

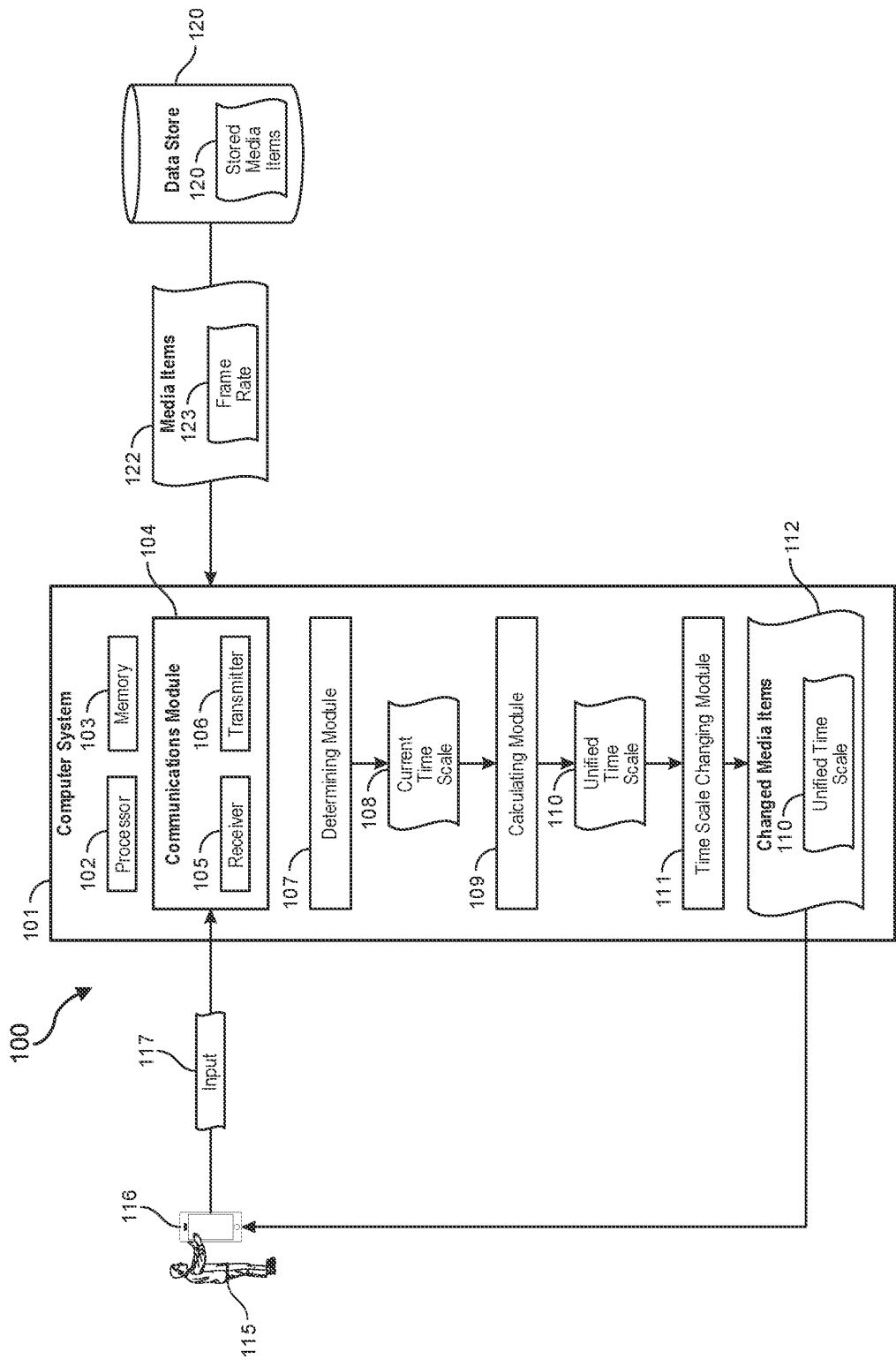


FIG. 1

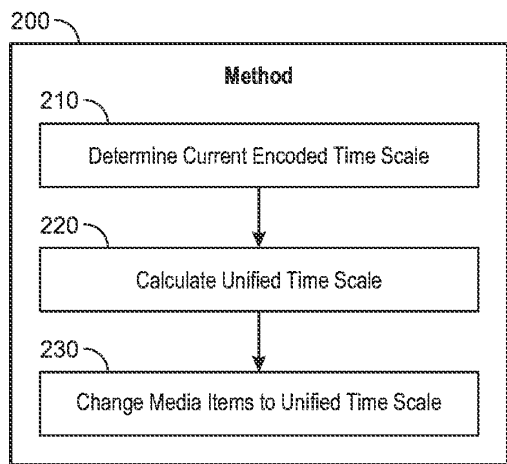


FIG. 2

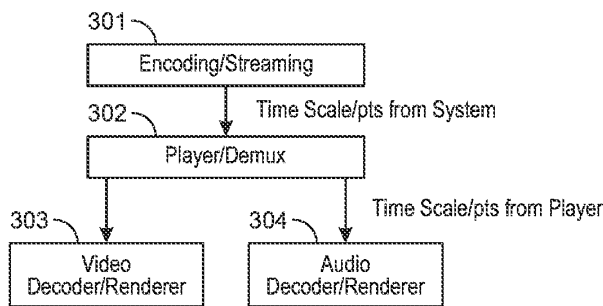


FIG. 3

400

401

402

Time Scale \ Frame Rate	1,000	90,000	1,000,000
24	41.66666667	3750	41666.6667
25	40	3600	40000
30	33.33333333	3000	33333.3333
60	16.66666667	1500	16666.6667
23.97602398	41.70833333	3753.75	41708.3333
29.97002997	33.36666667	3003	33366.6667
59.94005994	16.68333333	1501.5	16683.3333

Frame Interval

FIG. 4

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500

501 Frame #	502 Source Timestamp (s) (23.97fps)	503 Source Timestamp (ms)	504 Frame Interval (ms)
0	0.0000	0	
1	0.0417	42	42
2	0.0834	83	41
3	0.1251	125	42
4	0.1668	167	42
5	0.2085	209	42
6	0.2503	250	41
7	0.2920	292	42
8	0.3337	334	42
9	0.3754	375	41

PTS Rounding Error and Frame Interval

FIG. 5

600

601 V-syncTime Slot (ms) (50Hz)	602 Frame #	603 PTS without Rounding	604 PTS with Rounding	605 Frame #
