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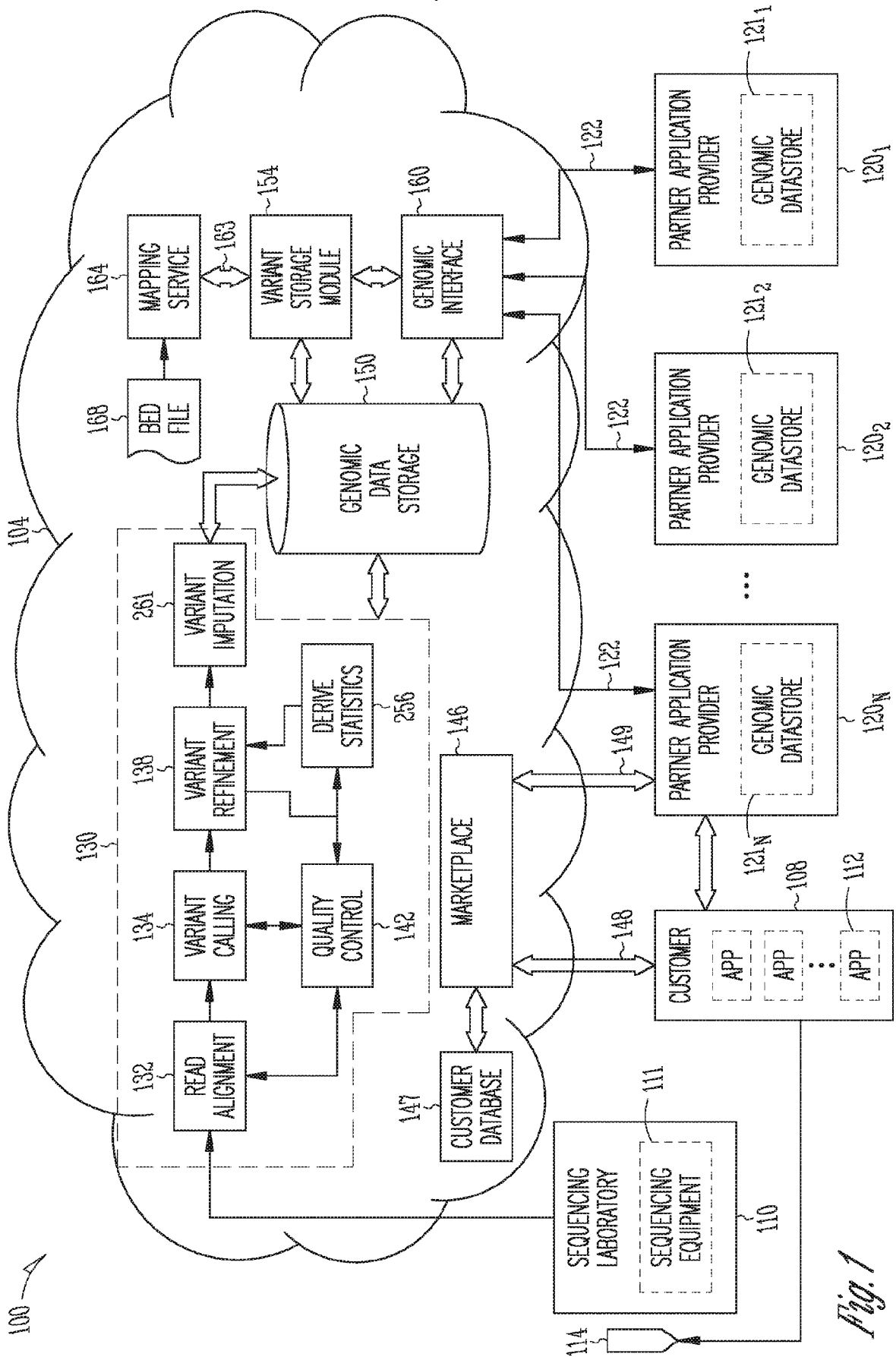


Fig. 1

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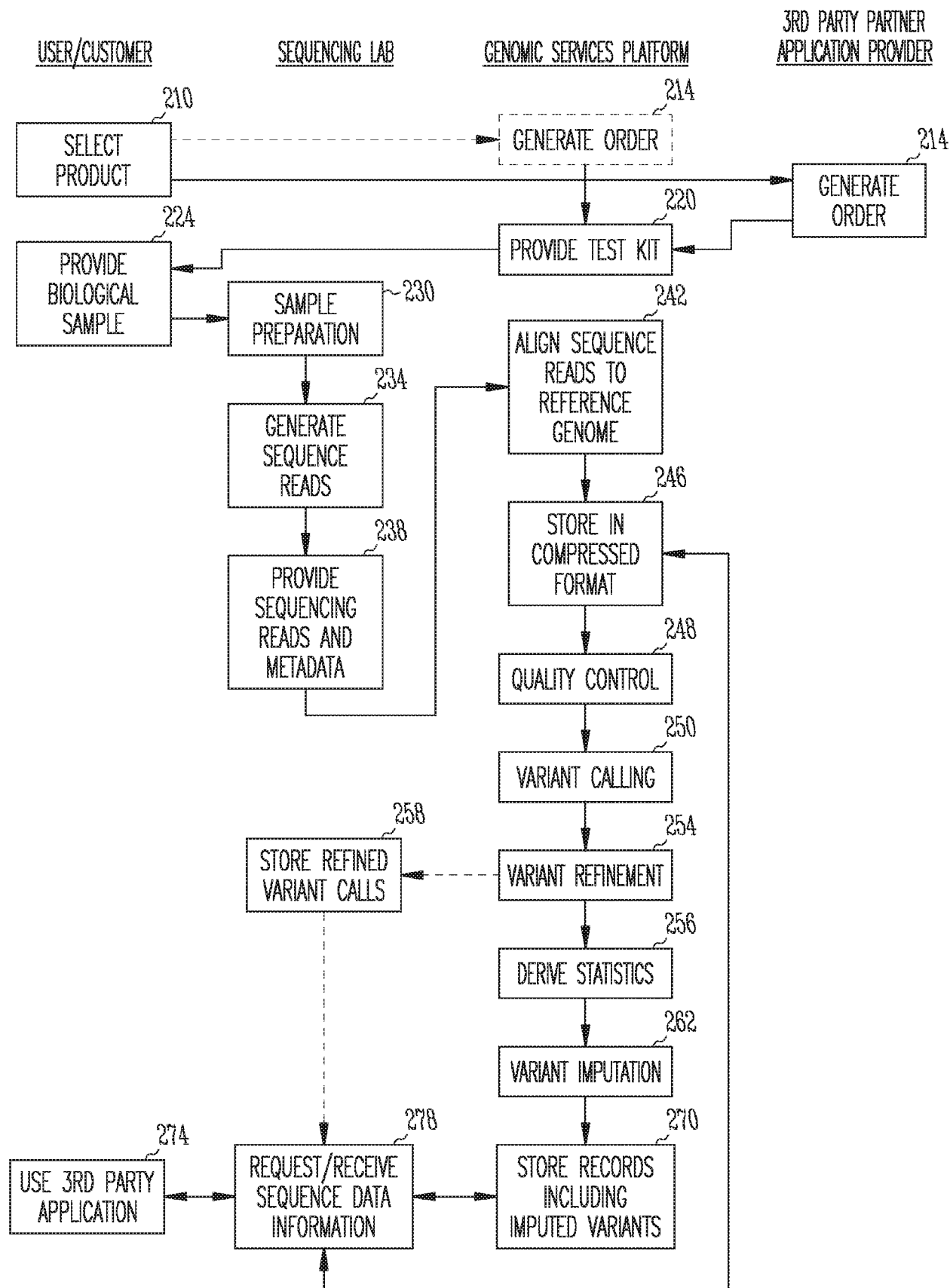
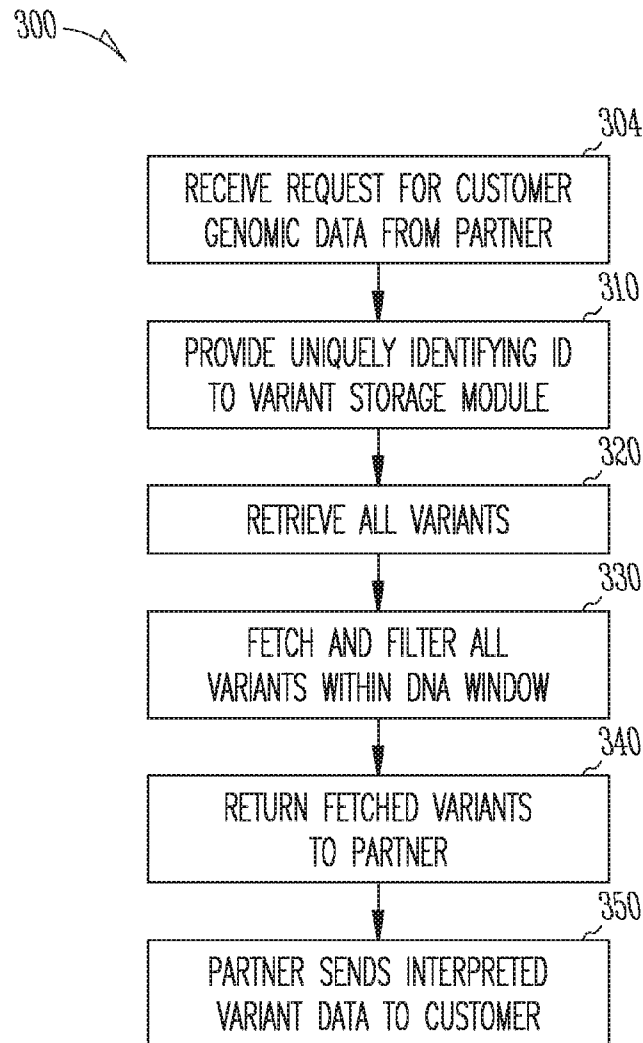


