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SYSTEMS AND METHODS FOR CANDIDACY DETERMINATIONS AND REQUEST PROCESSING WHILE MAINTAINING USER DATA ANONYMITY

Abstract

A first system may receive first data of a user associated with a first identifier and second data of the user associated with a second identifier that exclude user identifying information from a first and second data source, respectively. A key may be received from a second system that associates the first and second identifier with a common identifier generated to preserve user anonymity at the first system. The key may be used to generate aggregated data for the user that includes the first and second data and is associated with the common identifier. The aggregated data may be processed to determine the user as a candidate for an offer set. The common identifier for the user is included in a candidacy list for the offer set, and provided to the second system to facilitate request processing associated with the presentation of the offer set to candidate users.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION(S) [0001] This patent application is a continuation of U.S. Nonprovisional patent application Ser. No. 18/802,673, filed on Aug. 13, 2024, which is a continuation of U.S. Nonprovisional patent application Ser. No. 18/443,591, filed on Feb. 16, 2024, now U.S. Pat. No. 12,086,288, which claims the benefit of priority to U.S. Provisional Application No. 63/598,606, filed Nov. 14, 2023, all of which are incorporated by reference herein in their entireties.

TECHNICAL FIELD
[0002] Various embodiments of this disclosure relate generally to techniques for candidacy determinations and request processing, and, more particularly, to systems and methods for determining user candidacy for offer sets and processing pre-screen requests while maintaining anonymity of user data.
BACKGROUND
[0003] Offering entities, such as financial institutions, insurance institutions, etc., commonly leverage pre-screening techniques to present offer sets, including one or more products or services of the offering entities, to candidates. For example, when a candidate user has navigated to or launched an application on their device that is associated with an affiliate or client authorized by the offering entity to present at least one offer set to candidates, the user may be presented with a prompt that indicates they are a candidate (e.g., they are pre-approved, pre-screened, pre-selected) for the offer set, and includes an option to apply for the one or more products or services included in the offer set.
[0004] When credit-related data is utilized in determining user candidacy for the offer sets, Fair Credit Reporting Act (FCRA) regulations associated with pre-screening prohibit the offering entity from knowing an identity of the user until the offer set has been presented to the user. Therefore, to determine that the user is a candidate in a manner that is compliant with the FCRA regulations, conventional pre-screening techniques rely on a third party to determine candidates for the offer sets. For example, the offering entity may provide the third party with personally identifiable information (PII) and any internal data of the users to be considered in the candidacy determination, along with rules and/or models, which may be proprietary, for use by the third party in making the candidacy determination. The third party may receive credit-related data associated

with the Pll of the users from multiple credit bureaus, for example, and aggregate the credit-related data from each credit bureau with any internal data of the users. The third party may then run the rules and/or models on the aggregated data to identify a subset of the users as candidates for the offer sets.

[0005] The background description provided herein is for the purpose of generally presenting the context of the disclosure. Unless otherwise indicated herein, the materials described in this section are not prior art to the claims in this application and are not admitted to be prior art, or suggestions of the prior art, by inclusion in this section.

SUMMARY OF THE DISCLOSURE

[0006] According to certain aspects of the disclosure, methods and systems are disclosed for candidacy determinations and request processing. The methods and systems may include determining user candidacy for offer sets and processing pre-screen requests while maintaining anonymity of user data.

[0007] In an example, a method performed by a first system may include: receiving, from a first data source, first data of a user associated with a first identifier; receiving, from a second data source, second data of the user associated with a second identifier, wherein the first data and the second data exclude identifying information of the user; receiving, from a second system, a key that associates the first identifier, the second identifier, and a common identifier for the user generated by the second system to preserve an anonymity of the user at the first system, wherein the identifying information of the user is known and stored in association with the common identifier at the second system; generating, using the association of the first identifier and the second identifier provided by the key, aggregated data for the user that (i) includes the first data and the second data and (ii) is associated with the common identifier; processing the aggregated data to determine the user is a candidate for an offer set, of a plurality of offer sets; including the common identifier in a candidacy list for the offer set provided to the second system; receiving, from a client system configured to present one or more of the plurality of offer sets to candidate users, a request that includes a portion of the identifying information of the user; providing, to the second system, the portion of the identifying information and the offer set, wherein the second system uses the portion of the identifying information to determine the common identifier based on the stored association, and identifies the common identifier in the candidacy list for the offer set; receiving, from the second system, a candidacy indication that the user is a candidate for the offer set; and providing, to the client system, a response to the request, the response including the candidacy indication and one or more items of the offer set.

[0008] In a further example, a method for providing identity resolution may include: receiving, from a first data source, identifying information of a user associated with a first identifier; receiving, from a second data source, the identifying information of the user associated with a second identifier; determining the first identifier and the second identifier are associated with the user based on a match of the identifying information of the user; generating a common identifier for the user that excludes the identifying information of the user; generating a key associating the first identifier, the second identifier, and the common identifier; storing the identifying information of the user in association with at least the common identifier; providing the key to a candidacy determination system, wherein the candidacy determination system: uses the association of the first identifier and the second identifier provided by the key to generate aggregated data that includes first data associated with the first identifier received from the first data source and second data associated with the second identifier received from the second data source, and processes the aggregated data to determine the user is a candidate for an offer set; receiving, from the candidacy determination system, and storing a candidacy list for the offer set that includes the common identifier for the user; in response to a fulfillment system receiving a request associated with the user from a client system that is authorized to present the offer set, receiving, from the fulfillment system, a portion of the identifying information of the user included in the request and the offer set;

using the portion of the identifying information to determine the common identifier based on the stored association; identifying the common identifier in the stored candidacy list for the offer set; and generating and providing, to the fulfillment system, an indication that the user is a candidate for the offer set.

[0009] In a further example, a method performed by a first system may include: for a plurality of users associated with the first system, identifying a subset of candidate users for an offer set, of a plurality of offer sets, the identifying including, for each user of the plurality of users: receiving, from a first data source, first data of the user associated with a first identifier; receiving, from a second data source, second data of the user associated with a second identifier, wherein the first data and the second data exclude identifying information of the user; receiving, from a second system, a key that associates the first identifier, the second identifier, and a common identifier for the user generated by the second system to preserve an anonymity of the user at the first system, and wherein the identifying information of the user is known and stored in association with the common identifier at the second system; generating, as part of a data pool, and using the association of the first identifier and the second identifier provided by the key, aggregated data for the user that (i) includes the first data and the second data and (ii) is associated with the common identifier; and processing the aggregated data to determine the user as a candidate for the offer set; generating and providing, to the second system, a candidacy list for the offer set that includes the common identifier for each of the subset of candidate users; receiving, from a client system configured to present one or more of the plurality of offer sets to candidates, a request that includes a portion of the identifying information of a first user of the plurality of users; determining the client system is authorized to present the offer set from the plurality of offer sets; providing, to the second system, the portion of the identifying information and the offer set, wherein the second system determines whether the first user is one of the subset of candidate users for the offer set by using the portion of the identifying information to determine a common identifier for the first user based on the stored association, and determining whether the common identifier is included in the candidacy list for the offer set; receiving, from the second system, an indication of whether the first user is a candidate for the offer set; and providing, to the client system, a response to the request based on the indication.

[0010] Additional objects and advantages of the disclosed embodiments will be set forth in part in the description that follows, and in part will be apparent from the description, or may be learned by practice of the disclosed embodiments.

[0011] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the disclosed embodiments, as claimed.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate various exemplary aspects and together with the description, serve to explain the principles of the disclosed aspects.

[0013] FIG. **1** depicts an example environment for candidacy determinations and request processing, according to certain aspects.

[0014] FIG. **2**A depicts an example method for determining candidacy, according to certain aspects.

[0015] FIG. **2**B depicts an example method for providing identity resolution in the candidacy determination process of FIG. **2**A, according to certain aspects.

[0016] FIG. **2**C depicts a conceptual diagram of the example methods described in FIGS. **2**A and **2**B, according to certain aspects.

[0017] FIG. **3**A depicts an example method for request processing, according to certain aspects.
[0018] FIG. **3**B depicts an example method for providing identity resolution in the request process of FIG. **3**A, according to certain aspects.
[0019] FIG. **3**C depicts a conceptual diagram of the example methods described in FIGS. **3**A and **3**B, according to certain aspects.
[0020] FIG. **4**A depicts an example method for performing one or more reconciliation processes, according to certain aspects.
[0021] FIG. **4**B depicts an example method for providing identity resolution to facilitate the one or more reconciliation processes of FIG. **4**A, according to certain aspects.
[0022] FIG. **4**C depicts a conceptual diagram of the example methods described in FIGS. **4**A and **4**B, according to certain aspects.
[0023] FIG. **5** depicts an example of an offer presentation user interface, according to certain aspects
[0024] FIG. **6** depicts an example of a computer, according to certain aspects.

