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(54) **RECONCILIATION OF COMMERCIAL MEASUREMENT RATINGS**

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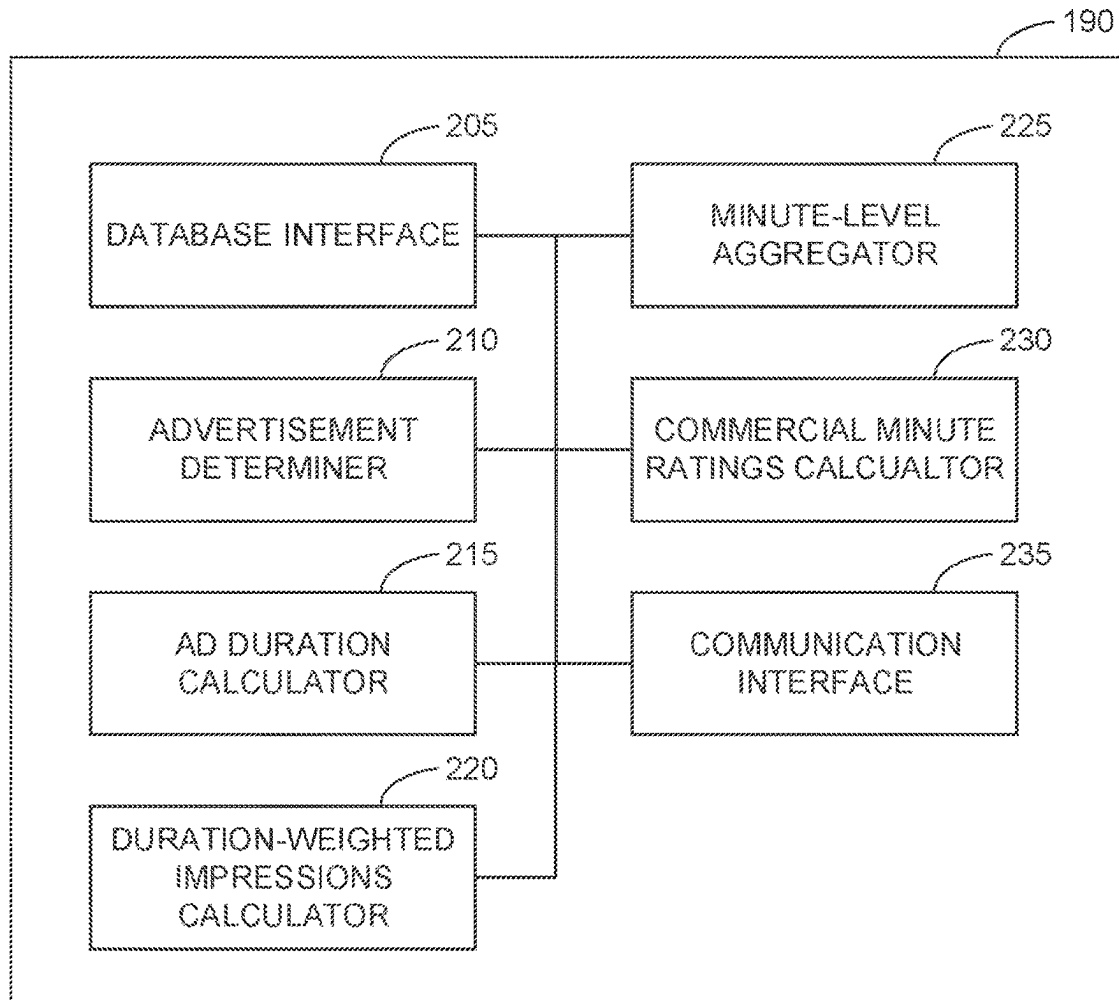(22) Filed: **May 1, 2025**

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CPC *H04N 21/812* (2013.01)

(57) **ABSTRACT**

An example apparatus includes an advertisement determiner to identify a first plurality of respondents that received an addressable advertisement and a second plurality of respondents that received a linear advertisement based on combined program tuning data and reference advertisement data; a calculator to calculate a first average commercial minute rating for the addressable advertisement based on first duration weighted impressions associated with the first plurality of respondents and a second average commercial minute rating for the linear advertisement based on second duration weighted impressions associated with the second plurality of respondents; and a communication interface to transmit the first average commercial minute rating and the second average commercial minute rating for crediting the addressable advertisement and the linear advertisement with audience viewership metrics.
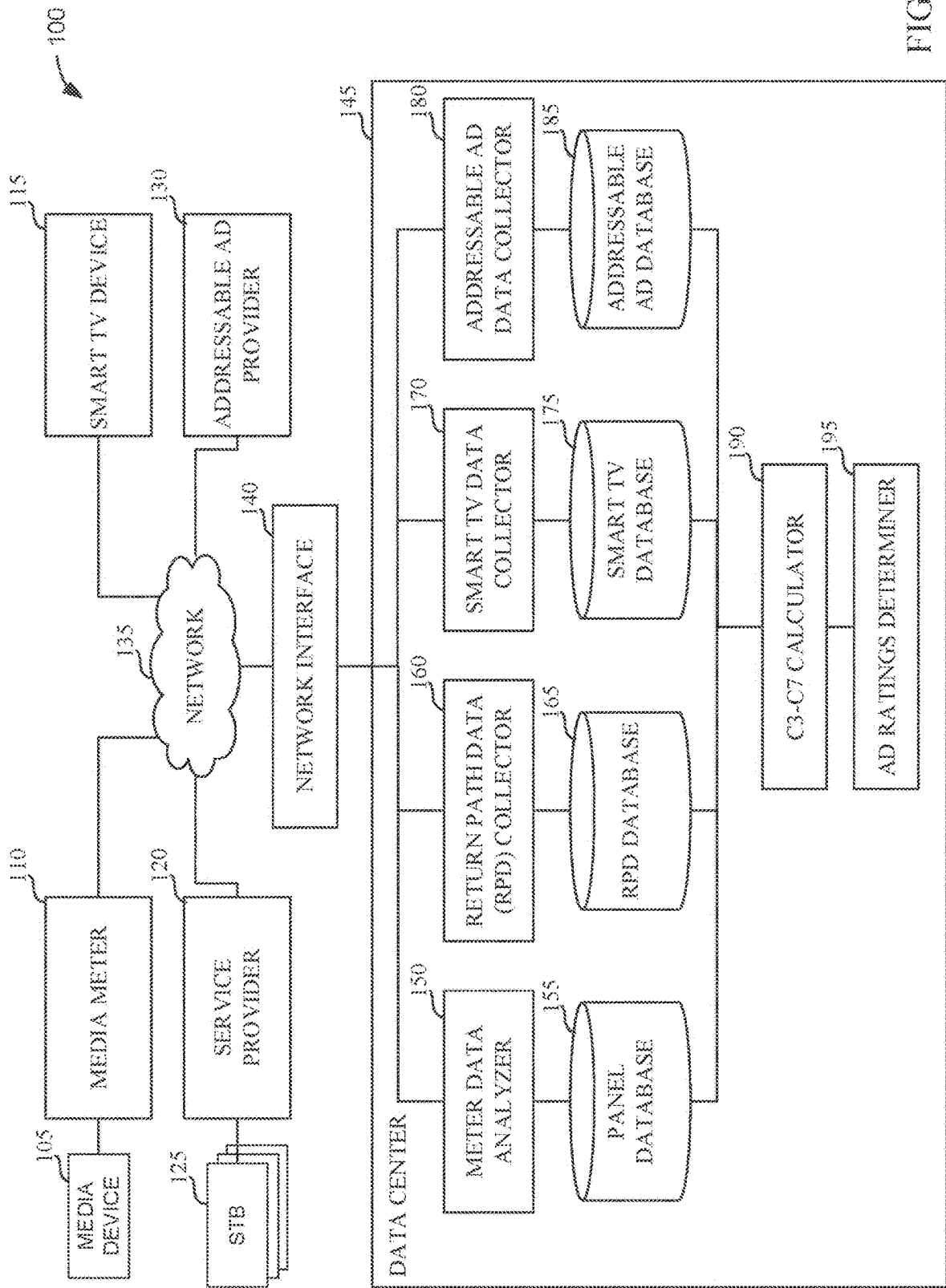
190

FIG. 1
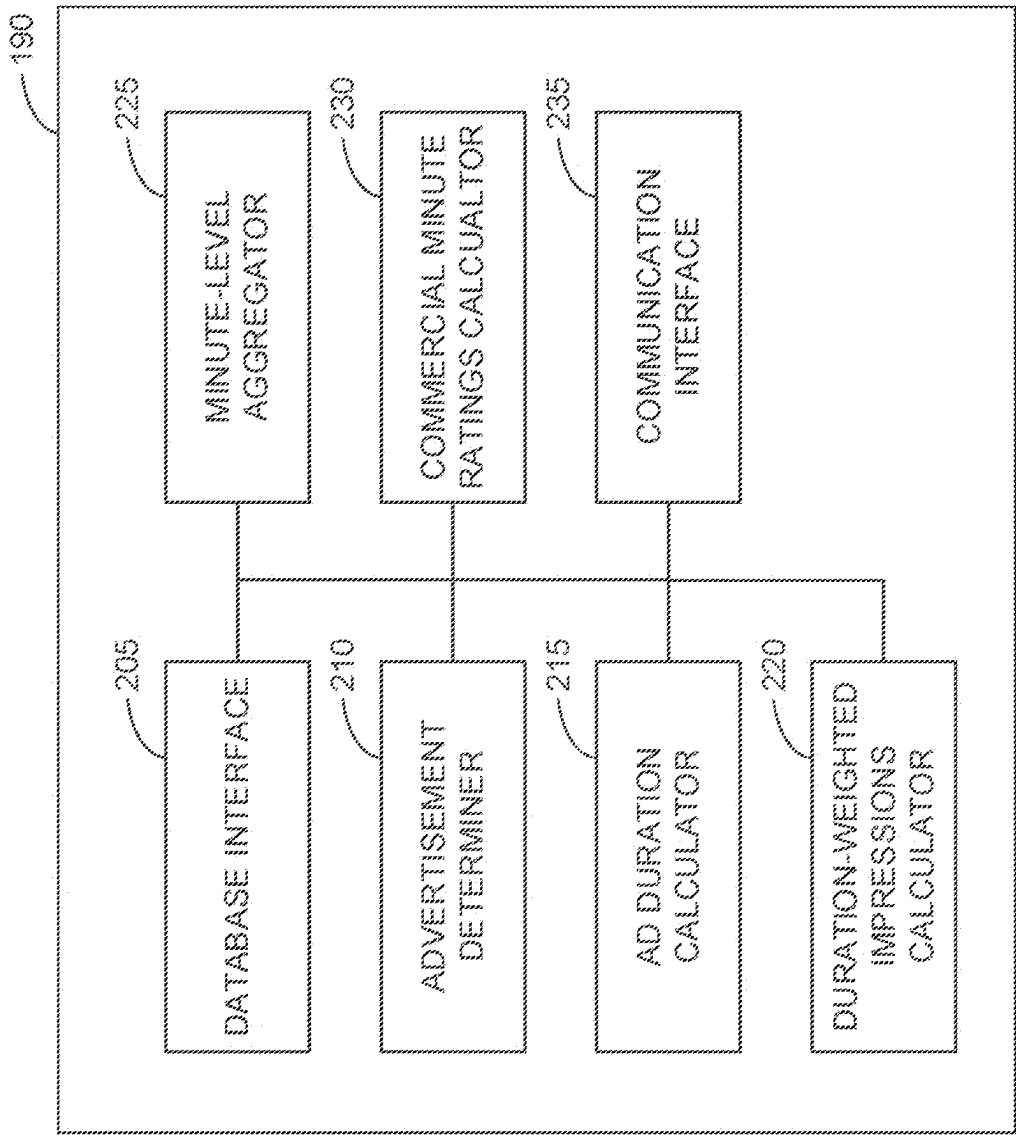
190

225 MINUTE-LEVEL AGGREGATOR

230 COMMERCIAL MINUTE RATINGS CALCUALTOR

235 COMMUNICATION INTERFACE

205 DATABASE INTERFACE

210 ADVERTISEMENT DETERMINER

215 AD DURATION CALCULATOR

220 DURATION-WEIGHTED IMPRESSIONS CALCULATOR

FIG. 2

300

MINUTE 1 ESPN WINS

MINUTE 2 TNT WINS

30 sec. LINEAR AD

30 sec. ADDRESSABLE AD

304

302

306

VIEWING ESPN

VIEWING TNT

5 sec.

25 sec.

308

310

FIG. 3

TELECAST DATE	PROGRAM	NETWORK	SOURCE	C3 IMPRESSIONS (HH)	UNIVERSE ESTIMATE (HH)	C3 RATING (HH)
10/13	NEWSROOM TODAY	CNN	NATIONAL PANEL	720,559	120,600,000	0.60
10/13	NEWSROOM TODAY	CNN	PANEL + SMART TV (LG)	713,353	120,600,000	0.59
10/13	NEWSROOM TODAY	CNN	SMART TV (LG)	18,312	3,158,831	0.58

400

FIG. 4A

SMART TV UNIVERSE	TARGET IMPRESSIONS	TARGET HOUSEHOLDS	REPORTABLE IMPRESSIONS
3,158,831	5,000		4,225

412   414   416

410

FIG. 4B

500

MINUTE OF PGM	BRAND	MINUTE LEVEL IMPRESSION PANEL + SMART TV	ADDRESSABLE IMPRESSIONS	REMAINDER LINEAR IMPRESSIONS
37	NATIONAL CAR RENTAL RENTAL CAR SVCS	726,517	825	725,692
38	IHOP RESTAURANT	709,136	910	708,226
39	DANGOTE MANUFACTURERS-GENERAL	699,878	824	699,054
40	ENSURE ORIGINAL NUTRITIONAL SUPPLMT	693,354	834	692,520
41	NETSUITE COMPUTER SOFTWARE	700,982	832	700,150
TOTAL		3,529,857	4,225	3,525,642

FIG. 5A

530

TELECAST DATE	PROGRAM	NETWORK	PRIOR C3 IMPRESSION (NATIONAL TV PANEL) (HH)	NEW C3 IMPRESSION (PANEL+SMART TV/ MVPD) (HH)	RECONCILED C3 IMPRESSION (PANEL+SMART TV/ MVPD) (HH)	DELTA (NEW C3- RECONCILED C3)
10/13	NEWSROOM TODAY	CNN	720,559	713,353	713,158	195

FIG. 5B

600

PROGRAM NAME	TELECAST START TIME	MINUTE OF PROGRAM	COMMERCIAL DURATION	IMPRESSIONS	DURATION WEIGHTED IMPRESSIONS
	602	604	606	608	610	612
EXAMPLE GRATIA	8:00 PM	1	0	25,552	
EXAMPLE GRATIA	8:00 PM	2	0	27,031	
EXAMPLE GRATIA	8:00 PM	3	0	27,031	
EXAMPLE GRATIA	8:00 PM	4	24	25,034	600,816
EXAMPLE GRATIA	8:00 PM	5	60	21,014	1,260,840
EXAMPLE GRATIA	8:00 PM	6	50	18,753	937,650
EXAMPLE GRATIA	8:00 PM	7	0	19,843	
EXAMPLE GRATIA	8:00 PM	8	0	22,654	
EXAMPLE GRATIA	8:00 PM	9	0	25,511	
EXAMPLE GRATIA	8:00 PM	10	0	25,002	

614
616
618

FIG. 6

PROGRAM NAME	TELECAST START TIME	MINUTE OF PROGRAM	COMMERCIAL DURATION	IMPRESSIONS	DURATION WEIGHTED IMPRESSIONS
EXEMPLI GRATIA	8:00PM	4	24	25,034	600,816
EXEMPLI GRATIA	8:00PM	5	60	14,716	882,960
EXEMPLI GRATIA	8:00PM	5	60	6,298	377,880
EXEMPLI GRATIA	8:00PM	6	50	18,753	937,650