Fig.2

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*Fig. 3*

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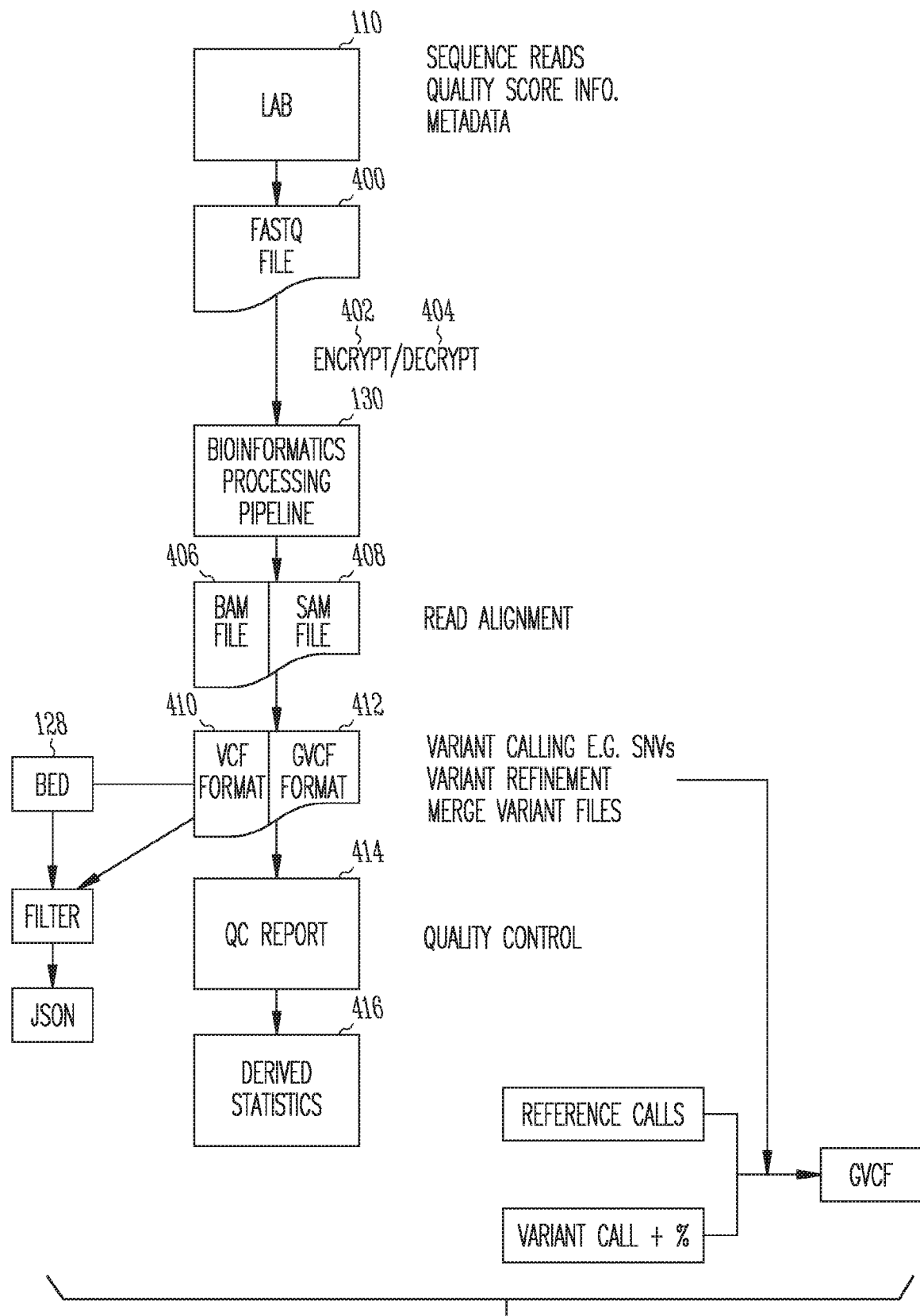
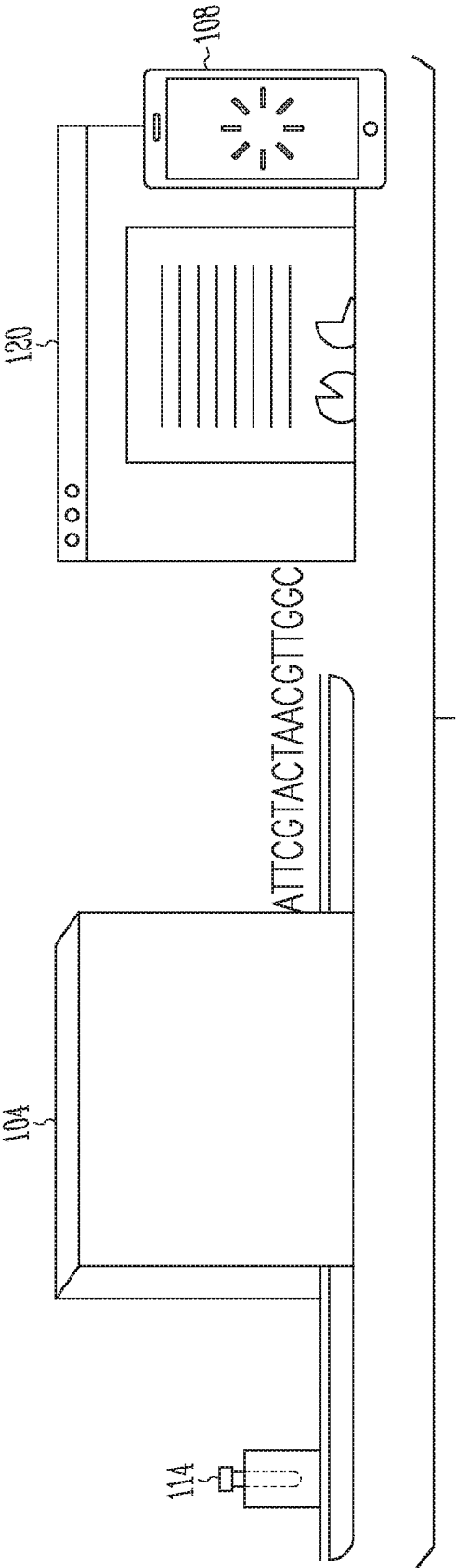
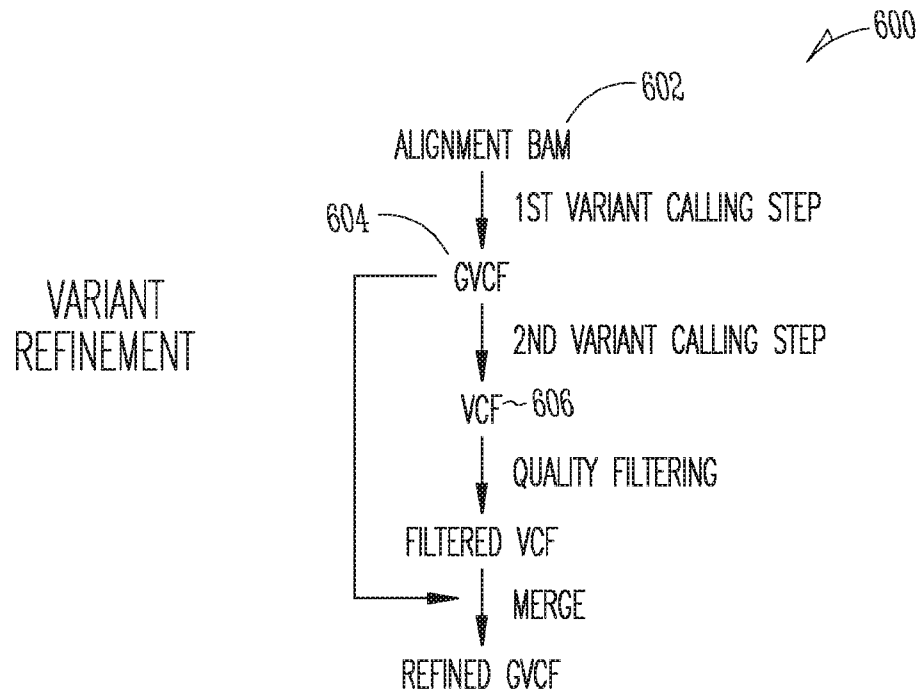


