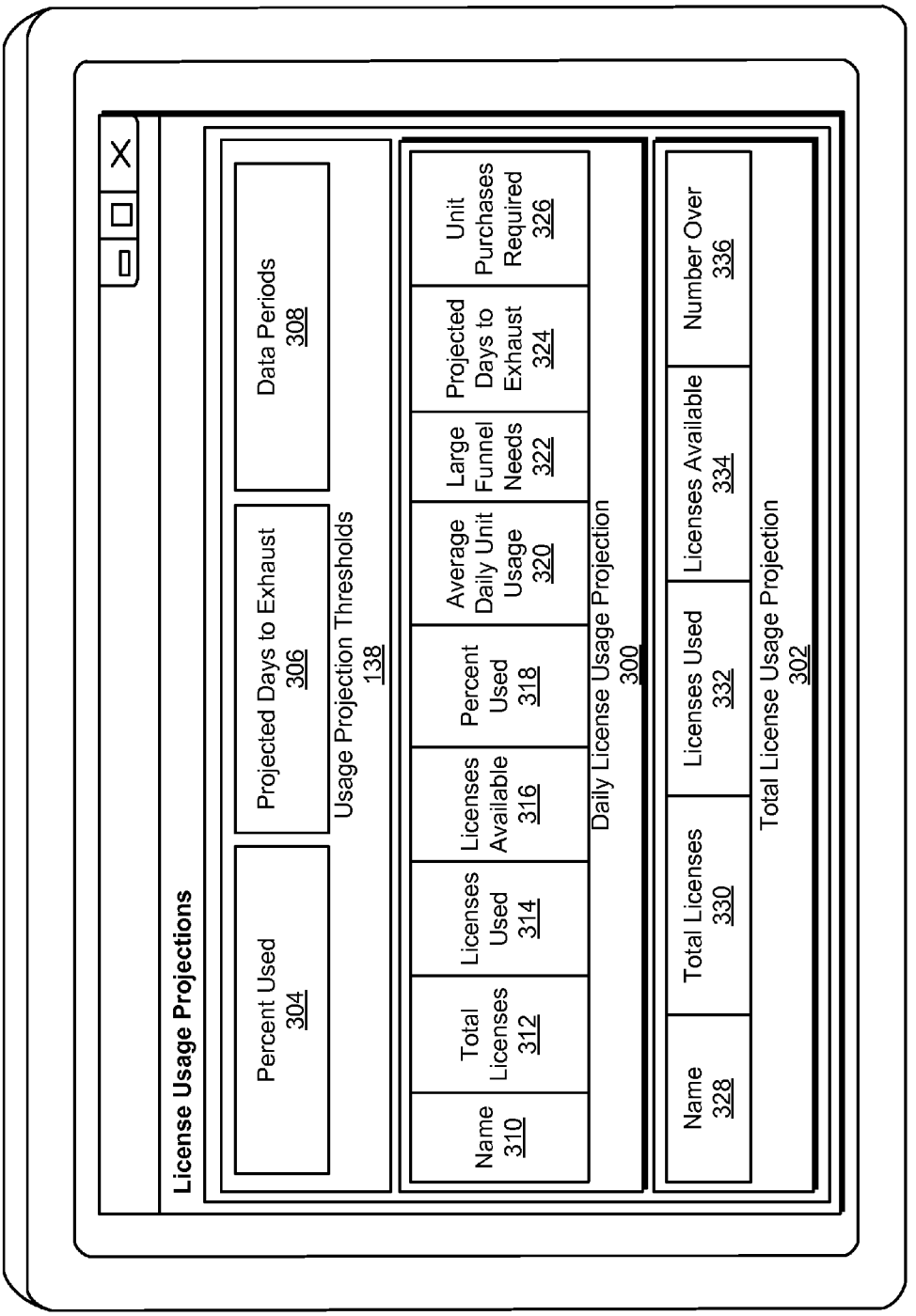

License Usage Projections
Percent Used 304
Projected Days to Exhaust 306
Data Periods 308
Usage Projection Thresholds 138
Name 310
Total Licenses 312
Licenses Used 314
Licenses Available 316
Percent Used 318
Average Daily Unit Usage 320
Large Funnel Needs 322
Projected Days to Exhaust 324
Unit Purchases Required 326
Daily License Usage Projection 300
Name 328
Total Licenses 330
Licenses Used 332
Licenses Available 334
Number Over 336
Total License Usage Projection 302
130