DETAILED DESCRIPTION

[0025] According to certain aspects of the disclosure, methods and systems are disclosed for candidacy determinations and request processing. As will be discussed in more detail below, in various embodiments, systems and methods are described for determining user candidacy for offer sets and processing pre-screen requests while maintaining anonymity of user data.
[0026] As briefly discussed in the background, when credit-related data is a basis for determining user candidacy for offer sets provided by an offering entity, conventional pre-screening techniques may rely on a third party to determine the candidates for the offer sets. For example, the offering entity may provide the third party with the Pll and any internal data of the users to be considered in the candidacy determination, along with rules and/or models, which may be proprietary, for use by the third party in making the candidacy determination. The third party may receive credit data associated with PII of the users from multiple credit bureaus, for example, and aggregate the credit data from each credit bureau with any internal data of the users. The third party may then run the rules and/or models of the offering entity on the aggregated data to identify a subset of the users as candidates for the offer sets.
[0027] These conventional pre-screening techniques require the sharing of sensitive data, such as the Pll of the user and proprietary rules and/or models of the offering entity, between the offering entity and the third party, which may carry significant risk. For example, the sensitive data may be vulnerable to a data breach as the sensitive data is being transferred to the third party and/or once stored by the third party. Additionally, using conventional pre-screening techniques, when a pre-screen request for a user who is a candidate for an offer set is received and responded to by the third party (e.g., resulting in an offer presented to the user), only limited data associated with the request and the user may be provided from the third party to the financial institution. Resultantly, types of analytics data associated with the pre-screening processes that can be collected and analyzed by the offering entity may be restricted due to the limited data provided by the third party.
[0028] To address these challenges, systems and methods are described herein for enabling candidacy determinations and request processing to be performed internally by a first system associated with the offering entity (e.g., a pre-screening system), while maintaining anonymity of user data for regulatory compliance by leveraging identity resolution services of a second system associated with a third party (e.g., an identity resolution system) to facilitate the candidacy determinations and request processing.
[0029] In an exemplary use case, the first system associated with the offering entity, such as a financial institution, may receive external data of a user from a plurality of external data sources. For example, the external data may include similar types of credit-related data from different credit bureaus that is to be considered for candidacy determinations. The external data from each external data source may be associated with a different external identifier and exclude any identifying

information of the user. Therefore, when initially received, the first system may have no way of knowing or understanding the external data of the user from the various external data sources as being data of a same user.

[0030] However, a key may be received from the second system associated with the third party providing identity resolution services to the offering entity. The key may serve as a mechanism to enable the first system to know or understand that the external data of the user received from the various external data sources is associated with the same user, but without knowing an identity of the user. For example, the key may associate the external identifiers with a common identifier generated by the second system to preserve the anonymity of the user at the first system. To generate the key, the second system may receive the identifying information of the user in association with each of the external identifiers from the external data sources, and determine the external identifiers are associated with the user based on a match of the identifying information of the user. Based on the determined match, the system may generate the common identifier for the user, associate the external identifiers and the common identifier in the key, and provide the key to the first system. Resultantly, the first system may use the key to consolidate the external data of the user, and associate the consolidated external data with the common identifier without compromising the identity of the user.

[0031] Additionally, one or more trained models and/or feature derivation rules associated with the offering entity may be applied by the first system to the consolidated external data to generate scores and/or derived features. The scores and/or derived features may be associated with the common identifier and aggregated with the consolidated external data for use in the candidacy determinations.

[0032] Further to the aggregated external data, scores, and/or derived features, internal data of the first system may be considered by the first system for candidacy determinations. The internal data, as stored by the offering entity, may include a relevant data portion or data attributes for use in the candidacy determinations, an internal identifier, and the identifying information of the user. To be able to include the internal data as part of the aggregated data in a manner that preserves anonymity of the user data, the first system may divide the internal data into a first dataset and a second dataset. The first dataset may include the internal identifier and the identifying information but excludes the relevant data portion or data attributes. The second dataset may include the internal identifier and the relevant data portion or data attributes but excludes the identifying information. The first system may provide the first dataset and the second dataset to the second system. The second system may use the identifying information from the first dataset to retrieve the common identifier, and generate a third dataset including the relevant data portion or data attributes from the second dataset and the common identifier. The first system may receive the third dataset from the second system, and may use the common identifier from the third dataset to identify and include the relevant data portion or data attributes from the third dataset in the aggregated data for the user.

[0033] Aggregated data may be similarly generated for each user of a plurality of users and associated with the common identifiers of the user to form a data pool. A plurality of candidate datasets including the common identifier and the aggregated data from the data pool may be generated for the plurality of users. The first system may process the data pool (e.g., by processing the candidate datasets) to determine candidacy of users for a plurality of offer sets. For example, a candidacy list may be generated for each of the plurality of offer sets. The candidacy list may include a subset of common identifiers for a subset of the users determined to be candidates for the respective offer set. Additionally, the candidacy list may include metadata describing or otherwise referencing a subset of the candidate datasets corresponding to the subset of common identifiers that include the aggregated data that was used to make the candidacy determinations.

[0034] The candidacy lists for the offer sets may be provided to the second system for use in facilitating the presentation of the offer set to candidate users in response to receiving pre-screen requests for the users. For example, the first system may receive a request from a client application

associated with a client system executing on a user device associated with one of the plurality of users. The request may include any portion of the identifying information of the user. The client system from which the request is received may be authorized or otherwise capable of presenting at least one offer set of the plurality of offer sets to candidate users. Accordingly, the first system may provide the second system the portion of the identifying information of the user and an identifier of the at least one offer set. The second system may use the portion of the identifying information to retrieve the common identifier for the user, use the identifier of the at least one offer set to retrieve a candidacy list for the at least one offer set, and determine whether the common identifier for the user is included in the candidacy list for the at least one offer set, and thus whether or not the user is a candidate for the at least one offer set. The first system may receive an indication from the second system of whether or not the user is a candidate for the at least one offer set, and generate a response to the request based on the indication to provide to the client system. When the indication included in the response is that the user is a candidate, the client system may present the at least one offer set to the user and may further interact with the first system to provide additional presentment-related details, as described in detail below.

[0035] In addition to the candidacy lists, the first system may provide the candidate datasets to the second system to enable provision of richer, more complete analytics data. The aggregated data included in the candidate datasets may be encrypted to mitigate risk when sharing the candidate datasets with the second system. The second system may generate analytics data associated with the processed pre-screen requests at predefined intervals. The analytics data may include a portion of the candidate datasets. For example, for a pre-screen request associated with a user that is received within the predefined interval and for which candidacy is determined for at least one offer set based on the common identifier for the user being included in the corresponding candidacy list, a candidate dataset including the common identifier for the user and the aggregated data (e.g., that was used to determine the user's candidacy) is included in the analytics data. For example, the metadata included in the candidacy list and the common identifier may be utilized to look up or identify the candidate dataset to include in the analytics data. The analytics data generated and provided to the first system may also now include identifying information of the user as the offer has been presented to the user based on the determined user candidacy. The first system may use the analytics data, among other data described in detail below, to perform one or more reconciliation processes.

[0036] While specific examples included throughout the present disclosure involve a financial institution as the offering entity that is providing one or more financial products and/or services as part of the offer set, it should be understood that techniques according to this disclosure may be adapted to any offering entity that may use credit-related data or other similarly regulated data as a basis for offer candidacy. It should also be understood that the examples above are illustrative only. The techniques and technologies of this disclosure may be adapted to any suitable activity.

[0037] Accordingly, reference to any particular activity is provided in this disclosure only for convenience and is not intended to limit the disclosure. A person of ordinary skill in the art would recognize that the concepts underlying the disclosed devices and methods may be utilized in any suitable activity. The disclosure may be understood with reference to the following description and the appended drawings, wherein like elements are referred to with the same reference numerals.

[0038] The terminology used below may be interpreted in its broadest reasonable manner, even though it is being used in conjunction with a detailed description of certain specific examples of the present disclosure. Indeed, certain terms may even be emphasized below; however, any terminology intended to be interpreted in any restricted manner will be overtly and specifically defined as such in this Detailed Description section. Both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the features, as claimed.

[0039] In this disclosure, the term “based on” may convey “based at least in part on.” The singular

forms “a,” “an,” and “the” may include plural referents unless the context dictates otherwise. The term “exemplary” may be used in the sense of “example” rather than “ideal.” The terms “comprises,” “comprising,” “includes,” “including,” or other variations thereof, may convey a non-exclusive inclusion such that a process, method, or product that comprises a list of elements does not necessarily include only those elements, but may include other elements not expressly listed or inherent to such a process, method, article, or apparatus. The term “or” may be interpreted disjunctively, such that “at least one of A or B” includes, (A), (B), (A and A), (A and B), etc. Similarly, the term “or” is intended to mean “and/or,” unless explicitly stated otherwise. “And/or” may convey all permutations, combinations, subcombinations, and individual instances of items or terms included within a list of the items or terms.

[0040] Terms like “provider,” “services provider,” or the like may generally encompass an entity or person involved in providing, selling, and/or renting items to persons, as well as an agent or intermediary of such an entity or person. An “item” may generally encompass a good, service, or the like having ownership or other rights that may be transferred. An “offering entity” may be a provider using pre-screening to identify candidates for offer sets that included one or more items. As used herein, terms like “user” generally encompass any person or entity that has an account with the offering entity, an account with a client of the offering entity that provides offer presentation services to the offering entity, and/or any other person or entity (e.g., any consumer) whom the offering entity or client may have relevant contact information of to enable provision of offer presentations. The term “application” may be used interchangeably with other terms like “program,” or the like, and generally encompasses software that is configured to interact with, modify, override, supplement, or operate in conjunction with other software.

[0041] FIG. **1** depicts an exemplary environment **100** for candidacy determinations and request processing, according to certain aspects, and which may be used with the techniques presented herein. A computing device **102** associated with a user or an agent interacting with the user may communicate with one or more of the other components of the environment **100** across electronic network **106**, including one or more server-side systems **108**, discussed below, to initiate a pre-screening process to determine the user's candidacy for one or more offer sets, for example. The environment **100** of FIG. **1** shows one computing device **102**. However, in other examples, there may be a plurality of computing devices **102** that are each communicating with one or more server-side systems **108** to initiate similar pre-screening processes.