Fig. 4

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*Fig. 6*

chr2	17530	17531
chr2	867341	867342
chr12	16175	16176

The table (700) displays genomic coordinates for three different chromosomes. The first column (702) lists the chromosomes (chr2, chr2, chr12). The second column (704) lists the start coordinates (17530, 867341, 16175). The third column (706) lists the end coordinates (17531, 867342, 16176).

Fig. 7

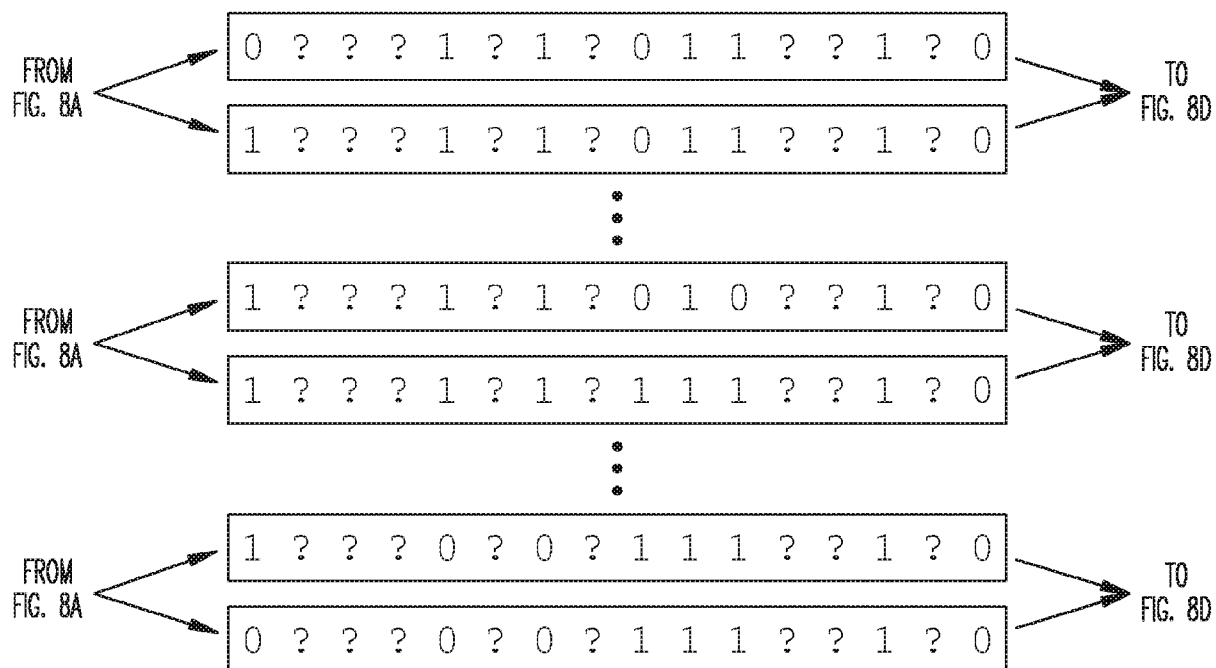
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1	?	?	?	1	?	1	?	0	2	2	?	?	2	?	0	TO FIG. 8C
0	?	?	?	2	?	2	?	0	2	2	?	?	2	?	0	
1	?	?	?	2	?	2	?	0	2	1	?	?	2	?	0	
1	?	?	?	2	?	1	?	1	2	2	?	?	2	?	0	
2	?	?	?	2	?	2	?	1	2	1	?	?	2	?	0	TO FIG. 8C
1	?	?	?	1	?	1	?	1	2	2	?	?	2	?	0	
1	?	?	?	2	?	2	?	0	2	1	?	?	2	?	1	
2	?	?	?	1	?	1	?	1	2	1	?	?	2	?	1	
1	?	?	?	0	?	0	?	2	2	2	?	?	2	?	0	TO FIG. 8C

GENOTYPE DATA WITH MISSING DATA AT
UNTYPED SNPs (GREY QUESTION MARKS)

Fig. 8A

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EACH SAMPLE IS PHASED AND THE
HAPLOTYPES ARE MODELLED AS A MOSAIC OF
THOSE IN THE HAPLOTYPE REFERENCE PANEL

Fig. 8B

0	0	0	0	1	1	1	0	0	1	1	1	1	1	1	0
1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	0
1	1	1	1	1	0	1	0	0	1	0	0	0	1	0	1
0	0	1	0	1	1	1	0	0	1	1	1	1	1	1	0
1	1	1	0	1	1	0	0	1	1	1	0	1	1	1	0
0	0	1	0	1	1	1	0	0	1	1	1	1	1	1	0
1	1	1	1	1	0	1	0	0	1	0	0	0	1	0	1
1	1	1	0	0	1	0	0	1	1	1	0	1	1	1	0
0	0	0	0	1	1	1	0	0	1	1	1	1	1	1	0
1	1	1	0	0	1	0	0	1	1	1	0	1	1	1	0

REFERENCE SET OF HAPLOTYPES,
FOR EXAMPLE, HAPMAP

Fig. 8C

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FROM FIG. 8B	➤	1	1	1	1	2	1	0	0	2	2	0	2	2	2	0
		0	0	1	0	2	2	2	0	0	2	2	2	2	2	0
FROM FIG. 8B	➤	1	1	1	1	2	2	2	0	0	2	1	1	2	2	0
		1	1	2	0	2	2	1	0	1	2	2	1	2	2	0
		2	2	2	2	2	1	2	0	1	2	1	1	2	2	0
		1	1	1	0	1	2	1	0	1	2	2	1	2	2	0
FROM FIG. 8B	➤	1	1	2	1	2	1	2	0	0	2	1	1	1	2	1
		2	2	2	1	1	1	1	0	1	2	1	0	1	2	1
		1	2	2	0	0	2	0	0	2	2	2	1	2	2	0

