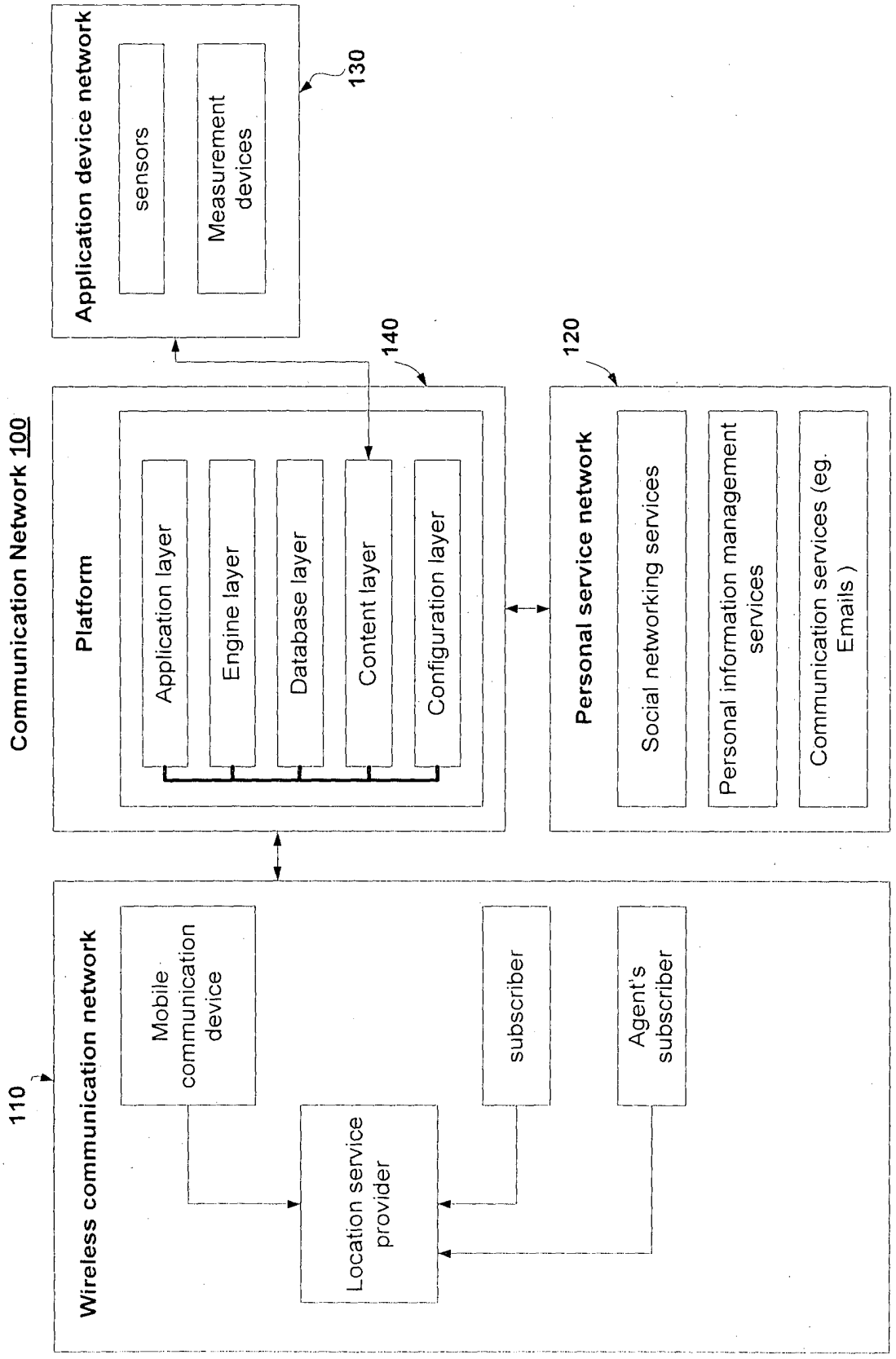

Communication Network 100
Application device network
sensors
Measurement devices
130
140
120
Platform
Application layer
Engine layer
Database layer
Content layer
Configuration layer
Personal service network
Social networking services
Personal information management services
Communication services (eg. Emails)
110
Wireless communication network
Mobile communication device
subscriber
Agent's subscriber
Location service provider