FIG. 3

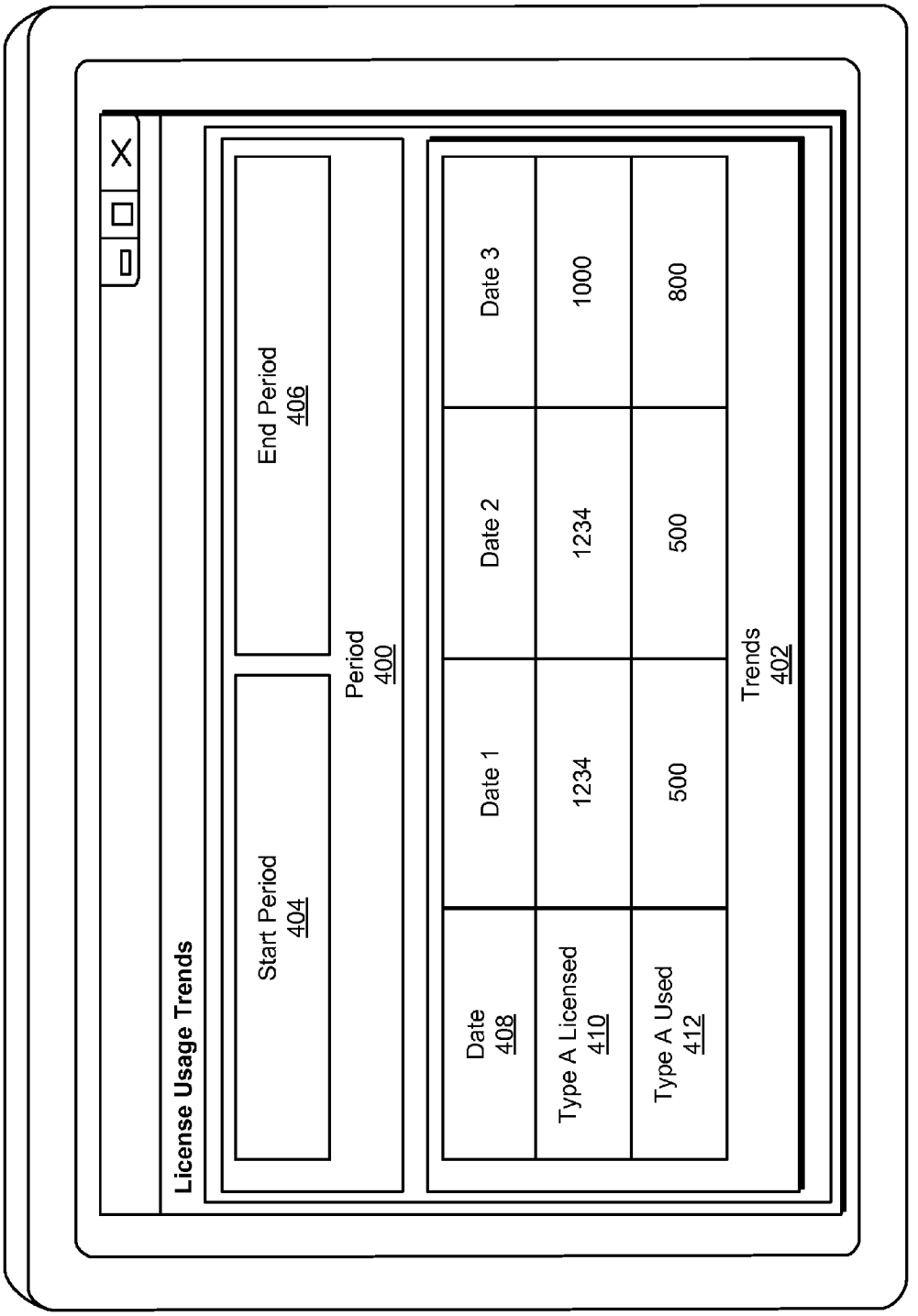

License Usage Trends
Start Period
404
End Period
406
Period
400
Date
408
Type A Licensed
410
Type A Used
412
Date 1
1234
500
Date 2
1234
500
Date 3
1000
800
Trends
402
130