702 704 706 708 710 712

700

714 716

FIG. 7

800

PROGRAM NAME	TELECAST START TIME	MINUTE OF PROGRAM	COMMERCIAL DURATION	IMPRESSIONS	DURATION WEIGHTED IMPRESSIONS
EXEMPLI GRATIA	8:00PM	4	24	25,034	600,816
EXEMPLI GRATIA	8:00PM	5	60	6,612	396,720
EXEMPLI GRATIA	8:00PM	5	60	6,298	377,880
EXEMPLI GRATIA	8:00PM	5	60	5,492	329,520
EXEMPLI GRATIA	8:00PM	5	30	2,612	156,720
EXEMPLI GRATIA	8:00PM	6	50	5,492	274,600
EXEMPLI GRATIA	8:00PM	6	30	2,612	156,720
EXEMPLI GRATIA	8:00PM	6	50	10,649	532,450

802 804 806 808 810 812
814 816 818 820 822 824 826

FIG. 8

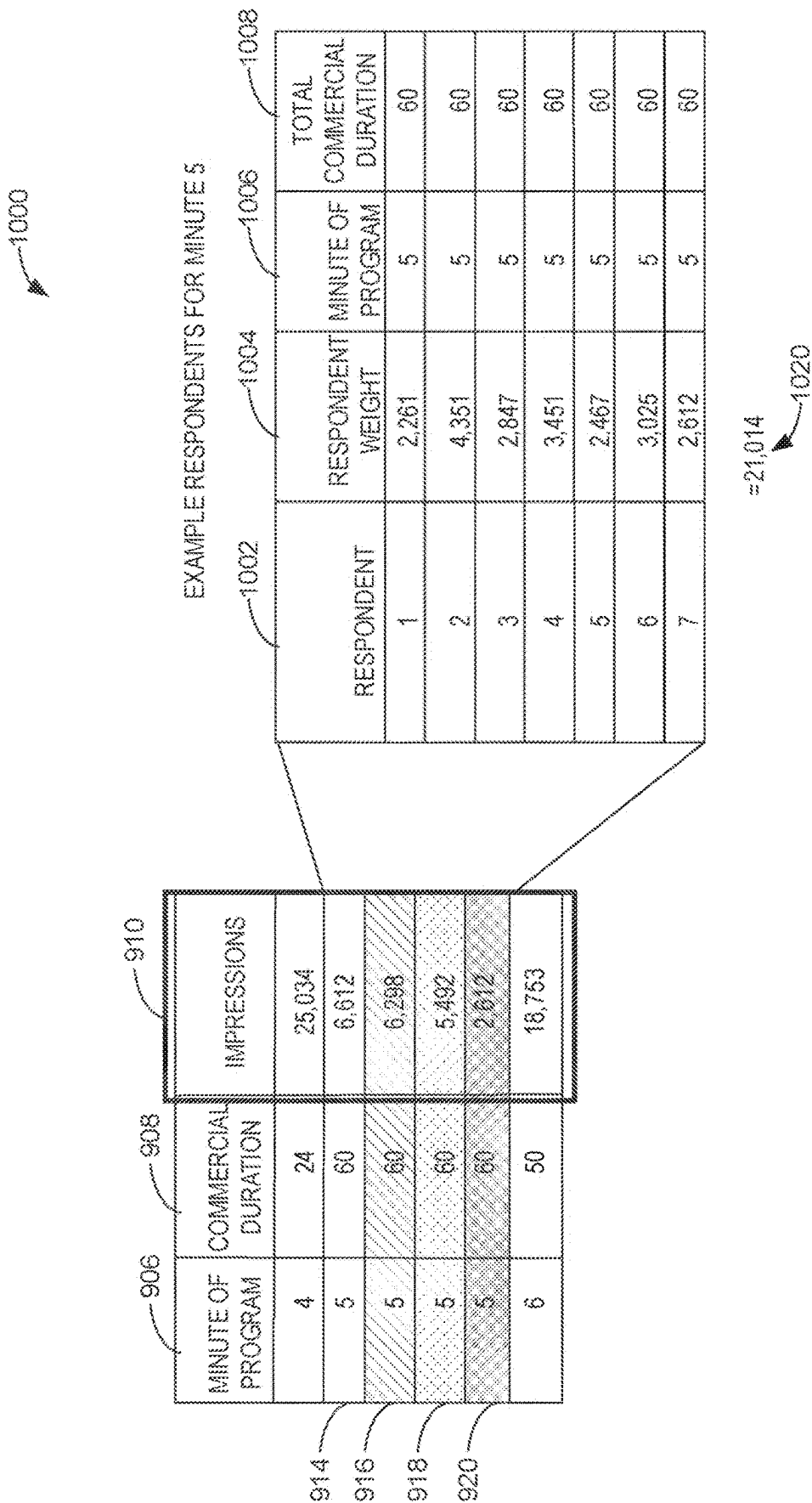| PROGRAM NAME	TELECAST START TIME	MINUTE OF PROGRAM	COMMERCIAL DURATION	IMPRESSIONS	DURATION WEIGHTED IMPRESSIONS
EXEMPLI GRATIA	8:00PM	4	24	25,034	600,616
EXEMPLI GRATIA	8:00PM	5	60	6,612	396,720
EXEMPLI GRATIA	8:00PM	5	60	6,298	377,880
EXEMPLI GRATIA	8:00PM	5	60	5,492	329,620
EXEMPLI GRATIA	8:00PM	5	60	2,612	156,720
EXEMPLI GRATIA	8:00PM	6	50	18,753	937,650

EXPOSED TO LINEAR ADS ONLY

EXPOSED TO 45 SECONDS LINEAR ADS, 15 SECONDS AD X

EXPOSED TO 40 SECONDS LINEAR ADS, 20 SECONDS AD Y

EXPOSED TO 25 SECONDS LINEAR ADS, 35 SECONDS ADS X AND Y

900

902 904 906 908 910 912

914 916 918 920

FIG. 9

1000

EXAMPLE RESPONDENTS FOR MINUTE 5

RESPONDENT	RESPONDENT WEIGHT	MINUTE OF PROGRAM	TOTAL COMMERCIAL DURATION
1	2,261	5	60
2	4,351	5	60
3	2,847	5	60
4	3,451	5	60
5	2,467	5	60
6	3,025	5	60
7	2,612	5	60

=21,014

MINUTE OF PROGRAM	COMMERCIAL DURATION	IMPRESSIONS
4	24	25,034
5	60	6,612
5	60	6,288
5	60	5,492
5	60	2,612
6	50	18,753

FIG. 10

EXAMPLE RESPONDENTS FOR MINUTE 5

1100

RESPONDENT	RESPONDENT WEIGHT (1002)	MINUTE OF PROGRAM (1004)	LINEAR DURATION (1006)	ADDRESSABLE DURATION (1102)	DURATION WDT LINEAR IMPRESSIONS (1104/1106)	DURATION WDT ADDRESABLE IMPRESSIONS (1108)
1	2,261	5	60	0	135,660	0
2	4,351	5	60	0	261,060	0
3	2,847	5	45	15	128,115	42,705
4	3,451	5	45	15	155,295	51,765
5	2,467	5	40	20	98,680	49,340
6	3,025	5	40	20	121,000	60,500
7	2,612	5	25	35	65,300	91,420

MINUTE OF PROGRAM (906)	COMMERCIAL DURATION (908)	IMPRESSIONS (910)
4	24	26,034
5	60	6,612
5	60	6,298
5	60	5,492
5	60	2,612
6	50	18,753

914
916
918
920

FIG. 11

AVERAGE MINUTE-LEVEL IMPRESSIONS ACROSS TELECAST

MINUTE OF PROGRAM	TOTAL SUMS OF WEIGHTS	TOTAL COMMERCIAL DURATION	DURATION WTD LINEAR IMPRESSIONS	DURATION WTD ADDRESSABLE IMPRESSIONS
4	25,034	24	600,816	0
5	21,014	60	965,160	295,730
6	16,753	56	937,650	0
		=134	2,503,576	295,730

MINUTE OF PROGRAM	COMMERCIAL DURATION	IMPRESSIONS
4	24	25,034
5	60	6,612
5	60	6,296
5	60	5,492
5	56	2,612
6	50	16,753

FIG. 12

AVERAGE ACROSS TOTAL COMMERCIAL SECONDS IN MINUTE

Table 1300:

MINUTE OF PROGRAM	TOTAL SUMS OF WEIGHTS	TOTAL COMMERCIAL DURATION	DURATION WTD LINEAR IMPRESSIONS	DURATION WTD ADDRESSABLE IMPRESSIONS	LINEAR COMMERCIAL MINUTE RATING	ADDRESSABLE COMMERCIAL MINUTE RATING
4	25,034	24	600,816	0	25,034	0
5	21,014	60	965,110	295,730	16,085	4,929
6	16,753	50	937,650	0	18,753	0

Table 910:

MINUTE OF PROGRAM	COMMERCIAL DURATION	IMPRESSIONS
4	24	25,034
5	60	6,612
5	60	6,298
5	60	5,492
5	60	2,612
6	50	18,753

FIG. 13

1400

| | | | | | | | | C3 CURRENCY | | C3 – PANEL + ACR | | TARGETED IMPRESSIONS | RECONCILED C3 | |
TELECAST DATE	ORIGIN-ATOR	PROGRAM NAME	EPISODE TITLE	START TIME	END TIME	DEMO	UNIVERSE ESTIMATE	AA%	AA PROJECTION	AA%	AA PROJECTION	AA PROJECTION	AA%	AA PROJECTION
10/22	NET	PROGRAM 1	S4:E5	8:00PM	9:00PM	HH	120,600,000	2.9	3,497,400	3.0	3,618,000	120,600	2.9	3,497,400
10/22	NET	PROGRAM 1	S4:E5	8:00PM	9:00PM	P25-54	121,160,000	3.2	3,877,120	3.1	3,755,960	121,160	3.0	3,634,800
10/22	NET	PROGRAM 2	S2:E5	9:00PM	10:00PM	HH	120,600,000	2.4	2,894,400	2.5	3,015,000	120,600	2.4	2,894,400
10/22	NET	PROGRAM 2	S2:E5	9:00PM	10:00PM	P25-54	121,160,000	2.6	3,150,160	2.7	3,271,320	121,160	2.6	3,150,160

1402   1404   1406   1408

FIG. 14A

1410

TELECAST DATE	ORIGIN-ATOR	PROGRAM NAME	EPISODE TITLE	START TIME	END TIME	MDP	DEMO	UNIVERSE ESTIMATE	CURRENCY 1412		PANEL+ACR 1414		TARGETED IMPRESSIONS 1416		RECONCILED AA 1418	
									AA% PROJECTION	AA PROJECTION	AA% PROJECTION	AA PROJECTION	AA% PROJECTION	AA PROJECTION	AA% PROJECTION	AA PROJECTION
10/22	NET	PROGRAM 1	S4:E5	8:00PM	9:00PM	3	HH	120,600,000	2.9	3,497,400	3.0	3,618,000	506,520	2.6	3,111,480	
10/23	NET	PROGRAM 1	S4:E5	9:00PM	10:00PM	4	HH	120,600,000	2.8	3,376,800	2.9	3,497,400	489,636	2.5	3,007,754	
10/24	NET	PROGRAM 1	S4:E5	10:00PM	11:00PM	5	HH	120,600,000	2.8	3,376,800	2.9	3,497,400	489,636	2.5	3,007,754	
10/25	NET	PROGRAM 1	S4:E5	11:00PM	12:00PM	6	HH	120,600,000	2.7	3,256,200	2.8	3,375,800	472,752	2.4	2,904,048	
10/26	NET	PROGRAM 1	S4:E5	12:00AM	1:00AM	12	HH	120,600,000	2.8	3,375,800	2.7	3,256,200	455,868	2.3	2,800,332	
10/27	NET	PROGRAM 1	S4:E5	1:00AM	2:00AM	13	HH	120,600,000	2.7	3,256,200	2.7	3,256,200	438,984	2.3	2,800,332	
10/28	NET	PROGRAM 1	S4:E5	2:00AM	3:00AM	14	HH	120,600,000	2.7	3,135,600	2.6	3,135,600	438,984	2.2	2,696,616	
10/29	NET	PROGRAM 1	S4:E5	3:00AM	4:00AM	15	HH	120,600,000	2.6	3,497,400	2.6	3,135,600	438,984	2.2	2,696,616	
10/30	NET	PROGRAM 1	S4:E5	4:00AM	5:00AM	21	HH	120,600,000	2.9	3,497,400	2.9	3,497,400	489,636	2.5	3,007,754	
10/31	NET	PROGRAM 1	S4:E5	5:00AM	6:00AM	22	HH	120,600,000	2.8	3,376,800	2.9	3,497,400	489,636	2.5	3,007,754	
11/1	NET	PROGRAM 1	S4:E5	6:00AM	7:00AM	23	HH	120,600,000	2.8	3,376,800	2.8	3,376,800	472,752	2.4	2,904,048	