THE REFERENCE HAPLOTYPES ARE USED TO
IMPUTE ALLELES INTO THE SAMPLES TO
CREATE IMPUTED GENOTYPES (SHADED)

Fig. 8D

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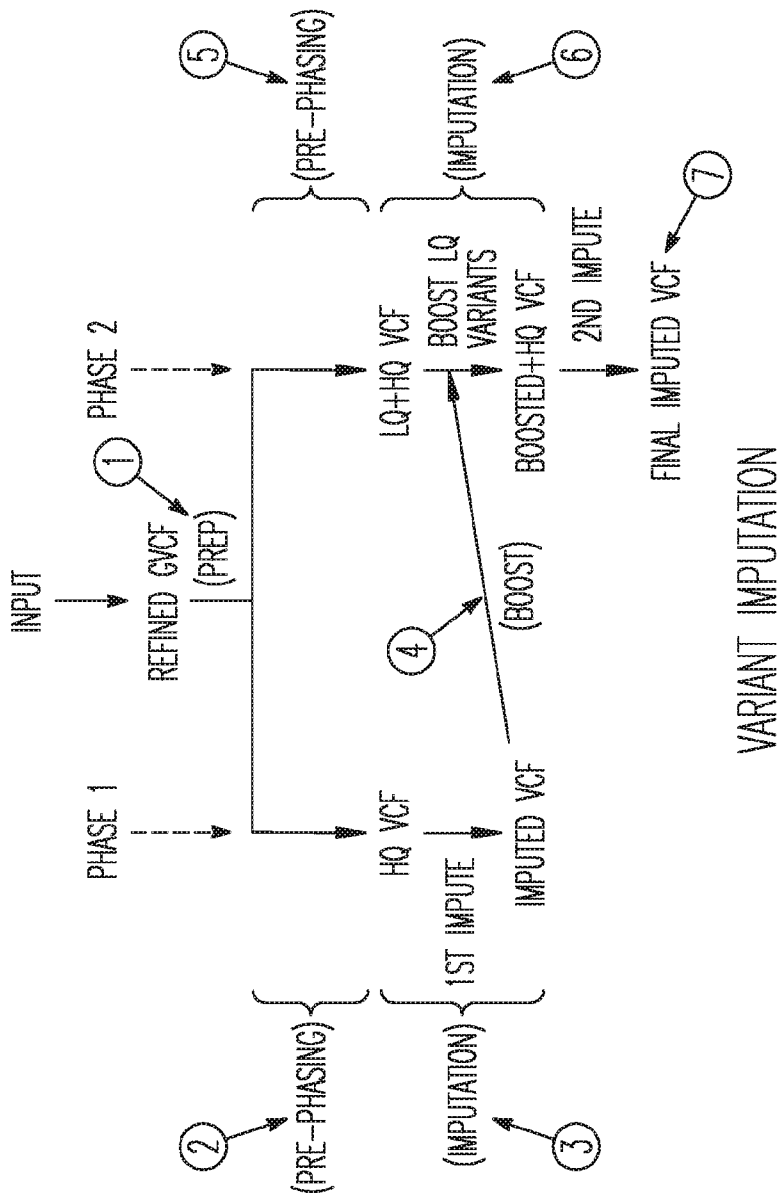


Fig. 9

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Fig. 10A

INPUT TO IMPUTATION

100

CHRL 16277 . T <NON_REF>
CHRL 16495 . G C

110

112

END	GT:DP:GQ:MIN_DP:PL	12.05
END=16385	GT:DP:GQ:MIN_DP:PL 0/0:6:12:5:0,12,180	
	GT:AD:DP:GQ:PL 0/1:10,3:13:40:40,0,178	

104

106

0, 12, 180

102

114

CQ, DIFF BETWEEN THE PROBABILITY OF THE TWO MOST LIKELY GENOTYPES

IMPUTATION REFERENCE PANEL

Fig. 10B

CHRL 16345 . G	A 100 PASS . GT 01	00	10	00	11
CHRL 16495 . G	C 100 PASS . GT 00	10	00	01	00

108

Fig. 10C

PREPARED VCF

116

CHRL 16345 . G	A	:	GT:DP:GQ:MIN_DP:PL	0/0:6:12:5:0,12,180
CHRL 16495 . G	C	12:05	GT:AD:DP:GQ:PL	0/1:10,3:13:40:40:0,178

118

GQ<20, LQ

120

GQ>20, HQ

122

124

GP, IMPUTED PROBABILITY OF THE 3 GENOTYPES (0.96, 0.04, 0)

Fig. 10D

1ST IMPUTED VCF

CHRL 16345 . G	A	:	GT:GP	0/0:0.96,0.04:0
CHRL 16495 . G	C	12:05	GT:AD:DP:GQ:PL	0/1:10,3:13:40:40:0,178

PGQ, A NEW GQ AFTER
COMBINING PL AND GP

126

BOOSTED VARIANTS

CHRL 16345 . G A .	GT:DP:GQ:MIN_DP:PL:GP:PGQ	0/0:6:12:5:0,12,180:0:96,0,04,0:26
CHRL 16495 . G C 12.05 .	GT:AD:DP:GQ:PL	0/1:10,3:13:40:40,0,178

Fig. 10E

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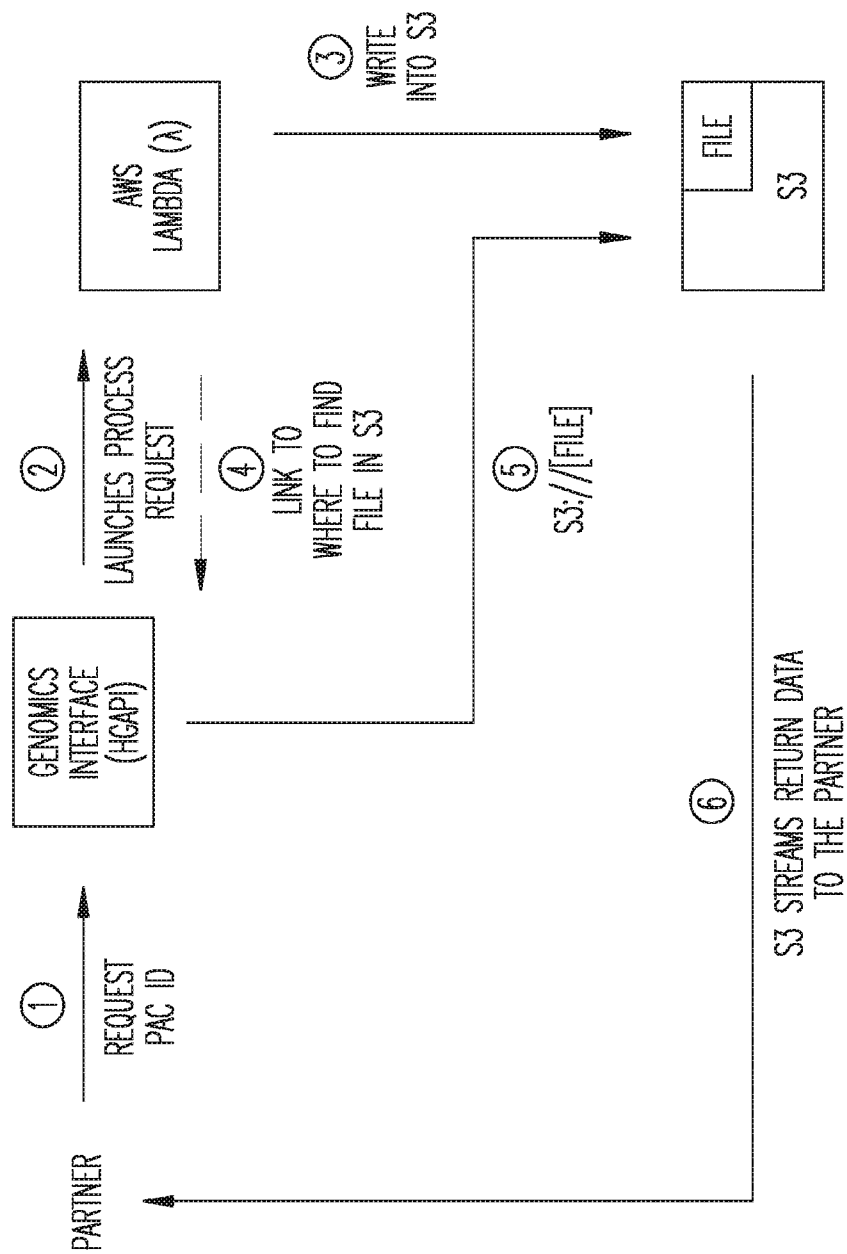