Fig 1

Exemplary architecture of platform

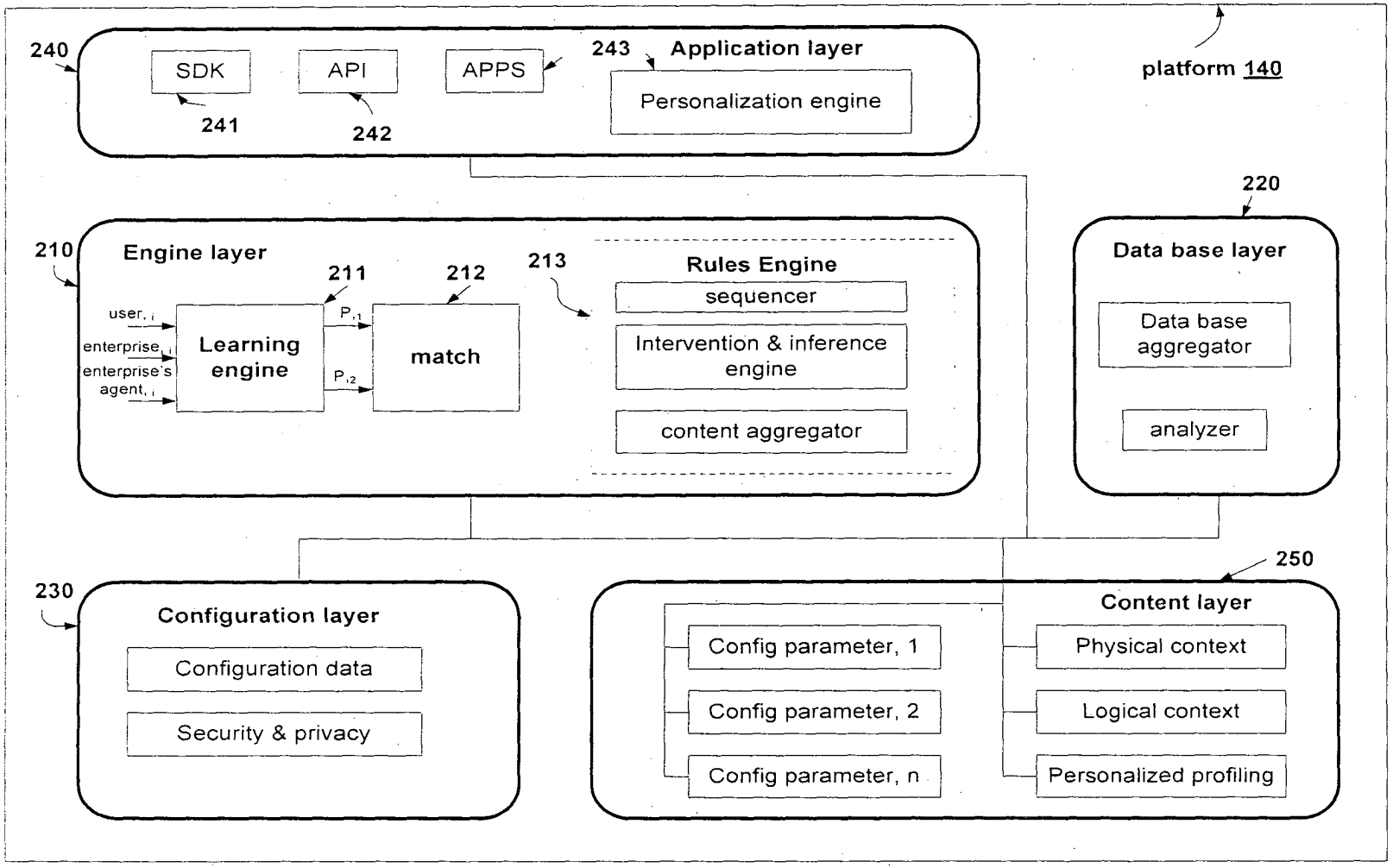


Fig 2

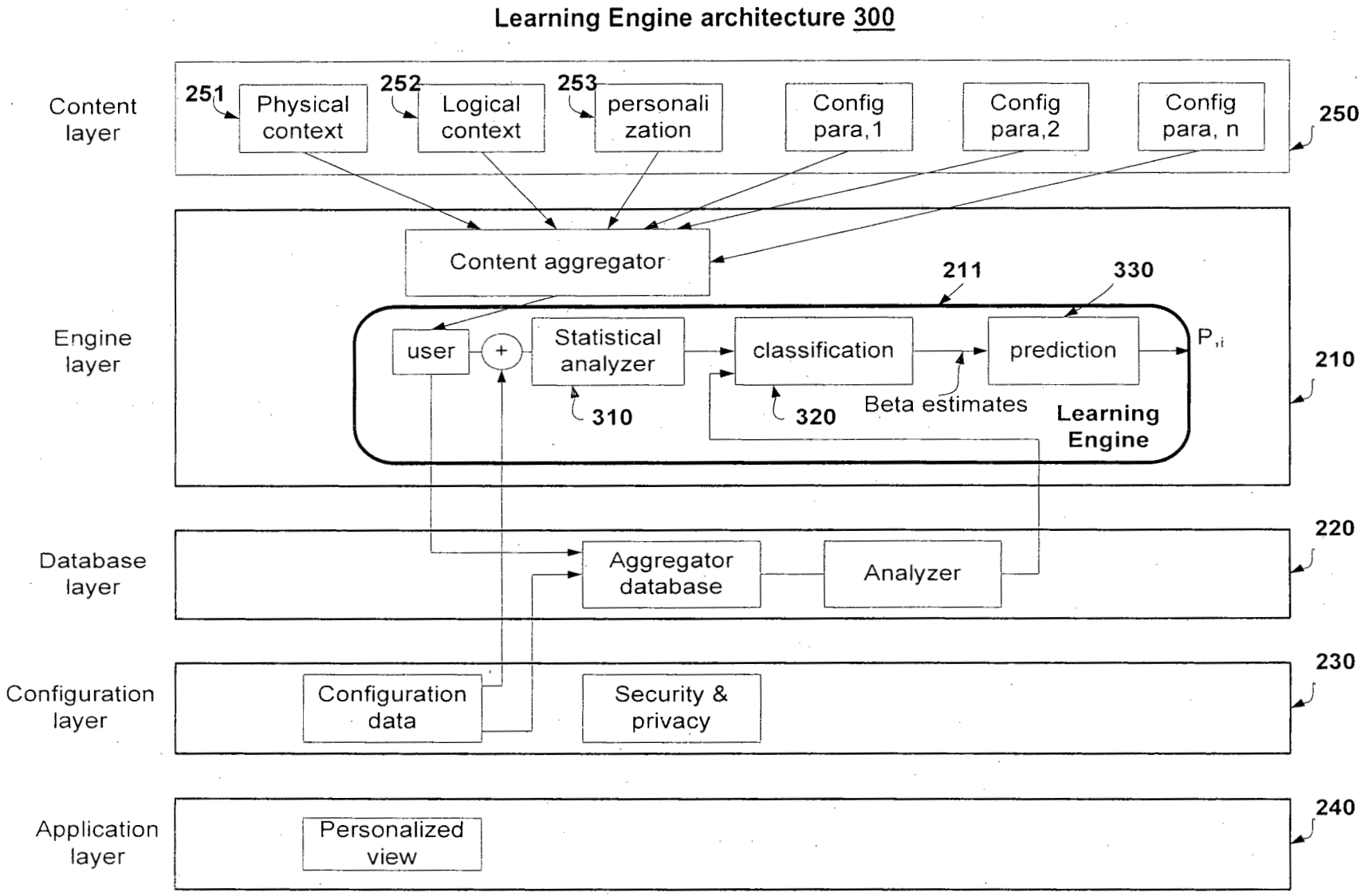

Learning Engine architecture 300
Content layer
Engine layer
Database layer
Configuration layer
Application layer
251
Physical context
252
Logical context
253
personalization
Config para,1
Config para,2
Config para, n
250
Content aggregator
211
330
user
+
Statistical analyzer
classification
prediction
$P_{,i}$
210
310
320
Beta estimates
Learning Engine
220
Aggregator database
Analyzer
230
Configuration data
Security & privacy
240
Personalized view