0	0	0	0	0
20	0			0
40	0			0
60	1	41.66667	42	1
80	1			1
...	...	...	...	...
1380	33	1376.4	1376	33
1400	33			33
1420	34	1418.1	1418	34
1440	34			34
1460	35	1459.8		34
1480	35		1460	35
1500	35			35
1520	36	1501.5		36

23.97fps to 50Hz FRCz FRC

FIG. 6

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700

701

702

Scale Frame Rate	Time	1,000	90,000	1,000,000	120,000
24		41.66666667	3750	41666.6667	5000
25		40	3600	40000	4800
30		33.33333333	3000	33333.3333	4000
60		16.66666667	1500	16666.6667	2000
23.97602398		41.70833333	3753.75	41708.3333	5005
29.97002997		33.36666667	3003	33366.6667	4004
59.94005994		16.68333333	1501.5	16683.3333	2002
120		8.333333333	750	8333.33333	1000
240		4.166666667	375	4166.66667	500
300		3.333333333	300	3333.33333	400

Video Frame Intervals

FIG. 7

800

801

802

Frame Rate	Time Scale	1,000	90,000	1,000,000	120,000
23.4273 (HEAAC)		42.66666667	3840	42666.6667	5120
31.25 (DDP/Atmos)		32	2880	32000	3840