[0042] In addition to communicating with the computing device **102** across the electronic network **106**, one or more components of the server-side systems **108** may communicate with one another across one or more other electronic networks similar to the electronic network **106** within the environment **100**. The server-side systems **108** may include an account services system **110**, a pre-screening system **112**, and/or one or more first data storage systems **114** that are associated with a first provider **113**. The first provider **113** may be a financial institution or other similar entity that generates offer sets associated with products and/or services of the first provider **113** to provide to candidates, where candidacy may be based in part on credit-related data or other similarly regulated data. The pre-screening system **112** may include a plurality of subsystems, such as a candidacy determination system **116**, a fulfillment system **118**, and/or an analytics system **120**. In some examples, one or more of the first data storage systems **114** may be internal data storage systems of the first provider **113**. Additionally or alternatively, one or more of the first data storage systems **114** may be external data storage systems hosted by a third party data storage service provider.

[0043] The server-side systems **108** may also include an identity resolution system **122** and/or one or more second data storage systems **124** that are associated with a second provider **123**. The second provider **123** may be an identity resolution provider that provides identity resolution services to the first provider **113** to facilitate regulatory compliant pre-screening processes. In some examples, one or more of the second data storage systems **124** may be internal data storage systems of the second provider **123**. Additionally or alternatively, one or more of the second data storage

systems **124** may be external data storage systems hosted by a third party data storage service provider. The environment **100** of FIG. **1** shows one identity resolution system **122**. However, in other examples, there may be a plurality of different identity resolution systems **122**, where each of the identity resolution systems **122** may be associated with a different provider (e.g., a third provider, fourth provider, and so on) that provides identity resolution services to the first provider **113**. Each of the different identity resolution service providers may have data storage systems hosted by the respective provider or a third party data storage service provider.

[0044] The server-side systems **108** may further include a plurality of external data sources **126** that provide external data of users to the pre-screening system **112** and/or the identity resolution system **122** for use in candidacy determinations. Additionally, the server-side systems **108** may include a client system **128** associated with a client of the first provider **113** that is configured to provide offer presentation services to the first provider **113**. In other examples, the client system **128** may instead be an offer presentation system of the first provider **113** configured to present offers to candidate users. The environment **100** of FIG. **1** shows one client system **128**. However, in other examples, there may be a plurality of different client systems **128**, where each of the client systems **128** may be authorized to present one or more of the offer sets of the first provider **113**. Further, the server-side systems **108** may include a monitoring system **130** that is configured to monitor an application process for any of the pre-screened offers presented to and applied for by candidates. The environment **100** of FIG. **1** shows one monitoring system **130**. However, in other examples, there may be a plurality of monitoring systems **130**, where each of the monitoring systems **130** may be configured to monitor one or more specific steps of the application process. Other components of the environment **100**, such as the pre-screening system **112**, the identify resolution system **122**, and/or the client system **128** may also be configured to be perform independent monitoring processes.

[0045] The above-provided examples are exemplary and non-limiting. The systems and devices of the environment **100** may communicate in any arrangement. As will be discussed herein, systems and/or devices of the environment **100** may communicate in order to enable pre-screening of users for offer sets that leverages regulatory compliant candidacy determinations and request processing, among other activities.

[0046] The computing device **102** may be configured to enable the user or the agent to access and/or interact with other systems in the environment **100**. For example, the computing device **102** may be a computer system such as, for example, a desktop computer, a laptop computer, a tablet, a smart cellular phone, a smart watch or other electronic wearable, etc. In some embodiments, the computing device **102** may include one or more electronic applications, e.g., a program, plugin, browser extension, etc., installed in a data storage device of the computing device **102**, such as a drive, disk, or a memory of the computing device **102**. In some embodiments, the electronic applications may be associated with one or more of the other components in the environment **100**. For example, a client application **104** associated with the client system **128** may be executed on the computing device **102** to enable initiation of a pre-screen process for the user, and presentation of one or more offer sets of the first provider **113** if the user is determined to be a candidate for the one or more offer sets via the pre-screen process. In some examples, the applications, including the client application **104**, may be thick applications installed locally on the computing device **102** and/or thin applications (e.g., web applications) that are rendered via the web browser launched on the computing device **102**.

[0047] Additionally, one or more components of the computing device **102** may generate, or may cause to be generated, one or more graphic user interfaces (GUIs) based on instructions/information stored in the data storage device, instructions/information received from the other systems in the environment **100**, and/or the like and may cause the GUIs to be displayed via a display of the computing device **102**. The GUIs may be, e.g., application interfaces or browser user interfaces and may include text, input text boxes, selection controls, and/or the like.

The display may include a touch screen or a display with other input systems (e.g., a mouse, keyboard, etc.) for the user to control the functions of computing device **102**.

[0048] The account services system **110** may include one or more server devices (or other similar computing devices) for executing account services of the first provider **113** (e.g., of the financial institution or other similar entity). Example account services may broadly include tasks associated with: opening and managing accounts, maintaining user preferences or settings associated with the accounts, and providing internal data associated with the accounts to one or more of the first data storage systems **114**, among other similar account-related services.

[0049] The pre-screening system **112** may include one or more server devices (or other similar computing devices) for executing services performed by the one or more subs-systems of the pre-screening system **112**, including the candidacy determination system **116**, the fulfillment system **118**, and/or the analytics system **120**. Example services performed by the candidacy determination system **116** may broadly include tasks associated with: data ingestion and/or integration (e.g., extract, transform, and load (ETL) processes), internal data anonymization, data pool generation, candidate dataset generation from the data pool, and campaign execution on the candidate datasets to generate a plurality of candidacy lists including candidates for a plurality of offer sets. Example services performed by the fulfillment system **118** may broadly include tasks associated with the processing of pre-screen requests received from client systems **128** to provide an indication of user candidacy or a lack thereof for a subset of the offer sets that the client systems **128** are respectively authorized to present. Example services performed by the analytics system **120** may broadly include tasks associated with one or more reconciliation processes.

[0050] The first data storage systems **114** may include a server system or computer-readable memory such as a hard drive, flash drive, disk, etc. In some examples, the first data storage systems **114** may include and/or interact with an application programming interface for exchanging data to other systems, e.g., one or more of the other components of the environment **100**, such as the account services system **110** and/or the pre-screening system **112**. In other examples, one or more of the first data storage systems **114** may be a sub-system or component of the account services system **110** and/or the pre-screening system **112** (e.g., when the one or more of the first data storage systems **114** are also provided or hosted by the first provider **113** rather than a third party).

[0051] The first data storage systems **114** may include and/or act as a repository or source for various types of data that may be received, generated, and/or used for or in relation to the pre-screening processes performed by the various sub-system of pre-screening system **112**. For example, the first data storage systems **114** may include a plurality of data stores, each storing one or more of the various types of data. Example types of data stored may include, but are not limited to, internal data of a plurality of users, anonymized external data of the users, data pool data including aggregated and anonymized data of the users, trained models, feature derivation rules, campaign rules, candidacy lists for offer sets and/or corresponding candidate datasets from which the candidacy lists are generated, pre-screen request data, analytics data, promotional inquiry data, monitoring data, and the like.

[0052] In some examples, and as illustrated in FIG. **1**, one or more access control layers **115** limit access to a particular subset of the data stores within the first data storage systems **114**. For example, certain types of data (e.g., non-anonymized internal user data) may be segregated from other types of data (e.g., anonymized user data in the data pool) by storing the data types in different subsets of one or more data stores within the first data storage systems **114**. Access to the different subsets may be limited or restricted at a system level and/or at an administrative user level using one or a combination of roles, entitlements, and credentials. As one non-limiting example, the implementation of roles, entitlements, and/or credentials may enable pre-screen specific deployments within the pre-screening system **112** such that data access is limited to the subset of one or more data stores within the first data storage systems **114** storing the data pool that includes anonymous data of the users. Data access to remaining data stores of the first data storage systems

114 that include internal data of the users that is known and not anonymized, for example, is denied or otherwise restricted. The access control may help to prevent a potential bad actor from gaining access to both the anonymous data and the known data, and using any data overlaps between the anonymous data and the known data to attempt to determine an identity of users associated with the anonymous data.

[0053] The identity resolution system **122** may include one or more server devices (or other similar computing devices) for executing identity resolution services. Example identity resolution services may broadly include tasks associated with generating common identifiers and keys to enable the candidacy determination system **116** to aggregate anonymized external data of users, as well as anonymize and associate the anonymized internal data of the users with the aggregated external data, among other data, for use in candidacy determinations. Additionally, the tasks may include, as part of pre-screen request processing, parsing one or more candidacy lists for common identifiers of the users associated with the requests to determine user candidacy or lack thereof, and generating candidacy indications to provide to the fulfillment system **118** based on the determination. Also, the tasks may include generating analytics data associated with processed pre-screened requests at pre-defined intervals to provide to the analytics system **120**. The analytics data generated may include a portion of the candidate datasets generated by and received from the candidacy determination system **116**. Further, the tasks may include generating and providing promotional inquiries to the external data sources **126**, as well as generating indications of the promotional inquiries to provide to the analytics system **120**.

[0054] The second data storage systems **124** may include a server system or computer-readable memory such as a hard drive, flash drive, disk, etc. In some examples, the second data storage systems **124** may include and/or interact with an application programming interface for exchanging data to other systems, e.g., one or more of the other components of the environment **100**, such as the identity resolution system **122**. In other examples, one or more of the second data storage systems **124** may be a sub-system or component of the identity resolution system **122** (e.g., when the one or more of the second data storage systems **124** are also provided or hosted by the first provider **113** rather than a third party).

[0055] The second data storage systems **124** may include and/or act as a repository or source for various types of data that may be received, generated, and/or used for providing identity resolution in association with the candidacy determinations and request processing performed by the pre-screening system **112**. For example, the second data storage systems **124** may include a plurality of data stores, each storing one or more of the various types of data. Example types of data stored may include, but are not limited to, generated common identifiers for users that are stored in association with identifying information for the users, generated keys that associate the common identifiers for users with different external identifiers provided by the external data sources **126** for the users, candidacy lists for offer sets, candidate datasets, analytics data, promotional inquiry data, and the like.