FIG. 4A

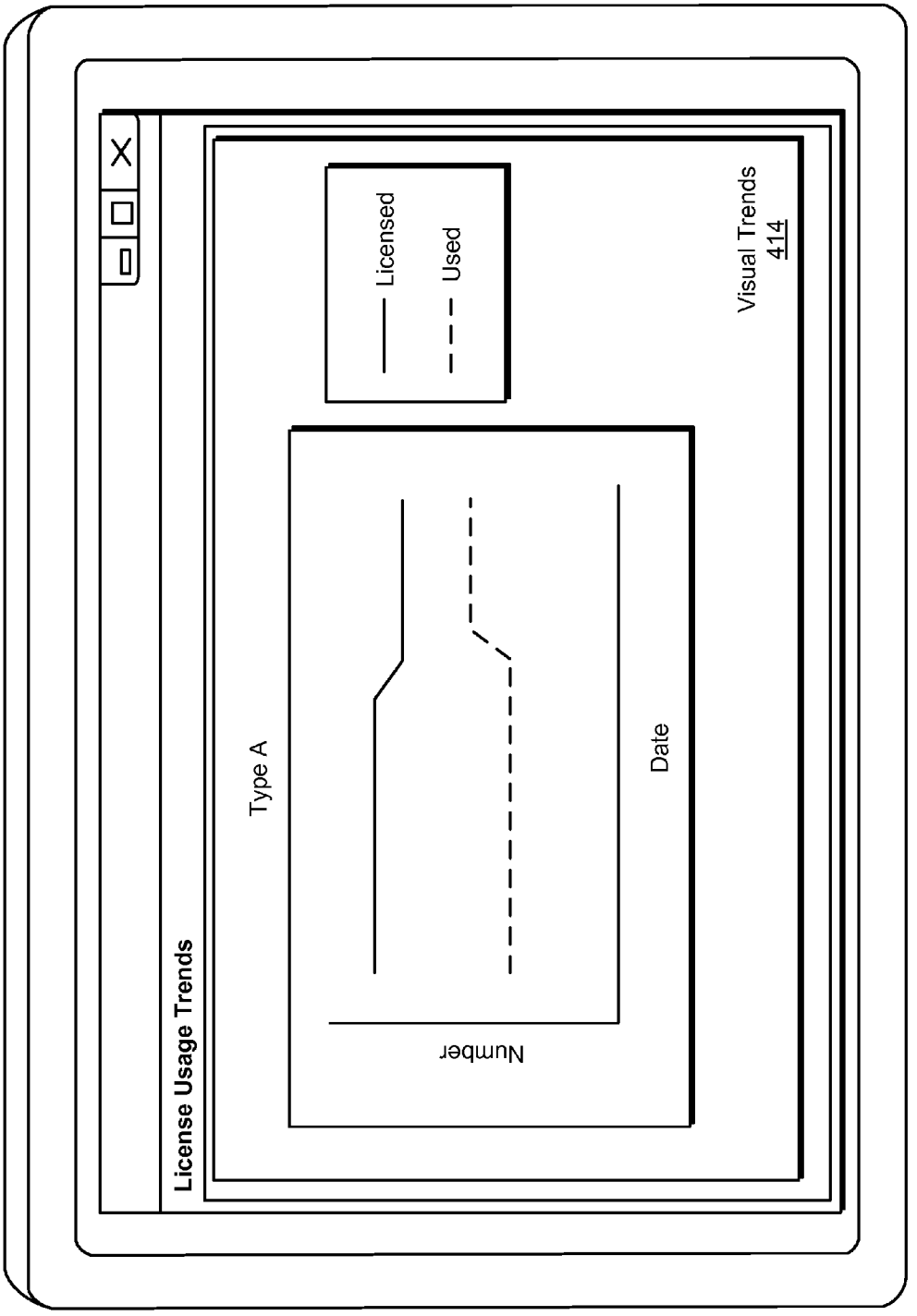

License Usage Trends
Visual Trends
414
Licensed
Used
Type A
Number
Date
130

FIG. 4B

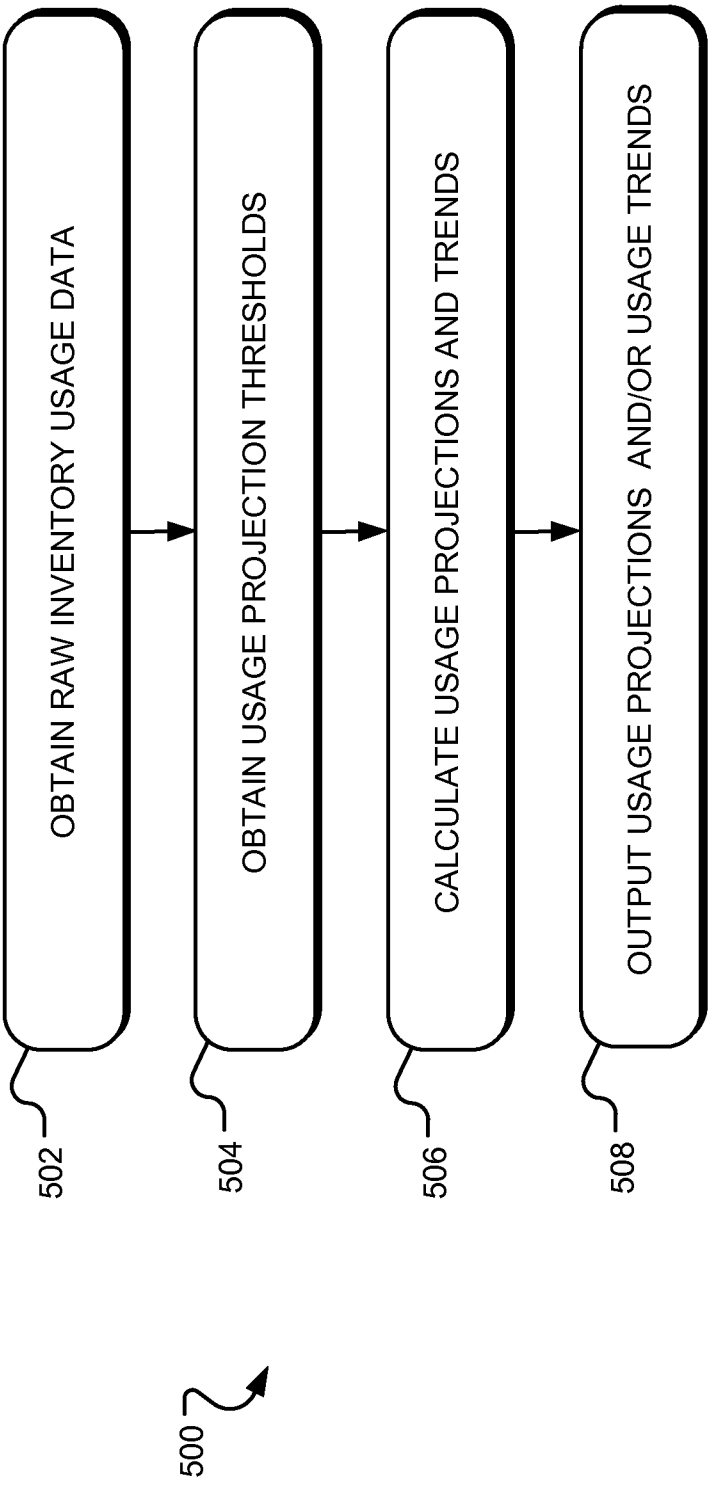

OBTAIN RAW INVENTORY USAGE DATA
OBTAIN USAGE PROJECTION THRESHOLDS
CALCULATE USAGE PROJECTIONS AND TRENDS
OUTPUT USAGE PROJECTIONS AND/OR USAGE TRENDS
502
504
506
508
500

FIG. 5

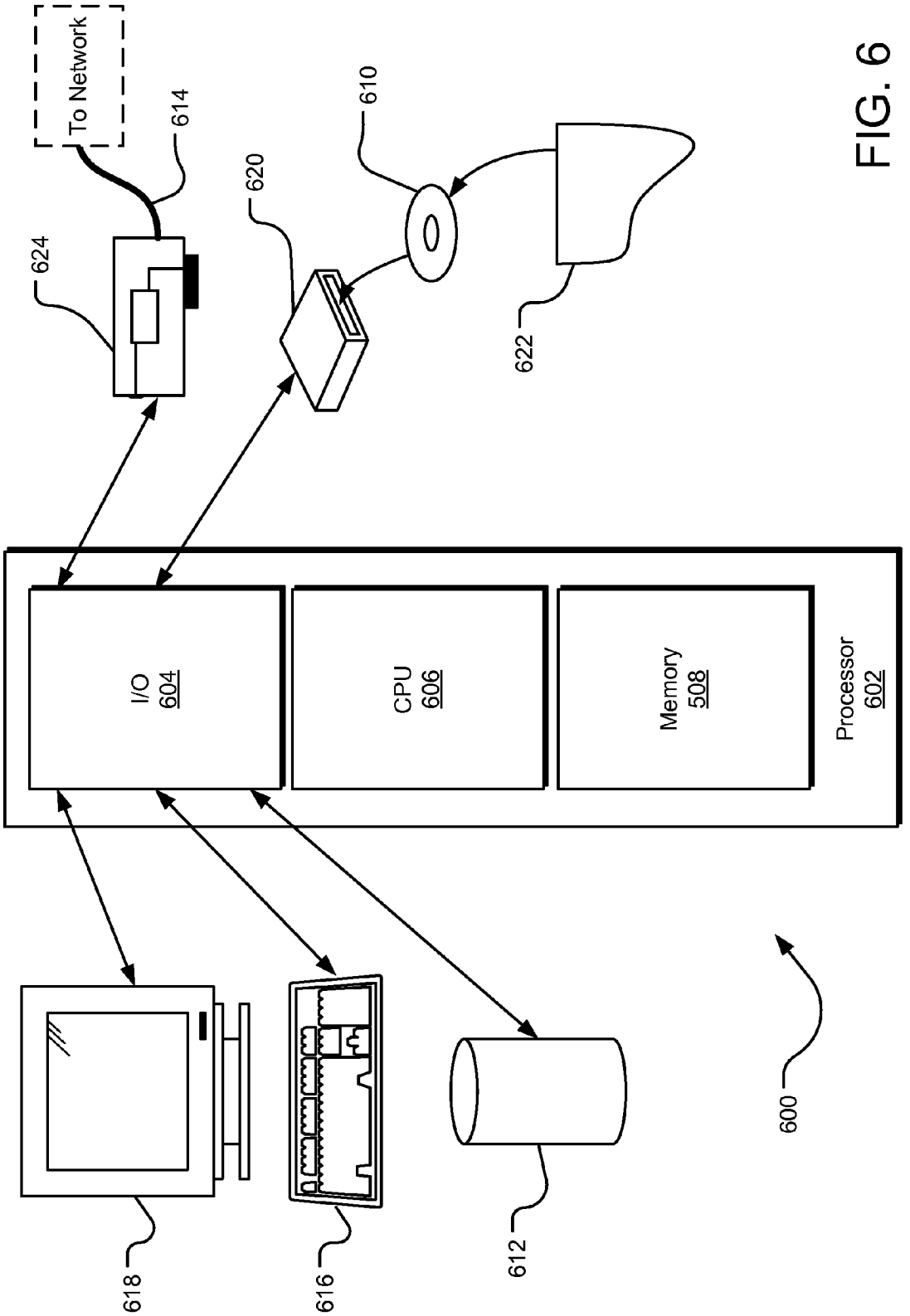

To Network
614
624
620
610
622
I/O
604
CPU
606
Memory
508
Processor
602
618
616
612
600

FIG. 6

SYSTEMS AND METHODS FOR MANAGING INVENTORY USAGE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims benefit under 35 U.S. C. §119(e) to U.S. Provisional Patent Application No. 61/759, 222, entitled "Systems and Methods for Managing Inventory Usage" and filed on Jan. 31, 2013. This application is specifically incorporated by reference in its entirety herein.