Audio Frame Intervals @48KHz

FIG. 8

900

901

902

Frame Rate	Time Scale	1,000	90,000	1,000,000	120,000
15.625 (HEAAC)		64	5760	64000	7680
20.83333333 (DDP/Atmos)		32	4320	48000	5760

Audio Frame Intervals @32KHz

FIG. 9

1000

1001 Sample Rate	1002 Frame Size	1003		1004	1005	1005	1007	1008
		Time Scale	Frame Rate					
24	1	24	41.66666667	1,000	90,000	1,000,000	120,000	17,640,000
25	1	25	40		3750	41666.6667	5000	735000
30	1	30	33.33333333		3600	40000	4800	705600
60	1	60	16.66666667		3000	33333.3333	4000	588000
23.97	1	23.97602398	41.70833333		1500	16666.6667	2000	294000
29.97	1	29.97002997	33.36666667		3753.75	41708.3333	5005	735735
59.94	1	59.94005994	16.68333333		3003	33366.6667	4004	588588
120	1	120	8.333333333		1501.5	16683.3333	2002	294294
240	1	240	4.166666667		750	8333.33333	1000	147000
300	1	300	3.333333333		375	4166.66667	500	73500
6000	2048	3.90625	256		300	3333.33333	400	58800
	1536	5.208333333	192		23040	256000	30720	4515840
32000	2048	15.625	64		17280	192000	23040	3386880
	1536	20.83333333	48		5760	64000	7680	1128960
44100	2048	21.53320313	46.4399093		4320	48000	5760	846720
	1536	28.7109375	34.82993197		4179.59184	46439.9093	5572.789116	819200
48000	2048	23.4375	42.66666667		3134.69388	34829.932	4179.591837	614400
	1536	31.25	32		3840	42666.6667	5120	752640
96000	2048	46.875	21.33333333		2880	32000	3840	564480
	1536	62.5	16		1920	21333.3333	2560	376320
					1440	16000	1920	282240

Audio/Video Frame Intervals Including 44100Hz Audio

FIG. 10

1100

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1101

1102

Frame Rate (fps)	Scaled Frame Rate (V)
23.976	24000
24	24
25	25
29.97	30000
30	30
50	50
59.94	60000
60	60

Scaled Frame Rate

FIG. 11

1200

1201

1202

1203

Frame Rate (fps)	Scaled Frame Rate (V)	Time Scale
23.976	24000	24000
24	24	3000
25	25	375
29.97	30000	30000
30	30	750
50	50	750
59.94	60000	60000
60	60	1500

Time Scale with 48KHz Audio

FIG. 12

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1300

Frame Rate (fps)	Scaled Frame Rate(V)	Time Scale
23.976	24000	3528000
24	24	88200
25	25	11025
29.97	30000	4410000
30	30	22050
50	50	22050
59.94	60000	8820000
60	60	485100

Time Scale with 44.1KHz Audio

FIG. 13

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1400

1401

1402

1403

1404

Frame Rate (fps)	Scaled Frame Rate(V)	Time Scale	Wrap-Around Time (Hours)
23.976	24000	24000	49.71
24	24	3000	397.68
25	25	375	3181.46
29.97	30000	30000	39.77
30	30	750	1590.73
50	50	750	1590.73
59.94	60000	60000	19.88
60	60	1500	795.36
120	120	3000	397.68
240	240	6000	198.84