FIG. 14B

1500

START

1505

OBTAIN PANEL DATA, RPD DATA, AND SMART TV DATA

1510

OBTAIN REFERENCE ADVERTISEMENT DATA

1515

COMBINE PANEL DATA, RPD DATA, SMART TV DATA, AND REFERENCE ADVERTISEMENT DATA

1520

IDENTIFY RESPONDENTS THAT RECEIVED ADDRESSABLE AD AND RESPONDENTS THAT RECEIVED LINEAR AD

1525

CALCULATE AD DURATIONS AT RESPONDENT-LEVEL

1530

CALCULATE DURATION-WEIGHTED IMPRESSIONS AT RESPONDENT-LEVEL

1535

AGGREGATE DURATION-WEIGHTED IMPRESSIONS TO MINUTE-LEVEL

1540

CALCUALTE AVERAGE COMMERCIAL MINUTE RATINGS

1545
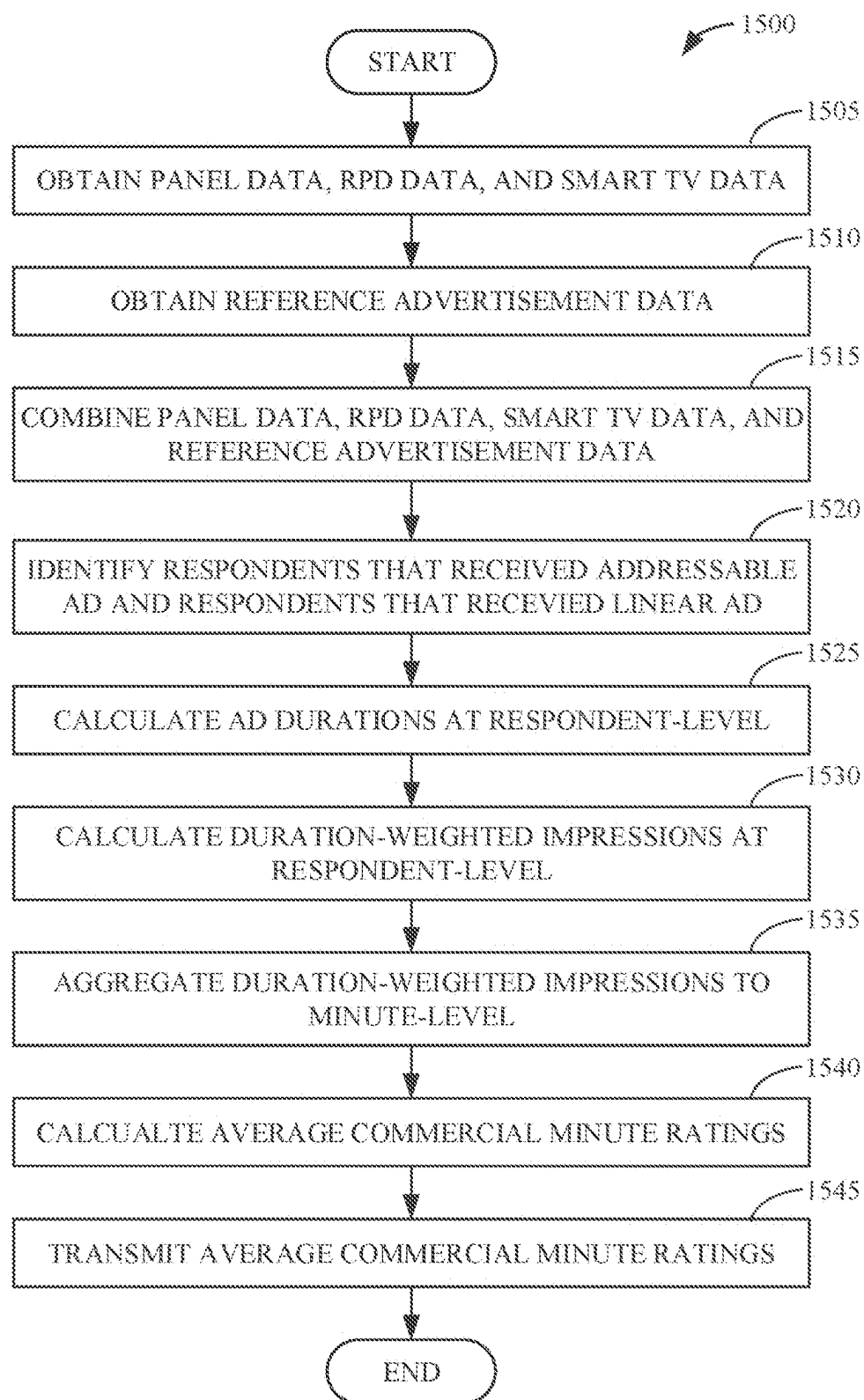
TRANSMIT AVERAGE COMMERCIAL MINUTE RATINGS
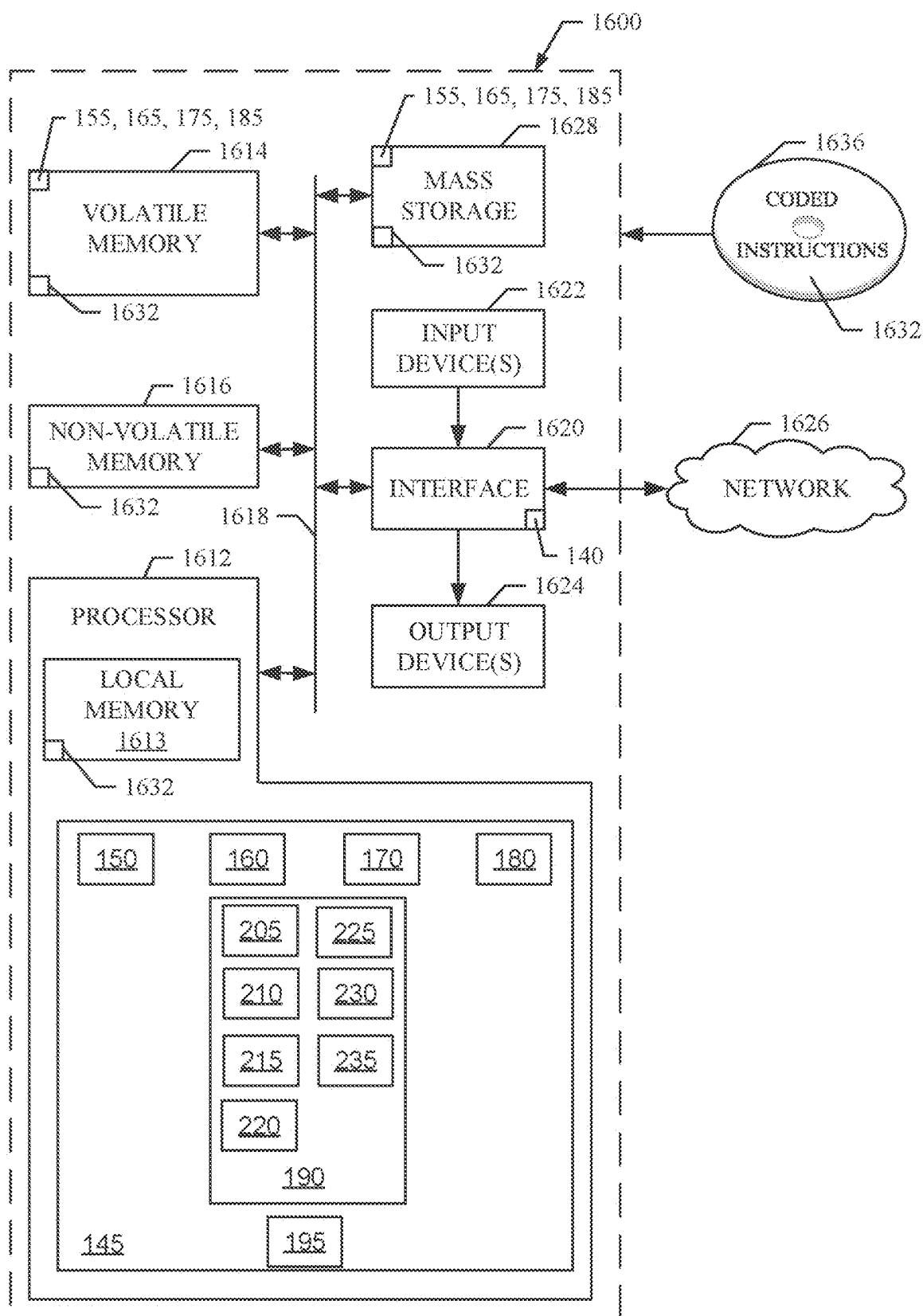
END

FIG. 15

FIG. 16

RECONCILIATION OF COMMERCIAL MEASUREMENT RATINGS

RELATED APPLICATION

[0001] This patent arises from a continuation of U.S. patent application Ser. No. 17/214,595, filed on Mar. 26, 2021, and titled "RECONCILIATION OF COMMERCIAL MEASUREMENT RATINGS," which is a continuation of International Application No. PCT/US21/17858, filed on Feb. 12, 2021, and titled "RECONCILIATION OF COMMERCIAL MEASUREMENT RATINGS," which claims the benefit of U.S. Provisional Patent Application No. 62/976,938, filed on Feb. 14, 2020, and titled "RECONCILIATION OF COMMERCIAL MEASUREMENT RATINGS," all of which are hereby incorporated herein by reference in their entireties. Priority to U.S. patent application Ser. No. 17/214,595, International Application No. PCT/US21/17858, and U.S. Provisional Patent Application No. 62/976,938 is claimed.

FIELD OF THE DISCLOSURE

[0002] This disclosure relates generally to audience measurement and, more particularly, to the reconciliation of commercial measurement ratings.

BACKGROUND

[0003] Audience measurement entities (AMEs), such as The Nielsen Company (US), LLC, may extrapolate audience viewership data for a total television viewing audience. The audience viewership data collected by an AME may include viewership data for advertisements broadcasted during television programs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 is a block diagram of an example environment in which the teachings of this disclosure may be implemented.
[0005] FIG. 2 is a block diagram of an example C3-C7 calculator included in the example environment of FIG. 1.
[0006] FIG. 3 illustrates an example of a linear advertisement and an addressable advertisement during media viewing.
[0007] FIGS. 4A, 4B illustrate example results of an example database interface included in the example C3-C7 calculator of FIG. 2 to combine panel data and Smart TV data to identify an addressable audience.
[0008] FIGS. 5A, 5B illustrate example results of recalculating minute-level audience data and reconciling a C3-C7 metric.
[0009] FIG. 6 illustrates an example ACM report based on duration weighted impressions during the commercial minutes of a telecast without accounting for linear advertisements and addressable advertisements.
[0010] FIG. 7 illustrates an example ACM report after an addressable advertisement insertion.
[0011] FIG. 8 illustrates an example ACM report with different addressable advertisements during different telecast minutes.
[0012] FIG. 9 illustrates example viewership for a linear advertisement and an addressable advertisement over different telecast minutes.
[0013] FIG. 10 illustrates example viewership results at the respondent-level.

[0014] FIG. 11 illustrates an example output of an example duration weighted impressions calculator included in the example C3-C7 calculator of FIG. 2.
[0015] FIG. 12 illustrates an example output of an example minute-level aggregator included in the example C3-C7 calculator of FIG. 2.
[0016] FIG. 13 illustrates an example output of an example commercial minute ratings calculator included in the example C3-C7 calculator of FIG. 2.
[0017] FIGS. 14A, 14B illustrate example ACM reports from an example ad ratings determiner of FIG. 1.
[0018] FIG. 15 is a flowchart representative of machine readable instructions which may be executed to implement the data center and the C3-C7 calculator 190 of FIGS. 1 and 2.
[0019] FIG. 16 is a block diagram of an example processing platform structured to execute the instructions of FIG. 15 to implement the C3-C7 calculator of FIGS. 1 and 2. Descriptors "first," "second," "third," etc. are used herein when identifying multiple elements or components which may be referred to separately. Unless otherwise specified or understood based on their context of use, such descriptors are not intended to impute any meaning of priority, physical order or arrangement in a list, or ordering in time but are merely used as labels for referring to multiple elements or components separately for ease of understanding the disclosed examples. In some examples, the descriptor "first" may be used to refer to an element in the detailed description, while the same element may be referred to in a claim with a different descriptor such as "second" or "third." In such instances, it should be understood that such descriptors are used merely for ease of referencing multiple elements or components.

DETAILED DESCRIPTION

[0020] As used herein, the term "media" includes any type of content and/or advertisement delivered via any type of distribution medium. Thus, media includes television programming or advertisements, radio programming or advertisements, movies, web sites, streaming media, etc. As used herein, the term "media asset" refers to any individual, collection, or portion/piece of media of interest. For example, a media asset may be a television show episode, a movie, a clip, etc. Media assets can be identified via unique media identifiers (e.g., a name of the media asset, a metadata tag, etc.). Media assets can be presented by any type of media presentation method (e.g., via streaming, via live broadcast, from a physical medium, etc.).
[0021] Example methods, apparatus, and articles of manufacture disclosed herein monitor media presentations by media devices. Such media devices may include, for example, Internet-enabled televisions, personal computers, Internet-enabled mobile handsets (e.g., a smartphone), video game consoles (e.g., Xbox®, PlayStation®), tablet computers (e.g., an iPad®), digital media players (e.g., a Roku® media player, a Slingbox®, etc.), etc.
[0022] In some examples, AMEs aggregate media monitoring information to determine ownership and/or usage statistics of media devices, determine the media presented by the media devices, determine audience ratings, determine relative rankings of usage and/or ownership of media devices, determine types of uses of media devices (e.g., whether a device is used for browsing the Internet, streaming media from the Internet, etc.), and/or determine other types

of media device information. In examples disclosed herein, monitoring information includes, but is not limited to, one or more of media identifying information (e.g., media-identifying metadata, codes, signatures, watermarks, and/or other information that may be used to identify presented media), application usage information (e.g., an identifier of an application, a time and/or duration of use of the application, a rating of the application, etc.), and/or user-identifying information (e.g., demographic information, a user identifier, a panelist identifier, a username, etc.), etc.

[0023] In some examples, audio watermarking is used to identify media such as television broadcasts, radio broadcasts, advertisements (television and/or radio), downloaded media, streaming media, prepackaged media, etc. Existing audio watermarking techniques identify media by embedding one or more audio codes (e.g., one or more watermarks), such as media identifying information and/or an identifier that may be mapped to media identifying information, into an audio and/or video component. In some examples, the watermark is embedded in the audio or video component so that the watermark is hidden.

[0024] To identify watermarked media, the watermark(s) are extracted and used to access a table of reference watermarks that are mapped to media identifying information. In some examples, media monitoring companies provide watermarks and watermarking devices to media providers with which to encode their media source feeds. In some examples, if a media provider provides multiple media source feeds (e.g., ESPN and ESPN 2, etc.), a media provider can provide a different watermark for each media source feed.

[0025] In some examples, signature matching is used to identify media. Unlike media monitoring techniques based on watermarks included with and/or embedded in the monitored media, fingerprint or signature-based media monitoring techniques generally use one or more inherent characteristics of the monitored media during a monitoring time interval to generate a substantially unique proxy for the media. Such a proxy is referred to as a signature or fingerprint, and can take any form (e.g., a series of digital values, a waveform, etc.) representative of any aspect(s) of the media signal(s) (e.g., the audio and/or video signals forming the media presentation being monitored). A signature may be a series of signatures collected in series over a time interval. A good signature is repeatable when processing the same media presentation, but is unique relative to other (e.g., different) presentations of other (e.g., different) media. Accordingly, the terms "fingerprint" and "signature" are used interchangeably herein and are defined herein to mean a proxy for identifying media that is generated from one or more inherent characteristics of the media.

[0026] Signature-based media monitoring generally involves determining (e.g., generating and/or collecting) signature(s) representative of a media signal (e.g., an audio signal and/or a video signal) output by a monitored media device and comparing the monitored signature(s) to one or more references signatures corresponding to known (e.g., reference) media source feeds. Various comparison criteria, such as a cross-correlation value, a Hamming distance, etc., can be evaluated to determine whether a monitored signature matches a particular reference signature. When a match between the monitored signature and a reference signature is found, the monitored media can be identified as corresponding to the particular reference media represented by the

reference signature that matched with the monitored signature. In some examples, signature matching is based on sequences of signatures such that, when a match between a sequence of monitored signatures and a sequence of reference signatures is found, the monitored media can be identified as corresponding to the particular reference media represented by the sequence of reference signatures that matched the sequence of monitored signatures. Because attributes, such as an identifier of the media, a presentation time, a broadcast channel, etc., are collected for the reference signature(s), these attributes may then be associated with the monitored media whose monitored signature matched the reference signature(s). Example systems for identifying media based on codes and/or signatures are long known and were first disclosed in Thomas, U.S. Pat. No. 5,481,294, which is hereby incorporated by reference in its entirety.

[0027] AMEs, such as The Nielsen Company (US), LLC, desire knowledge regarding how users interact with media devices such as smartphones, tablets, laptops, smart televisions, etc. AMEs may also be referred to as media monitoring entities, audience survey entities, etc. In some examples, AMEs monitor media presentations made at the media devices to, among other things, monitor exposure to advertisements, determine advertisement effectiveness, etc. AMEs can provide media meters to people (e.g., panelists) which can generate media monitoring data based on the media exposure of those users. Such media meters can be associated with a specific media device (e.g., a television, a mobile phone, a computer, etc.) and/or a specific person (e.g., a portable meter, etc.).

[0028] As noted above, AMEs extrapolate ratings metrics and/or other audience measurement data for a total television viewing audience from a relatively small sample of panelist households, also referred to herein as panel homes. The panel homes may be well studied and are typically chosen to be representative of an audience universe as a whole.

[0029] To help supplement panel data, an AME, such as The Nielsen Company (US), LLC, may reach agreements with pay-television provider companies to obtain the television tuning information derived from set top boxes, which is referred to herein, and in the industry, as return path data (RPD). Set-top box (STB) data includes all the data collected by the set-top box. STB data may include, for example, tuning events and/or commands received by the STB (e.g., power on, power off, change channel, change input source, start presenting media, pause the presentation of media, record a presentation of media, volume up/down, etc.). STB data may additionally or alternatively include commands sent to a content provider by the STB (e.g., switch input sources, record a media presentation, delete a recorded media presentation, the time/date a media presentation was started, the time a media presentation was completed, etc.), heartbeat signals, or the like. The set-top box data may additionally or alternatively include a household identification (e.g. a household ID) and/or a STB identification (e.g. a STB ID).