[0056] The external data sources **126** may each include one or more server devices (or other similar computing devices) for executing data provision services. Example data provision services may broadly include tasks associated with providing external data of the users to one or more systems of the first provider **113** and/or the second provider **123**. In some examples, a subset of the external data sources **126** may provide different portions of the external data to each of the candidacy determination system **116** and the identity resolution system **122**. For example, the subset of the external data sources **126** may each store identifying information of the users, external data of the users, and external identifiers generated by the respective external data sources **126** for the users that do not include any identifying information of the users. The external data may include data used and/or processed for use in the candidacy determinations performed by the candidacy determination system **116**. However, the external data may be a type of data that, based on industry regulations, the identity of the user is to remain anonymous to the candidacy determination system

116. As a non-limiting example, the subset of the external data sources **126** may include systems of one or more credit bureaus that are configured to provide credit-related data for the users, where an identity of the users to which the credit-related data belongs cannot be known by the first provider **113** until certain actions occur (e.g., until after an offer is presented) to maintain compliance with FCRA. Therefore, and as described in more detail below, the subset of the external data sources **126** may provide only the external data and the external identifier for the users to the candidacy determination system **116**, and may provide only the identifying information and the external identifier for the users to the identity resolution system **122**.

[0057] In other examples, a remaining subset of the external data sources **126** may provide the identifying information of the users along with the external data of the users (e.g., provide non-anonymous external data) to the first provider **113** for storage within one or more data stores of the first data storage systems **114**. For conciseness and clarity throughout the disclosure, such non-anonymous external data that is received and stored by the first provider **113** in the first data storage systems **114** may be referred to as or treated similarly to internal data of the first provider **113**. For example, because the internal data stored is not anonymous, if the internal data is to be included or considered as part of the candidacy determinations performed by the candidacy determination system **116**, the first provider **113** uses services of the identity resolution system **122** to anonymize the internal data, as described in detail below.

[0058] The client system **128** may include one or more server devices (or other similar computing devices) for executing offer presentation services. Example offer presentation services may broadly include tasks associated with: authenticating users via the client application **104**; generating and providing pre-screen requests to the fulfillment system **118**; generating and providing offer information requests to the fulfillment system **118** when the users are indicated as candidates responsive to the pre-screen requests, generating and causing display of offer presentation user interfaces via the client application **104** based on responses to the offer information requests, and providing offer presentation indications to the fulfillment system **118**. Additionally, when the candidates select to apply for the offer presented, the tasks may further include sending signals to monitoring system **130** to initiate a monitoring of the application process. In some examples, the client system **128** or a different vendor of the first provider **113**, including a system of the first provider **113** itself, may provide services for fulfilling offer presentations via other communication modalities than the client application **104**, such as via direct mail to the users' physical mail addresses.

[0059] The monitoring system **130** may include one or more server devices (or other similar computing devices) for executing monitoring services in response to a candidate selecting to apply for a presented offer. Example monitoring services may broadly include tasks associated with: tracking information associated with the application process including referrals and/or a payment process, as well as compliance monitoring, including how the client system **128** is presenting the offer set.

[0060] The network **106** over which the one or more components of the environment **100** communicate may include one or more wired and/or wireless networks, such as a wide area network (“WAN”), a local area network (“LAN”), personal area network (“PAN”), a cellular network (e.g., a 3G network, a 4G network, a 5G network, etc.) or the like. In some embodiments, the network **106** includes the Internet, and information and data provided between various systems occurs online. “Online” may mean connecting to or accessing source data or information from a location remote from other devices or networks coupled to the Internet. Alternatively, “online” may refer to connecting or accessing an electronic network (wired or wireless) via a mobile communications network or device. The computing device **102** and one or more of the server-side systems **108** may be connected via the network **106**, using one or more standard communication protocols. The computing device **102** and one or more of the server-side systems **108** may transmit and receive communications from each other across the network **106**, as discussed in more detail

below.
[0061] Although depicted as separate components in FIG. **1**, it should be understood that a component or portion of a component in the system of exemplary environment **100** may, in some embodiments, be integrated with or incorporated into one or more other components. For example, one or more of the first data storage systems **114** may be integrated with the pre-screening system **112**, one or more of the second data storage systems **124** may be integrated with the identity resolution system **122**, or the like. In some embodiments, operations or aspects of one or more of the components discussed above may be distributed amongst one or more other components. Any suitable arrangement and/or integration of the various systems and devices of the exemplary environment **100** may be used.
[0062] In the following disclosure, various acts may be described as performed or executed by a component from FIG. **1**, such as the computing device **102** or one or more of the server-side systems **108**, or components thereof. However, it should be understood that in various embodiments, various components of the exemplary environment **100** discussed above may execute instructions or perform acts including the acts discussed below. An act performed by a device may be considered to be performed by a processor, actuator, or the like associated with that device. Further, it should be understood that in various embodiments, various steps may be added, omitted, and/or rearranged in any suitable manner.
[0063] FIG. **2**A depicts an example method **200** for determining candidacy. FIG. **2**B depicts an example method **221** for providing identity resolution in the candidacy determination method **200** of FIG. **2**A. In some examples, various steps of the method **200** may be performed by the candidacy determination system **116**, while various steps of the method **221** may be performed by the identity resolution system **122**. FIG. **2**C depicts a conceptual diagram **238** of the example methods **200**, **221** described in FIGS. **2**A and **2**B to illustrate the interactions between the candidacy determination system **116** and the identity resolution system **122**.
[0064] Referring concurrently to FIGS. **2**A and **2**C, at step **202**, the method **200** of FIG. **2**A may include receiving a plurality of external data of a user from the plurality of external data sources **126**. The plurality of external data received may be associated with a plurality of external identifiers and exclude identifying information of the user.
[0065] As shown in FIG. **2**C, the external data sources **126** may include at least a first data source **240** and a second data source **248**. The first data source **240** may store first data **244** in association with (i) a first external identifier **242** generated by the first data source **240** for the user (e.g., ID1), and (ii) identifying information **246** of the user (e.g., (PII). The second data source **248** may store second data **252** in association with (i) a second external identifier **250** generated by the second data source **248** for the user (e.g., ID2), and (ii) the identifying information **246** of the user (e.g., PII). The first external identifier **242** and the second external identifier **250** generated for the user may be different from one another. Additionally, while the first data **244** and the second data **252** may be comprised of the same types of data, values for the types of values may vary.
[0066] To provide an illustrative example, the first data source **240** and second data source **248** may be associated with at least two different credit reporting agencies or credit bureaus that are providing credit-related data as the first data **244** and the second data **252**. Example types of the credit-related data included in the first data **244** and the second data **252** may include a plurality of different types of credit-related data attributes. The identifying information **246** of the user may include a name, an address, a phone number, a social security number, a date of birth, and/or other PII. Certain external data sources **126** may provide more or less types of PII within the identifying information **246** of the user than others of the external data sources **126**.
[0067] The external data received by the candidacy determination system **116** at step **202** from the first data source **240** may include the first external identifier **242** and the first data **244**, but exclude the identifying information **246** of the user. Similarly, the external data received by the candidacy determination system **116** at step **202** from the second data source **248** may include the second

external identifier **250** and the second data **252**, but exclude the identifying information **246** of the user. The identifying information **246** of the user is specifically excluded to maintain regulatory compliance (e.g., FCRA compliance). Additionally, as previously mentioned, the first external identifier **242** and the second external identifier **250** may be different identifiers. Therefore, when the candidacy determination system **116** initially receives the first data **244** and the second data **252**, the candidacy determination system **116** has no knowledge of or any way of identifying the first data **244** and the second data **252** as data of the same user because at no point is the identifying information **246** of the user provided to the candidacy determination system **116**.

[0068] Again referring to FIGS. **2**A and **2**C concurrently, at step **204**, the method **200** of FIG. **2**A may include receiving, from the identity resolution system **122**, a key **256** that associates the plurality of external identifiers, such as the first external identifier **242** and the second external identifier **250**, with one another and a common identifier **254** (e.g., CI) generated for the user by the identity resolution system **122**. As described in more detail below, the key **256** may be used by one or more systems of the first provider **113**, including at least the pre-screening system **112**, to aggregate any and all of the external data associated with the user that is received and of relevance for candidacy determinations. In other words, the key **256** provides a mechanism for identifying the first data **244** and the second data **252** as data of the same user, while continuing to preserve anonymity of the user as the common identifier **254** and/or the key **256** exclude any identifying information of the user.

[0069] Steps **222**-**228** of the method **221** of FIG. **2**B describe aspects related to the generation of the common identifier **254** and the key **256** by the identity resolution system **122**. For example, now referring to FIGS. **2**B and **2**C concurrently, at step **222**, the method **221** of FIG. **2**B may include receiving, from the plurality of external data sources **126**, the plurality of external identifiers and identifying information of the user. Continuing the above-example where the external data sources include at least the first data source **240** and the second data source **248** and as shown in FIG. **2**C, the identity resolution system **122** may receive the first external identifier **242** and the identifying information **246** of the user from the first data source **240**, and the second external identifier **250** and the identifying information **246** of the user from the second data source **248**.

[0070] At step **224**, the method **221** may include determining the plurality of external identifiers, such as the first external identifier **242** and the second external identifier **250**, are associated with the user based on a match of the identifying information **246** of the user. For example, at least a portion of the identifying information **246** of the user provided in association with the first external identifier **242** by the first data source **240** may match a portion of the identifying information **246** of the user provided in association with the second external identifier **250** by the second data source **248**. At step **226**, the method **221** may include generating the common identifier **254** for the user that excludes the identifying information **246** of the user. For example, the common identifier **254** may be a random sequence of alphanumeric characters generated by the identity resolution system **122**. At step **228**, the method **221** may include generating and providing, to the candidacy determination system **116**, the key **256** associating the plurality of external identifiers, such as the first external identifier **242** and the second external identifier **250**, with one another and the common identifier **254**.