Proposed AVI Time Scale and Wrap-Around Time with 48KHz Audio

FIG. 14

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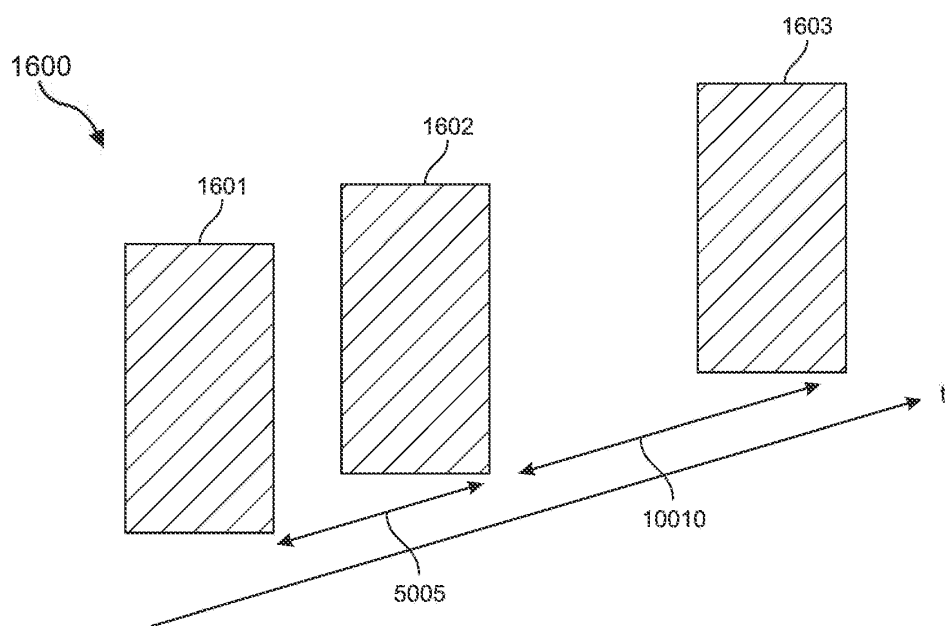
1500

Frame#	PTS (ms)	Scaled PTS (us)	Native PTS (us)	Rounding Error (us)
0	0	0	0	0
1	42	42000	41708	292
2	83	83000	83417	-417
3	125	125000	125125	-125
4	167	167000	166833	167
5	209	209000	208542	458
6	250	250000	250250	-250
7	292	292000	291958	42
8	334	334000	333667	333
9	375	375000	375375	-375
10	417	417000	417083	-83
11	459	459000	458792	208
12	501	501000	500500	500
13	542	542000	542208	-208
14	584	584000	583917	83

PTS Scaling

FIG. 15

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Minimum Interval (D) and Multiple (N) of (D)

FIG. 16

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1700

Frame#	PTS (ms)	Remastered PTS (us)	Native PTS (us)	Rounding Error (us)
0	0	0	0	0
1	42	41708	41708	0
2	83	83417	83417	0
3	125	125125	125125	0
4	167	166833	166833	0
5	209	208542	208542	0
6	250	250250	250250	0
7	292	291958	291958	0
8	334	333667	333667	0
9	375	375375	375375	0
10	417	417083	417083	0
11	459	458792	458792	0
12	501	500500	500500	0
13	542	542208	542208	0
14	584	583917	583917	0