[0030] Return path data includes any data receivable at a media service provider (e.g., a such as a cable television service provider, a satellite television service provider, a streaming media service provider, a content provider, etc.) via a return path to the service provider from a media consumer site. As such, return path data includes at least a

portion of the set-top box data. Return path data may additionally or alternatively include data from any other consumer device with network access capabilities (e.g., via a cellular network, the internet, other public or private networks, etc.). For example, return path data may include any or all of linear real time data from an STB, guide user data from a guide server, click stream data, key stream data (e.g., any click on the remote-volume, mute, etc.), interactive activity (such as Video On Demand) and any other data (e.g., data from middleware). RPD data can additionally or alternatively be from the network (e.g., via Switched Digital software) and/or any cloud-based data (such as a remote server DVR) from the cloud.

[0031] Example methods, apparatus, systems, and articles of manufacture (e.g., physical storage media) disclosed herein implement the reconciliation of commercial measurement ratings, such as the C3-C7 measurement ratings produced by The Nielsen Company (US), LLC. The C3-C7 metric represents the average audience of National commercials within a given program, inclusive of three (C3) or seven (C7) days of time-shifted viewing. The C3-C7 metric provides commercial metrics regarding the average commercial minute (ACM) for broadcasts of linear advertisements during a program. In examples disclosed herein, an ACM is the average number of duration weighted impressions during the commercial minutes of a telecast. In some example, the C3-C7 metric is determined by calculating the duration weighted impressions for each commercial minute of a telecast by multiplying the number of commercial impressions during the program by the duration of the commercials airing in that minute. The C3-C7 metric then sums the duration weighted impression for the entire telecast and sums the commercial duration in seconds. The C3-C7 metric determines the ACM by dividing the total duration weighted impressions by the total commercial duration.

[0032] In examples disclosed herein, a linear advertisement is an advertisement scheduled for broadcasting during a specific program to all households tuned to that program. The C3-C7 metric is determined by the AME for the linear broadcasts using tuning data measurements collected from households during the period(s) of time that advertisement(s) was (were) broadcasted during a program.

[0033] Although example techniques disclosed herein are described from the perspective of reconciling C3-C7 commercial metrics that are based on an ACM aggregation technique, the disclosed example techniques can be used to reconcile other ratings metrics. For example, the disclosed example techniques could be used to reconcile commercial metrics that are based on an exact commercial minute (ECM) aggregation technique.

[0034] However, the development of addressable advertisement insertion technology has changed the way commercial advertisements in telecasts are provided to at least some media devices in households. Households have experienced an increase in the use of smart televisions (Smart TVs) for presenting media. In examples disclosed herein, a Smart TV is a television that is able to connect to a network, such as the internet, and run applications. Smart TVs may also include technology that allows advertisers to push specific advertisements to targeted households. Additionally, addressable advertisement insertion technology can push specific advertisements to targeted households using set-top boxes (e.g., based on information conveyed by RPD from the set-top boxes), etc. In examples disclosed herein, an addressable advertisement is an advertisement that is shown to a specific media device in a household. In examples disclosed herein, a media device selected for an addressable advertisement will not present the linear advertisement originally scheduled for that time period in the program.

[0035] To support addressable advertisement insertion technology, examples disclosed herein augment ACM computation for the C3-C7 metric to reconcile the C3-C7 metric to capture viewership of an advertisement accurately. The addressable advertisement insertion technology allows different households to view different advertisements during the same block of time. An example C3-C7 metric may not differentiate between whether a household audience was presented a linear advertisement or an addressable advertisement while watching a program. Disclosed example techniques reconcile the C3-C7 metrics such that they include ACM viewership data for both the linear advertisements and the addressable advertisements presented in households.

[0036] Examples disclosed herein reconcile the C3-C7 metric to differentiate the ACM measurements for addressable advertisements and linear advertisements. Examples disclosed herein collect program viewership data from household Smart TVs and integrate the program viewership data into the measurement data collected for a national panel of households. The program viewership data collected from each Smart TV device in each household represents what program each Smart TV device was tuned to. Examples disclosed herein may collect the viewership data using automatic content recognition techniques based on watermarks, fingerprinting, etc. Examples disclosed herein may additionally or alternatively collect viewership data through a television set-top-box and from RPD data. Examples disclosed herein also obtain reference data that indicate which devices were served the linear advertisement during a time for that program broadcast, and which devices were served an addressable advertisement during that same time in the program broadcast. Examples disclosed herein use both the program viewership data collected for the national panel and the reference data indicating which devices presented which advertisement as inputs to the modified C3-C7 metric. Examples disclosed herein weight ACM measurements from individual Smart TV devices, set-top boxes, individuals in households, etc. to determine the C3-C7 metrics for a program such that the C3-C7 distinguish between linear advertisements and addressable advertisements.

[0037] Examples disclosed herein may also introduce a potential gap in the C3-C7 metric measurement when including the viewership data from Smart TVs into the measurement. In some examples, this gap accounts for data being collected from Smart TVs in a home but not being collected from other televisions in households with the Smart TVs. In some examples, to avoid understating the audience estimates, an additional weighting step is used to correct for potential bias in households affected by the Smart TV data collection. In some examples, the additional weighting step includes giving panel households that are in the same footprint as the Smart TV households an additional weight (the weight being larger than the weight added to the Smart TV households) that can be applied to the tuning/viewing data from the non-Smart TV devices. Giving additional weight to the viewing data in the panel households

that have data collected from all devices allows for closing the gap introduced by using Smart TVs for measurement.

[0038] FIG. 1 is a block diagram of an example environment 100 in which the teachings of this disclosure may be implemented. The environment 100 includes an example media device 105, an example media meter 110, an example Smart TV device 115, an example service provider 120, example set top boxes (STBs) 125, an example addressable ad provider 130, an example network 135, an example network interface 140, and an example data center 145. The data center 145 further includes an example meter data analyzer 150, an example panel database 155, an example return path data (RPD) collector 160, an example RPD database 165, an example Smart TV data collector 170, an example Smart TV database 175, an example addressable ad data collector 180, an example addressable ad database 185, an example C3-C7 calculator 190, and an example ad ratings determiner 195.

[0039] The example media device 105 is used to access and view different media. The example the media device 105 can be implemented with any device or combinations of devices that are able to connect to media such as, for example, a smart television (TV), a set-top box (STB), a game console, a digital video recorder (DVR), an Apple TV, a Roku device, YouTube TV, an Amazon fire device, other over-the-top (OTT) devices, etc., or any combination thereof.

[0040] The example media meter 110 collects media monitoring information from the media device 105. In some examples, the media meter 110 is associated with (e.g., installed on, coupled to, etc.) to the example media device 105. For example, the media device 105 associated with the media meter 110 presents media (e.g., via a display, etc.). In some examples, the media device 105 that is associated with the media meter 110 additionally or alternatively presents the media on separate media presentation equipment (e.g., speakers, a display, etc.). In such examples, the media meter 110 can have direct connections (e.g., physical connections) to the media device 105, and/or may be connected wirelessly (e.g., via Wi-Fi, via Bluetooth, etc.) to the media device 105.

[0041] Additionally or alternatively, in some examples, the media meter 110 is a portable meter carried by one or more individual people. In the illustrated example, the media meter 110 monitors media presented to one or more people associated with the media meter 110 and generates the monitoring data. In some examples, the monitoring data generated by the media meter 110 can include watermarks or signatures associated with the presented media. For example, the media meter 110 can determine a watermark (e.g., generate watermarks, extract watermarks, etc.) and/or a signature (e.g., generate signatures, extract signatures, etc.) associated with the presented media. Accordingly, the monitoring data can include media signatures and/or media watermarks representative of the media monitored by the media meter 110. In some examples, the media meter 110 provides the monitoring data to the data center 145 via the example network 135.

[0042] The example Smart TV device 115 is a television that is able to connect to a network, such as the internet, and run applications. The example Smart TV device 115 may also include technology that allows advertisers to push specific advertisements to targeted households. In some examples, the Smart TV device 115 includes technology (e.g., an automatic content recognition (ACR) chip) for

determining what media (e.g., an advertisement, television show, etc.) is presented on the Smart TV device 115. For example, the Smart TV device 115 may include an ACR chip that takes a picture of what is presented on the screen periodically (e.g., once every two second, once every ten seconds, etc.). In some such examples, the ACR chip in the Smart TV device 115 uses a reference library to perform matching through image fingerprinting (e.g., comparing a compressed screen shot of the media on the screen to image fingerprints stored in the reference library). The Smart TV device 115 determines what media is presented on the screen of the Smart TV device 115. In some examples, the Smart TV device 115 provides the identified media from the image fingerprinting to the data center 145 via the example network 135.

[0043] In the illustrated example of FIG. 1, the example service provider 120 collects return path data from the example STBs 125 in households. In some examples, the example STBs 125 generates data that may include, for example, tuning events and/or commands received by the STBs 125 (e.g., power on, power off, change channel, change input source, start presenting media, pause the presentation of media, record a presentation of media, volume up/down, etc.). The data from the example STBs 125 may additionally or alternatively include commands sent to a content provider by the STBs 125 (e.g., such as one or more commands to switch input sources, record a media presentation, delete a recorded media presentation, etc., and/or data related to one or more commands, such as the time/date a media presentation was started, the time a media presentation was completed, etc.), heartbeat signals, or the like. The data from the STBs 125 may additionally or alternatively include a household identification (e.g., a household ID) and/or a STB identification (e.g., a STB ID). The example service provider 120 collects return path data from the data of the STBs 125. The example service provider 120 may include a cable television service provider, a satellite television service provider, a streaming media service provider, a content provider, etc. In some examples, the return path data collected by the service provider 120 includes any or all of linear real time data from an STB, guide user data from a guide server, click stream data, key stream data (e.g., any click on the remote-volume, mute, etc.), interactive activity (such as Video On Demand) and any other data (e.g., data from middleware). In some examples, the service provider 120 provides the return path data to the data center 145 via the example network 135.

[0044] The example addressable ad provider 130 is an advertisement provider that provides addressable advertisements to selected households. The example addressable ad provider 130 pushes specific advertisements to targeted households (e.g., a household with demographic information that indicates there is a baby in the household may be targeted to receive a diaper advertisement instead of a car advertisement). In examples disclosed herein, an addressable advertisement is an advertisement that is shown to a specific media device in a household. The example addressable ad provider 130 identifies the target households for specific advertisements for different times (e.g., minutes) during a telecast. In some examples, the addressable ad provider 130 provides data identifying households that received the different addressable advertisements at the different times during a telecast to the data center 145 via the example network 135.

[0045] The example network 135 is a network used to transmit the monitoring data, Smart TV data, return path data, and addressable advertisement data to the example data center 145 via the network interface 140. In some examples, the network 135 can be the Internet or any other suitable external network. In other examples, any other suitable means of transmitting the monitoring data, Smart TV data, return path data, and addressable advertisement data to the data center 145 can be used.

[0046] The example data center 145 is an execution environment used to implement the example meter data analyzer 150, the example panel database 155, the example RPD collector 160, the example RPD database 165, the example Smart TV data collector 170, the example Smart TV database 175, the example addressable ad data collector 180, the example addressable ad database 185, the example C3-C7 calculator 190, and the example ad ratings determiner 195. In some examples, the data center 145 is associated with a AME. In some examples, the data center 145 can be a physical processing center (e.g., a central facility of the AME, etc.). Additionally or alternatively, the data center 145 can be implemented via a cloud service (e.g., AWS™, etc.).

[0047] In the illustrated example of FIG. 1, the meter data analyzer 150 collects, via the network interface 140 in communication with the example network 135, the monitoring data from example media meter 110, which monitors media exposure associated with example media device 105 (e.g., televisions, radios, computers, tablet devices, smart phones, etc.) in panel homes recruited by an AME. The example meter data analyzer 150 processes the gathered media monitoring data to detect, identify, credit, etc. respective media assets and/or portions thereof (e.g., media segments) associated with the corresponding monitoring data. For example, the meter data analyzer 150 can compare the monitoring data to generated reference data to determine what respective media assets and/or media segments are associated with the corresponding monitoring data. In some examples, the meter data analyzer 150 can hash the signatures included in the monitoring data. In some examples, the meter data analyzer 150 can identify the media by matching unhashed signatures and/or hashed signatures. In some examples, the meter data analyzer 150 can identify media by matching watermarks included in the monitoring data to reference watermarks that are mapped to media identifying information. The meter data analyzer 150 of the illustrated example also analyzes the monitoring data to determine if a media asset, and/or particular portion(s) (e.g., segment(s)) thereof, is to be credited as a media exposure represented in the monitoring data. The example meter data analyzer 150 stores the identified monitoring data as panel data (e.g., monitoring data associated with panel households) along with additional panel household information (e.g., demographic information, geographic location, etc.) from the media meter 110 in the example panel database 155.

[0048] The example RPD collector 160 collects, via the network interface 140 in communication with the example network 135, the return path data from the example service provider 120 for associating with the example STBs 125. The RPD collector 160 stores the return path data along with additional household information (e.g., demographic information, geographic location, etc.) from the STBs 125 in the example RPD database 165.

[0049] The example Smart TV data collector 170 collects, via the network interface 140 in communication with the example network 135, the Smart TV data from the example Smart TV device 115 for monitoring media exposure associated with the example Smart TV device 115 households. The Smart TV data collector 170 stores the Smart TV data along with additional household information (e.g., demographic information, geographic location, etc.) from the Smart TV device 115 in the example Smart TV database 175.

[0050] The example addressable ad data collector 180 collects, via the network interface 140 in communication with the example network 135, the addressable advertisement data from the example addressable ad provider 130 for monitoring addressable advertisement exposure associated with media devices in target households. The addressable ad data collector 180 stores the addressable advertisement data along with additional household information (e.g., demographic information, geographic location, etc.) for the household selected by the addressable ad provider 130 in the example addressable ad database 185.

[0051] The example C3-C7 calculator 190 obtains the panel data, return path data, Smart TV data, and reference advertisement data from the example panel database 155, the example RPD database 165, the example Smart TV database 175, and the example addressable ad database 185, respectively. The C3-C7 calculator 190 combines the panel data, the return path data, the Smart TV data, and the reference advertisement data. The C3-C7 calculator 190 analyzes the combined panel data, the return path data, the Smart TV data, and the reference advertisement data by identifying data associated with advertisement exposure (linear advertisements and addressable advertisements), removing duplicate data, etc. The example C3-C7 calculator 190 identifies respondents that received addressable advertisements and respondents that received linear advertisements from the combined and analyzed panel data, the return path data, the Smart TV data, and the reference advertisement data. The example C3-C7 calculator 190 calculates the average commercial minute ratings for minutes in a telecast that were addressable advertisements and linear advertisements. The example C3-C7 calculator 190 transmits the average commercial minute ratings to the example ad ratings determiner 195. The example C3-C7 calculator 190 is described in further detail below in connection with FIG. 2.

[0052] The example ad ratings determiner 195 determines ratings data and/or other audience metrics by using the average commercial minute ratings from the C3-C7 calculator 190. In some examples, the ad ratings determiner 195 can use the ratings data to select addressable advertisements for respondents, modify the linear advertisements and addressable advertisements, disable addressable advertisements for target respondents, etc. In some examples, the ad ratings determiner 195 generates a report including data metrics regarding media exposure events for advertisements during a telecast that may be presented to media providers and advertisers.

[0053] FIG. 2 is a block diagram of an example implementation of the C3-C7 calculator 190 included in the example environment 100 of FIG. 1. The example C3-C7 calculator 190 of FIG. 2 includes an example database interface 205, an example advertisement determiner 210, an example ad duration calculator 215, an example duration weighted impressions calculator 220, an example minute-level aggregator 225, an example commercial minute ratings calculator 230, and an example communication interface 235.