Fig 3

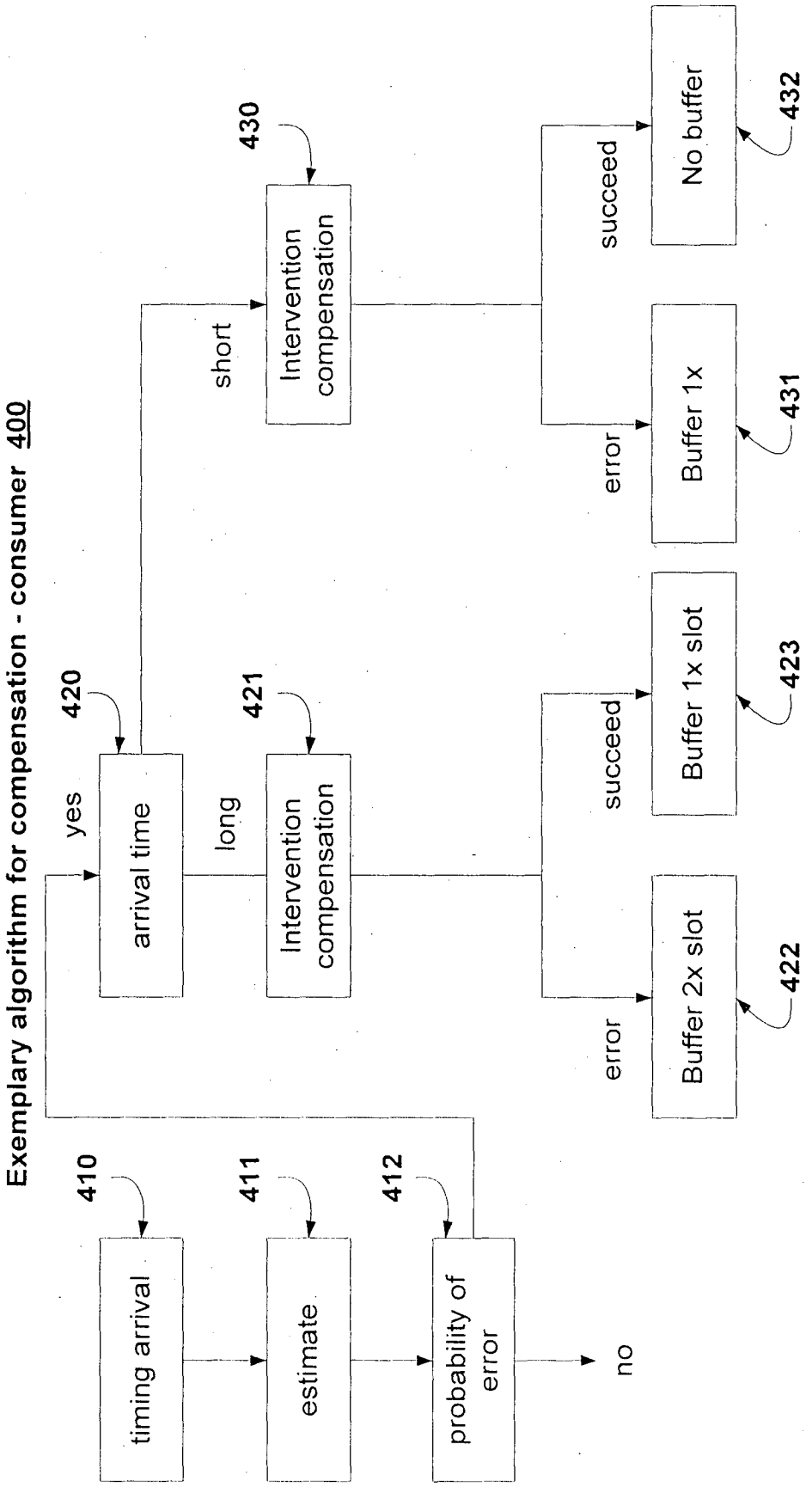

Exemplary algorithm for compensation - consumer 400
timing arrival
410
estimate
411
probability of error
412
no
yes
arrival time
420
long
Intervention compensation
421
short
Intervention compensation
430
succeed
Buffer 2x slot
422
error
succeed
Buffer 1x slot
423
error
Buffer 1x
431
succeed
No buffer
432

Fig 4

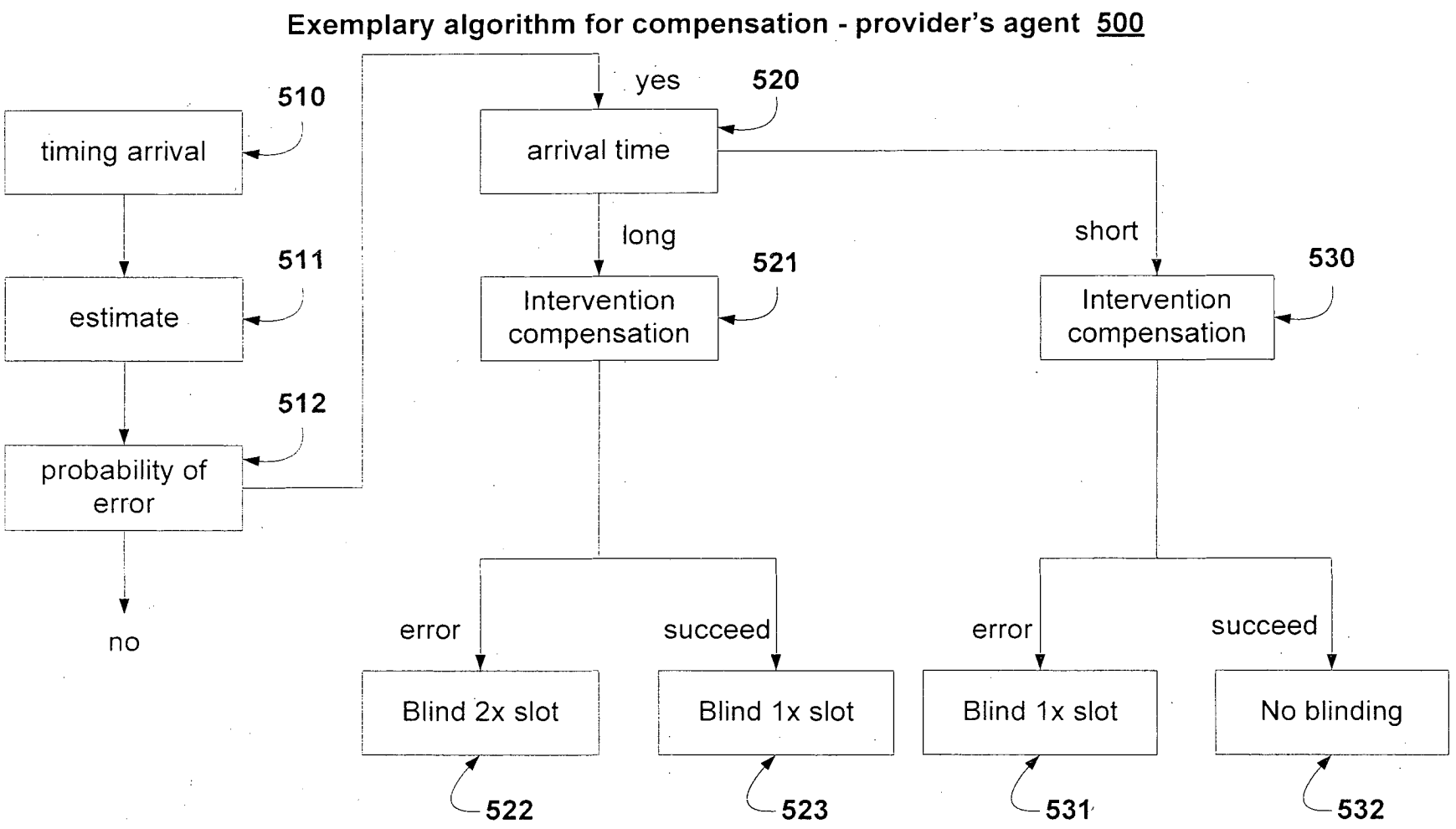

Exemplary algorithm for compensation - provider's agent 500
timing arrival
510
estimate
511
probability of error
512
no
yes
arrival time
520
long
Intervention compensation
521
error
succeed
Blind 2x slot
Blind 1x slot
522
523
short
Intervention compensation
530
error
succeed
Blind 1x slot
No blinding
531
532