FIG. 17

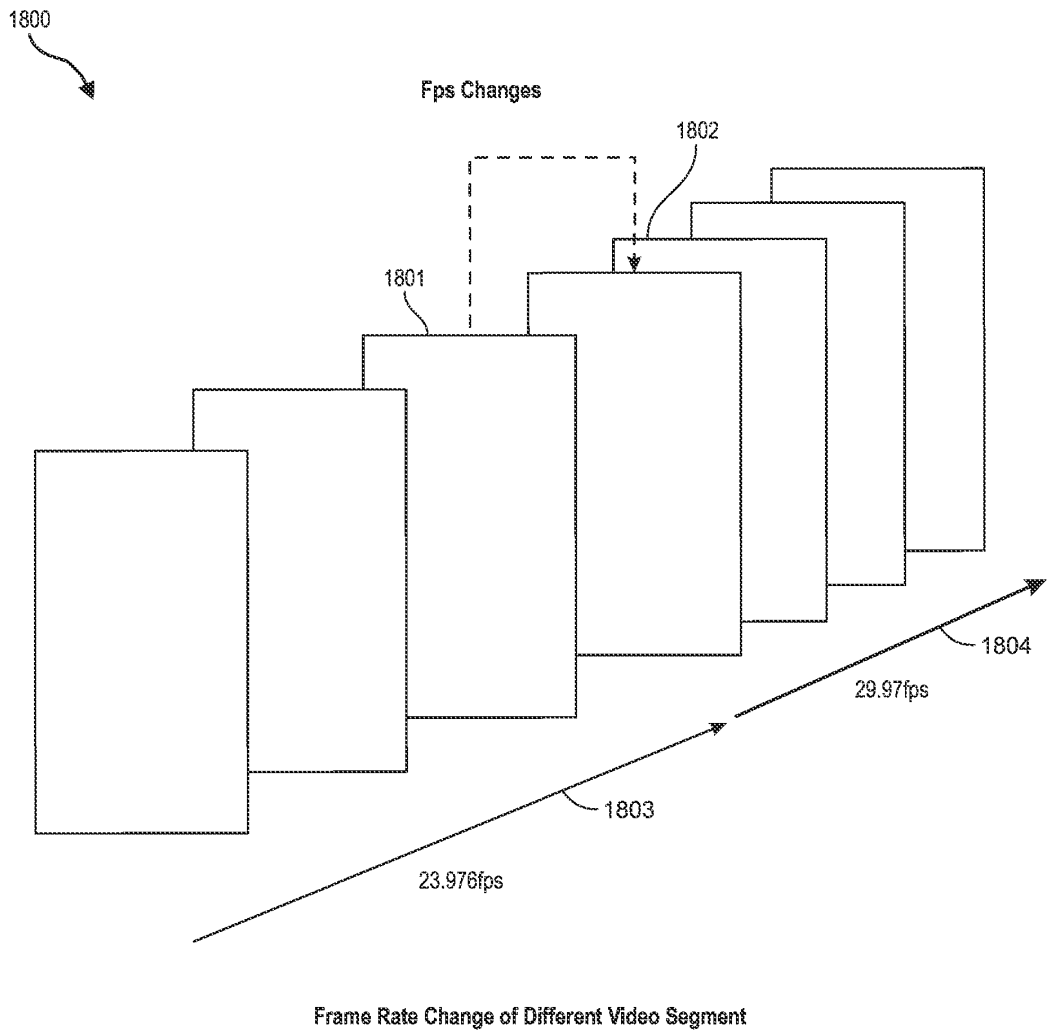
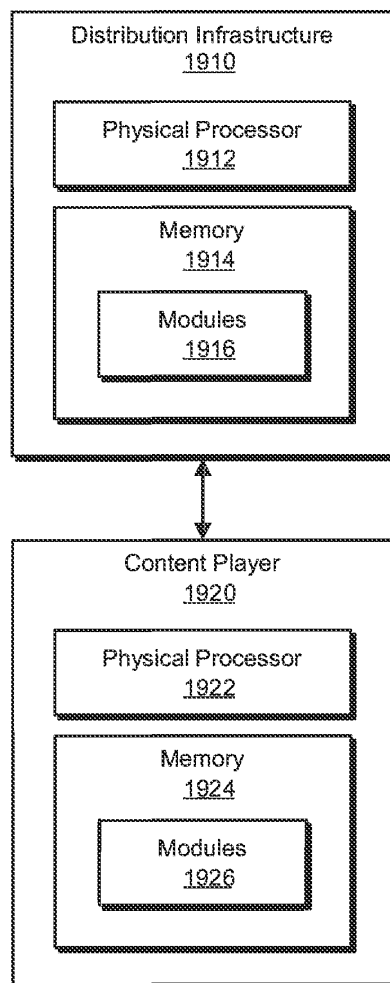