[0071] Additionally, at step **230**, the method **221** may include storing the identifying information **246** of the user in association with the key **256** and/or at least the common identifier **254** in one or more of the second data storage systems **124**. Such storage may facilitate identity resolution provided by the identity resolution system **122** as the pre-screening system **112**, and more specifically, the fulfillment system **118** is processing a pre-screen request as described in more detail with reference to FIGS. **3**A-**3**C below.

[0072] Returning to concurrently referring to FIGS. **2**A and **2**C, at step **206**, the method **200** of FIG. **2**A performed by the candidacy determination system **116** may include consolidating external

data of the user that is associated with the common identifier **254** using the key **256** to, for example, generate consolidated external data **262**. In some examples, the consolidated external data **262** may be generated through a consolidation process **260** performed by an extract, transform, and load (ETL) system **258** of the candidacy determination system **116**. For example, the key **256** may be used to determine each of the external identifiers associated with the user, such as the first external identifier **242** and the second external identifier **250**. The data received from the external data sources **126** that are associated with the external identifiers determined to be associated with the user, such as the first data **244** associated with the first external identifier **242** and the second data **252** associated with the second external identifier **250**, may then be consolidated or joined to generate the consolidated external data **262**.

[0073] To provide a non-limiting, illustrative example, the first data **244** may include a plurality of credit-related data attributes for the user collected and/or synthesized by the first data source **240**. The second data **252** may include the same or similar types of credit-related data attributes for the user collected and/or synthesized by the second data source **248**. As part of the consolidation process **260**, values of one or more same or similar data attributes from the first data **244** and the second data **252** may be further processed and/or joined to generate a single value for the respective data attribute across the first data source **240** and the second data source **248** to be included in the consolidated external data **262**.

[0074] In some examples, and as shown in FIG. **2**C, the consolidated external data **262** may be provided as input into one or more processes performed by the ETL system **258**, such as processes **266** associated with running models and/or deriving features, to generate additional data types for consideration in the candidacy determinations. For example, the consolidated external data **262** may be input into one or more trained machine learning models retrieved from one or more of the first data storage systems **114** to generate one or more scores **268**. Additionally or alternatively, one or more feature derivation rules may be applied to the consolidated external data **262** to derive one or more features **270** from the consolidated external data **262**. The scores **268** and/or features **270** may be associated with the common identifier **254** for the user to enable the scores **268** and/or features **270** to be joined with the consolidated external data **262** for use in candidacy determinations, as described in detail below.

[0075] In further examples, internal data of the user may be considered along with the consolidated external data **262**, the scores **268**, and/or the features **270** in the candidacy determinations. Optional steps **208**-**214** of method **200** of FIG. **2**A may be performed by the candidacy determination system **116** to anonymize any internal data for the user that is to be considered in the candidacy determinations. If more than one type of internal data is to be considered, optional steps **208**-**214** of the method **200** may be repeated for each type of internal data. Internal data may include any data collected by the first provider **113**, such as data collected by the account services system **110** for storage in one or more of the first data storage systems **114**. Additionally or alternatively, the internal data may include any data collected by a third party system on behalf of the first provider **113** (e.g., including non-anonymous external data provided by one or more of the external data sources **126**) and received for storage in one or more of the first data storage systems **114**. In some examples, at least optional steps **208** and **210** may be performed by an internal data anonymization system **276** of the candidacy determination system **116**, as shown in FIG. **2**C.

[0076] Continuing to refer to FIGS. **2**A and **2**C concurrently, at optional step **208**, the method **200** of FIG. **2**A may include receiving internal data **278** of the user from an internal data source, such one of the first data storage systems **114**. The internal data **278** may include a relevant data portion (e.g., third data **282**), an internal identifier **280** (e.g., ID3), and the identifying information **246** (e.g., PII) of the user. The third data **282** may be a portion of the internal data **278** relevant for consideration in the candidacy determinations. The internal identifier **280** may be randomly generated and excludes any of the identifying information **246** of the user. The identifying information **246** of the user included in the internal data **278** may include more or less types of PII

than the types of Pll included in the identifying information **246** of the user provided by the external data sources **126**. However, at least one of the types of Pll included in the identifying information **246** of the user may be the same across the external data sources **126** and internal data source.

[0077] At optional step **210**, the method **200** may include dividing the internal data **278** into a first dataset **284** and a second dataset **286**. The first dataset **284** may include the internal identifier **280** and the identifying information **246** of the user, but excludes the relevant data portion (e.g., the third data **282**). The second dataset **286** may include the internal identifier **280** and the relevant data portion (e.g., the third data **282**), but excludes the identifying information **246** of the user. At optional step **212**, the method **200** may include, in response to providing the first dataset **284** and the second dataset **286** to the identity resolution system **122**, receiving a third dataset **288** including the relevant data portion (e.g., the third data **282**) from the second dataset **286** and the common identifier **254**.

[0078] Optional steps **232** and **234** of the method **221** of FIG. **2**B describe aspects related to the generation of the third dataset **288** by the identity resolution system **122**. For example, turning now to FIG. **2**B and FIG. **2**C, at optional step **232**, the method **221** of FIG. **2**B may include receiving, from the candidacy determination system **116**, the first dataset **284** and the second dataset **286**. At optional step **234**, the method **221** may then include generating and providing, to the candidacy determination system **116**, the third dataset **288**. For example, the internal identifier **280** included in each of the first dataset **284** and the second dataset **286** may enable the identity resolution system **122** to associate the first dataset **284** and the second dataset **286** with one another. The identifying information **246** of the user included in the first dataset **284** may be used to retrieve the common identifier **254** for the user. For example, the identity resolution system **122** may use the identifying information **246** of the user to query one of the second data storage systems **124** that is storing the association of the identifying information **246** of the user with the key **256** and/or the common identifier **254** to retrieve the common identifier **254**. The retrieved common identifier **254** may then be included in the third dataset **288** along with the relevant data portion (e.g., the third data **282**) extracted from the second dataset **286** associated with the first dataset **284**.

[0079] Inclusion of the common identifier **254** in the third dataset **288** may allow the candidacy determination system **116** to identify the relevant data portion (e.g., the third data **282**) as being associated with the same user as the first data **244** and second data **252** while continuing to preserve the anonymity of the user. For example, returning to the method **200** for candidacy determinations of FIG. **2**A, at optional step **214**, the method **200** may include joining the relevant data portion of the internal data **278** (e.g., the third data **282**) with the consolidated external data **262** of the user using the common identifier **254**. In examples where the scores **268** and/or the features **270** are generated from the consolidated external data **262**, the scores **268** and/or the features **270** may also be joined with the relevant data portion of the internal data **278** (e.g., the third data **282**) and the consolidated external data **262** using the association of the scores **268** and/or the features **270** with the common identifier **254**.

[0080] At least steps **202**-**206** and optionally steps **208**-**214** of the method **200** of FIG. **2**A, as well as at least steps **222**-**230** and optionally steps **232**-**234** of the method **221** of FIG. **2**B, may be repeated for each user of a plurality of users to enable joining of any and all data of each respective user that is relevant to the candidacy determinations. Resultantly, referring to FIGS. **2**A and **2**C concurrently, at step **216**, the method **200** of FIG. **2**A may include generating a data pool **274** including aggregated data **272** for each of the plurality of users. For a given user, the aggregated data **272** may include the consolidated external data **262**, any additional data generated from the consolidated external data **262**, such as the scores **268** and/or the features **270**, as well as any relevant portions of the internal data **278**, such as the third data **282**. The aggregated data **272** for the user may be associated with the common identifier **254** within the data pool **274**. Therefore, the data pool **274** may comprise a plurality of sets of aggregated data **272** associated with a plurality of

common identifiers **254** corresponding to the plurality of users.
[0081] The data pool **274** may be stored in a subset of one or more data stores of the first data storage systems **114**. Data access to the subset of the data stores storing the data pool **274** may be controlled by the one or more access control layers **115** in order to restrict access to data in the data pool **274** to only approved users (e.g., administrative users) associated with the first provider **113** (e.g., based on roles, entitlements, and/or credentials). Specifically, if an administrative user is given access to the anonymized data in the data pool **274**, the administrative user may be restricted from accessing any non-data pool data in the first data storage systems **114** that includes non-anonymized data or known user identifying information. Such access control may help to prevent the administrative user, who may be a potential bad actor, from gaining access to both the anonymized data and the non-anonymized data, and using any data overlaps between the two to attempt to determine an identity of users associated with the anonymized data.
[0082] In some examples, a plurality of candidate datasets **294** corresponding to the plurality of users may be generated from the data pool **274**. For example, each one of the candidate datasets **294** may be a record including the common identifier **254** and the aggregated data **272** for one of the plurality of users from the data pool **274**. The various types of data forming the aggregated data **272** may be identified within the record based on a source file for the data and an associated timestamp when the data was received and/or generated.
[0083] At step **218**, the method **200** may include processing the data pool **274** to determine, from the plurality of users, a subset of candidate users for each of a plurality of offer sets. In some examples, processing of the data pool **274** may include processing of the candidate datasets **294** generated from the data pool **274**. Each offer set may include one or more products or services offered by the first provider **113**. Candidacy for each offer set may be based on variable candidacy criteria. As illustrated in FIG. **2**C, a campaign execution system **290** of the candidacy determination system **116** may apply a plurality of campaign rules associated with the respective candidacy criteria of each offer set to the plurality of sets of aggregated data **272** in the data pool **274** (or candidate datasets **294**) to determine the subset of candidate users. For example, a portion of the sets of aggregated data **272** in the data pool **274** (or candidate datasets **294**) may be identified as meeting the respective candidacy criteria for each offer set based on the application of the rules. The portion of common identifiers **254** associated with the portion of the sets of aggregated data **272** in the data pool **274** (or candidate datasets **294**) may indicate the subset of candidate users.
[0084] The campaign rules may include inclusionary rules. Example inclusionary rules for an offer set may be that a candidate user has a credit-related score included in the consolidated external data **262** above a predefined threshold value and/or a model-obtained score from the scores **268** above a predefined threshold value. The campaign rules may also include exclusionary or suppressive rules. An example exclusionary or suppressive rule for the offer set may be to exclude from candidacy a user that has already been offered and/or applied for a number of products or services from the first provider **113** that exceeds a predefined threshold number. The number of products or services that the user has been offered and/or applied for may be a type of internal data of the user that can be anonymized and joined as part of the aggregated data **272**, as described with reference to optional steps **208**-**214** of the method **200**.
[0085] At step **220**, the method **200** may include generating and providing, to the identity resolution system **122**, a plurality of candidacy lists **292** for the plurality of offer sets. Each candidacy list **292** may include the subset of common identifiers **254** for the subset of candidate users determined for the respective offer set (e.g., the portion of common identifiers **254** associated with the portion of the sets of aggregated data **272** identified as meeting the respective candidacy criteria for respective offer set). In some examples, each candidacy list **292** may include or otherwise be associated with an identifier of the respective offer set the list corresponds to (e.g., an offer set identifier) that is generated by the candidacy determination system **116**. Additionally, each candidacy list **292** may include metadata describing or otherwise referencing a subset of the