Fig 5

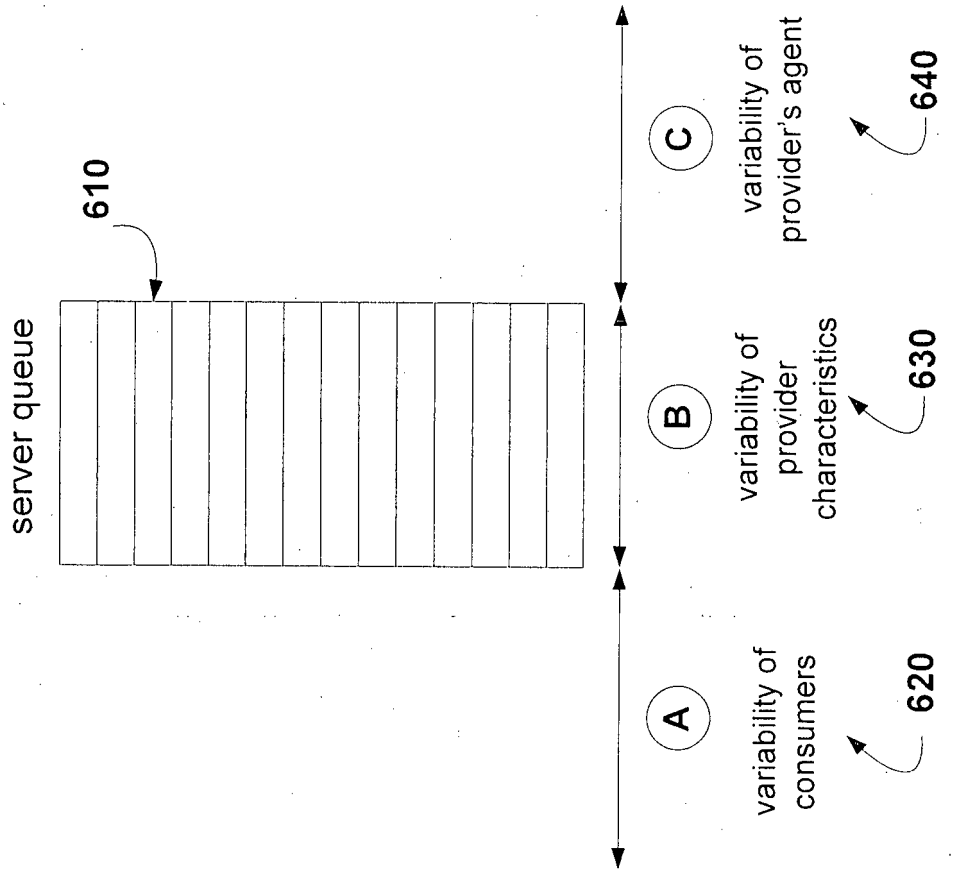

server queue
610
A
variability of consumers
620
B
variability of provider characteristics
630
C
variability of provider's agent
640

Fig 6

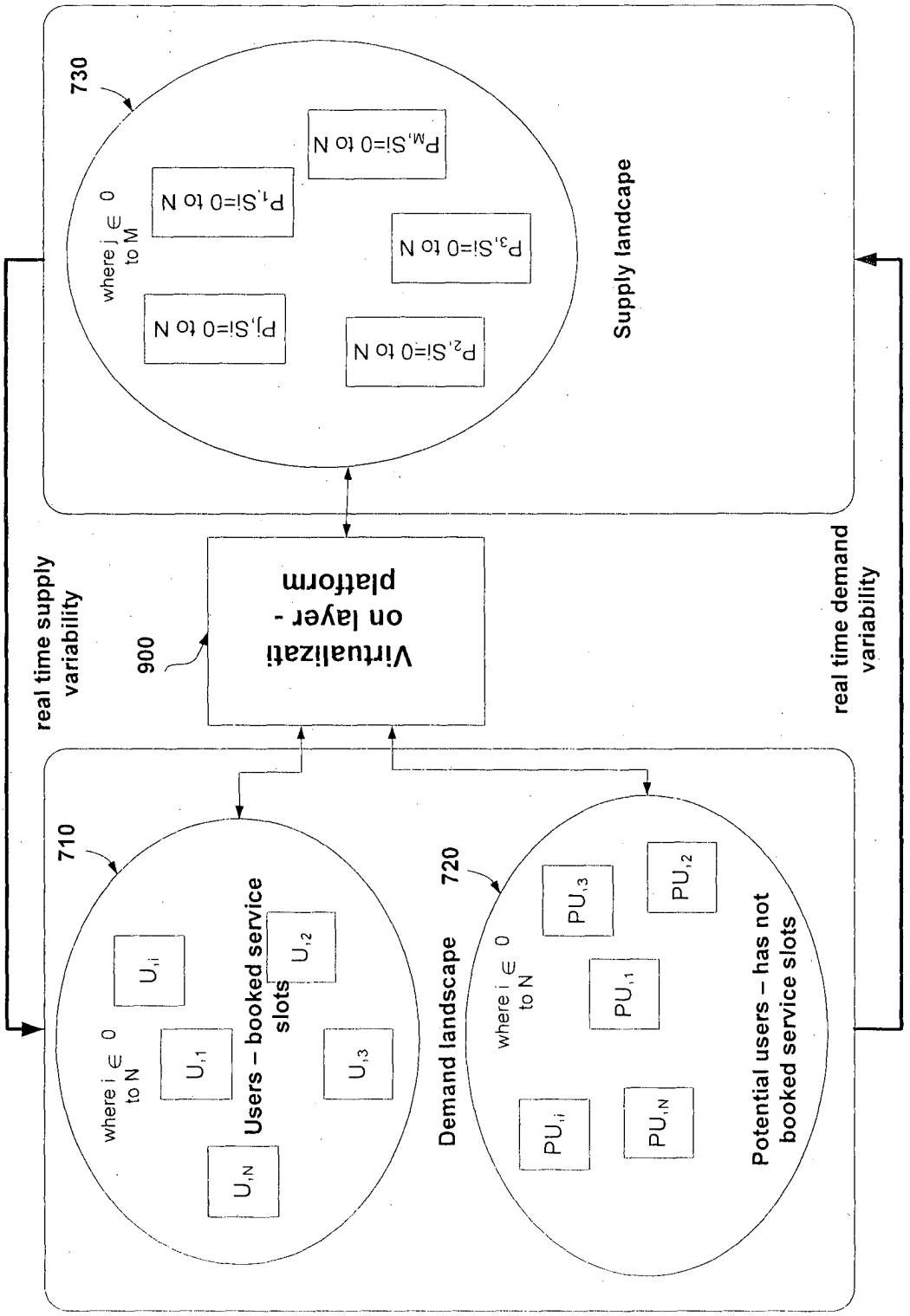

730
where j ∈ 0 to M
P1, Si=0 to N
P2, Si=0 to N
P3, Si=0 to N
Pj, Si=0 to N
PM, Si=0 to N
Supply landcape
real time supply variability
900
Virtualizati on layer - platform
real time demand variability
710
where i ∈ 0 to N
Ui,i
Ui,1
Ui,2
Ui,3
Ui,N
Users – booked service slots
720
Demand landscape
where i ∈ 0 to N
PUi,i
PUi,1
PUi,2
PUi,3
PUi,N
Potential users – has not booked service slots