FIG. 18

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1900

**FIG. 19**

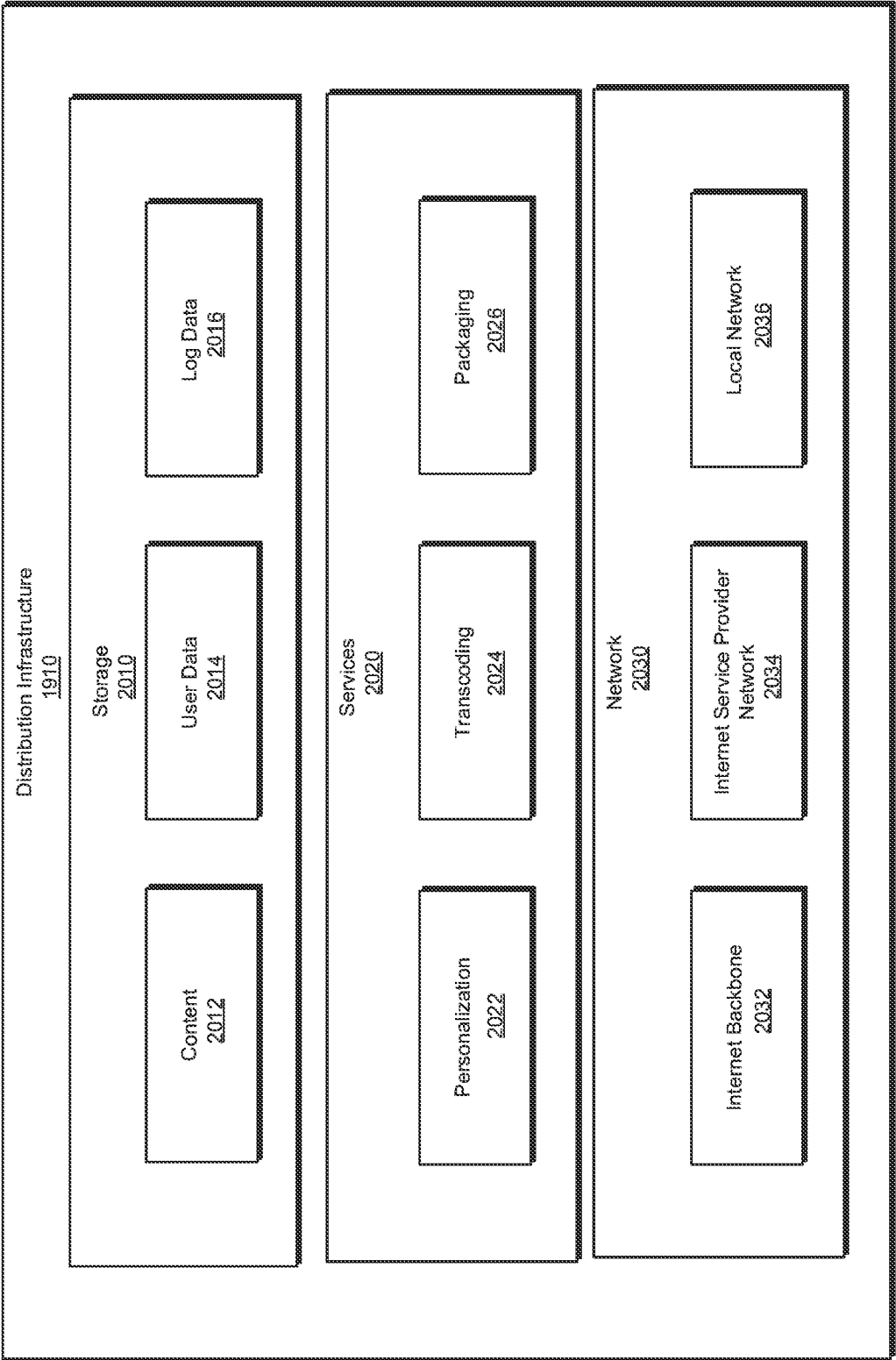


FIG. 20

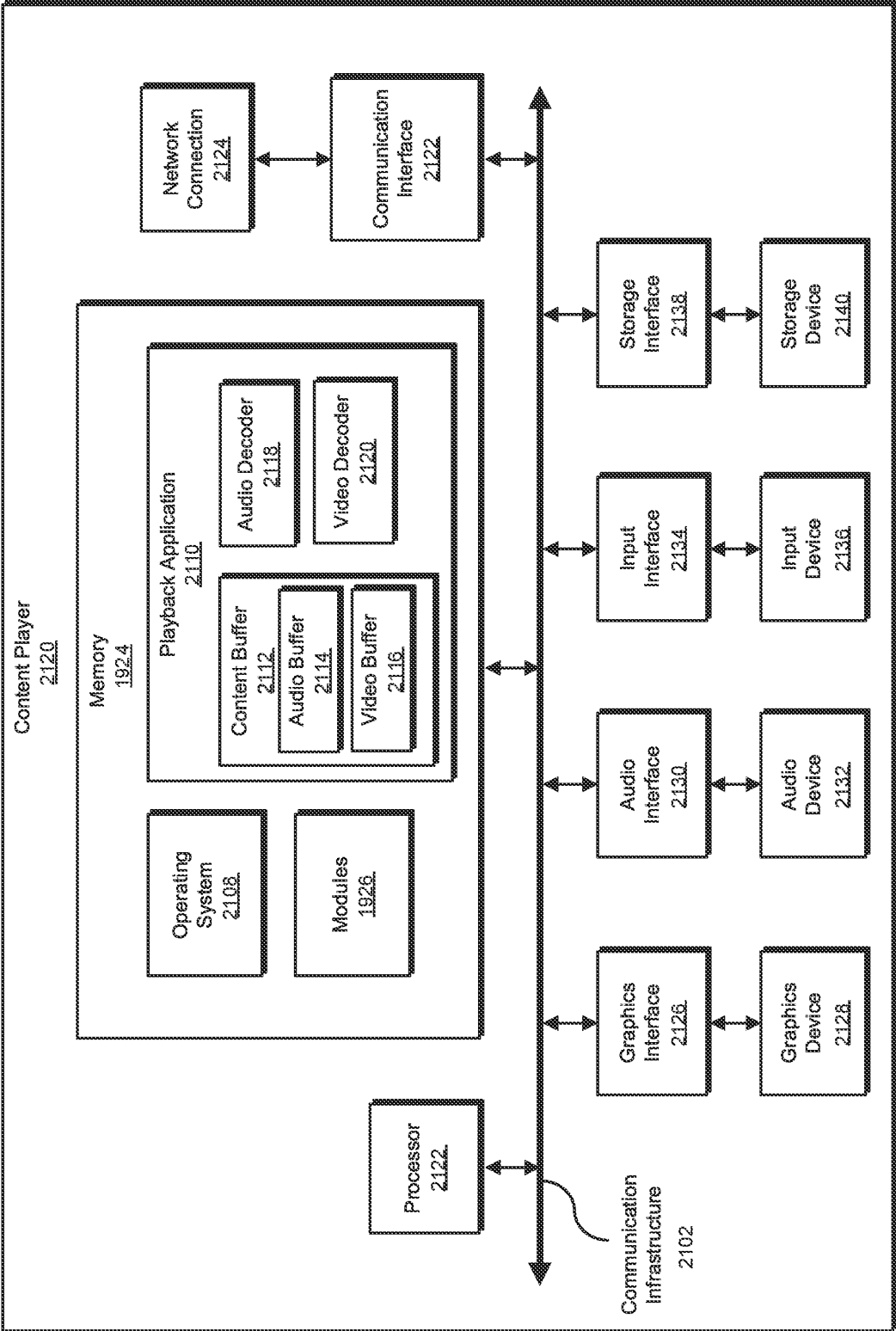


FIG. 21