[0054] The example database interface **205** obtains the panel data, return path data, Smart TV data, and reference advertisement data from the example panel database **155**, the example RPD database **165**, the example Smart TV database **175**, and the example addressable ad database **185**, respectively. In some examples, the panel data collected from media devices (e.g., the example media device **105** of FIG. **1**), the return path data collected from service providers (e.g., the example service provider **120** of FIG. **1**), and the Smart TV data collected from Smart TV devices (e.g., the example Smart TV device **115** of FIG. **1**) are referred to as program tuning data of households. The database interface **205** combines the panel data, the return path data, the Smart TV data, and the reference advertisement data. The database interface **205** analyzes the combined panel data, the return path data, the Smart TV data, and the reference advertisement data by identifying data associated with advertisement exposure (linear advertisements and addressable advertisements), removing duplicate data, etc.

[0055] The example advertisement determiner **210** identifies respondents that received addressable advertisements and respondents that receive linear advertisements. In examples disclosed herein, a respondent may include a household, an individual person, an individual media device, etc. The advertisement determiner **210** identifies the respondents that received addressable advertisements and the respondents that receive linear advertisements from the combined program tuning data and the reference advertisement data from the example database interface **205**.

[0056] The example ad duration calculator **215** calculates advertisement durations at the respondent-level. The ad duration calculator **215** calculates the durations for linear advertisements and for addressable advertisements. In some examples, the ad duration calculator **215** determines the durations of a linear advertisement and an addressable advertisement in seconds for each minute in a telecast. For example, during one minute of a telecast, the ad duration calculator **215** determines that a linear advertisement was presented for 45 seconds during the minute and an addressable advertisement was presented for 15 seconds during the minute.

[0057] The example duration weighted impressions calculator **220** calculates duration weighted impressions at the respondent-level based on the durations of linear advertisements and the durations of addressable advertisements calculated by the ad duration calculator **215**. The duration weighted impressions calculator **220** calculates the duration weighted impressions for the respondents. In examples disclosed herein, impressions are the sums of weights of individual respondents that viewed the advertisements during a given minute. In some examples, the duration weighted impressions calculator **220** calculates the duration weighted impressions for the linear advertisements and addressable advertisements using Equations 1a and 1b below.

$$\text{duration weighted linear impressions} = \qquad \text{(Equation 1a)}$$
$$\text{weight} * \text{linear duration}$$

$$\text{duration weighted addressable impressions} = \qquad \text{(Equation 1b)}$$
$$\text{weight} * \text{addressable duration}$$

As illustrated in Equations 1a, 1b above, the duration weighted impressions account for weight values associated with each respondent and the durations of the linear advertisements and addressable advertisements calculated by the ad duration calculator **215**. In such examples, the duration weighted impressions include weighting values from the respondents to correct for potential bias in households affected by the Smart TV data collection. In some examples, the additional weighting step includes giving panel households that are in the same footprint as the Smart TV households an additional weight (the weight being larger than the weight added to the Smart TV households) that can be applied to the tuning/viewing data from the non-Smart TV devices of those panel households. Giving additional weight to the viewing data in the panel households that have data collected from all devices allows for closing the gap introduced by using Smart TVs for measurement.

[0058] The example minute-level aggregator **225** aggregates the duration weighted impressions from the duration weighted impressions calculator **220** to the minute-level. The minute-level aggregator **225** aggregates the duration weighted impressions for linear advertisements and addressable advertisements for the respondents for each commercial minute in the telecast. The minute-level aggregator **225** sums the duration weighted impressions for each commercial minute using the below Equations 2a and 2b.

$$\text{total duration } wtd \text{ linear impressions} = \qquad \text{(Equation 2a)}$$
$$\sum (\text{weight} * \text{linear duration})$$

$$\text{total duration } wtd \text{ addressable impressions} = \qquad \text{(Equation 2b)}$$
$$\sum (\text{weight} * \text{addressable duration})$$

The minute-level aggregator **225** determines the total commercial duration for the telecast in seconds (e.g., across all commercial minutes). The minute-level aggregator **225** determines the minute-level impressions across the telecast for both the linear advertisements and the addressable advertisements by dividing the resulting total duration weighted impressions from Equations 2a, 2b above by the total commercial duration for the telecast.

[0059] The example commercial minute ratings calculator **230** calculates the average commercial minute ratings based on the minute-level duration weighted impressions from the example minute-level aggregator **225**. The commercial minute ratings calculator **230** calculates the average commercial minute rating for the addressable advertisement and the average commercial minute rating for the linear advertisement using the total duration weighted impressions of the addressable advertisement, the total duration weighted impressions of the linear advertisement, and a total number of commercial seconds from the example minute-level aggregator **225**. The example commercial minute ratings calculator **230** may calculate the average commercial minute ratings using Equations 3a and 3b below.

average linear commercial minute rating = $\qquad$ (Equation 3a)

$$\frac{\text{total duration } wtd \text{ linear impressions}}{\text{total commercial duration}}$$

average addressable commercial minute rating = (Equation 3b)

$$\frac{\text{total duration } wtd \text{ addressable impressions}}{\text{total commercial duration}}$$

In Equations 3a, 3b above, the total commercial duration represents the sum of the total duration of the linear advertisement in seconds and the total duration of the addressable advertisement in seconds. The commercial minute ratings calculator **230** determines the average commercial minute ratings while accounting for different advertisement durations at the respondent-level to depict changes in an audience for linear advertisements and addressable advertisements in a telecast.

[0060] The example communication interface **235** transmits the average commercial minute ratings (e.g., the average linear commercial minute ratings and the average addressable commercial minute ratings) from the commercial minute ratings calculator **230** to the example ad ratings determiner **195** of FIG. **1**. The example communication interface **235** transmits the average commercial minute ratings for the linear advertisements and addressable advertisements to the ad ratings determiner **195** to credit the addressable advertisement and the linear advertisement with audience viewership metrics.

[0061] FIG. **3** illustrates an example of a linear advertisement and an addressable advertisement during an example media viewing **300**. The example media viewing **300** includes an example first program **302**, an example addressable advertisement period **304**, and an example second program **306**. The example addressable advertisement period **304** includes an example first time period **308** and an example second time period **310**. The example of FIG. **3** illustrates an example of two minutes of viewing. In the illustrated example, the user views media on the example first program **302** (e.g., ESPN) for a first minute. During the first program **302**, there is a linear advertisement for 30 seconds followed by an addressable advertisement period **304**. In the illustrated example, the user views the addressable advertisement period **304** for the first time period **308** (e.g., five seconds) on the first program **302**. After the first time period **308**, the user tunes to the second program **306** (e.g., TNT). In the illustrated example, the first time period **308** (e.g., five seconds) is credited to the addressable advertisement on the first program **302**. The second time period **310** is credited towards the linear commercial total on the first program **302** instead of credited as viewing the second program **306** because if the viewer is not viewing the addressable advertisement during the second time period **310**, then the C3-C7 metric assumes the second time period **310** should be credited to the linear advertisement on the first program **302**.

[0062] FIGS. **4A**, **4B** illustrate example results **400**, **410** of the example database interface **205** included in the example C3-C7 calculator **190** of FIG. **2** combining panel data and Smart TV data and identifying an addressable audience. The example results **400** of FIG. **4A** illustrate the example database interface **205** combining the panel data, return path data, and the Smart TV data. The example results **400**

include example C3 ratings **402**, **404**, **406** for a telecast before accounting for addressable advertisements. In the illustrated example, the results **400** include C3 ratings for the telecast based on the data obtained by the database interface **205**. In the illustrated example, the database interface **205** obtains panel data for the C3 rating **402**. The database interface **205** obtains panel data and Smart TV data and combines the data for the C3 rating **404**. The database interface **205** obtains Smart TV data for the C3 rating **406**.

[0063] FIG. **4B** illustrates the results **410** for an addressable advertisement audience from reference advertisement data. The results **410** include example universe device impressions **412**, example target impressions **414**, and example reportable impressions **416**. The example database interface **205** obtains the reference advertisement data to identify the universe device impressions **412**, example target impressions **414**, and example reportable impressions **416**. In examples disclosed herein, not all devices (e.g., Smart TV device, other media devices, etc.) in the universe device impression **412** meet a desired target demographic for an addressable advertisement or are not able to receive addressable advertisements (e.g., lack of technology). The target impression **414** represents the number of impressions based on targeted households for an addressable advertisement. However, not all targeted households see the addressable advertisement (e.g., change of the channel, etc.). The reportable impressions **416** illustrate the number of target household with reportable impressions for viewing the addressable advertisement. The example database interface **205** obtains the panel data, return path data, and Smart TV data illustrated in the example results **400** and the reference addressable advertisement data illustrated in the example results **410** to adjust the C3-C7 metric for addressable advertisement impressions.

[0064] FIGS. **5A**, **5B** illustrate example results **500**, **530** of recalculating minute-level audience data and reconciling C3-C7 metric. The example results **500** of FIG. **5A** illustrate recalculating minute-level audience impressions based on the results **400** and **410** of FIGS. **4A**, **4B**. The example results **500** include example advertisements **502-510**, example commercial minutes **512**, example advertisement brands **514**, example minute-level impressions **516**, example addressable impressions **518**, and example linear impressions **520**. In the illustrated example, the addressable impressions **518** and the linear impressions **520** for the advertisements **502-510** are determined from the minute-level impressions **516**.

[0065] The example results **530** of FIG. **5B** illustrate reconciling the C3-C7 metric to calculate ACM ratings based on the minute-level audience impressions from the example results **500** of FIG. **5A**. The example results **530** include an example telecast **532**, an example program **534**, an example network **536**, an example prior C3 impression **538**, an example prior C3 impression **540**, an example reconciled C3 impression **542**, and an example delta C3 metric **544**. In the illustrated example, the prior C3 impression **538** illustrates the C3 impressions that do not differentiate between linear advertisement impressions and addressable advertisement impressions (e.g., the addressable impressions **518** and the linear impressions **520**) based on panel data. In the illustrated example, the prior C3 impression **540** illustrates the C3 impressions that do not differentiate between linear advertisement impressions and addressable advertisement impressions (e.g., the addressable

impressions **518** and the linear impressions **520**) based on panel data, return path data, and Smart TV data. The reconciled C3 impression **542** illustrates the C3 impressions that different between linear advertisement impressions and addressable advertisement impressions (e.g., the addressable impressions **518** and the linear impressions **520**) according to the teachings of this disclosure. In the illustrated example, the delta C3 metric **544** illustrates the difference between the prior C3 impression **540** and the reconciled C3 impressions **542** at the respondent level based on the difference between the linear advertisement impressions and addressable advertisement impressions. Although the delta C3 metric **544** is the difference between the C3 model calculating impressions when not differentiating linear impressions and addressable impressions (e.g., prior C3 impression **540**) and when differentiating linear impressions and addressable impressions (e.g., the reconciled C3 impressions **542**), the delta C3 metric **544** does not illustrate the number of addressable impressions.

[0066] FIG. **6** illustrates example results for an ACM report **600** based on duration weighted impressions during the commercial minutes of a telecast without accounting for linear advertisements and addressable advertisements. In the illustrated example, the C3-C7 commercial metrics report the ACM which is the average number of duration weighted impressions during the commercial minutes of a telecast. Therefore, every commercial during the same telecast will have the same ACM rating. The example ACM report **600** includes example program name **602**, example telecast start time **604**, example minutes of telecast **606**, example commercial durations **608**, example impressions **610**, and example duration weighted impressions **612** for each of example commercial minutes **614**, **616**, **618**. The ACM report **600** illustrates a ten minute long telecast that has commercials during the minutes **4-6** (e.g., commercial minutes **614**, **616**, **618**). In the illustrated example, the impressions **610** of the commercial minutes **614**, **616**, **618** are duration weighted by multiplying the impressions **610** by the commercial duration **608**. For example, for commercial minute **614**, the impressions **610** (e.g., 25,034) is multiplied by the commercial duration **608** (e.g., 24) to determine the duration weighted impression **612** (e.g., 600,816). In the illustrated example, the duration weighted impressions **612** do not differentiate impressions for linear advertisements and addressable advertisements for the commercial minutes **614**, **616**, **618**. In the illustrated example, the ACM rating for the telecast is found by determining the total duration weighted impression for the telecast (e.g., 2,799,306) and determining the total for the commercial duration **608** (e.g., 134). The ACM rating from the ACM report **600** is the total duration weighted impressions divided by the total commercial duration (e.g., 2,799,306/134=20,890). The ACM rating for the ACM report **600** is the same for all commercials during the commercial minutes **614**, **616**, **618** (e.g., no differentiation between linear advertisements and addressable advertisements).

[0067] FIG. **7** illustrates example results for an ACM report **700** after an addressable advertisement insertion. The example ACM report **700** includes example program names **702**, example telecast start times **704**, example commercial durations **708**, example impressions **710**, and example duration weighted impressions for an example linear advertisement **714** and an example addressable advertisement **716**. The ACM report **700** illustrates the addressable advertise-

ment **716** that is inserted in minute five of the telecast to some target households. In the illustrated example, the ACM computations illustrated in the example of FIG. **6** are not applicable when an addressable advertisement (e.g., the addressable advertisement **716**) is inserted into a commercial minute of the telecast because different households will see different advertisements of differing durations at different time of the commercial minutes (and, thus, all commercials do not have the same ACM rating as illustrated in FIG. **6**). The ACM report **700** determines the duration weighted impressions **712** for the linear advertisement **714** and the addressable advertisement **716** separately to determine different ACM ratings. In the illustrated example, the ACM rating for the linear advertisements only is determined to be 18,070 by dividing the total linear impressions **710** (e.g., excluding the impressions **710** for the addressable advertisement **716**) by the total commercial duration **708** (e.g., 2,421,426/134=18,070). The ACM rating of 18,070 for the linear advertisements of the ACM report **700** is different from the prior ACM ratings determined in the ACM report **600** (20,890). FIG. **7** illustrates that the ACM ratings calculations from FIG. **6** are not applicable when an addressable advertisement is inserted in the telecast. In some examples, if the linear advertisement **714** and the addressable advertisement **716** are not the same length/duration (e.g., the addressable advertisement **716** has a commercial duration **708** of 15 seconds), there are remaining seconds (e.g., 45 seconds) of linear advertisements that would be eligible for the C3 metric. However, the remaining seconds (e.g., the 45 seconds in the illustrated example) would not be accounted for based on the ACM calculations illustrated in FIGS. **6** and **7**.

[0068] FIG. **8** illustrates example results for an ACM report **800** with different addressable advertisements during different telecast minutes. The example ACM report **800** includes example program names **802**, example telecast start times **804**, example telecast minutes **806**, example commercial durations **808**, example impression **810**, and example duration weighted impressions **812** for the example linear advertisement **814**, the example addressable advertisement **816**, the example addressable advertisement **818**, and the example combination addressable advertisement **820** for minute **5** and the example addressable advertisement **822**, the example addressable advertisement **824**, and the example linear advertisement **826** for minute **6**. In the illustrated example, the ACM computations illustrated in the example of FIG. **6** are not applicable when multiple addressable advertisements inserted into a commercial minute of the telecast. The ACM report **800** illustrates how during a commercial minute (e.g., minute **5**), some households may see the linear advertisement **814**, some households may see the addressable advertisement **816**, some households may see the addressable advertisement **816**, and some households may see a combination addressable advertisement **820** (e.g., a portion of the addressable advertisement **816** and a portion of the addressable advertisement **818**). FIG. **8** illustrates that the ACM ratings calculations from FIG. **6** are not applicable when multiple addressable advertisement and/or combinations of addressable advertisements are inserted in the telecast. Simply calculating an ACM rating for all commercials during the telecast in the ACM report **800** would not account for the different impressions of the linear advertisement **814**, the addressable advertisement **816**, the addressable advertisement **818**, and the combination addressable

advertisement **820** for minute **5** and the addressable advertisement **822**, the addressable advertisement **824**, and the linear advertisement **826** for minute **6**. Examples disclosed herein reconcile the C3-C7 metric to determine the ACM ratings for the telecast that account for differences in linear advertisements and addressable advertisement.