Fig 7

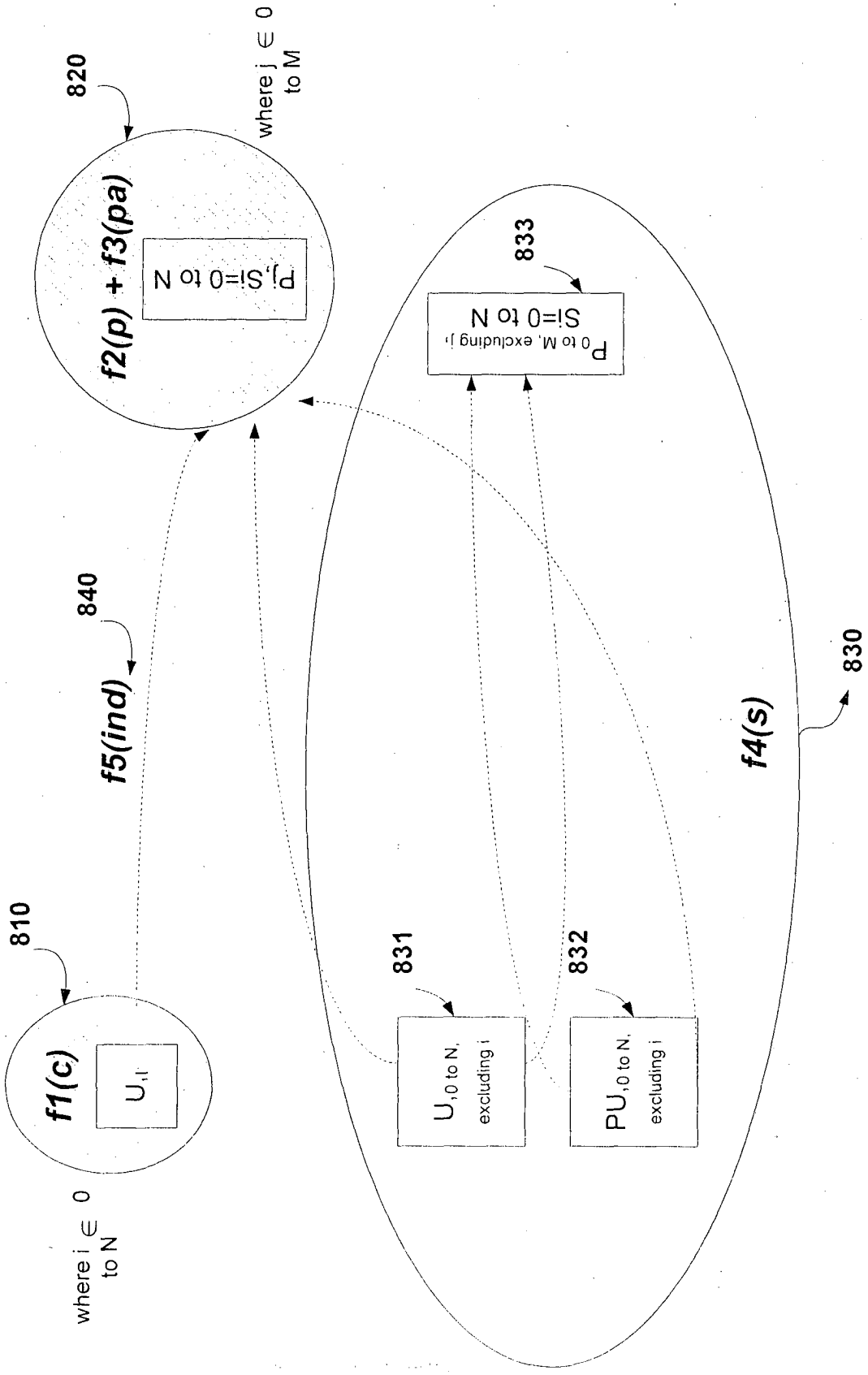

820
where j ∈ 0 to M
f2(p) + f3(pa)
Pj,Si=0 to N
833
P0 to M, excluding j,
Si=0 to N
840
f5(ind)
830
f4(s)
810
f1(c)
Ui,I
831
U,0 to N, excluding i
832
PU,0 to N, excluding i
where i ∈ 0 to N