candidate datasets **294** corresponding to the subset of common identifiers **254** that include the aggregated data **272** that was used to make the candidacy determinations.

[0086] As described in more detail below with reference to FIGS. **4**A-**4**C, an entirety of the candidate datasets **294** generated from the data pool **274** may be provided to the identity resolution system **122** along with the candidacy lists **292**. At least a portion of the candidate datasets **294** may later be included by the identity resolution system **122** as part of analytics data that is provided to and used by the analytics system **120** to perform one or more reconciliation processes.

[0087] In some examples, the candidacy lists **292** and candidate datasets **294** may also be stored in one of the first data storage systems **114**.

[0088] Turning back to FIG. **2**B, step **236** of the method **221** describes aspects related to the receipt of the candidacy lists **292** by the identity resolution system **122**. For example, at step **236**, the method **221** may include receiving, from the candidacy determination system **116**, and storing the plurality of candidacy lists **292** for the plurality of offer sets. The candidacy lists **292** may be stored in one or more of the second data storage systems **124** for subsequent retrieval and use to provide identity resolution in association with processing of a pre-screen request by the candidacy determination system **116**, as described in detail with references to FIGS. **3**A-**3**C below. In some examples, when each candidacy list **292** includes or is otherwise associated with an offer set identifier of the respective offer set that the list corresponds to, the candidacy lists **292** may be stored in association with the offer set identifiers to facilitate retrieval of an appropriate one or more of the candidacy lists **292**.

[0089] The candidate datasets **294** may also be stored in one or more of the second data storage systems **124** for subsequent retrieval and use to provide analytics data, as described in detail with references to FIGS. **4**A-**4**C below.

[0090] The methods **200**, **221** and corresponding conceptual diagram **238** described above are provided merely as examples for determining user candidacy for offer sets, and may include additional, fewer, different, or differently arranged steps than depicted in FIGS. **2**A-**2**C.

[0091] FIG. **3**A depicts an example method **300** for request processing. FIG. **3**B depicts an example method **321** for providing identity resolution in the request processing of FIG. **3**A. In some examples, various steps of the method **300** may be performed by the fulfillment system **118** of the pre-screening system **112**, while various steps of the method **321** may be performed by the identity resolution system **122**. FIG. **3**C depicts a conceptual diagram **340** of the example methods **300**, **321** described in FIGS. **3**A and **3**B to illustrate the interactions among various components of the environment **100**, including the computing device **102**, the client system **128**, the fulfillment system **118**, the identity resolution system **122**, and the monitoring system **130**.

[0092] Referring concurrently to FIGS. **3**A and **3**C, at step **302**, the method **300** of FIG. **3**A may include receiving, from the client system **128**, a first request **352** including identifying information **354** (e.g., PII) of a user. The first request **352** may be a pre-screen request. For purposes of this example, the user may be the user associated with computing device **102** or the user whom the agent is interacting with via the computing device **102**. The identifying information **354** of the user included in the first request **352** may include at least a portion of the identifying information **246** of the user that is stored in association with the key **256** and/or the common identifier **254** for the user in one or more of the second data storage systems **124** associated with the second provider **123**. The portion of the identifying information **354** included in the first request **352** is simply passed by the fulfillment system **118** onto the identity resolution system **122** for use as described with reference to step **306**. The identifying information **354** is not persisted in any form within any systems of the first provider **113** to help ensure anonymity of the user is preserved. In some examples, the first request **352** may also include a request identifier (e.g., a pre-screen identifier). As discussed in more detail with respect to FIGS. **4**A-**4**C below, the request identifier may be utilized to associate and store information associated with the first request **352** in pre-screen logs for use in one or more reconciliation processes.

[0093] In some examples, and as shown in FIG. **3**C, the first request **352** may be generated in response to authentication of the user through the client application **104** executing on the computing device **102**. For example, at step **342**, authentication of the user may be prompted via the client application **104**. The prompt may request input of authentication data **344**. Dependent on the context, the authentication data **344** may include identifying information of the user (e.g., a name and an address) and/or user account credentials with the client system **128** from which similar identifying information of the user may be obtained. As one example, when the computing device **102** is a device of or associated with the user and the user has an account with the client system **128**, the user may be prompted to enter account credentials upon the computing device **102** launching or navigating to the client application **104** (e.g., via a login user interface). As another example, when the computing device **102** is a device of an agent interacting with the user, the agent may verbally request identifying information from the user to input to the computing device **102**. The authentication data **344** of the user provided as input responsive to the prompt may then be provided from the computing device **102** to the client system **128** via the client application **104**. The authentication data **344** may be used by the client system **128** to authenticate the user at step **346**. Upon authentication, the client system **128** may generate the first request **352** at step **348**. The identifying information **354** of the user included in the first request **352** may be information obtained from the authentication of the user at step **346** (e.g., from the authentication data **344** and/or information obtained using the authentication data **344**). In some examples, the identifying information **354** may include at least a name and an address of the user that is appended to the first request **352**.

[0094] Returning to referring concurrently to FIGS. **3**A and **3**C, at step **304**, the method **300** may include determining one or more offer sets of the plurality of offer sets associated with the client system **128**. The offers sets associated with the client system **128** may be a subset of the offer sets provided by the first provider **113** that are made available to or the client system **128** is otherwise authorized to present to candidate users. At step **306**, the method may include providing, to the identity resolution system **122**, one or more identifiers of the one or more offer sets determined at step **304** (e.g., offer set IDs **358**) and the identifying information **354** of the user included in the first request **352**. At step **308**, an indication of user candidacy (e.g., a candidacy indication **360**) for each of the one or more offer sets may be received from the identity resolution system **122**.

[0095] Steps **322**-**334** of the method **221** of FIG. **2**B describe aspects of identity resolution performed by the identity resolution system **122** related to determining a candidacy of the user for the one or more offer sets. For example, referring now concurrently to FIGS. **2**B and **2**C, at step **322**, the method **221** may include receiving, from the candidacy determination system **116**, the one or more identifiers of the one or more offer sets (e.g., the offer set IDs **358**) and the identifying information **354** of the user.

[0096] At step **324**, the method **321** may include using the one or more identifiers of the one or more offer sets (e.g., the offer set IDs **358**) to retrieve, from the plurality of candidacy lists **292**, one or more candidacy lists **292** for the one or more offer sets. The candidacy lists **292** for the offer sets may be stored in association with the offer set identifiers (e.g., the offer set IDs **358**) in one or more of the second data storage systems **124**, as described above in step **236** of the method **221**. Therefore, the identity resolution system **122** may query the one or more of the second data storage systems **124** using the offer set IDs **358** of the one or more offer sets to retrieve the one or more candidacy lists **292** for the one or more offer sets.

[0097] At step **326**, the method **321** may include using the identifying information **354** of the user to retrieve the common identifier **254** for the user. As previously discussed, the identifying information **354** included in the first request **352** and received by the identity resolution system **122** at step **322** may include at least a portion of the identifying information **246** of the user. The identifying information **246** may be stored in association with the key **256** and/or the common identifier **254** in one or more of the second data storage systems **124**, as described above in step

230 of the method **221**. Therefore, the identity resolution system **122** may query the one or more of the second data storage systems **124** using the identifying information **354** of the user to retrieve the common identifier **254** associated with the identifying information **246** that at least partially matches the identifying information **354**.

[0098] At step **328**, the method **321** may include determining user candidacy for each of the one or more offer sets based on inclusion of the common identifier **254** for the user in the one or more of the candidacy lists **292** for the one or more offer sets. At decision **330**, a determination is made as to whether the common identifier **254** is included in any of the candidacy lists **292** for the one or more offer sets (e.g., and thus whether the identity of the user of the common identifier **254** as maintained within the identity resolution system **122** and associated second data storage systems **124** is a candidate for the offer sets). If the common identifier **254** is determined not to be included in any of the candidacy lists **292** at decision **330**, at step **332**, the method **321** may include generating and providing, to the candidacy determination system **116**, an indication of lack of candidacy (e.g., as the candidacy indication **360**).

[0099] If the common identifier **254** is determined to be included in at least one of the candidacy lists **292** at decision **330**, at step **334**, the method **321** may include generating and providing, to the candidacy determination system **116**, an indication of candidacy (e.g., as the candidacy indication **360**). The indication of candidacy may be associated with at least one of the one or more identifiers of the one offer sets (e.g., one of the offer set IDs **358**) corresponding to the at least one of the candidacy lists **292** that included the common identifier **254** of the user.