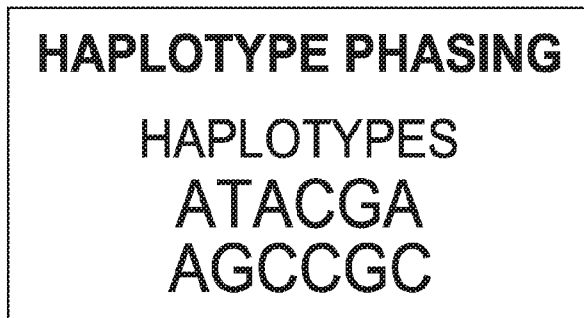
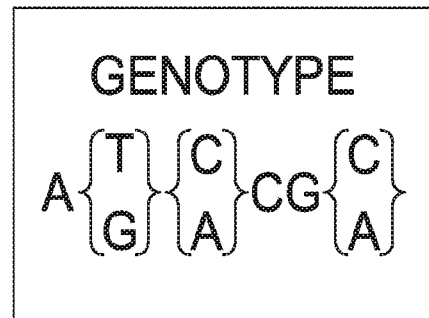
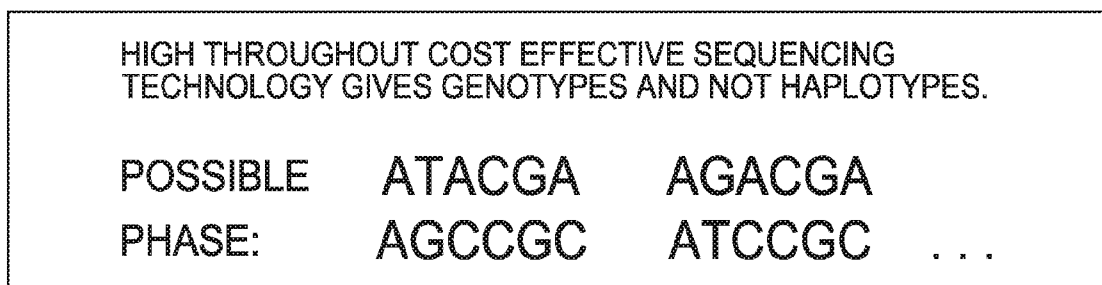
Fig. 11

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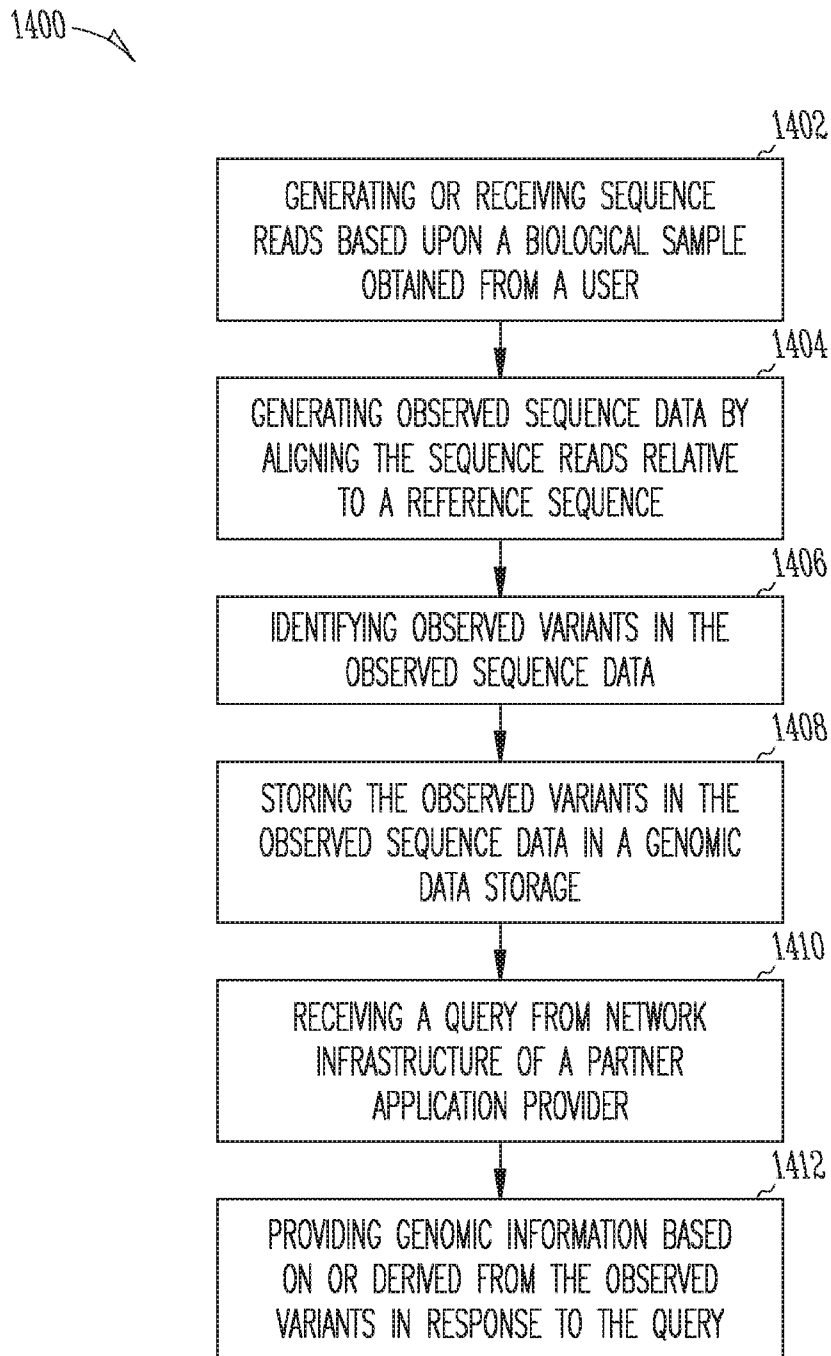
APPID	USERID	PARTNERAPPCUSTOMERID (PAC ID)	CREATEDAT
AP-0W690YXS0GWX04APOCR6LRN2	US-09NU-RG7YM	PC-222N9M5QRGM5I8GY3U0YU	5/31/2017 18:47
AP-74NSX48N32E7N8QNF884530	US-G1CE-S94DU	PC-222213F31R529BR6RJLP24K	6/20/2017 1:37
AP-W3Q0LWH6GF9FUWNB929ACED	US-2RZV-6SGHU	PC-222K1S3P7SR0MD1WT1J39XU	7/14/2017 17:50
AP-12FZCM5G52Q0APG639EN38TD	US-JWW-1Z0MV	PC-2226113KHJ7HLZ7EDZAJF8B	5/8/2017 17:06
AP-FRBEM5KAF0FM3S75TAG6SRJW	US-3GFF-9A29T	PC-222PK1X7FNTVUV1NWK5UNRXJ	6/19/2017 17:46
AP-0W690YXS0GWX04APOCR6LRN2	US-P3KR-XXS6M	PC-222NQXB7440NR5IYRYT35L74	7/21/2017 15:56
AP-0W690YXS0GWX04APOCR6LRN2	US-AF03-EZ25A	PC-222KXCTL0CRXF4NWXJ06LI5T	5/27/2017 0:42
AP-W3Q0LWH6GF9FUWNB929ACED	US-CD5R-RHYJI	PC-222G45KPEDBD4FBPUJCMNQAO	4/21/2017 22:06
AP-12FZCM5G52Q0APG639EN38TD	US-FZ72-AKRBD	PC-222VQXCAX1XSR6FEEAL6QP4M	7/25/2016 17:32
AP-74NSX48N32E7N8QNF884530	US-WRZZ-C669V	PC-222K0Q7J4PJEMJY8JFD7A0JI	7/18/2017 21:28