TECHNICAL FIELD

[0002] Aspects of the present disclosure relate to the management of inventory, and in particular, systems and methods for managing the usage of inventory and for predicting when available inventory will be consumed.

BACKGROUND

[0003] Many industries obtain, assign, and/or distribute inventory to a large number of customers. For such industries, it is challenging to manage available inventory. For example, it can be difficult to predict when the available inventory will be consumed and more will be needed. In such instances, the inventory may be unavailable when it is needed, resulting in delays and other obstacles in providing inventory to customers.

[0004] In the telecommunications industry, companies often purchase a large amount of licenses from a vendor to be able to assign a license to a customer in connection with the services and/or products provided. However, many vendors provide licenses to a variety of different software, hardware, telephony features, or services to a company. These licenses are frequently assigned to customers at different intervals. For example, licenses to a circuit path into a network for making telephone calls may be assigned more frequently than licenses to a call forwarding feature. Thus, license inventories are used at different rates. Moreover, if some license inventory is depleted, there can be delays in activating a license for a customer, in providing a service or feature to a customer, or in connecting a customer to a communications network.

[0005] Besides the problem of exhausting license inventory, without knowledge of the availability of certain licenses, technicians in the field may not be able to activate certain features during installation resulting in inefficiencies and customer dissatisfaction. For example, when connecting a new customer to a communications network, a field technician generally travels to a customer site to provide installation services, including connecting the customer to the network and providing access to designated software, hardware, features, or services. In doing this, the field technician also needs to assign various licenses to the customer. In some conventional systems, it is often difficult to determine whether a particular license is available until the field technician attempts to assign the license to the customer. If the pool of available licenses from the vendor has been exhausted, the field technician will be unable to complete the installation. As a result, the installation is delayed until: new licenses are purchased from or provided temporarily by the vendor; a permanent license is assigned to the customer; and the field technician returns or remotely completes the installation.

[0006] It is with these observations in mind, among others, that various aspects of the present disclosure were conceived and developed.

SUMMARY

[0007] Implementations described and claimed herein address the foregoing problems by providing systems and methods for managing inventory usage to predict when a pool of available inventory will become exhausted based on past usage trend data. In one implementation, raw usage data is extracted from a first data sample. The first data sample has a first input time, and the raw usage data specifies a total amount of inventory for one or more inventory types. The total amount of inventory is categorized for each of the inventory types into an amount of used inventory and an amount of available inventory. A projected inventory usage for each of the inventory types is generated based on the categorized total amount of inventory. The projected inventory usage defines an availability status of each of the inventory types.

[0008] Other implementations are also described and recited herein. Further, while multiple implementations are disclosed, still other implementations of the presently disclosed technology will become apparent to those skilled in the art from the following detailed description, which shows and describes illustrative implementations of the presently disclosed technology. As will be realized, the presently disclosed technology is capable of modifications in various aspects, all without departing from the spirit and scope of the presently disclosed technology. Accordingly, the drawings and detailed description are to be regarded as illustrative in nature and not limiting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1** is an example system for managing the usage and availability of inventory;

[0010] FIG. **2**A shows an example user interface displaying subscriber license data;

[0011] FIG. **2**B depicts an example user interface displaying group service license data;

[0012] FIG. **2**C shows an example user interface displaying virtual service license data;

[0013] FIG. **2**D illustrates an example user interface displaying user service license data;

[0014] FIG. **2**E shows an example user interface displaying system parameter license data;

[0015] FIG. **2**F shows an example user interface displaying system license data;

[0016] FIG. **3** depicts an example user interface displaying usage projection results;

[0017] FIG. **4**A shows an example user interface displaying usage trend results;

[0018] FIG. **4**B illustrates an example user interface displaying a visual representation of the usage trend results from FIG. **4**A;

[0019] FIG. **5** is a flow chart illustrating example operations for managing inventory; and

[0020] FIG. **6** is an example computing system that may implement various systems and methods discussed herein.

DETAILED DESCRIPTION

[0021] Aspects of the present disclosure involve inventory management and associated systems and methodologies to manage inventory usage to predict when to obtain additional inventory to prevent a pool of available inventory from becoming exhausted. Other aspects involve ascertaining trending usage for a set of inventory for use in business management, for example, to determine whether a particular

product is commercially valuable. In some specific implementations, the system involves the management of licenses required to provide various telecommunications services and to ensure that such licenses are not inadvertently exhausted when such licenses are to be assigned to a customer.

[0022] In one aspect, raw data relating to usage and availability of inventory is obtained. Stated differently, the raw data includes a total amount of inventory, which is separated into an amount of used inventory and an amount of available inventory over a given time period. To manage the pool of available inventory, inventory usage projections are generated using the raw data. The inventory usage projections include a percentage used, an average daily unit usage, and a projected number of days until exhaustion. Usage projection thresholds, such as a percentage of inventory used threshold and a number of days until inventory exhaustion threshold are obtained. The usage projection thresholds are used to generate alerts relating to a projected availability of inventory. For example, if the calculated percentage used exceeds or is projected to exceed the percentage of inventory used threshold, an alert is generated. Similarly, if the projected number of days until exhaustion falls below the number of days until inventory exhaustion threshold, an alert is generated. The alerts indicate when available inventory will be consumed.

[0023] Further, the inventory usage projections may include an estimated unit purchases needed, calculated based on the raw data and the usage projection thresholds. The estimated unit purchases needed conveys the amount of additional inventory needed to remain within the usage projection thresholds. For example, the estimated unit purchases needed shows the amount of additional inventory needed to remain above the number of days until inventory exhaustion threshold and below the percentage of inventory used threshold. The estimated unit purchases needed indicates when to purchase or reallocate inventory to prevent the pool of available inventory from becoming exhausted.

[0024] Inventory usage trends are determined based on the total amount of inventory and the amount of used inventory over regular intervals for a given time period. For example, the inventory usage trends may show the amount of used inventory as compared to the total amount of inventory on a monthly basis for a year. As such, the inventory usage trends may indicate, for example: whether to purchase additional inventory, reallocate inventory, or remove inventory; whether a certain time period has a higher demand; whether a certain product, inventory type, and/or customer is commercially valuable; etc.

[0025] The following description is given in the context of license usage management in the communications industry. Such licenses include, without limitation, licenses to telephony features, trunking licenses, software licenses, hardware licenses, and licenses to other services or functionality. However, it will be appreciated by those of ordinary skill that the presently disclosed technology may be applied in other contexts and/or other industries to manage inventory usage.

[0026] Referring to FIG. **1**, an example inventory management system **100** for managing the usage and availability of licenses is shown. In one implementation, the system **100** includes memory **102**, a processor **120**, and an interface **130**.