[0100] Returning to referring to FIGS. **2**A and **2**C concurrently, once the candidacy indication **360** for each of the one or more offer sets has been received, the fulfillment system **118** may utilize the candidacy indication **360** to generate a first response **362** to the first request **352**. The first response **362** may include the request identifier (e.g., the pre-screen identifier) included in the first request **352** to enable the client system **128** to associate the first response **362** to the first request **352**. For example, at decision **310**, the method **300** of FIG. **3**A may include determining whether the user is a candidate for any of the one or more offer sets. The determination may be based on the candidacy indication **360** received for each of the one or more offer sets at step **308**.

[0101] If the user is determined not to be a candidate for any of the one or more offer sets at decision **310**, the method **300** may proceed to step **312**. At step **312**, the method **300** may include generating and providing, to the client system **128**, the first response **362** to the first request **352** indicating a lack of candidacy. The method **300** may then end. For example, and as illustrated by the dashed line in FIG. **3**C, once the client system **128** receives the first response **362**, the client system **128** may perform no further actions associated with pre-screening and/or offer presentation.

[0102] If the user is determined to be a candidate for at least one offer set of the one or more offer sets at decision **310**, the method **300** may proceed to step **314**. At step **314**, the method **300** may include generating and providing, to the client system **128**, the first response **362** to the first request **352** indicating the user as a candidate for the at least one offer set and including one or more items of the at least one offer set. In other words, the first request **352** may translate the offer set to one or more items of the offer set that may be known or understood by the client system **128**. In some examples, identifiers of the one or more items may be included in the first response **362**. Example identifiers of the one or more items may include stock keeping units (SKUs), brand codes, or other similar item identifiers.

[0103] At step **316**, the method **300** may include receiving, from the client system **128**, a second request **366** for offer information. For example, at step **364** shown in FIG. **3**C, the client system **128** may generate the second request **366**. In some examples, the client system **128** may generate the second request **366** based on or responsive to the first response **362**. For example, the receipt of the first response **362** indicating the user as a candidate may directly cause or trigger the generation of the second request **366**. In such examples, the second request **366** may include a client identifier associated with the client system **128** and/or the one or more items of the at least one offer set

included in the first response **362**. In other examples, the client system **128** may iteratively generate and send the second request **366** to the fulfillment system **118** at predefined intervals (e.g., hourly, daily, weekly, etc.). In such examples, the second request **366** may include the client identifier associated with the client system **128**. The client system **128** may then cache or otherwise store offer information that is included in a second response **368** generated by the fulfillment system **118** in response to the second request **366**, as described in more detail below.

[0104] At step **318**, the method **300** of FIG. **3**A may include retrieving the offer information. For example, the fulfillment system **118** may use the client identifier included in the second request **366** to query the one or more of the first data storage systems **114** to retrieve offer information for any and all items of the one or more offer sets associated with the client system **128** (e.g., the one or more offer sets that the client system **128** is authorized to present). As an alternative example, when second request **366** includes the one or more items of the at least one offer set from the first response **362**, the one or more items of the at least one offer set may be used to query the one or more of the first data storage systems **114** to retrieve offer information specifically for the one or more items of the at least one offer set. Example offer information for a given item may include but is not limited to, terms, rewards, bonus, rates, restrictions, etc.

[0105] At step **319**, the method **300** may include generating and providing, to the client system **128**, a second response **368** to the second request **366** including the offer information. In some examples, when the second request **366** is iteratively generated and sent by the client system **128** at predefined intervals, the offer information may be cached or otherwise stored by the client system **128** for subsequent retrieval and use, as described below.

[0106] At step **320**, the method **300** may include receiving, from the client system **128**, an indication of offer presentation to the user (e.g., offer presentation indication **376**). The offer presentation indication **376** may provide an acknowledgement or confirmation to the fulfillment system **118** that the offer information has in fact been presented to the user. In some examples, the offer presentation indication **376** and/or a separate indication may further indicate interactions of the user with the offer presented (e.g., accept, decline, ignore, etc.).

[0107] Referring now exclusively to FIG. **3**C, the client system **128** may be configured to generate an offer presentation user interface (UI) **372** at step **370**. In some examples, when the receipt of the first response **362** triggers or directly causes the generation of the second request **366**, the offer information for the one or more items of the at least one offer set included in the second response **368** may be extracted. The offer presentation UI **372** may be generated based on at least a portion of the extracted offer information. In other examples, when the offer information for each item of the one or more offer sets associated with the client system **128** included in the second response **368** is cached or otherwise stored at predefined intervals, the client system **128** may retrieve a subset of the cached offer information that is associated with the one or more items of the at least one offer set included in the first response **362** to generate the offer presentation UI **372**. The offer presentation UI **372** may be generated based on at least a portion of the subset of the cached offer information.

[0108] Additionally, the offer presentation UI **372** may be generated based on or more compliance rules to help ensure the offer information is presented in a manner that is compliant with one or more regulations. An example offer presentation UI **372** is shown in FIG. **5**, below. The client system **128** may provide the offer presentation UI to the computing device **102** via the client application **104**. The client application **104** may display the offer presentation UI **372** on the computing device **102** at step **374**. Further, based on the offer presentation UI **372** being provided to the computing device **102** for display, the client system **128** may provide the offer presentation indication **376** (e.g., generated as part of step **370**) to the fulfillment system **118**.

[0109] In some examples, the user may select to apply for the offer via the displayed offer presentation UI **372**. For example, the presentation UI **372** may include an apply control element that may be selected. In response to receiving the selection to apply at step **378**, the computing

device **102** may provide an indication of the selection to apply (e.g., a selection indication **380**) to the client system **128** via the client application **104**. Based on the receipt of the selection indication **380**, the client system **128** may generate an initiation signal **384** at step **382** to provide to the monitoring system **130**. The monitoring system **130** may initiate a monitoring of the application process at step **386** based on the initiation signal **384**. As part of the monitoring, the monitoring system **130** may collect application process information that is provided to one or more systems (not shown in FIG. **1**) associated with the first provider **113** for subsequent review and analysis. Example types of the application process information collected may include information associated with referrals and/or a payment process performed as part of the application process, and compliance information. In addition to the application process monitoring performed by the monitoring system **130**, other monitoring processes may be independently implemented by the client system **128**, the pre-screening system **112**, and/or the identity resolution system **122**.

[0110] FIG. **4**A depicts an example method **400** for performing one or more reconciliation processes. FIG. **4**B depicts an example method **420** for providing identity resolution to facilitate the performance of the one or more reconciliation processes of FIG. **4**A. In some examples, various steps of the method **400** may be performed by the analytics system **120** of the pre-screening system **112**, while various steps of the method **420** may be performed by the identity resolution system **122**. FIG. **4**C depicts a conceptual diagram **430** of the example methods **400**, **420** described in FIGS. **4**A and **4**B to illustrate the interactions among various components of the environment **100**, including the analytics system **120**, the identity resolution system **122**, and the external data sources **126**.

[0111] Referring concurrently to FIGS. **4**A and **4**C, at step **402**, the method **400** of FIG. **4**A may include storing the first request **352** and associated information, including the first response **362**, in association with a request identifier (e.g., the pre-screen identifier) included in the first request **352**. For example, the first request **352** and associated information may be stored as a pre-screen log in one or more of the first data storage systems **114**, where the pre-screen log is stored in association with the pre-screen identifier.

[0112] At step **404**, the method **400** may include receiving analytics data **432** from the identity resolution system **122**. At step **406**, the method **400** may include receiving, from the identity resolution system **122**, an indication of a promotional inquiry **434** associated with the first request **352** provided from the identity resolution system **122** to the external data sources **126** (e.g., a promotional inquiry indication **436**).

[0113] The analytics data **432** and the promotional inquiry indication **436** may be generated by the identity resolution system **122**. For example, turning to FIGS. **4**B and **4**C, at step **422**, the method **420** may include generating and providing the analytics data **432** to the analytics system **120**. The analytics data **432** generated by the identity resolution system **122** may include a portion of the candidate datasets **294**, and may be generated at predefined intervals (e.g., daily, weekly, etc.). Once generated, the analytics data **432** may also be stored in one or more of the second data storage systems **124**.

[0114] As briefly described above, in addition to the candidacy lists **292**, the identity resolution system **122** may receive and store the candidate datasets **294** in the one or more second data storage systems **124**. Each one of the candidate datasets **294** may be a record including a common identifier **254** and the aggregated data **272** for one of the plurality of users included in the data pool **274**. The various types of data forming the aggregated data **272** may be identified within the record based on a source file for the data and an associated timestamp when the data was received and/or generated.

[0115] In association with each iteration of the steps **324**, **326**, and **328** of method **321** as described with reference to FIG. **3**B, when facilitating the processing of the first request **352**, the identity resolution system **122** may write or otherwise store data in one or more of the second data storage systems **124** that indicates at least the identifying information **354** of the user included in the first

request **352**, the corresponding common identifier **254** retrieved for the user, and one or more of the candidacy lists **292** in which the common identifier **254** was included (e.g., the candidacy lists **292** corresponding to the offer sets for which the user was determined a candidate and presented an offer for responsive to the first request **352**).