[0069] FIG. **9** illustrates example viewership for the linear advertisement and addressable advertisement over different telecast minutes in accordance with the teachings of this disclosure. An example Table **900** of FIG. **9** includes example program names **902**, example telecast start times **904**, example telecast minutes **906**, example commercial durations **908**, example impressions **910**, and example duration weighted impressions **912** for the example advertisements **914-920**. In the illustrated example, during minute **5** of the telecast minutes **906**, the advertisement **914** illustrates households exposed to a linear advertisement, the advertisement **916** illustrates households exposed to 45 seconds of the linear advertisement and 15 seconds of a first addressable advertisement, the advertisement **918** illustrates households exposed to 40 seconds of the linear advertisement and 20 seconds of a second addressable advertisement, and the advertisement **920** illustrates household exposed to 25 seconds of the linear advertisement and 35 seconds of the first addressable advertisement and the second addressable advertisement. Examples disclosed herein calculate ACM ratings to account for different durations and exposures to linear advertisement and addressable advertisement combinations. In the illustrated example, the impressions **910** are the sums of weights of individual respondents (households or persons) that viewed the advertisement (e.g., the linear advertisement or addressable advertisement) during a given telecast minute **906**. The duration weighted impressions **912** at the respondent level are able to adjust for different advertisement exposures and durations as seen in the example Table **900**.

[0070] FIG. **10** illustrates example viewership results **1000** at the respondent-level. The example viewership results **1000** includes the example telecast minutes **906**, the example commercial durations **908**, and the example impressions **910** for the example advertisements **914-920** of FIG. **9**. The viewership results **1000** further includes example respondents **1002**, example respondent weights **1004**, example telecast minutes **1006**, and example total commercial durations **1008** based on the telecast minutes **906**, the commercial durations **908**, and the impressions **910** for the advertisements **914-920**. The viewership results **1000** illustrate the different weights for respondents during a telecast. The viewership results **1000** include example total respondent weight **1020** (21,014), which is the sum of the respondent weights during the telecast for minute **5** of the telecast minutes **1006** (the same minute as the advertisements **914-920**). The example respondent weights **1004** may be used by the example duration weighted impressions calculator **220** of FIG. **2** to determine the duration weighted impressions for the advertisements **914-920**, which is described in further detail below in connection with FIG. **11**.

[0071] FIG. **11** illustrates example results **1100** of the example duration weighted impressions calculator **220** included in the example C3-C7 calculator **190** of FIG. **2**. The example results **1100** include the example telecast minutes **906**, the example commercial durations **908**, and the example impressions **910** for the example advertisements **914-920** of FIG. **9** and the example respondents **1002**, the

example respondent weights **1004**, and the example telecast minutes **1006** of FIG. **10**. The results **1100** further include example linear durations **1102**, example addressable durations **1104**, example duration weighted linear impressions **1106**, and example duration weighted addressable impressions **1108**. The example duration weighted impressions calculator **220** calculates the duration weighted linear impressions **1106** and the duration weighted addressable impressions **1108** using Equations 1a, 1b, as described above in connection with FIG. **2**. The example duration weighted impressions calculator **220** calculates the duration weighted linear impressions **1106** and the duration weighted addressable impressions **1108** using the linear durations **1102** and the addressable durations **1104** from the example ad duration calculator **215** of FIG. **2** and the respondent weights **1004**.

[0072] FIG. **12** illustrates example results **1200** of the example minute-level aggregator **225** included in the example C3-C7 calculator **190** of FIG. **2**. The example results **1200** include the example telecast minutes **906**, the example commercial durations **908**, and the example impressions **910** for the example advertisements **914-920** of FIG. **9** and for example advertisements **1202, 1204**. The results **1200** further include example telecast minutes **1206**, example total weight sums **1208**, example total commercial durations **1210**, example duration weighted linear impressions **1212**, and example duration weighted addressable impressions **1214**. The results **1200** illustrate the minute-level aggregator **225** aggregating the respondent-level results **1100** of FIG. **11** from the example duration weighted impressions calculator **220**. The example minute-level aggregator **225** sums the duration weighted impressions (e.g., the example duration weighted linear impressions **1106** and the example duration weighted addressable impressions **1108** of FIG. **11**) across each commercial minute using the Equations 2a, 2b, as described above in connection with FIG. **2**, to determine the duration weighted linear impressions **1212** and the duration weighted addressable impressions **1214**. The example results **1200** includes an example total telecast commercial duration **1216**, an example total duration weighted linear impression **1218**, and an example total duration weighted addressable impression **1220**. The minute-level aggregator **225** determines the total telecast commercial duration **1216** to be 134 seconds, the total duration weighted linear impression **1218** to be 2,503, 576, and the total duration weighted addressable impression **1220** to be 295,73. The total telecast commercial duration **1216**, the total duration weighted linear impression **1218**, and the total duration weighted addressable impression **1220** are used by the example commercial minute ratings calculator **230** of FIG. **2**, as described in further detail below in connection with FIG. **13**.

[0073] FIG. **13** illustrates example results **1300** of the example commercial minute ratings calculator **230** included in the example C3-C7 calculator **190** of FIG. **2**. The example results **1300** include the example telecast minutes **906**, the example commercial durations **908**, and the example impressions **910** for the example advertisements **914-920** of FIG. **9** and for example advertisements **1202, 1204** of FIG. **12**. The results **1300** further include example telecast minutes **1206**, example total weight sums **1208**, example total commercial durations **1210**, example duration weighted linear impressions **1212**, and example duration weighted addressable impressions **1214** of FIG. **12**, example linear commercial minute ratings **1302**, and example addressable

commercial minute ratings **1304**. The commercial minute ratings calculator **230** determines the linear commercial minute ratings **1302** and the addressable commercial minute ratings **1304** using the Equations 3a, 3b, as described in detail above in connection with FIG. **2**. In some examples, when a minute in the telecast minutes **1206** has only duration weighted linear impressions **1212** (e.g., the duration weighted addressable impressions is 0), the linear commercial minute ratings **1302** are equivalent to summing the respondent weights. The example commercial minute ratings calculator **230** determines total linear commercial minute ratings and total addressable commercial minute ratings using the total telecast commercial duration **1216**, the total duration weighted linear impression **1218**, and the total duration weighted addressable impression **1220** of FIG. **12** from the example minute-level aggregator **225** of FIG. **2**. For examples, the total linear commercial minute ratings is determined to be 18,683 (e.g., 2,503,576/134=18,683) and the total addressable commercial minute ratings is determined to be 2,207 (e.g., 295,730/134=2,207). The total linear commercial minute ratings and total addressable commercial minute ratings from the results **1300** illustrate ACM ratings for different advertisements (linear advertisements and addressable advertisements) that may also have different advertisement durations, which improve the depiction of changes in the audience for different advertisements.

[0074] FIGS. **14A**, **14B** illustrate example ACM reports **1400**, **1410** from the ad ratings determiner **195** of FIG. **1**. The example ACM report **1400** of FIG. **14A** illustrates an example report for the reconciled C3 metric based on the results of the C3-C7 calculator **190** of FIG. **1**. The example ACM report **1400** includes example C3 currency average audience estimates **1402**, example adjusted C3 average audience estimates **1404**, example targeted impressions **1406**, and example reconciled C3 average audience estimates **1408**. The example C3 currency average audience estimates **1402** illustrates the average audience estimates for a program using the prior C3 calculation using only panel data to determine currency estimates. The example adjusted C3 average audience estimates **1404** illustrates the average audience estimates for a program using an adjusted C3 calculation with panel data and ACR data. The example targeted impressions **1406** illustrates a total target number of impressions for average audience watching the program (how many target individuals from the audience being measured that are targeted for watching the program during the duration). The example reconciled C3 average audience estimates **1408** illustrates the average audience estimates for a program using the reconciled C3 calculation from the results of the C3-C7 calculator **190** of FIG. **1**. In the illustrated example, each of the C3 currency average audience estimates **1402**, the adjusted C3 average audience estimates **1404**, and the reconciled C3 average audience estimates **1408** include "AA %" columns that represent average audience percentage (the percent of the total population being measured that was watching the program) and "AA Projection" columns that represent the average audience watching the program represented in terms of impressions (how many actual individuals from the audience being measured were watching the program on average during the duration).

[0075] The example ACM report **1410** of FIG. **14B** illustrates an example report for the reconciled minute based on the results of the C3-C7 calculator **190**. The example ACM

report **1410** includes example C3 currency average audience estimates **1412**, example adjusted C3 average audience estimates **1414**, example targeted impressions **1416**, and example reconciled C3 average audience estimates **1418**. The example C3 currency average audience estimates **1412** illustrates the average audience estimates for program minutes using the prior C3 calculation using only panel data to determine currency estimates. The example adjusted C3 average audience estimates **1414** illustrates the average audience estimates for program minutes using an adjusted C3 calculation with panel data and ACR data. The example targeted impressions **1416** illustrates total target number of impressions for average audience watching program minutes (how many target individuals from the audience being measured that are targeted for watching the program minute). The example reconciled C3 average audience estimates **1418** illustrates the average audience estimates for program minutes using the reconciled C3 calculation from the results of the C3-C7 calculator **190** of FIG. **1**. In the illustrated example, each of the C3 currency average audience estimates **1412**, the adjusted C3 average audience estimates **1414**, and the reconciled C3 average audience estimates **1418** include "AA %" columns that represent average audience percentage (the percent of the total population being measured that was watching the program minute) and "AA Projection" columns that represent the average audience watching the program represented in terms of impressions (how many actual individuals from the audience being measured were watching the program minute on average).

[0076] While example manners of implementing the data center **145** and the C3-C7 calculator **190** are illustrated in FIG. **1** and FIG. **2**, one or more of the elements, processes and/or devices illustrated in FIGS. **1** and **2** may be combined, divided, re-arranged, omitted, eliminated and/or implemented in any other way. Further, the example meter data analyzer **150**, the example panel database **155**, the example RPD collector **160**, the example RPD database **165**, the example Smart TV data collector **170**, the example Smart TV database **175**, the example addressable ad data collector **180**, the example addressable ad database **185**, the example ad ratings determiner **195**, the example database interface **205**, the example advertisement determiner **210**, the example ad duration calculator **215**, the example duration weighted impressions calculator **220**, the example minute-level aggregator **225**, the example commercial minute ratings calculator **230**, the example communication interface **235** and/or, more generally, the example data center **145** and the example C3-C7 calculator **190** of FIGS. **1** and **2** may be implemented by hardware, software, firmware and/or any combination of hardware, software and/or firmware. Thus, for example, any of the example meter data analyzer **150**, the example panel database **155**, the example RPD collector **160**, the example RPD database **165**, the example Smart TV data collector **170**, the example Smart TV database **175**, the example addressable ad data collector **180**, the example addressable ad database **185**, the example ad ratings determiner **195**, the example database interface **205**, the example advertisement determiner **210**, the example ad duration calculator **215**, the example duration weighted impressions calculator **220**, the example minute-level aggregator **225**, the example commercial minute ratings calculator **230**, the example communication interface **235** and/or, more generally, the example data center **145** and the example C3-C7 calculator **190** of FIGS. **1** and **2** could be implemented by

one or more analog or digital circuit(s), logic circuits, programmable processor(s), programmable controller(s), graphics processing unit(s) (GPU(s)), digital signal processor(s) (DSP(s)), application specific integrated circuit(s) (ASIC(s)), programmable logic device(s) (PLD(s)) and/or field programmable logic device(s) (FPLD(s)). When reading any of the apparatus or system claims of this patent to cover a purely software and/or firmware implementation, at least one of the example meter data analyzer **150**, the example panel database **155**, the example RPD collector **160**, the example RPD database **165**, the example Smart TV data collector **170**, the example Smart TV database **175**, the example addressable ad data collector **180**, the example addressable ad database **185**, the example ad ratings determiner **195**, the example database interface **205**, the example advertisement determiner **210**, the example ad duration calculator **215**, the example duration weighted impressions calculator **220**, the example minute-level aggregator **225**, the example commercial minute ratings calculator **230**, the example communication interface **235** is/are hereby expressly defined to include a non-transitory computer readable storage device or storage disk such as a memory, a digital versatile disk (DVD), a compact disk (CD), a Blu-ray disk, etc. including the software and/or firmware. Further still, the example data center **145** and the example C3-C7 calculator **190** of FIGS. **1** and **2** may include one or more elements, processes and/or devices in addition to, or instead of, those illustrated in FIGS. **1** and **2**, and/or may include more than one of any or all of the illustrated elements, processes and devices. As used herein, the phrase "in communication," including variations thereof, encompasses direct communication and/or indirect communication through one or more intermediary components, and does not require direct physical (e.g., wired) communication and/or constant communication, but rather additionally includes selective communication at periodic intervals, scheduled intervals, aperiodic intervals, and/or one-time events.

[0077] A flowchart representative of example hardware logic, machine readable instructions, hardware implemented state machines, and/or any combination thereof for implementing the data center **145** and the C3-C7 calculator **190** of FIGS. **1** and **2** is shown in FIG. **15**. The machine readable instructions may be one or more executable programs or portion(s) of an executable program for execution by a computer processor and/or processor circuitry, such as the processor **1612** shown in the example processor platform **1600** discussed below in connection with FIG. **16**. The program may be embodied in software stored on a non-transitory computer readable storage medium such as a CD-ROM, a floppy disk, a hard drive, a DVD, a Blu-ray disk, or a memory associated with the processor **1612**, but the entire program and/or parts thereof could alternatively be executed by a device other than the processor **1612** and/or embodied in firmware or dedicated hardware. Further, although the example program is described with reference to the flowchart illustrated in FIG. **15**, many other methods of implementing the example data center **145** and the example C3-C7 calculator **190** may alternatively be used. For example, the order of execution of the blocks may be changed, and/or some of the blocks described may be changed, eliminated, or combined. Additionally or alternatively, any or all of the blocks may be implemented by one or more hardware circuits (e.g., discrete and/or integrated analog and/or digital circuitry, an FPGA, an ASIC, a com-

parator, an operational-amplifier (op-amp), a logic circuit, etc.) structured to perform the corresponding operation without executing software or firmware. The processor circuitry may be distributed in different network locations and/or local to one or more devices (e.g., a multi-core processor in a single machine, multiple processors distributed across a server rack, etc.).

[0078] The machine readable instructions described herein may be stored in one or more of a compressed format, an encrypted format, a fragmented format, a compiled format, an executable format, a packaged format, etc. Machine readable instructions as described herein may be stored as data or a data structure (e.g., portions of instructions, code, representations of code, etc.) that may be utilized to create, manufacture, and/or produce machine executable instructions. For example, the machine readable instructions may be fragmented and stored on one or more storage devices and/or computing devices (e.g., servers) located at the same or different locations of a network or collection of networks (e.g., in the cloud, in edge devices, etc.). The machine readable instructions may require one or more of installation, modification, adaptation, updating, combining, supplementing, configuring, decryption, decompression, unpacking, distribution, reassignment, compilation, etc. in order to make them directly readable, interpretable, and/or executable by a computing device and/or other machine. For example, the machine readable instructions may be stored in multiple parts, which are individually compressed, encrypted, and stored on separate computing devices, wherein the parts when decrypted, decompressed, and combined form a set of executable instructions that implement one or more functions that may together form a program such as that described herein.

[0079] In another example, the machine readable instructions may be stored in a state in which they may be read by processor circuitry, but require addition of a library (e.g., a dynamic link library (DLL)), a software development kit (SDK), an application programming interface (API), etc. in order to execute the instructions on a particular computing device or other device. In another example, the machine readable instructions may need to be configured (e.g., settings stored, data input, network addresses recorded, etc.) before the machine readable instructions and/or the corresponding program(s) can be executed in whole or in part. Thus, machine readable media, as used herein, may include machine readable instructions and/or program(s) regardless of the particular format or state of the machine readable instructions and/or program(s) when stored or otherwise at rest or in transit.