[0027] The memory **102** includes raw data **104** and threshold data **106**. In one implementation, the raw data **104** is gathered from network switches, routers, other network devices, and/or vendor software and relates to usage and availability of a license type over a given time period. In other words, the raw data **104** includes a total amount of licenses purchased from a vendor for each license type, which is categorized into an amount of used licenses and an amount of available licenses for each license type for a data sample. Each data sample is input into the memory **102** at an input time. In one implementation, a data sample is automatically input into the memory **102** at regular intervals (e.g., hourly, daily, weekly, monthly, yearly, etc.). In another implementation, a data sample is input manually into the memory **102**. The raw data **104** may be organized according to each data sample (i.e., by input time) and according to license type within each data sample.

[0028] In one implementation, the raw data **104** includes subscriber license data **108**, group service license data **110**, virtual service license data **112**, user service license data **114**, system parameter license data **116**, and system license data **118**. The data **108**, **110**, **112**, **114**, **116**, and **118** may each include information corresponding to different license types, as shown in FIGS. **2**A-**2**F. For example, the subscriber license data **108** may include information relating to one or more license types for subscriber(s), each license type having a total amount of licenses purchased from a vendor, which is separated into an amount of used licenses and/or an amount of available licenses for each data sample.

[0029] The threshold data **106** includes alert data **124** and trend period data **126** used to determine inventory usage projections and inventory usage trends. In one implementation, the alert data **124** includes usage projection thresholds **128** that are used to generate an alert if projected usage and/or availability of a license type fall outside the usage projection threshold. The usage projection thresholds **128** may be automatically set based on past usage trends and/or past usage projections or manually set. For example, if past trends indicate a license type is likely to be consumed faster or have a greater demand, then the usage projection thresholds **128** may be more restrictively set such that an alert is generated earlier relative to other license types. The alerts also indicate when available licenses for the license type are expected to run out. The alert may be, for example, an audible or visual alarm, a message (e.g., an email or push notification), etc. As can be understood from FIGS. **2**A-**4**B, in one particular implementation, projected usage and/or availability is displayed on a user interface in a spreadsheet, and the alerts are visual alarms in the form of highlighting of data falling outside the usage projection thresholds.

[0030] In one implementation, the usage projection thresholds **128** include a percentage used threshold and a time until exhaustion threshold. The percentage used threshold generates an alert for a license type based on a calculated percentage used during a given time period. The calculated percentage used reflects a percentage of a total amount of licenses purchased from a vendor that are used (i.e., assigned to a customer). If the calculated percentage used exceeds or is projected to exceed the percentage used threshold, an alert is generated. The time until exhaustion threshold generates an alert for a license type based on a projected amount of time until the total amount of licenses purchased from a vendor are used, assigned or otherwise exhausted. The time may be any interval, including, but not limited to, days, weeks, months, or years. If the projected number of days until exhaustion falls below the number of days until inventory exhaustion threshold, an alert is generated.

[0031] The trend period data **126** corresponds to one or more data samples, each input into the memory **102** at an

input time. The trend period data **126** is used to set how many data samples to use in calculating projected usage and availability of a license type based on a first data sample having a first input time, a second data sample having a second input time, and any data samples input into the memory **102** between the first input time and the second input time. In one implementation, the first data sample is the earliest data sample in the raw data **104**, and the second data sample is the newest data sample in the raw data **104**. In other implementations, the first data sample is any of the past data samples stored in the memory **102**. The trend period data **126** specifies how many data samples to use in calculations, projections, and/or trends by setting a time interval (e.g., hours, days, weeks, months, years, etc.) since the first input time.

[0032] The processor **120** includes a projection module **122**. In one implementation, the projection modules **122** uses the raw data **104** and/or the threshold data **106** to calculate projected license usage and availability of one or more license types and to determine when to obtain additional licenses. As described with respect to FIGS. **3**-**4**B, the projection license usage may be license usage projections or license usage trends for each license type over the time interval.

[0033] In one implementation, the license usage projections include a percentage used calculation, an average period unit usage calculation, a projected exhaustion time, and an estimated unit purchases needed. The percentage used is calculated based on a percentage of the total amount of licenses purchased that has been assigned to customers or otherwise used. If the calculated percentage used exceeds the percentage used threshold, the projection module **122** generates an alert.

[0034] The average period unit usage for a license type is calculated based on a past usage, current usage, and the trend period data **126**. Stated differently, the projection module **122** calculates the average period unit usage based on: the amount of licenses used in the data samples that were input between the first and second input times (past usage); the amount of licenses used in the second data sample (current usage); and the time elapsed between the first and second input times, as determined from the trend period data **126**. In one implementation, the average period unit usage is proportional to:

$$\frac{(U_C - U_P)}{(t_2 - t_1)},$$

where U_P is the past usage, U_C is the current usage, t_1 is the first input time, and t_2 is the second input time. The average period unit usage may be calculated for any period of time (e.g., an average daily unit usage).

[0035] The projected exhaustion time represents an estimated time (e.g., days) remaining until a pool of available licenses for a license type is exhausted. In one implementation, the projected exhaustion time is calculated based on: the past usage, the current usage, the average period unit usage, and the trend period data **126**. In one implementation, the projected exhaustion time is proportional to:

$$\frac{L_A}{U_{Avg}},$$

where U_{Avg} is the average period unit usage and L_A is the available unassigned licenses. In some implementations, the projection module **122** considers additional factors, such as whether the rate at which installs occur is likely to change for a license type, when the used and available licenses will expire, etc. in determining the projected exhaustion time for the license type.

[0036] The estimated unit purchases needed conveys the amount of additional licenses needed to remain within the usage projection thresholds **128** for a license type. For example, the estimated unit purchases needed shows the amount of additional licenses needed to remain above the time until exhaustion threshold and below the percentage used threshold. The estimated unit purchases needed indicates when to purchase or reallocate licenses to prevent the pool of available licenses for the license type from becoming depleted.

[0037] The projection module **122** calculates the estimated unit purchases needed based on the projected exhaustion time and the average period unit usage. Where the projected exhaust time is sooner than a threshold or desired exhaustion time, the projected exhaustion time is subtracted from the threshold or desired exhaustion time. In one implementation, the estimated unit purchases needed is proportional to: $(U_{Avg} \times (t_T - t_E) + c$, where U_{Avg} is the average period unit usage, t_E is the projected exhaustion time, t_T is the threshold or desired exhaustion time, and c is a padding. Padding may be added to the estimated unit purchases needed to ensure the pool of available licenses for a license type is not exhausted.

[0038] In one implementation, license usage trends are determined based on the total amount of licenses purchased for a license type and the amount of licenses used over the time interval between the first input time and the second input time. For example, the license usage trends **130** may show the amount of used licenses for a license type as compared to the total amount of purchased licenses for that license type on a monthly basis for a year. As such, the license usage trends may indicate whether to purchase additional licenses or reallocate purchased licenses from another source. For example, if a relatively small amount of licenses are needed and another source has consistently unused licenses, the licenses may be reallocated rather than purchased. The license usage trends may further indicate whether installs occur for a license type more frequently during a certain time period (e.g., fall). Additionally, the license usage trends may indicate whether a license type is commercially valuable. For example, if a license type consistently is not assigned during installs, fewer, if any, licenses for that licenses type may be purchased. Other license usage, license availability, and business management information will be apparent from the license usage trends.