Fig 8

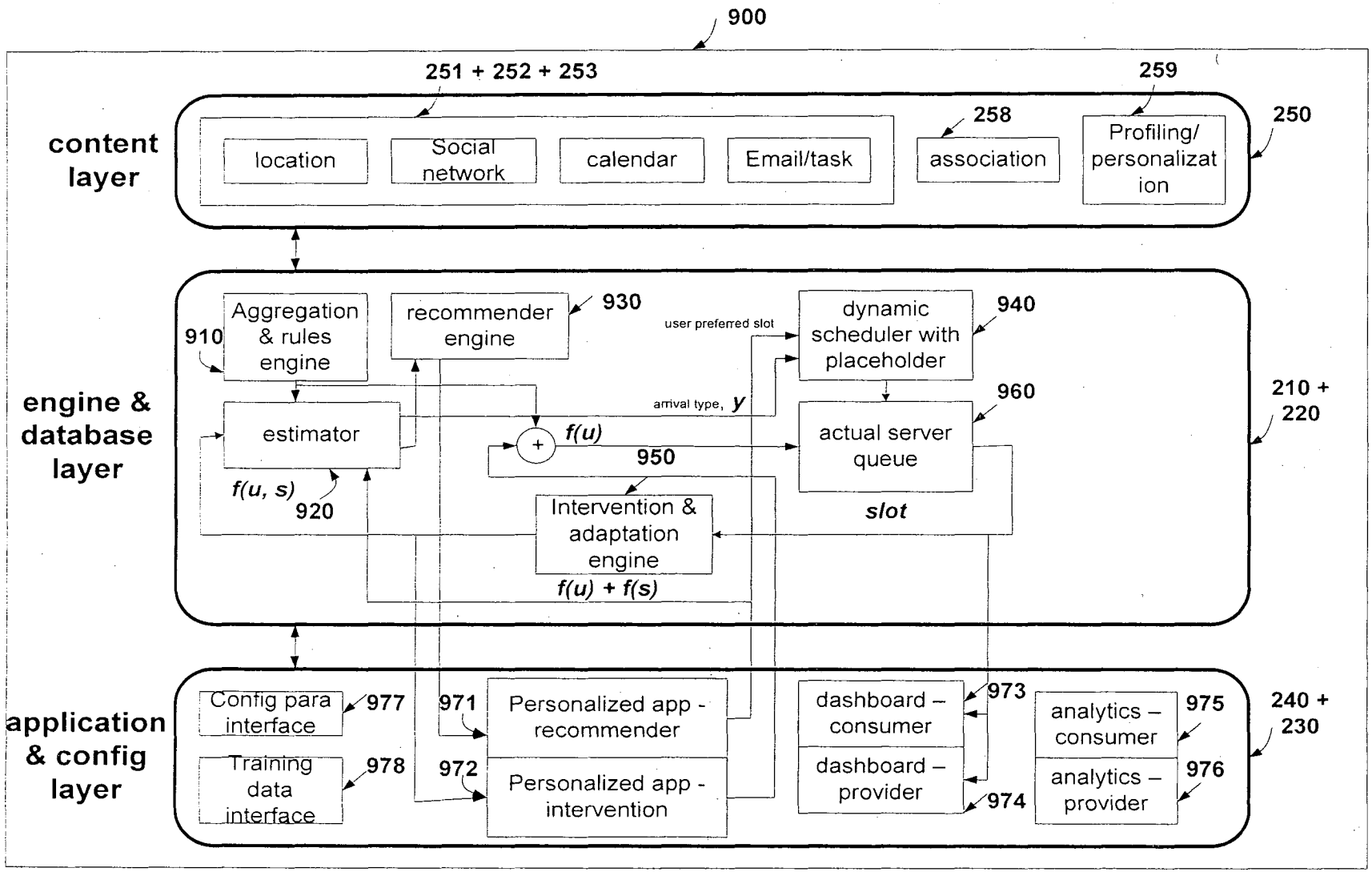

900
251 + 252 + 253
259
content layer
location
Social network
calendar
Email/task
258
association
Profiling/ personalizat ion
250
engine & database layer
910
Aggregation & rules engine
recommender engine
930
user preferred slot
dynamic scheduler with placeholder
940
arrival type, y
960
estimator
f(u)
950
actual server queue
210 + 220
f(u, s)
920
Intervention & adaptation engine
slot
f(u) + f(s)
application & config layer
Config para interface
977
971
Personalized app - recommender
dashboard – consumer
973
analytics – consumer
975
240 + 230
Training data interface
978
972
Personalized app - intervention
dashboard – provider
974
analytics – provider
976

Fig 9

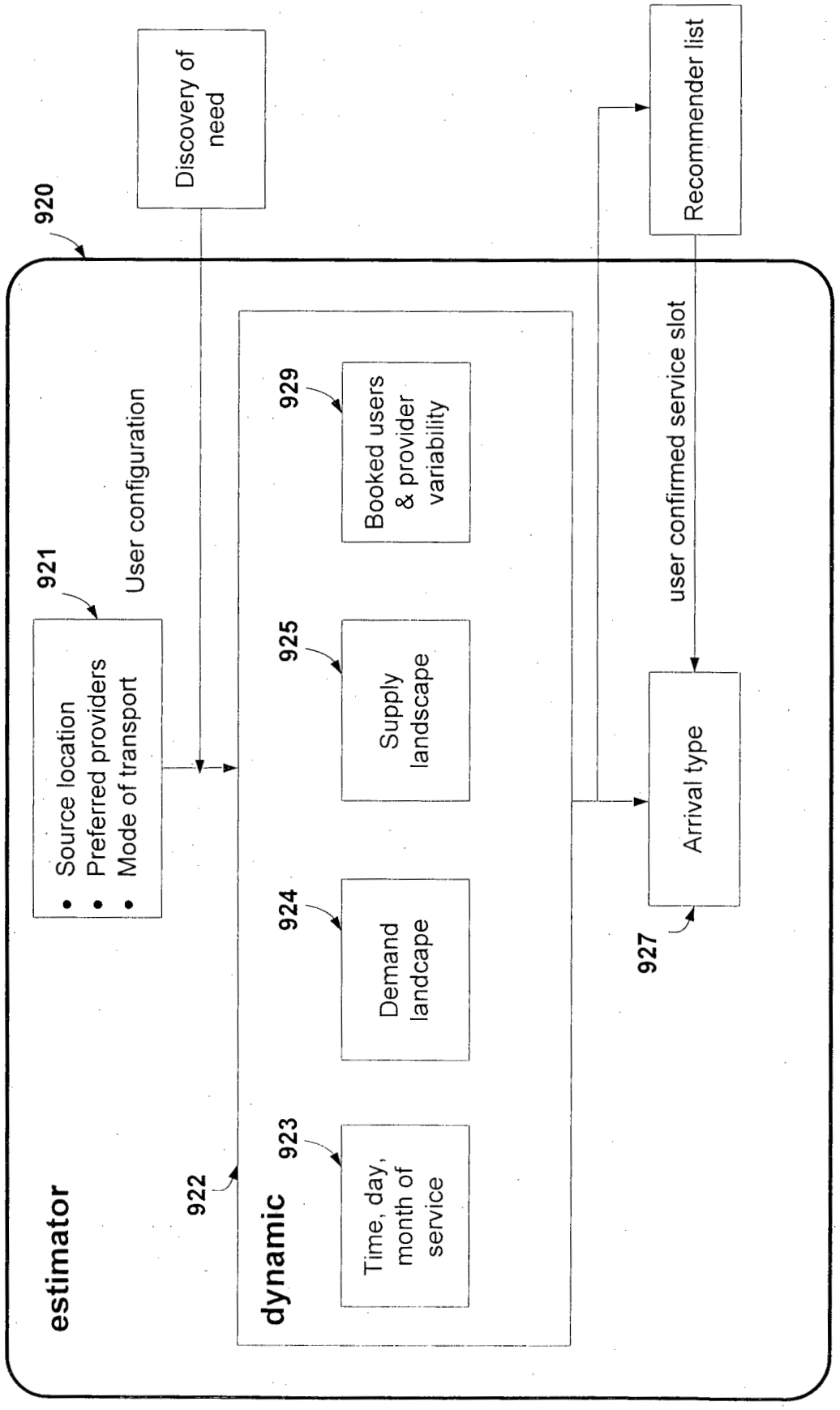

Discovery of need
Recommender list
920
estimator
921
User configuration
• Source location
• Preferred providers
• Mode of transport
922
dynamic
923
Time, day, month of service
924
Demand landcape
925
Supply landscape
929
Booked users & provider variability
927
Arrival type
user confirmed service slot

Fig 10A

1010

baseline	threshold	arrival time	time	day	month	season	state	src	weather	transport	class-label
10min	0	10 min	1030	Wed	Jan	flu	none	home	sunny	car	20min
	10	20 min	0830	Wed	Jan	flu	none	home	sunny	car	20min
	15	25 min	0900	Mon	Jan	flu	att-kids	home	sunny	car	30min
	20	30 min	0900	Wed	Jan	flu	none	home	rain	car	30min
	30	40 min	0900	Mon	Jan	flu	att-kids	home	rain	car	45min
15min	0	15 min	9000	Mon	Jan	flu	none	home	sunny	train	20min
	5	20 min	0830	Wed	Jan	flu	none	home	sunny	train	20min
	10	25 min	0900	Mon	Jan	flu	att-kids	home	sunny	train	30min
	15	30 min	0900	Wed	Jan	flu	none	home	rain	train	30min
	25	40 min	0900	Mon	Jan	flu	att-kids	home	rain	train	45min
30min	0	30 min	9000	Mon	Jan	flu	none	work	sunny	train	30min
	5	35 min	0830	Wed	Jan	flu	none	work	sunny	train	45min
	10	40 min	0900	Mon	Jan	flu	meeting	work	sunny	train	45min
	15	45 min	0900	Wed	Jan	flu	none	work	rain	train	45min
	25	55 min	0900	Mon	Jan	flu	meeting	work	rain	train	60min