Fig. 12

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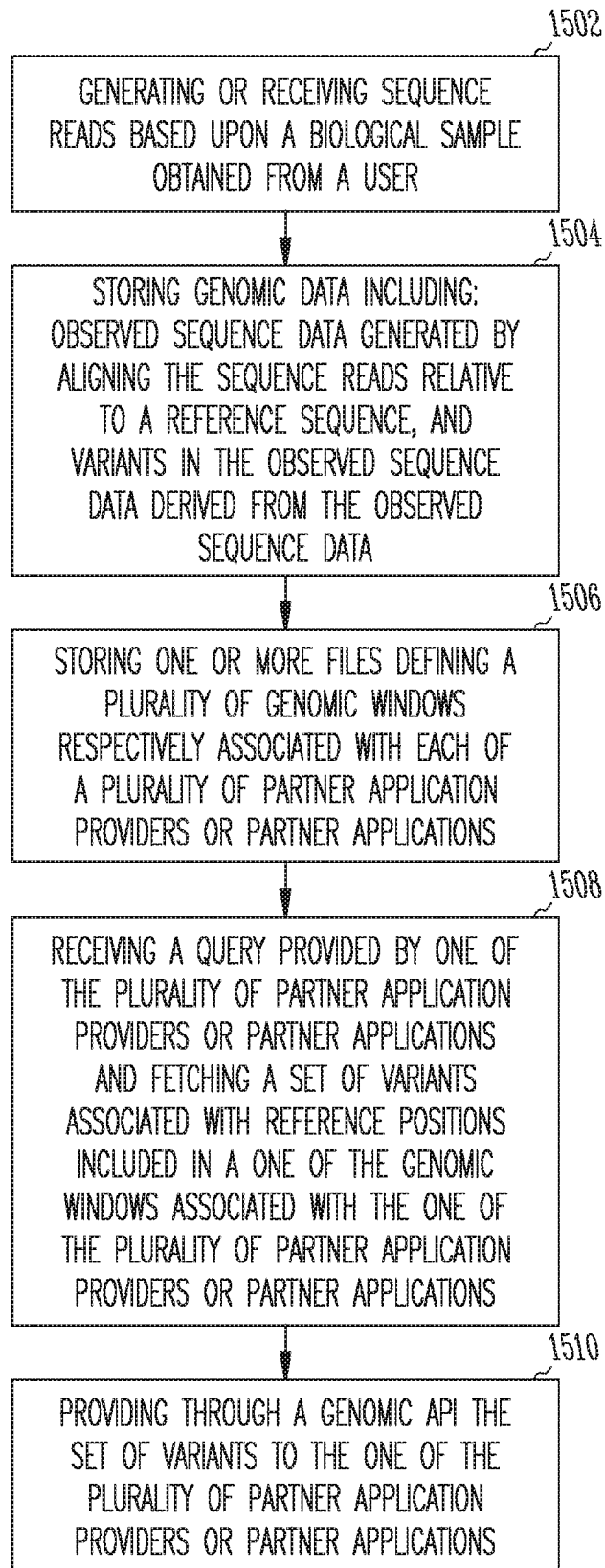
*Fig. 13A**Fig. 13B**Fig. 13C*

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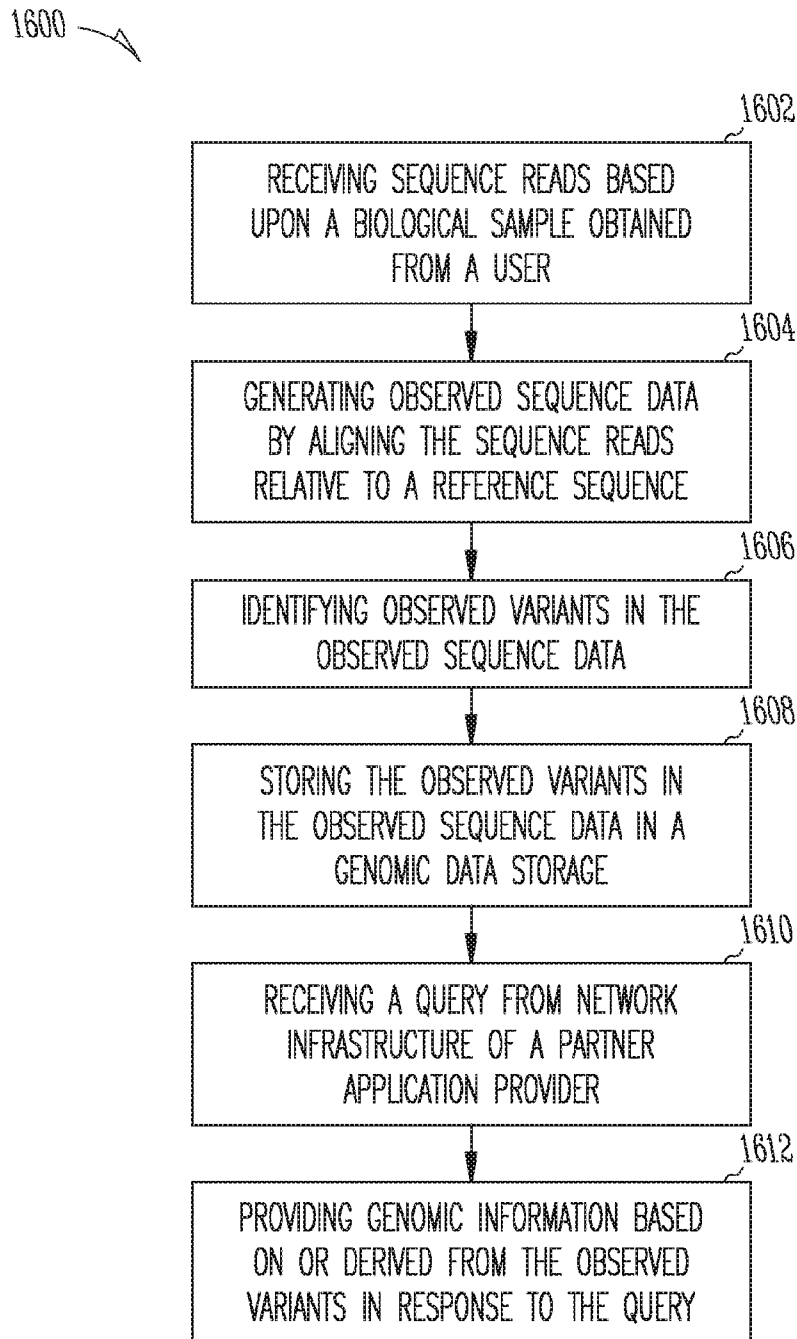
*Fig. 14*