[0080] The machine readable instructions described herein can be represented by any past, present, or future instruction language, scripting language, programming language, etc. For example, the machine readable instructions may be represented using any of the following languages: C, C++, Java, C #, Perl, Python, JavaScript, HyperText Markup Language (HTML), Structured Query Language (SQL), Swift, etc.

[0081] As mentioned above, the example process of FIG. **15** may be implemented using executable instructions (e.g., computer and/or machine readable instructions) stored on a non-transitory computer and/or machine readable medium such as a hard disk drive, a flash memory, a read-only memory, a compact disk, a digital versatile disk, a cache, a random-access memory and/or any other storage device or

storage disk in which information is stored for any duration (e.g., for extended time periods, permanently, for brief instances, for temporarily buffering, and/or for caching of the information). As used herein, the term non-transitory computer readable medium is expressly defined to include any type of computer readable storage device and/or storage disk and to exclude propagating signals and to exclude transmission media.

[0082] "Including" and "comprising" (and all forms and tenses thereof) are used herein to be open ended terms. Thus, whenever a claim employs any form of "include" or "comprise" (e.g., comprises, includes, comprising, including, having, etc.) as a preamble or within a claim recitation of any kind, it is to be understood that additional elements, terms, etc. may be present without falling outside the scope of the corresponding claim or recitation. As used herein, when the phrase "at least" is used as the transition term in, for example, a preamble of a claim, it is open-ended in the same manner as the term "comprising" and "including" are open ended. The term "and/or" when used, for example, in a form such as A, B, and/or C refers to any combination or subset of A, B, C such as (1) A alone, (2) B alone, (3) C alone, (4) A with B, (5) A with C, (6) B with C, and (7) A with B and with C. As used herein in the context of describing structures, components, items, objects and/or things, the phrase "at least one of A and B" is intended to refer to implementations including any of (1) at least one A, (2) at least one B, and (3) at least one A and at least one B. Similarly, as used herein in the context of describing structures, components, items, objects and/or things, the phrase "at least one of A or B" is intended to refer to implementations including any of (1) at least one A, (2) at least one B, and (3) at least one A and at least one B. As used herein in the context of describing the performance or execution of processes, instructions, actions, activities and/or steps, the phrase "at least one of A and B" is intended to refer to implementations including any of (1) at least one A, (2) at least one B, and (3) at least one A and at least one B. Similarly, as used herein in the context of describing the performance or execution of processes, instructions, actions, activities and/or steps, the phrase "at least one of A or B" is intended to refer to implementations including any of (1) at least one A, (2) at least one B, and (3) at least one A and at least one B.

[0083] As used herein, singular references (e.g., "a", "an", "first", "second", etc.) do not exclude a plurality. The term "a" or "an" entity, as used herein, refers to one or more of that entity. The terms "a" (or "an"), "one or more", and "at least one" can be used interchangeably herein. Furthermore, although individually listed, a plurality of means, elements or method actions may be implemented by, e.g., a single unit or processor. Additionally, although individual features may be included in different examples or claims, these may possibly be combined, and the inclusion in different examples or claims does not imply that a combination of features is not feasible and/or advantageous.

[0084] FIG. 15 is a flowchart representative of machine readable instructions which may be executed to implement the example data center 145 and the example C3-C7 calculator 190 of FIGS. 1 and 2. The program 1500 of FIG. 15 begins execution at block 1505 at which the example database interface 205 obtains panel data, RPD data, and Smart TV data. In some examples, the example meter data analyzer 150 determines the panel data. The example meter

data analyzer 150 collects monitoring data from the example media meter 110, which monitors media exposure associated with example media device 105 (e.g., televisions, radios, computers, tablet devices, smart phones, etc.) in panel homes recruited by an AME. The example meter data analyzer 150 processes the gathered media monitoring data to detect, identify, credit, etc. respective media assets and/or portions thereof (e.g., media segments) associated with the corresponding monitoring data. The example meter data analyzer 150 stores the identified monitoring data as panel data (e.g., monitoring data associated with panel households) along with additional panel household information (e.g., demographic information, geographic location, etc.) from the media meter 110 in the example panel database 155. In some examples, the example RPD collector 160 determines the return path data. The example RPD collector 160 collects the return path data from the example service provider 120 associated with the STBs 125. The RPD collector 160 stores the return path data along with additional household information (e.g., demographic information, geographic location, etc.) from the STBs 125 in the example RPD database 165. In some examples, the example Smart TV data collector 170 determines the Smart TV data. The example Smart TV data collector 170 collects the Smart TV data from the example Smart TV device 115 for monitoring media exposure associated with the example Smart TV device 115 households. The Smart TV data collector 170 stores the Smart TV data along with additional household information (e.g., demographic information, geographic location, etc.) from the Smart TV device 115 in the example Smart TV database 175. The example database interface 205 obtains the panel data, return path data, and Smart TV data from the example panel database 155, the example RPD database 165, and the example Smart TV database 175, respectively. In some examples, the panel data, the return path data, and the Smart TV data are referred to as program tuning data of households.

[0085] At block 1510, the example database interface 205 obtains reference advertisement data. In some examples, the example addressable ad data collector 180 determines the reference advertisement data. The example addressable ad data collector 180 collects the addressable advertisement data from the example addressable ad provider 130 for monitoring addressable advertisement exposure associated with media devices in target households. The addressable ad data collector 180 stores the addressable advertisement data as reference advertisement data along with additional household information (e.g., demographic information, geographic location, etc.) for the household selected by the addressable ad provider 130 in the example addressable ad database 185. The database interface 205 obtains the reference advertisement data from the example addressable ad database 185. At block 1515, the example database interface 205 combines panel data, RPD data, Smart TV data, and reference advertisement data. The database interface 205 combines the panel data, the return path data, the Smart TV data, and the reference advertisement data. The database interface 205 analyzes the combined panel data, the return path data, the Smart TV data, and the reference advertisement data by identifying data associated with advertisement exposure (linear advertisements and addressable advertisements), removing duplicate data, etc.

[0086] At block 1520, the example advertisement determiner 210 identifies respondents that received addressable

ad and respondents that receive linear ad. In examples disclosed herein, a respondent may include a household, an individual person, an individual media device, etc. The advertisement determiner **210** identifies the respondents that received addressable advertisements and the respondents that receive linear advertisements from the combined program tuning data and the reference advertisement data from the example database interface **205**.

[0087] At block **1525**, the example ad duration calculator **215** calculates ad durations at the respondent-level. The ad duration calculator **215** calculates the advertisement durations for linear advertisements and for addressable advertisements. In some examples, the ad duration calculator **215** determines the durations of a linear advertisement and an addressable advertisement in seconds for each minute in a telecast. For example, during one minute of a telecast, the ad duration calculator **215** determines that a linear advertisement was presented for 45 seconds during the minute and an addressable advertisement was presented for 15 seconds during the minute.

[0088] At block **1530**, the example duration weighted impressions calculator **220** calculates duration weighted impressions at respondent-level. The duration weighted impressions calculator **220** calculates duration weighted impressions at the respondent-level based on the durations of linear advertisements and the durations of addressable advertisements calculated by the ad duration calculator **215**. The duration weighted impressions calculator **220** calculates the duration weighted impressions for the respondents. In examples disclosed herein impressions are the sums of weights of individual respondents that viewed the advertisements during a given minute. The duration weighted impressions calculator **220** calculates the duration weighted impressions for the linear advertisements and addressable advertisements using Equations 1a and 1b, as described above in connection with FIG. **2**. In examples disclosed herein, the duration weighted impressions account for weight values associated with each respondent and the durations of the linear advertisements and addressable advertisements calculated by the ad duration calculator **215**.

[0089] At block **1535**, the example minute-level aggregator **225** aggregates the duration weighted impressions to the minute-level. The minute-level aggregator **225** aggregates the duration weighted impressions for linear advertisements and addressable advertisements for the respondents for each commercial minute in the telecast. The minute-level aggregator **225** sums the duration weighted impressions for each commercial minute using the Equations 2a and 2b, as described above in connection with FIG. **2**. The minute-level aggregator **225** determines the total commercial duration for the telecast in seconds (e.g., across all commercial minutes). The minute-level aggregator **225** determines the minute-level impressions across the telecast for both the linear advertisements and the addressable advertisements by dividing the resulting total duration weighted impressions from Equations 2a, 2b above by the total commercial duration for the telecast.

[0090] At block **1540**, the example commercial minute ratings calculator **230** calculates the average commercial minute ratings. The commercial minute ratings calculator **230** calculates the average commercial minute ratings based on the minute-level duration weighted impressions from the example minute-level aggregator **225**. The commercial minute ratings calculator **230** calculates the average commercial

minute rating for the addressable advertisement and the average commercial minute rating for the linear advertisement using the first total impressions of the addressable advertisement, the second total impressions of the linear advertisement, and a total number of commercial seconds from the example minute-level aggregator **225**. The example commercial minute ratings calculator **230** may calculate the average commercial minute ratings using Equations 3a and 3b, as described above in connection with FIG. **2**. The commercial minute ratings calculator **230** determines the average commercial minutes while accounting for different advertisement durations at the respondent-level to depict changes in an audience for linear advertisements and addressable advertisements in a telecast.

[0091] At block **1545**, the example communication interface **235** transmits the average commercial minute ratings. The communication interface **235** transmits the average commercial minute ratings from the commercial minute ratings calculator **230** to the example ad ratings determiner **195** of FIG. **1**. The example communication interface **235** transmits the average commercial minute ratings for the linear advertisements and addressable advertisements for the ad ratings determiner **195** to credit the addressable advertisement and the linear advertisement with audience viewership metrics. In some examples, the ad ratings determiner **195** can use the ratings data to select addressable advertisements for respondents, modify the linear advertisements and addressable advertisements, disable addressable advertisements for target respondents, etc. In some examples, the ad ratings determiner **195** generates a report including data metrics regarding media exposure events for advertisements during a telecast that may be presented to media providers and advertisers. After block **1545**, the program **1500** ends.

[0092] FIG. **16** is a block diagram of an example processor platform **1600** structured to execute the instructions of FIG. **15** to implement the example data center **145** and/or the example C3-C7 calculator **190** of FIGS. **1** and **2**. The processor platform **1600** can be, for example, a server, a personal computer, a workstation, a self-learning machine (e.g., a neural network), a mobile device (e.g., a cell phone, a smart phone, a tablet such as an iPad™), a personal digital assistant (PDA), an Internet appliance, a DVD player, a CD player, a digital video recorder, a Blu-ray player, a gaming console, a personal video recorder, a set top box, a headset or other wearable device, or any other type of computing device.

[0093] The processor platform **1600** of the illustrated example includes a processor **1612**. The processor **1612** of the illustrated example is hardware. For example, the processor **1612** can be implemented by one or more integrated circuits, logic circuits, microprocessors, GPUs, DSPs, or controllers from any desired family or manufacturer. The hardware processor may be a semiconductor based (e.g., silicon based) device. In this example, the processor implements the example meter data analyzer **150**, the example RPD collector **160**, the example Smart TV data collector **170**, the example addressable ad data collector **180**, the example ad ratings determiner **195**, the example database interface **205**, the example advertisement determiner **210**, the example ad duration calculator **215**, the example duration weighted impressions calculator **220**, the example minute-level aggregator **225**, the example commercial minute ratings calculator **230**, the example communication interface **235**.

[0094] The processor **1612** of the illustrated example includes a local memory **1613** (e.g., a cache). The processor **1612** of the illustrated example is in communication with a main memory including a volatile memory **1614** and a non-volatile memory **1616** via a bus **1618**. The volatile memory **1614** may be implemented by Synchronous Dynamic Random Access Memory (SDRAM), Dynamic Random Access Memory (DRAM), RAMBUS® Dynamic Random Access Memory (RDRAM®) and/or any other type of random access memory device. The non-volatile memory **1616** may be implemented by flash memory and/or any other desired type of memory device. Access to the main memory **1614**, **1616** is controlled by a memory controller.

[0095] The processor platform **1600** of the illustrated example also includes an interface circuit **1620**. The interface circuit **1620** may be implemented by any type of interface standard, such as an Ethernet interface, a universal serial bus (USB), a Bluetooth® interface, a near field communication (NFC) interface, and/or a PCI express interface.

[0096] In the illustrated example, one or more input devices **1622** are connected to the interface circuit **1620**. The input device(s) **1622** permit(s) a user to enter data and/or commands into the processor **1612**. The input device(s) can be implemented by, for example, an audio sensor, a microphone, a camera (still or video), a keyboard, a button, a mouse, a touchscreen, a track-pad, a trackball, isopoint and/or a voice recognition system.

[0097] One or more output devices **1624** are also connected to the interface circuit **1620** of the illustrated example. The output devices **1624** can be implemented, for example, by display devices (e.g., a light emitting diode (LED), an organic light emitting diode (OLED), a liquid crystal display (LCD), a cathode ray tube display (CRT), an in-place switching (IPS) display, a touchscreen, etc.), a tactile output device, a printer and/or speaker. The interface circuit **1620** of the illustrated example, thus, typically includes a graphics driver card, a graphics driver chip and/or a graphics driver processor.

[0098] The interface circuit **1620** of the illustrated example also includes a communication device such as a transmitter, a receiver, a transceiver, a modem, a residential gateway, a wireless access point, and/or a network interface to facilitate exchange of data with external machines (e.g., computing devices of any kind) via a network **1626**. The communication can be via, for example, an Ethernet connection, a digital subscriber line (DSL) connection, a telephone line connection, a coaxial cable system, a satellite system, a line-of-site wireless system, a cellular telephone system, etc.

[0099] The processor platform **1600** of the illustrated example also includes one or more mass storage devices **1628** for storing software and/or data. Examples of such mass storage devices **1628** include floppy disk drives, hard drive disks, compact disk drives, Blu-ray disk drives, redundant array of independent disks (RAID) systems, and digital versatile disk (DVD) drives.

[0100] The machine executable instructions **1632** of FIG. **15** may be stored in the mass storage device **1628**, in the volatile memory **1614**, in the non-volatile memory **1616**, and/or on a removable non-transitory computer readable storage medium such as a CD or DVD.

[0101] From the foregoing, it will be appreciated that example methods, apparatus and articles of manufacture have been disclosed that reconcile commercial measurement ratings. The disclosed methods, apparatus and articles of manufacture improve the C3-C7 metric for average commercial minutes to differentiate ratings for linear advertisements and addressable advertisements. The disclosed methods, apparatus and articles of manufacture collect program viewership data from household devices and Smart TVs and return path data from service providers to identify what advertisement devices were served. The disclosed methods, apparatus and articles of manufacture also obtain reference data from advertisers that indicate which devices were served the linear advertisement during a time for that program broadcast, and which devices were served an addressable advertisement during that same time in the program broadcast. The disclosed methods, apparatus and articles of manufacture use both the program viewership data collected and the reference advertisement data as inputs to the modified C3-C7 metric. The disclosed methods, apparatus and articles of manufacture weight ACM measurements from individual devices to determine the C3-C7 metrics for a program such that the C3-C7 distinguish between linear advertisements and addressable advertisements.

[0102] Example methods, apparatus, systems, and articles of manufacture to reconcile commercial measurement ratings are disclosed herein. Further examples and combinations thereof include the following:

[0103] Example 1 includes an apparatus comprising an advertisement determiner to identify a first plurality of respondents that received an addressable advertisement and a second plurality of respondents that received a linear advertisement based on combined program tuning data and reference advertisement data, a calculator to calculate a first average commercial minute rating for the addressable advertisement based on first duration weighted impressions associated with the first plurality of respondents and a second average commercial minute rating for the linear advertisement based on second duration weighted impressions associated with the second plurality of respondents, and a communication interface to transmit the first average commercial minute rating and the second average commercial minute rating for crediting the addressable advertisement and the linear advertisement with audience viewership metrics.