Fig 10B

1020

time-window	distance	state	need	cycle-time	users	active-users-now-cluster	providers	active-p-cluster	class-arr-type
	$U_{,i}$				$S_{,i}$				$Y_{,i}$
45min	15min	home	medium	10min	10000	25%	100	10%	-1
20min	35min	work	medium	10min	10000	50%	100	20%	0
70min	60min	work	low	10min	10000	30%	100	20%	0
30min	20min	work	urgent	10min	10000	30%	100	10%	+1

Fig 10C

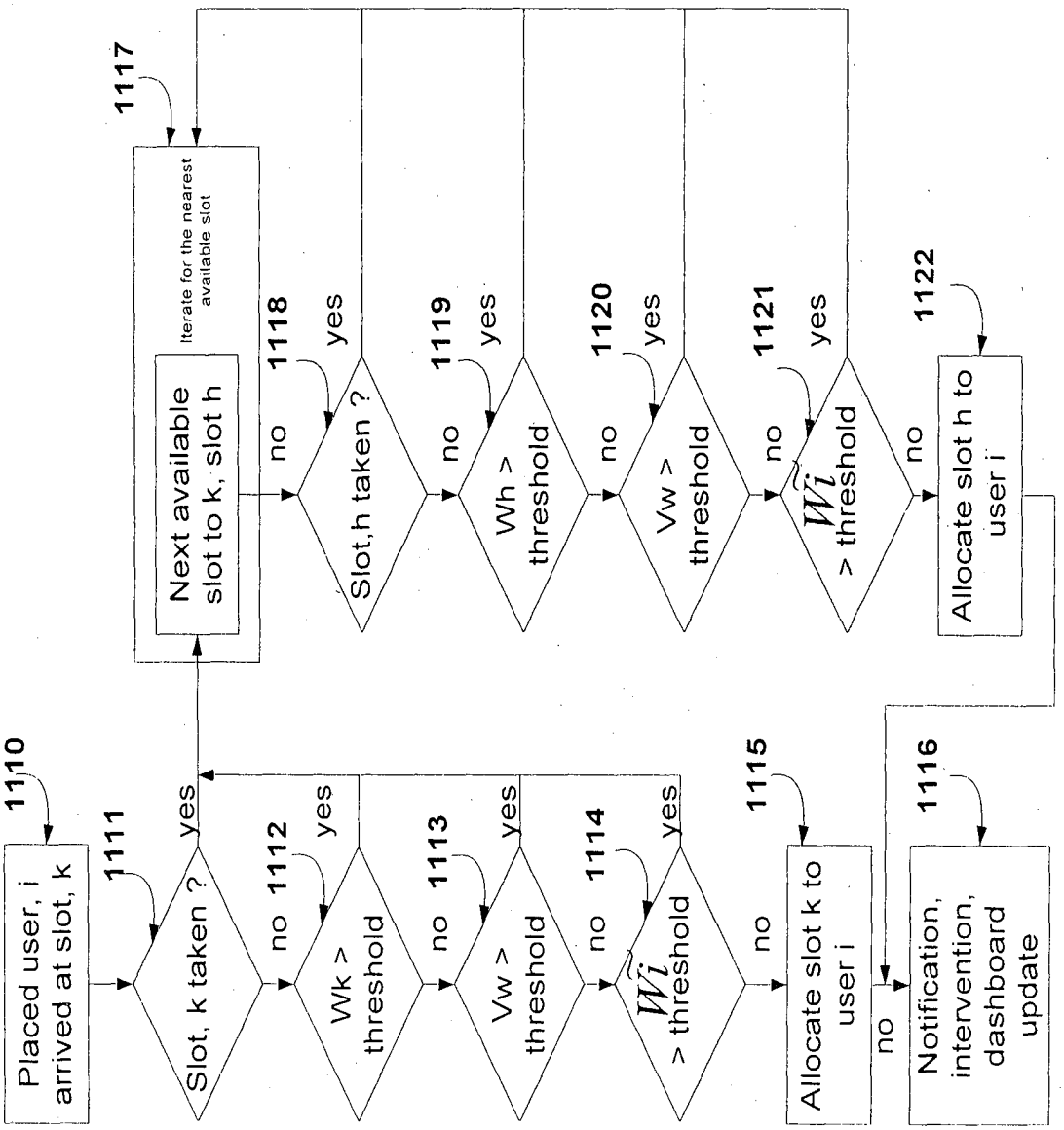

1110
Placed user, i arrived at slot, k
1111
Slot, k taken ?
yes
1112
no
Wk > threshold
yes
1113
no
Vw > threshold
yes
1114
no
$\widetilde{Wi}$ > threshold
yes
1115
no
Allocate slot k to user i
1116
Notification, intervention, dashboard update
1117
Iterate for the nearest available slot
Next available slot to k, slot h
1118
no
Slot,h taken ?
yes
1119
no
Wh > threshold
yes
1120
no
Vw > threshold
yes
1121
no
$\widetilde{Wi}$ > threshold
yes
1122
no
Allocate slot h to user i