1500

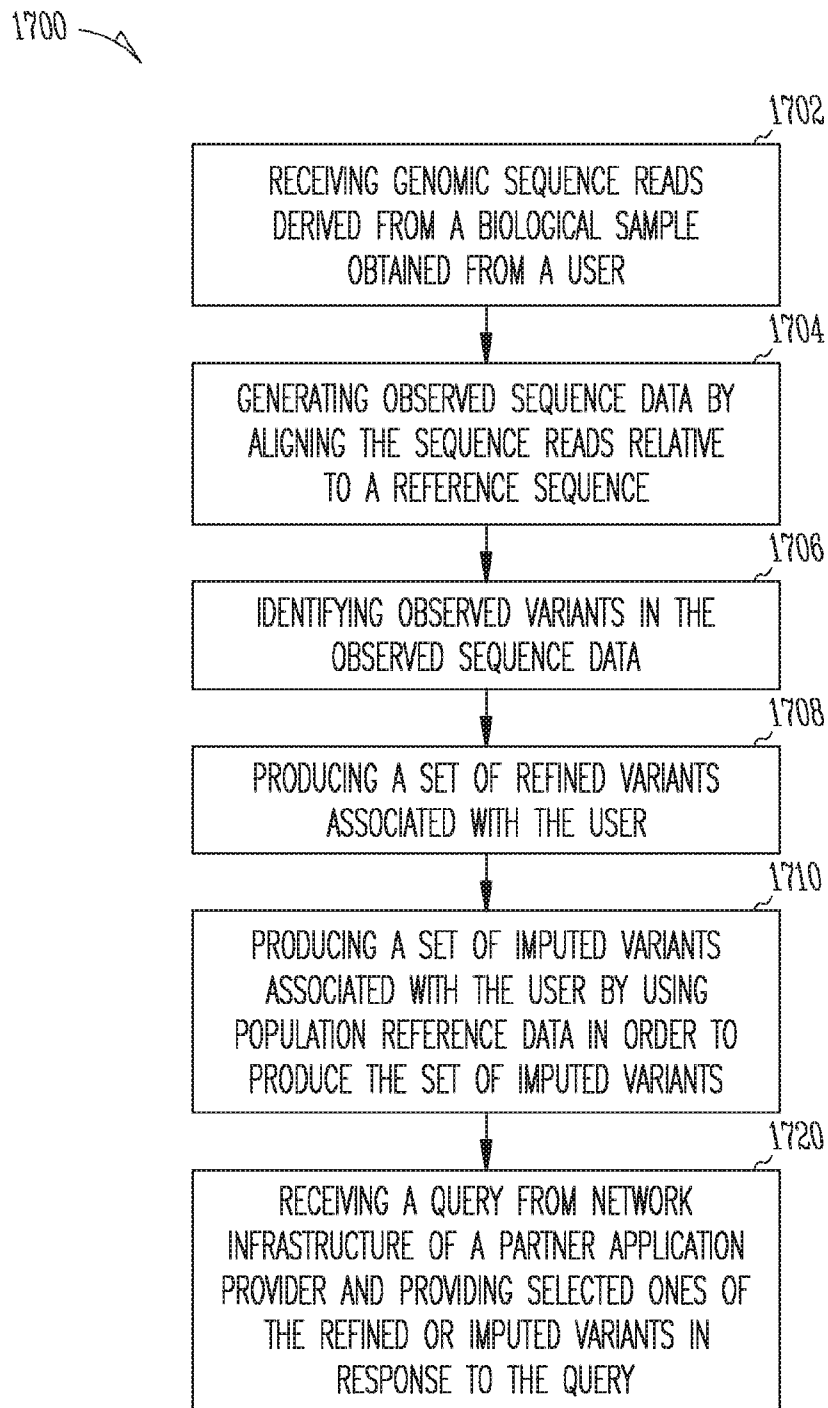
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*Fig. 15*

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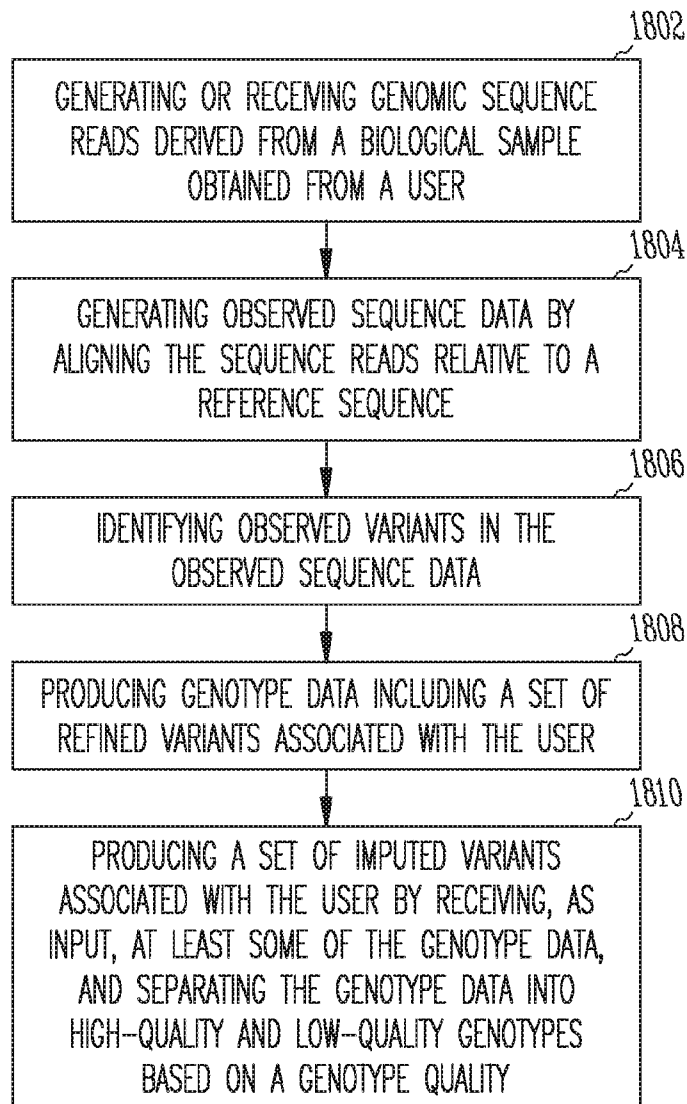
*Fig. 16*