[0039] In one particular implementation, the projection module **122** calculates the license usage projections and the license usage trends for each pair of redundant servers in a network, as well as for the network as a whole, for each license type over the time interval. The projection module **122** determines the estimated unit purchases needed for each server pair and for the entire network. The license usage projections and the license usage trends may be used to determine whether to purchase additional licenses for the network as a whole or for a server pair or to reallocate licenses from one server pair to another server pair in the network. Generally, a contract with a vendor to purchase licenses for a license type has a lower purchase price where more licenses are

purchased at one time. As such, often it is more cost effective to purchase licenses for the network as a whole and allocate the licenses to each server pair as needed. If additional licenses are not needed for the network as a whole, licenses may be allocated from one server pair to another such that new licenses do not need to be purchased from the vendor. For example, if one server pair has a flat usage trend for a license type with consistently available licenses, it is likely safe to reallocate the available licenses to another server pair according to the estimated unit purchases needed for that server pair.

[0040] In one implementation, data is input via the interface **130**, and the license usage projections and the license usage trends are output via the interface **130**, for example, for display on a user interface (e.g., a graphical user interface). The displayed projections and trends provide a quick visual cue regarding license usage, availability, trends, and projections. In one implementation, the alerts are displayed on the user interface to provide quick notification of approaching problems.

[0041] FIGS. **2**A-**2**F show the interface **130** displaying the raw data **104**. As shown, the interface **130** displays the raw data **104**, for example, as a spreadsheet. In one implementation, the raw data **104** includes a total amount of licenses (e.g., purchased from a vendor), which is categorized for each license type into an amount of used licenses and an amount of available licenses. The raw data **104** may be further categorized based on an input time of the data sample, an expiration date for the licenses, an amount used by a particular group or type of user (e.g., a hosted user or trunk user), or the like.

[0042] Turning to FIG. **2**A, the interface **130** displays the subscriber license data **108**. In one implementation, the subscriber license data **108** includes data organized by a subscriber license type **200**, which may be, for example, a user license type or a group license type. For each of the subscriber license types **200**, a total amount of licenses **202** is shown, which is categorized into an amount of licenses used **204**, and an amount of licenses available **206** is displayed. In one implementation, where the amount of total licenses **202** is unlimited, the amount of licenses available **206** is similarly shown as unlimited, regardless of the amount of licenses used **204**.

[0043] As can be understood from FIG. **2**B, the interface **130** displays the group service license data **110**. In one implementation, the license types corresponding to the group service license data **110** are reflected by a group name **208**, which may be, for example, a specified licensed group or a licensed group feature or service. In one implementation, the group features or services may include, without limitation, custom ringback, instant conferencing, authorization codes, standard group services, premium group services, and the like. For each of the group names **208**, the total amount of licenses **202** is shown, which is categorized into the amount of licenses used **204**, and the amount of licenses available **206** is displayed. In one implementation, where the amount of total licenses **202** is unlimited, the amount of licenses available **206** is similarly shown as unlimited, regardless of the amount of licenses used **204**.

[0044] FIG. **2**C shows the virtual service license data **112** on the interface **130**. In one implementation, the license types corresponding to the virtual service license data **112** are reflected by a virtual name **210**, which may be, for example, a specified licensed group or a licensed group feature or service. In one implementation, the group features or services may include, without limitation, virtual services, including, for example, auto attendant, call center, instant group call, trunk group, and the like. For each of the virtual names **210**, the total amount of licenses **202** is shown, which is categorized into the amount of licenses used **204**, and the amount of licenses available **206** is displayed. In one implementation, where the amount of total licenses **202** is unlimited, the amount of licenses available **206** is similarly shown as unlimited, regardless of the amount of licenses used **204**.

[0045] Referring to FIG. **2**D, the user service license data **114** is shown on the interface **130**. In one implementation, the license types corresponding to the user service license data **114** are reflected by a user name **212**, which may be, for example, a specified licensed user or a licensed user feature or service. In one implementation, the user features or services may include, without limitation, base user services, business line user services, standard user services, personal mobility user services, premium user services, and particular features, such as: assistant, automatic hold/retrieve, communicator, receptionist services, call notify, call center, calling line, custom ringback, external custom ringback, fax messaging, messaging, mobility, video add-on, and the like. For each of the user names **212**, the total amount of licenses **202** is shown, which is categorized into the amount of licenses used **204**, and the amount of licenses available **206** is displayed. In one implementation, where the amount of total licenses **202** is unlimited, the amount of licenses available **206** is similarly shown as unlimited, regardless of the amount of licenses used **204**.

[0046] As can be understood from FIG. **2**E, the system parameter license data **116** is shown on the interface **130**. In one implementation, the license types corresponding to the system parameter license data **116** are reflected by a parameter name **214**, which may be, for example, a specified system parameter. In one implementation, the parameters may include, without limitation, trunking call capacity, trunking busting call capacity, and the like. For each of the parameter names **214**, the total amount of licenses **202** is shown, which is categorized into the amount of licenses used **204**, and the amount of licenses available **206** is displayed. In one implementation, where the amount of total licenses **202** is unlimited, the amount of licenses available **206** is similarly shown as unlimited, regardless of the amount of licenses used **204**.

[0047] FIG. **2**F displays the system license data **118** on the interface **130**. In one implementation, the license types corresponding to the system license data **118** are reflected by a system name **216**, which may be, for example, a specified system feature or service. In one implementation, the system features or services may include, without limitation enterprise voice portal, lawful interfacept event monitoring, lawful intercept media monitoring, network-wide messaging, Session Initiation Protocol (SIP) running on Transmission Control Protocol (TCP), Service packs, SH interface, and the like. For each of the system names **216**, the total amount of licenses **202** is shown, which is categorized into the amount of licenses used **204**, and the amount of licenses available **206** is displayed. In one implementation, where the amount of total licenses **202** is unlimited, the amount of licenses available **206** is similarly shown as unlimited, regardless of the amount of licenses used **204**.

[0048] FIG. **3** depicts the interface **130** displaying the license usage projections, separated into a daily license usage projection **300** and a total license usage projection **302**. In one implementation, the daily license usage projections **300** are organized by data sample and further organized by license

type. For example, a data sample input on a date may be organized according to each of the following license types: base licenses, business line licenses, standard licenses, mobility licenses, premium licenses, call notify licenses, and messaging licenses.