Fig 11

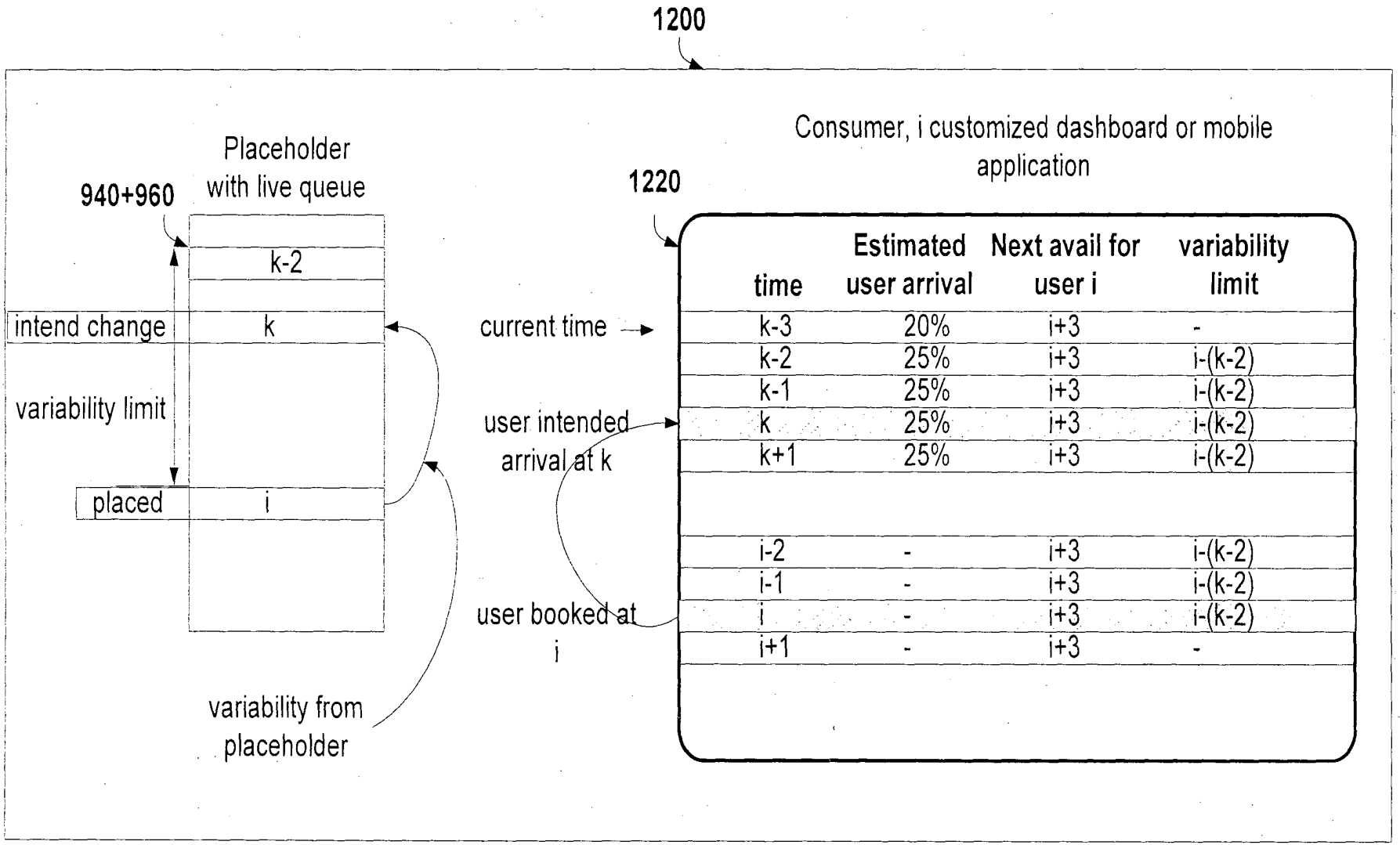

1200
Placeholder with live queue
940+960
k-2
intend change
k
variability limit
placed
i
variability from placeholder
Consumer, i customized dashboard or mobile application
1220
current time
user intended arrival at k
user booked at i
time
Estimated user arrival
Next avail for user i
variability limit
k-3 20% i+3 -
k-2 25% i+3 i-(k-2)
k-1 25% i+3 i-(k-2)
k 25% i+3 i-(k-2)
k+1 25% i+3 i-(k-2)
i-2 - i+3 i-(k-2)
i-1 - i+3 i-(k-2)
i - i+3 i-(k-2)
i+1 - i+3 -

Fig 12

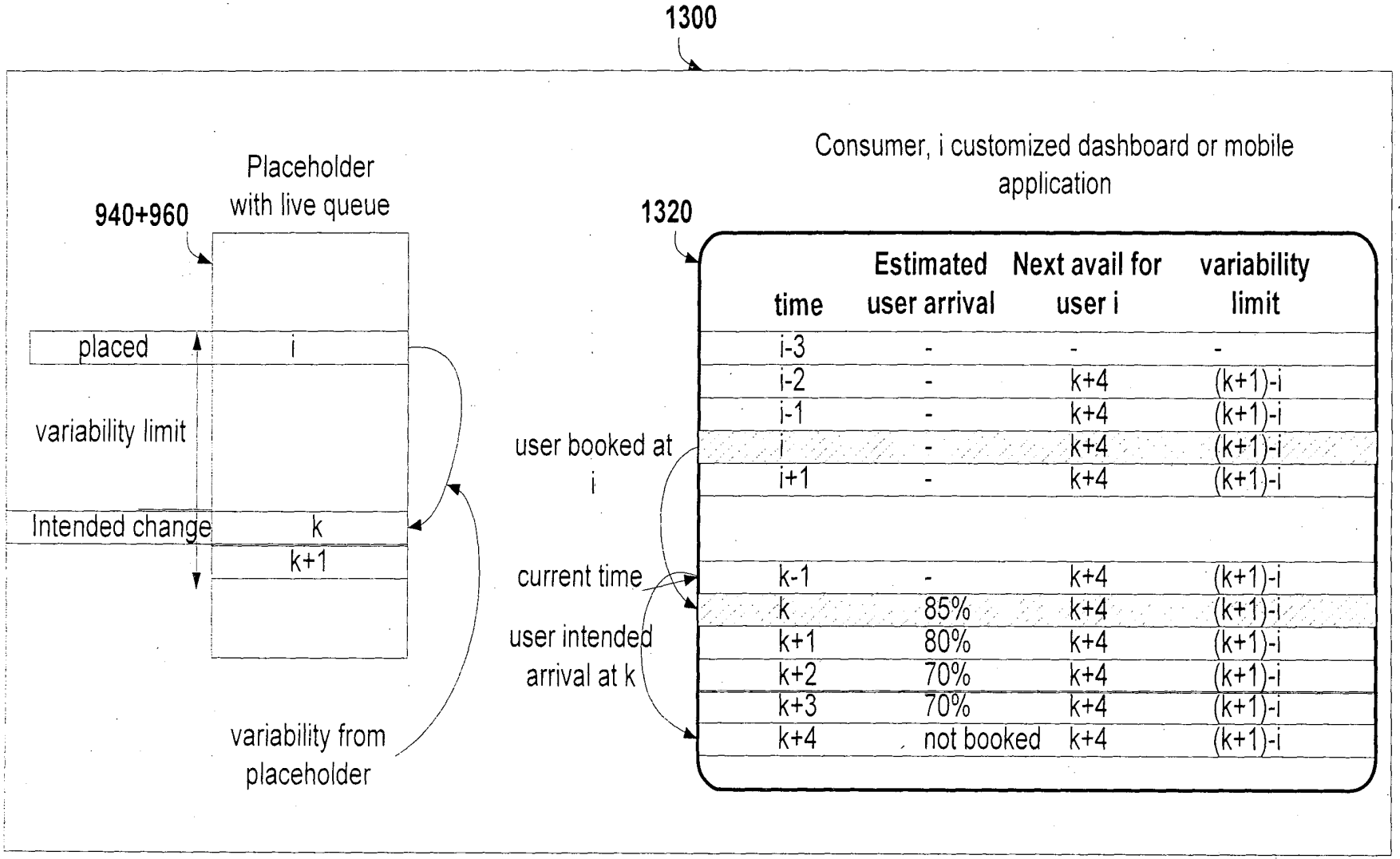

1300
Placeholder with live queue
940+960
placed
i
variability limit
Intended change
k
k+1
variability from placeholder
Consumer, i customized dashboard or mobile application
1320
user booked at i
current time
user intended arrival at k
time
Estimated user arrival
Next avail for user i
variability limit
i-3 - - -
i-2 - k+4 (k+1)-i
i-1 - k+4 (k+1)-i
i - k+4 (k+1)-i
i+1 - k+4 (k+1)-i
k-1 - k+4 (k+1)-i
k 85% k+4 (k+1)-i
k+1 80% k+4 (k+1)-i
k+2 70% k+4 (k+1)-i
k+3 70% k+4 (k+1)-i
k+4 not booked k+4 (k+1)-i

Fig 13