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*Fig. 17*

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1800 ↗

*Fig. 18*

1900

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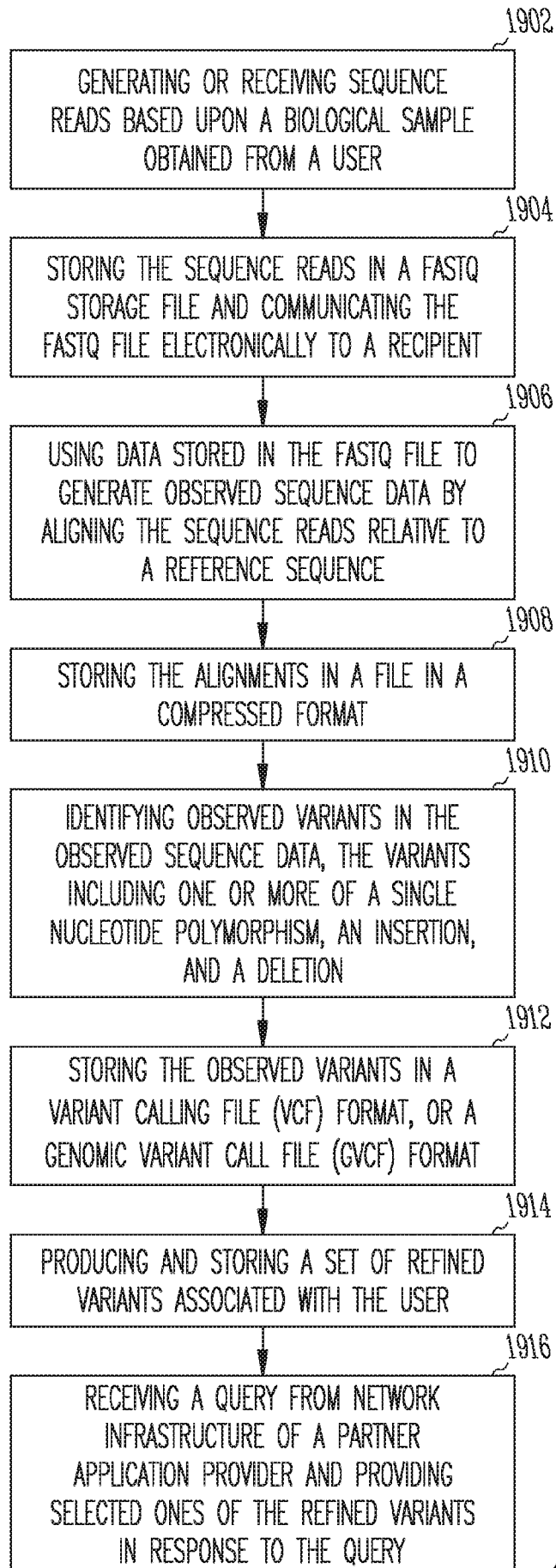
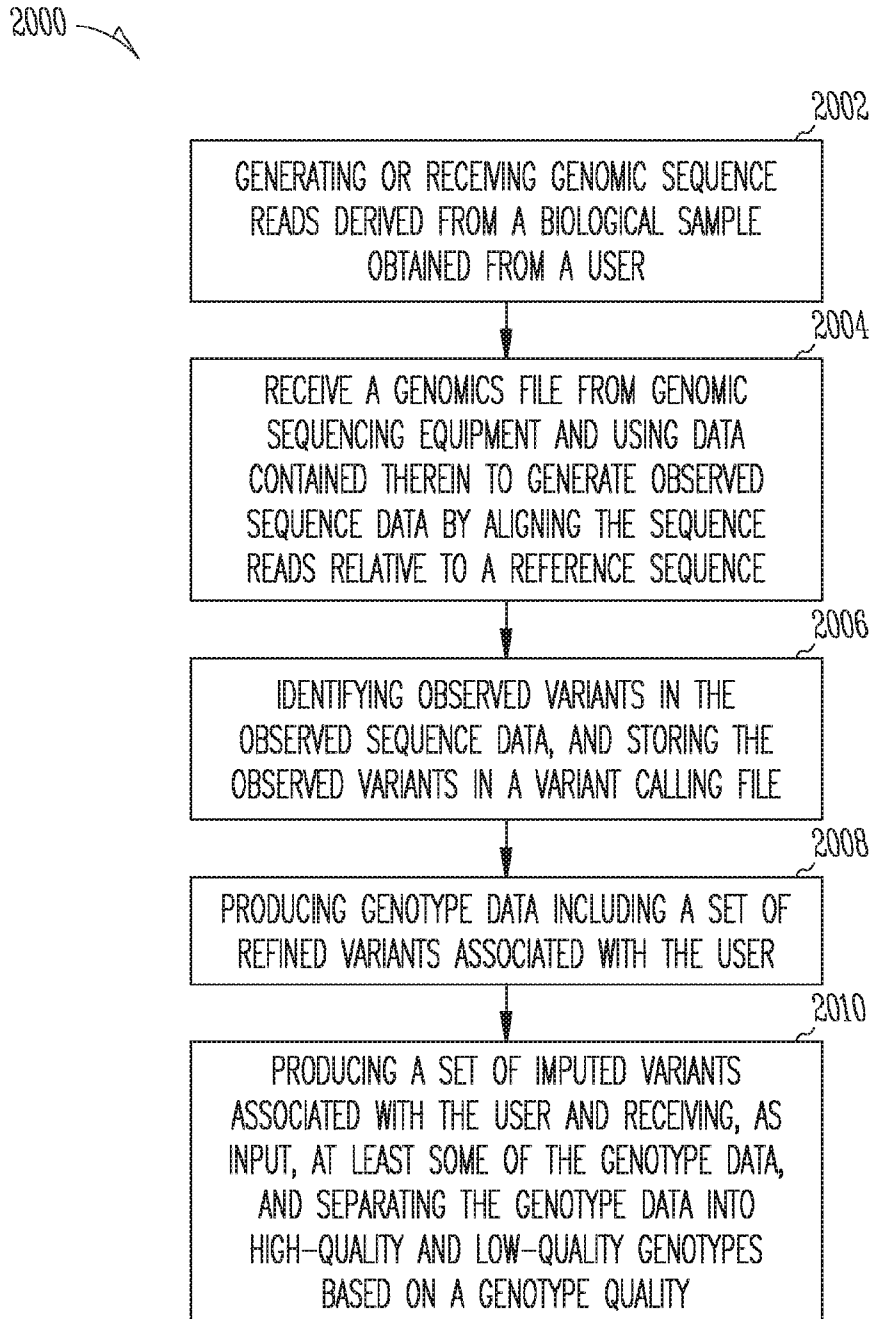
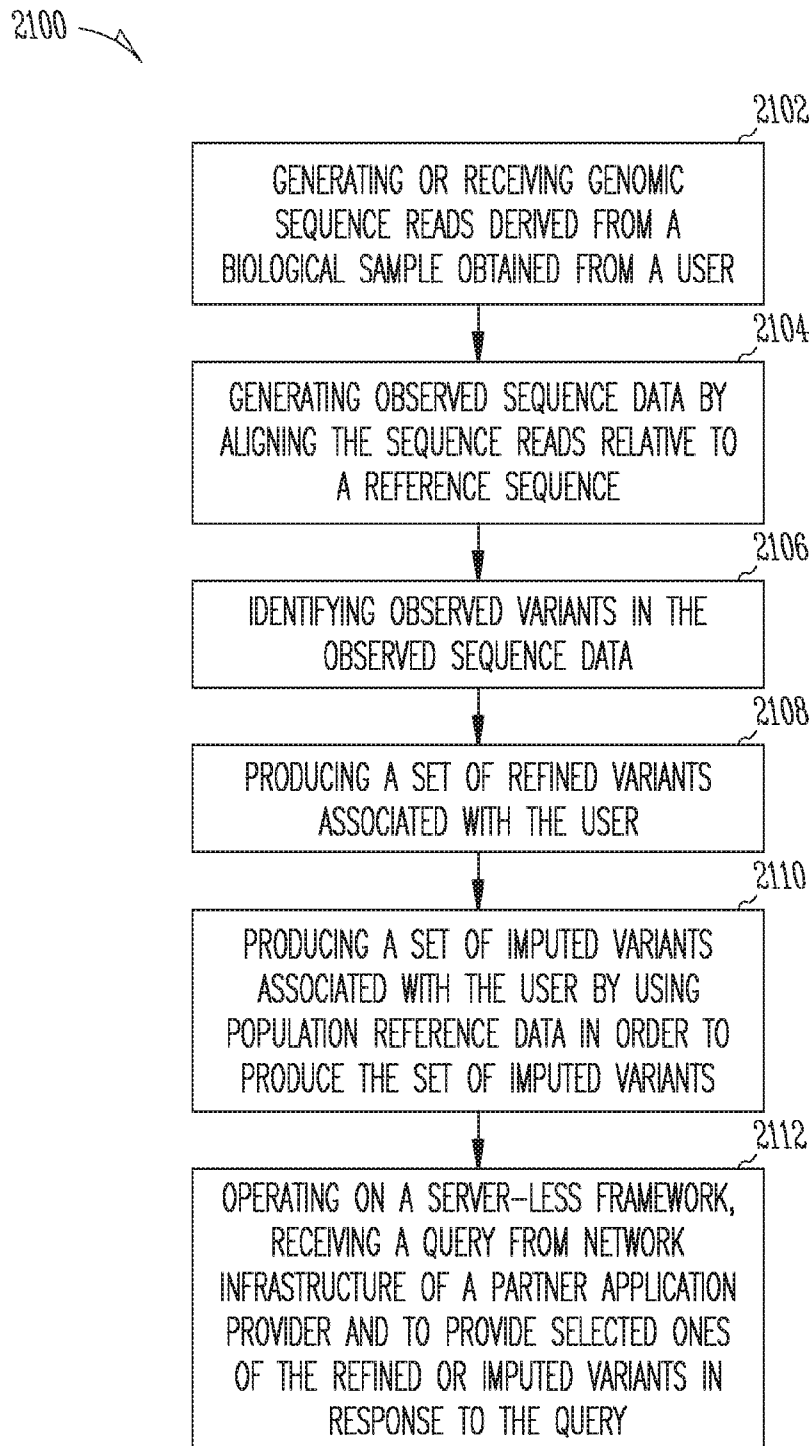


Fig. 19

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*Fig. 20*

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*Fig. 21*