[0104] Example 2 includes the apparatus of example 1, wherein a respondent is a household or an individual person.

[0105] Example 3 includes the apparatus of example 1, wherein the program tuning data includes at least panel data collected from media devices, return path data collected from service providers, and smart TV data collected from smart television devices.

[0106] Example 4 includes the apparatus of example 1, wherein the calculator is a first calculator, and further including a second calculator to calculate the first duration weighted impressions for the first plurality of respondents and the second duration weighted impressions the second plurality of respondents, the first duration weighted impressions and the second duration weighted impressions to account for weight values associated with each respondent included in the first plurality of respondents and the second plurality of respondents.

[0107] Example 5 includes the apparatus of example 4, further including a third calculator to calculate a first dura-

tion associated with the linear advertisement and a second duration associated with the addressable advertisement.

[0108] Example 6 includes the apparatus of example 5, wherein the second calculator is to calculate the first duration weighted impressions for the first plurality of respondents and the second duration weighted impressions for the second plurality of respondents based on the first duration associated with the linear advertisement and the second duration associated with the addressable advertisement.

[0109] Example 7 includes the apparatus of example 1, further including an aggregator to aggregate the first duration weighted impressions for the first plurality of respondents and aggregate the second duration weighted impressions for the second plurality of respondents for each commercial minute.

[0110] Example 8 includes the apparatus of example 7, wherein the calculator is to calculate a first total impressions of the addressable advertisement based on a sum of the first duration weighted impressions for the first plurality of respondents, and a second total impressions of the linear advertisement based on a sum of the second duration weighted impressions for the second plurality of respondents.

[0111] Example 9 includes the apparatus of example 8, wherein the calculator is to calculate the first average commercial minute rating for the addressable advertisement and the second average commercial minute rating for the linear advertisement based on the first total impressions of the addressable advertisement, the second total impressions of the linear advertisement, and a total number of commercial seconds.

[0112] Example 10 includes the apparatus of example 9, wherein the total number of commercial seconds is a sum of a first duration associated with the linear advertisement and a second duration associated with the addressable advertisement.

[0113] Example 11 includes At least one non-transitory computer readable medium comprising instructions which, when executed, cause at least one processor to at least identify a first plurality of respondents that received an addressable advertisement and a second plurality of respondents that received a linear advertisement based on combined program tuning data and reference advertisement data, calculate a first average commercial minute rating for the addressable advertisement based on first duration weighted impressions associated with the first plurality of respondents and a second average commercial minute rating for the linear advertisement based on second duration weighted impressions associated with the second plurality of respondents, and transmit the first average commercial minute rating and the second average commercial minute rating for crediting the addressable advertisement and the linear advertisement with audience viewership metrics.

[0114] Example 12 includes the at least one non-transitory computer readable medium of example 11, wherein a respondent is a household or an individual person.

[0115] Example 13 includes the at least one non-transitory computer readable medium of example 11, wherein the program tuning data includes at least panel data collected from media devices, return path data collected from service providers, and smart TV data collected from smart television devices.

[0116] Example 14 includes the at least one non-transitory computer readable medium of example 11, wherein the

instructions cause the at least one processor to calculate the first duration weighted impressions for the first plurality of respondents and second duration weighted impressions for the second plurality of respondents, the first duration weighted impressions and the second duration weighted impressions to account for weight values associated with each respondent included in the first plurality of respondents and the second plurality of respondents.

[0117] Example 15 includes the at least one non-transitory computer readable medium of example 14, wherein the instructions cause the at least one processor to calculate a first duration associated with the linear advertisement and a second duration associated with the addressable advertisement.

[0118] Example 16 includes the at least one non-transitory computer readable medium of example 15, wherein the instructions cause the at least one processor to calculate the first duration weighted impressions for the first plurality of respondents and the second duration weighted impressions for the second plurality of respondents based on the first duration associated with the linear advertisement and the second duration associated with the addressable advertisement.

[0119] Example 17 includes the at least one non-transitory computer readable medium of example 11, wherein the instructions cause the at least one processor to aggregate the first duration weighted impressions for the first plurality of respondents and aggregate the second duration weighted impressions for the second plurality of respondents for each commercial minute.

[0120] Example 18 includes the at least one non-transitory computer readable medium of example 17, wherein the instructions cause the at least one processor to calculate a first total impressions of the addressable advertisement based on a sum of the first duration weighted impressions for the first plurality of respondents, and a second total impressions of the linear advertisement based on a sum of the second duration weighted impressions for the second plurality of respondents.

[0121] Example 19 includes the at least one non-transitory computer readable medium of example 18, wherein the instructions cause the at least one processor to calculate the first average commercial minute rating for the addressable advertisement and the second average commercial minute rating for the linear advertisement based on the first total impressions of the addressable advertisement, the second total impressions of the linear advertisement, and a total number of commercial seconds.

[0122] Example 20 includes the at least one non-transitory computer readable medium of example 19, wherein the total number of commercial seconds is a sum of a first duration associated with the linear advertisement and a second duration associated with the addressable advertisement.

[0123] Example 21 includes a method comprising identifying a first plurality of respondents that received an addressable advertisement and a second plurality of respondents that received a linear advertisement based on combined program tuning data and reference advertisement data, calculating, by executing an instruction with at least one processor, a first average commercial minute rating for the addressable advertisement based on first duration weighted impressions associated with the first plurality of respondents and a second average commercial minute rating for the linear advertisement based on second duration weighted

impressions associated with the second plurality of respondents, and transmitting the first average commercial minute rating and the second average commercial minute rating for crediting the addressable advertisement and the linear advertisement with audience viewership metrics.

[0124] Example 22 includes the method of example 21, wherein a respondent is a household or an individual person.

[0125] Example 23 includes the method of example 21, wherein the program tuning data includes at least panel data collected from media devices, return path data collected from service providers, and smart TV data collected from smart television devices.

[0126] Example 24 includes the method of example 21, further including calculating the first duration weighted impressions for the first plurality of respondents and the second duration weighted impressions for the second plurality of respondents, the first duration weighted impressions and the second duration weighted impressions to account for weight values associated with each respondent included in the first plurality of respondents and the second plurality of respondents.

[0127] Example 25 includes the method of example 24, further including calculating a first duration associated with the linear advertisement and a second duration associated with the addressable advertisement.

[0128] Example 26 includes the method of example 25, further including calculating the first duration weighted impressions for the first plurality of respondents and the second duration weighted impressions for the second plurality of respondents based on the first duration associated with the linear advertisement and the second duration associated with the addressable advertisement.

[0129] Example 27 includes the method of example 21, further including aggregating the first duration weighted impressions for the first plurality of respondents and aggregate the second duration weighted impressions for the second plurality of respondents for each commercial minute.

[0130] Example 28 includes the method of example 27, further including calculating a first total impressions of the addressable advertisement based on a sum of the first duration weighted impressions for the first plurality of respondents, and a second total impressions of the linear advertisement based on a sum of the second duration weighted impressions for the second plurality of respondents.

[0131] Example 29 includes the method of example 28, further including calculating the first average commercial minute rating for the addressable advertisement and the second average commercial minute rating for the linear advertisement based on the first total impressions of the addressable advertisement, the second total impressions of the linear advertisement, and a total number of commercial seconds.

[0132] Example 30 includes the method of example 29, wherein the total number of commercial seconds is a sum of a first duration associated with the linear advertisement and a second duration associated with the addressable advertisement.

[0133] Although certain example methods, apparatus and articles of manufacture have been disclosed herein, the scope of coverage of this patent is not limited thereto. On the contrary, this patent covers all methods, apparatus and articles of manufacture fairly falling within the scope of the claims of this patent.

1-20. (canceled)

21. A computer-implemented method comprising:
generating an average commercial minute rating associated with advertisement exposure for a given program telecast based on a first set of media data and a second set of media data, wherein the first set of media data is associated with a first plurality of households, wherein the second set of media data is associated with a second plurality of households;
adjusting the average commercial minute rating to account for an addressable advertisement by:
identifying, using reference advertisement data and a combination of the first set of media data and the second set of media data, a first plurality of respondents that received the addressable advertisement during the given program telecast and a second plurality of respondents that received a linear advertisement during the given program telecast, wherein the reference advertisement data comprises addressable advertisement data and household data associated with an addressable advertisement;
determining first durations of respective impressions of the addressable advertisement associated with the first plurality of respondents;
determining second durations of respective impressions of the linear advertisement associated with the second plurality of respondents; and
calculating a first average commercial minute rating for the addressable advertisement based on the determined first durations and a second average commercial minute rating for the linear advertisement based on the determined second durations; and
controlling addressable advertisement delivery for one or more respondents based on the first average commercial minute rating and the second average commercial minute rating, wherein controlling addressable advertisement delivery includes at least one of: (i) modifying addressable advertisements or (ii) disabling addressable advertisements for the one or more respondents.

22. The method of claim 21, wherein generating the average commercial minute rating is further based on return path data collected from service providers.

23. The method of claim 21, further comprising calculating first duration weighted impressions for the first plurality of respondents and second duration weighted impressions for the second plurality of respondents, wherein the first duration weighted impressions are based on the first durations and first weight values associated with each respondent included in the first plurality of respondents, wherein the second duration weighted impressions are based on the second durations and second weight values associated with each respondent included in the second plurality of respondents.

24. The method of claim 23, further comprising calculating the first duration weighted impressions for the first plurality of respondents and the second duration weighted impressions for the second plurality of respondents based on a first reference duration associated with the addressable advertisement and a second reference duration associated with the linear advertisement.

25. The method of claim 23, further comprising aggregating the first duration weighted impressions for the first plurality of respondents and aggregate the second duration

weighted impressions for the second plurality of respondents for each commercial minute of the given program telecast.

26. The method of claim 25, further comprising calculating a first total impressions of the addressable advertisement based on a sum of the first duration weighted impressions for the first plurality of respondents, and a second total impressions of the linear advertisement based on a sum of the second duration weighted impressions for the second plurality of respondents.

27. The method of claim 26, further comprising calculating the first average commercial minute rating for the addressable advertisement and the second average commercial minute rating for the linear advertisement based on the first total impressions of the addressable advertisement, the second total impressions of the linear advertisement, and a total number of commercial seconds.

28. The method of claim 27, wherein the total number of commercial seconds is a sum of a first reference duration associated with the addressable advertisement and a second reference duration associated with the linear advertisement.

29. A tangible, non-transitory computer readable medium comprising instructions that, when executed, cause at least one processor to perform a set of operations comprising:

generating an average commercial minute rating associated with advertisement exposure for a given program telecast based on a first set of media data and a second set of media data, wherein the first set of media data is associated with a first plurality of households, wherein the second set of media data is associated with a second plurality of households;

adjusting the average commercial minute rating to account for an addressable advertisement by:

identifying, using reference advertisement data and a combination of the first set of media data and the second set of media data, a first plurality of respondents that received the addressable advertisement during the given program telecast and a second plurality of respondents that received a linear advertisement during the given program telecast, wherein the reference advertisement data comprises addressable advertisement data and household data associated with an addressable advertisement;

determining first durations of respective impressions of the addressable advertisement associated with the first plurality of respondents;

determining second durations of respective impressions of the linear advertisement associated with the second plurality of respondents; and

calculating a first average commercial minute rating for the addressable advertisement based on the determined first durations and a second average commercial minute rating for the linear advertisement based on the determined second durations; and

controlling addressable advertisement delivery for one or more respondents based on the first average commercial minute rating and the second average commercial minute rating, wherein controlling addressable advertisement delivery includes at least one of: (i) modifying addressable advertisements or (ii) disabling addressable advertisements for the one or more respondents.

30. The tangible, non-transitory computer readable medium of claim 29, wherein the set of operations further comprises calculating first duration weighted impressions for the first plurality of respondents and second duration

weighted impressions for the second plurality of respondents, wherein the first duration weighted impressions are based on the first durations and first weight values associated with each respondent included in the first plurality of respondents, wherein the second duration weighted impressions are based on the second durations and second weight values associated with each respondent included in the second plurality of respondents.

31. The tangible, non-transitory computer readable medium of claim 30, wherein the set of operations further comprises calculating the first duration weighted impressions for the first plurality of respondents and the second duration weighted impressions for the second plurality of respondents based on a first reference duration associated with the addressable advertisement and a second reference duration associated with the linear advertisement.

32. The tangible, non-transitory computer readable medium of claim 30, wherein the set of operations further comprises aggregating the first duration weighted impressions for the first plurality of respondents and aggregate the second duration weighted impressions for the second plurality of respondents for each commercial minute of the given program telecast.

33. The tangible, non-transitory computer readable medium of claim 32, wherein the set of operations further comprises calculating a first total impressions of the addressable advertisement based on a sum of the first duration weighted impressions for the first plurality of respondents, and a second total impressions of the linear advertisement based on a sum of the second duration weighted impressions for the second plurality of respondents.

34. The tangible, non-transitory computer readable medium of claim 33, wherein the set of operations further comprises calculating the first average commercial minute rating for the addressable advertisement and the second average commercial minute rating for the linear advertisement based on the first total impressions of the addressable advertisement, the second total impressions of the linear advertisement, and a total number of commercial seconds.

35. A computing device comprising:

at least one processor; and

tangible, non-transitory computer readable medium comprising instructions that, when executed, cause the at least one processor to perform a set of operations comprising:

generating an average commercial minute rating associated with advertisement exposure for a given program telecast based on a first set of media data and a second set of media data, wherein the first set of media data is associated with a first plurality of households, wherein the second set of media data is associated with a second plurality of households;

adjusting the average commercial minute rating to account for an addressable advertisement by:

identifying, using reference advertisement data and a combination of the first set of media data and the second set of media data, a first plurality of respondents that received the addressable advertisement during the given program telecast and a second plurality of respondents that received a linear advertisement during the given program telecast, wherein the reference advertisement data comprises addressable advertisement data and household data associated with an addressable advertisement;

determining first durations of respective impressions of the addressable advertisement associated with the first plurality of respondents;

determining second durations of respective impressions of the linear advertisement associated with the second plurality of respondents; and

calculating a first average commercial minute rating for the addressable advertisement based on the determined first durations and a second average commercial minute rating for the linear advertisement based on the determined second durations; and

controlling addressable advertisement delivery for one or more respondents based on the first average commercial minute rating and the second average commercial minute rating, wherein controlling addressable advertisement delivery includes at least one of: (i) modifying addressable advertisements or (ii) disabling addressable advertisements for the one or more respondents.

36. The computing device of claim 35, wherein the set of operations further comprises calculating first duration weighted impressions for the first plurality of respondents and second duration weighted impressions for the second plurality of respondents, wherein the first duration weighted impressions are based on the first durations and first weight values associated with each respondent included in the first plurality of respondents, wherein the second duration weighted impressions are based on the second durations and second weight values associated with each respondent included in the second plurality of respondents.

37. The computing device of claim 36, wherein the set of operations further comprises calculating the first duration weighted impressions for the first plurality of respondents and the second duration weighted impressions for the second plurality of respondents based on a first reference duration associated with the addressable advertisement and a second reference duration associated with the linear advertisement.

38. The computing device of claim 16, wherein the set of operations further comprises aggregating the first duration weighted impressions for the first plurality of respondents and aggregate the second duration weighted impressions for the second plurality of respondents for each commercial minute of the given program telecast.

39. The computing device of claim 38, wherein the set of operations further comprises calculating a first total impressions of the addressable advertisement based on a sum of the first duration weighted impressions for the first plurality of respondents, and a second total impressions of the linear advertisement based on a sum of the second duration weighted impressions for the second plurality of respondents.

40. The computing device of claim 39, wherein the set of operations further comprises calculating the first average commercial minute rating for the addressable advertisement and the second average commercial minute rating for the linear advertisement based on the first total impressions of the addressable advertisement, the second total impressions of the linear advertisement, and a total number of commercial seconds.

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