[0049] The usage projection thresholds **138** may be shown on the interface **130** to permit adjustment of the various usage projection thresholds **138** in calculating the daily license usage projections **300** and/or the total license usage projections **302**. For example, the usage projection thresholds **138** may include a percent used threshold **304** and a projected time to exhaust threshold **306**, as described herein. The usage projection thresholds **138** may further include a data periods control **308** to set trend data periods.

[0050] For each license type, the interface **130** displays a name **310** and a total amount of licenses **312**, which is categorized into an amount of licenses used **314** and an amount of licenses available **316**. The daily license usage projections **300** includes the projected license usage calculated for one or more of the license types, as described herein. In one implementation, the interface **130** displays at least one of: a percentage used calculation **318**, an average period unit usage calculation **320**, an estimation of large funnel needs calculation **322**, a projected exhaustion time calculation **324**, and an estimated unit purchases required calculation **326**. In one implementation, the daily license usage projections **300** are displayed for each server pair.

[0051] The total license usage projections **302** for the network as a whole are additionally calculated for the data sample and displayed by license type. In one implementation, the license types for the total license usage projections **302** may include, without limitation, business line, standard services, personal mobility, premium services, or the like. As shown in FIG. **3**, the total license usage projections **302** for the network as a whole may include, for example, a total amount of licenses **330**, an amount of used licenses **332**, an amount of available licenses **334**, and amount over **336** the total licenses **330**.

[0052] FIG. **4**A shows the user interface **130** displaying license usage trends **402** for a given period **400** from a start period **404** to an end period **406**. In one implementation, the license usage trends **402** are organized by input date **408** and license type. For each license type and input date **408**, a total amount of licenses **410** and an amount of licenses used **412** is shown. The start period **404** and the end period **406** may be set to compute the license usage trends **402** over a plurality of input times. In one implementation, the license types include, without limitation, Concurrent Call Path (CCP) services, business lines, standard services, mobility services, premium services, messaging services, and the like.

[0053] FIG. **4**B illustrates a visual representation **414** of the license usage trends **402** from FIG. **4**A. In one implementation, as shown in FIG. **4**B, the visual representation **414** is presented as a graph for each license type. The total amount of licenses **410** and the amount of licenses used **412** are each shown from the start period **404** to the end period **406**. The visual representation **414** provides a quick visual cue regarding license usage and availability.

[0054] FIG. **5** is a flow chart illustrating example operations **500** for managing inventory. In one implementation, an obtaining operation **502** obtains raw data relating to usage and availability of inventory over a given time. The raw data includes a total amount of inventory, which is separated into an amount of used inventory and an amount of available inventory for one or more data samples each having an input time.

[0055] A second obtaining operation **504** obtains usage projection thresholds, such as a percentage of inventory used threshold and a number of days until inventory exhaustion threshold. The usage projection thresholds are used to generate alerts relating to a projected availability of inventory. For example, if the calculated percentage used exceeds or is projected to exceed the percentage of inventory used threshold, an alert is generated. Similarly, if the projected number of days until exhaustion falls below the number of days until inventory exhaustion threshold, an alert is generated. The alerts indicate when available inventory will be depleted.

[0056] A calculating operation **506** calculates inventory usage projections and trends using the raw usage data. In one implementation, the inventory usage projections include a percentage used, an average daily unit usage, and a projected number of days until exhaustion. Further, the inventory usage projections may include an estimated unit purchases needed, calculated based on the raw data and the usage projection thresholds. The estimated unit purchases needed conveys the amount of additional inventory needed to remain within the usage projection thresholds. For example, the estimated unit purchases needed shows the amount of additional inventory needed to remain above the number of days until inventory exhaustion threshold and below the percentage of inventory used threshold. The estimated unit purchases needed indicates when to purchase or reallocate inventory to prevent the pool of available inventory from becoming depleted when needed for assigning to a customer.

[0057] The calculating operation **506** determines Inventory usage trends based on the total amount of inventory and the amount of used inventory over regular intervals for a given time period. For example, the inventory usage trends may show the amount of used inventory as compared to the total amount of inventory on a monthly basis for a year. As such, the inventory usage trends may indicate, for example: whether to purchase additional inventory, reallocate inventory, or remove inventory; whether a certain time period has a higher demand; whether a certain product, inventory type, and/or customer is commercially valuable; etc. An outputting operation **508** outputs the inventory usage projections and/or trends. In one implementation, the outputting operation displays the projections and/or trends on a user interface.

[0058] Referring to FIG. **6**, a general purpose computer system **600** is capable of executing a computer program product to execute a computer process. Data and program files may be input to the computer system **600**, which reads the files and executes the programs therein. Some of the elements of the general purpose computer system **600** are shown in FIG. **6**, wherein a processor **602** is shown having an input/output (I/O) section **604**, a Central Processing Unit (CPU) **606**, and memory **608**.

[0059] There may be one or more processors **602**, such that the processor **602** of the computer system **600** comprises the CPU **606** or a plurality of processing units, commonly referred to as a parallel processing environment. The computer system **600** may be a conventional computer, a distributed computer, or any other type of computer, such as one or more external computers made available via a network architecture, for example as described with respect to FIG. **5**. The presently described technology is optionally implemented in software devices loaded in the memory **608**, stored on a

configured DVD/CD-ROM **610** or a storage unit **612**, and/or communicated via a wired or wireless network link **614** on a carrier signal, thereby transforming the computer system **600** in FIG. **6** to a special purpose machine for implementing the operations described herein.

[0060] The I/O section **604** is connected to one or more user-interface devices (e.g., a keyboard **616** and a display unit **618**), the storage unit **612**, and a disk drive **620**. In one implementation, the disk drive **620** is a DVD/CD-ROM drive unit capable of reading the DVD/CD-ROM **610**, which typically contains programs and data **622**. In another implementation, the disk drive **620** is a solid state drive unit.

[0061] Computer program products containing mechanisms to effectuate the systems and methods in accordance with the presently described technology may reside in the memory **604**, on the storage unit **612**, on the DVD/CD-ROM **610** of the computer system **600**, or on external storage devices made available via a network architecture with such computer program products, including one or more database management products, web server products, application server products, and/or other additional software components. Alternatively, the disk drive **620** may be replaced or supplemented by a floppy drive unit, a tape drive unit, or other storage medium drive unit. The network adapter **624** is capable of connecting the computer system **600** to a network via the network link **614**, through which the computer system **600** can receive instructions and data embodied in a carrier wave. An example of such systems is personal computers. It should be understood that computing systems may also embody devices such as Personal Digital Assistants (PDAs), mobile phones, tablets or slates, multimedia consoles, gaming consoles, set top boxes, etc.

[0062] When used in a LAN-networking environment, the computer system **600** is connected (by wired connection or wirelessly) to a local network through the network interface or adapter **624**, which is one type of communications device. When used in a WAN-networking environment, the computer system **600** typically includes a modem, a network adapter, or any other type of communications device for establishing communications over the wide area network. In a networked environment, program modules depicted relative to the computer system **600** or portions thereof, may be stored in a remote memory storage device. It is appreciated that the network connections shown are examples of communications devices for and other means of establishing a communications link between the computers may be used.

[0063] In an example implementation, inventory usage management software and other modules and services may be embodied by instructions stored on such storage systems and executed by the processor **602**. Some or all of the operations described herein may be performed by the processor **602**. Further, local computing systems, remote data sources and/or services, and other associated logic represent firmware, hardware, and/or software configured to control data access. Such services may be implemented using a general purpose computer and specialized software (such as a server executing service software), a special purpose computing system and specialized software (such as a mobile device or network appliance executing service software), or other computing configurations. In addition, one or more functionalities of the systems and methods disclosed herein may be generated by the processor **602** and a user may interact with a Graphical User Interface (GUI) using one or more user-interface devices (e.g., the keyboard **616**, the display unit **618**, and the user devices **604**) with some of the data in use directly coming from online sources and data stores.

[0064] In the present disclosure, the methods disclosed may be implemented as sets of instructions or software readable by a device. Further, it is understood that the specific order or hierarchy of steps in the methods disclosed are instances of example approaches. Based upon design preferences, it is understood that the specific order or hierarchy of steps in the method can be rearranged while remaining within the disclosed subject matter. The accompanying method claims present elements of the various steps in a sample order, and are not necessarily meant to be limited to the specific order or hierarchy presented.

[0065] The described disclosure may be provided as a computer program product, or software, that may include a machine-readable medium having stored thereon instructions, which may be used to program a computer system (or other electronic devices) to perform a process according to the present disclosure. A machine-readable medium includes any mechanism for storing information in a form (e.g., software, processing application) readable by a machine (e.g., a computer). The machine-readable medium may include, but is not limited to, magnetic storage medium (e.g., floppy diskette), optical storage medium (e.g., CD-ROM); magneto-optical storage medium, read only memory (ROM); random access memory (RAM); erasable programmable memory (e.g., EPROM and EEPROM); flash memory; or other types of medium suitable for storing electronic instructions.

[0066] The description above includes example systems, methods, techniques, instruction sequences, and/or computer program products that embody techniques of the present disclosure. However, it is understood that the described disclosure may be practiced without these specific details.

[0067] It is believed that the present disclosure and many of its attendant advantages will be understood by the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the components without departing from the disclosed subject matter or without sacrificing all of its material advantages.

[0068] While the present disclosure has been described with reference to various embodiments, it will be understood that these embodiments are illustrative and that the scope of the disclosure is not limited to them. Many variations, modifications, additions, and improvements are possible. More generally, embodiments in accordance with the present disclosure have been described in the context of particular implementations. Functionality may be separated or combined in blocks differently in various embodiments of the disclosure or described with different terminology.

What is claimed is:

1. A method for managing inventory, the method comprising:

extracting raw usage data from a first data sample having a first input time, the raw usage data specifying a total amount of inventory for one or more inventory types;

categorizing the total amount of inventory for each of the inventory types into an amount of used inventory and an amount of available inventory; and

generating a projected inventory usage for each of the inventory types using a processor based on the categorized total amount of inventory, the projected inventory usage defining an availability status of each of the inventory types.

2. The method of claim 1, wherein the inventory is a pool of licenses.

3. The method of claim 2, wherein the pool of licenses includes at least one of: software licenses; telecommunications service licenses; telecommunications feature licenses; system licenses; network licenses; computing licenses; subscriber licenses; or service licenses.

4. The method of claim 1, wherein the first data sample is gathered from a computing device.

5. The method of claim 4, wherein the computing device is at least one of: one or more network switches; one or more routers; or vendor software.

6. The method of claim 1, further comprising:

outputting the projected inventory usage for display on a graphical user interface.

7. The method of claim 1, wherein the projected inventory usage includes a percentage used generated based on a ratio of the amount of used inventory to the total amount of inventory.

8. The method of claim 1, wherein the raw usage data is further extracted from a second data sample having a second input time.

9. The method of claim 8, wherein the projected inventory usage includes an average period unit usage generated based on a ratio of a difference between a past usage and a current usage to a time elapsed between the first and second input times, the past usage determined based on the amount of used inventory between the first and second input times, the current usage determined based on the amount of used inventory corresponding to the second input time.

10. The method of claim 9, wherein the projected inventory usage includes a projected exhaustion time representing an estimated time until the total amount of inventory for each of the inventory types is exhausted, the projected exhaustion time generated based on a ratio of the amount of available inventory to the average period unit usage.

11. The method of claim 10, wherein the projected inventory usage includes an estimated unit purchases needed generated based on the projected exhaustion time and the average period unit usage.

12. The method of claim 8, wherein the projected inventory usage includes inventory usage trends determined based on the total amount of inventory and the amount of used inventory over a time interval from the first input time to the second input time.

13. The method of claim 1, further comprising:

generating an alert if the projected inventory usage falls outside a usage projection threshold.

14. The method of claim 13, wherein the usage projection threshold includes a percentage used threshold and the projected inventory usage includes a percentage used generated based on a ratio of the amount of used inventory to the total amount of inventory, the alert being generated where the percentage used exceeds the percentage used threshold.

15. The method of claim 13, wherein the usage projection threshold includes a time until exhaustion threshold and the projected inventory usage includes a projected exhaustion time, the alert being generated where the projected exhaustion time is below the time until exhaustion threshold.

16. One or more non-transitory tangible computer-readable storage media storing computer-executable instructions for performing a computer process on a computing system, the computer process comprising:

extracting raw usage data from a first data sample having a first input time, the raw usage data specifying a total amount of inventory for one or more inventory types;

categorizing the total amount of inventory for each of the inventory types into an amount of used inventory and an amount of available inventory; and

generating a projected inventory usage for each of the inventory types based on the categorized total amount of inventory, the projected inventory usage defining an availability status of each of the inventory types.

17. The one or more non-transitory tangible computer-readable storage media of claim 16, wherein the raw usage data is further extracted from a second data sample having a second input time, the projected inventory usage including an average period unit usage generated based on a ratio of a difference between a past usage and a current usage to a time elapsed between the first and second input times, the past usage determined based on the amount of used inventory between the first and second input times, the current usage determined based on the amount of used inventory corresponding to the second input time.

18. A system for managing inventory, the system comprising:

a projection module executable by a processor and configured to generate a projected inventory usage defining an availability status of one or more inventory types, the projected inventory usage generated based on a categorized total amount of inventory included in raw usage data extracted from one or more data samples each having an input time, the total amount of inventory for each of the inventory types categorized into an amount of used inventory and an amount of available inventory.

19. The system of claim 18, wherein the one or more inventory types include license types.

20. The system of claim 18, wherein the one or more data samples are gathered from at least one of: one or more network switches; one or more routers; or vendor software.

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