[0116] Additionally, the candidacy lists **292** received and stored by the identity resolution system **122** may include metadata describing or otherwise referencing a subset of the candidate datasets **294** corresponding to the subset of common identifiers **254** that include the aggregated data that was used to make the candidacy determinations for the corresponding offer sets. Therefore, to generate the analytics data **432**, for each first request **352** processed within the predefined interval, the identity resolution system **122** may retrieve at least the common identifier **254** and the candidacy lists **292** indicated in association with the first request **352** from one or more of the second data storage systems **124**. The identity resolution system **122** may then use the metadata of the candidacy lists **292** in conjunction with the common identifier **254** to look up or identify a candidate dataset **294**, from the candidate datasets **294** stored in the second data storage systems **124**. The candidate dataset **294** identified may represent the aggregated data **272** (e.g., including the source files and associated timestamps for the various data types forming the aggregated data **272**) for the user associated with the first request **352** that was used by the campaign execution system **290** to make the candidacy determination and include the common identifier **254** for the user in the candidacy list **292**. The candidate dataset **294** identified may be included in the analytics data **432**.

[0117] Additionally, at step **424**, the method **420** may include generating and providing the promotional inquiry **434** associated with the first request **352** to the external data sources **126**. To generate the promotional inquiry **434**, the identifying information **354** of the user included in the first request **352** that is written to the one or more of the second data storage systems **124** in association with the first request **352** may be retrieved by the identity resolution system **122** and included in the promotional inquiry **434** to identify the user associated with the first request **352**. In some examples, the identity resolution system **122** may retrieve other information of the user to include in the promotional inquiry **434**. For example, the external identifiers (e.g., the first external identifier **242** and the second external identifier **250**) provided by the external data sources **126** may be retrieved using at least a portion of the identifying information **354** (e.g., the portion matching the identifying information **246** provided by the external data sources **126**) and included in the promotional inquiry **434** to further identify the user associated with the first request **352**. The promotional inquiry **434** may indicate to the external data sources **126** that data of the user provided by the external data sources **126** was used to determine candidacy of the user for an offer set. The promotional inquiry **434** may be any form of reporting to meet regulatory compliance. In some examples, a plurality of promotional inquiries **434** may be generated prior to sending to the external data sources **126** in a batched manner. The batching may be based on a pre-defined time interval similar to the analytics data **432** and/or may be based on a number or volume of promotional inquiries.

[0118] At step **426**, the method **420** may include generating and sending the promotional inquiry indication **436** to the analytics system **120**. The promotional inquiry indication **436** may indicate to the analytics system **120** that the promotional inquiry **434** has in fact been provided to the external data sources **126** and thus regulatory compliance has been maintained.

[0119] Returning back to referring to FIGS. **4**A and **4**C concurrently, at step **408**, the method **400** may include performing one or more reconciliation processes. The reconciliation processes may be performed based on the stored first request **352** and associated information, the analytics data **432**, and/or the promotional inquiry indication **436**. A first reconciliation process may include, for each first request **352** received, using the stored first request **352** and the associated information to confirm a respective first response **362** was generated. A second reconciliation process may include an analysis of the analytics data **432**, including the portion of the candidate datasets **294**. For example, the aggregated data **272** within the portion of the candidate datasets **294** may be

decrypted and analyzed to determine an accuracy of the campaign execution system **290** in generating the candidacy lists **292** (e.g., are the candidacy lists **292** over inclusive or under inclusive). A third reconciliation process may include confirming that for each of the first requests **352** received, a corresponding promotional inquiry **434** has been provided to the external data sources **126** using the promotional inquiry indication **436**.

[0120] FIG. **5** depicts an example of the offer presentation UI **372**. The user offer presentation UI **372** may be displayed by the client application **104** executing on the computing device **102**. The offer presentation UI **372** may include a pre-screen indicator **500** that indicates the user is a candidate for an item of the first provider **113** (e.g., the user has been pre-approved, pre-selected, pre-screened). The offer presentation UI **372** may include an item identifier **502**, such as a name and/or photograph, along with item information **504**. The item identifier **502** and/or the item information **504** may be at least a portion of the offer information included in the second response **368** that was received and used by the client system **128** to generate the offer presentation UI **372**. To provide a non-limiting example, when the item is a credit card of the first provider **113**, the item information **504** may include an introductory bonus, rewards, an annual fee, and an annual percentage rate (APR). The offer presentation UI **372** may also include control element **506** that may be selected by the user to initiate an application process. Additionally, the offer presentation UI **372** may include an opt out element **508** that may be selected by the user to indicate they do not consent to any future pre-screenings. In some examples, the opt out element **508** may be a feature included for regulatory compliance.

[0121] The offer presentation UI **372** described above is provided merely as an example, and may include additional, fewer, different, or differently arranged information and/or interactive control elements than depicted in FIG. **5**.

[0122] In general, any process or operation discussed in this disclosure that is understood to be computer-implementable, such as the processes or operations depicted in FIGS. **2**A-**5**, may be performed by one or more processors of a computer system, such any of the systems or devices in the environment **100** of FIG. **1**, as described above. A process or process step performed by one or more processors may also be referred to as an operation. The one or more processors may be configured to perform such processes by having access to instructions (e.g., software or computer-readable code) that, when executed by the one or more processors, cause the one or more processors to perform the processes. The instructions may be stored in a data storage device, such as a drive, disk, or a memory of the computer system. A processor may be a central processing unit (CPU), a graphics processing unit (GPU), or any suitable type of processing unit.

[0123] A computer system, such as a system or device implementing a process or operation in the examples above, may include one or more computing devices, such as one or more of the systems or devices in FIG. **1**. One or more processors of a computer system may be included in a single computing device or distributed among a plurality of computing devices. A memory of the computer system may include the respective memory of each computing device of the plurality of computing devices.

[0124] FIG. **6** depicts an example of a computer **600**, according to certain embodiments. FIG. **6** is a simplified functional block diagram of a computer **600** that may be configured as a device for executing processes or operations depicted in, or described with respect to, FIGS. **2**A-**5**, according to exemplary embodiments of the present disclosure. For example, the computer **600** may be configured as the computing device **102**, one of the server-side systems **108**, and/or another device according to exemplary embodiments of this disclosure. In various embodiments, any of the systems herein may be a computer **600** including, e.g., a data communication interface **620** for packet data communication. The computer **600** may communicate with one or more other computers **600** using the electronic network **625**. The electronic network **625** may include a wired or wireless network similar to the network **106** depicted in FIG. **1**.

[0125] The computer **600** also may include a central processing unit (“CPU”), in the form of one or

more processors **602**, for executing program instructions **624**. The program instructions **624** may include instructions for running one or more applications, including the client application **104** associated with the client system **128** (e.g., if the computer **600** is the computing device **102**). The program instructions **624** may include instructions for running one or more operations of the server-side systems **108** (e.g., if the computer **600** is a server device or other similar computing device of one or more of the respective server-side systems **108**). The computer **600** may include an internal communication bus **608**, and a drive unit **606** (such as read-only memory (ROM), hard disk drive (HDD), solid-state disk drive (SDD), etc.) that may store data on a computer readable medium **622**, although the computer **600** may receive programming and data via network communications. The computer **600** may also have a memory **604** (such as random access memory (RAM)) storing instructions **624** for executing techniques presented herein, although the instructions **624** may be stored temporarily or permanently within other modules of computer **600** (e.g., processor **602** and/or computer readable medium **622**). The computer **600** also may include user input and output ports **612** and/or a display **610** to connect with input and output devices such as keyboards, mice, touchscreens, monitors, displays, etc. The various system functions may be implemented in a distributed fashion on a number of similar platforms, to distribute the processing load. Alternatively, the systems may be implemented by appropriate programming of one computer hardware platform.

[0126] Program aspects of the technology may be thought of as “products” or “articles of manufacture” typically in the form of executable code and/or associated data that is carried on or embodied in a type of machine-readable medium. “Storage” type media include any or all of the tangible memory of the computers, processors or the like, or associated modules thereof, such as various semiconductor memories, tape drives, disk drives and the like, which may provide non-transitory storage at any time for the software programming. All or portions of the software may at times be communicated through the Internet or various other telecommunication networks. Such communications, e.g., may enable loading of the software from one computer or processor into another. Thus, another type of media that may bear the software elements includes optical, electrical and electromagnetic waves, such as used across physical interfaces between local devices, through wired and optical landline networks and over various air-links. The physical elements that carry such waves, such as wired or wireless links, optical links, or the like, also may be considered as media bearing the software. As used herein, unless restricted to non-transitory, tangible “storage” media, terms such as computer or machine “readable medium” refer to any medium that participates in providing instructions to a processor for execution.

[0127] While the disclosed methods, devices, and systems are described with exemplary reference to transmitting data, it should be appreciated that the disclosed embodiments may be applicable to any environment, such as a desktop or laptop computer, an automobile entertainment system, a home entertainment system, etc. Also, the disclosed embodiments may be applicable to any type of Internet protocol.

[0128] It should be understood that embodiments in this disclosure are exemplary only, and that other embodiments may include various combinations of features from other embodiments, as well as additional or fewer features.

[0129] It should be appreciated that in the above description of exemplary embodiments of the invention, various features of the invention are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of one or more of the various inventive aspects. This method of disclosure, however, is not to be interpreted as reflecting an intention that the claimed invention requires more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive aspects lie in less than all features of a single foregoing disclosed embodiment. Thus, the claims following the Detailed Description are hereby expressly incorporated into this Detailed Description, with each claim standing on its own as a separate embodiment of this invention.

[0130] Furthermore, while some embodiments described herein include some but not other features included in other embodiments, combinations of features of different embodiments are meant to be within the scope of the invention, and form different embodiments, as would be understood by those skilled in the art. For example, in the following claims, any of the claimed embodiments can be used in any combination.
[0131] Thus, while certain embodiments have been described, those skilled in the art will recognize that other and further modifications may be made thereto without departing from the spirit of the invention, and it is intended to claim all such changes and modifications as falling within the scope of the invention. For example, functionality may be added or deleted from the block diagrams and operations may be interchanged among functional blocks. Steps may be added or deleted to methods described within the scope of the present invention.
[0132] The above disclosed subject matter is to be considered illustrative, and not restrictive, and the appended claims are intended to cover all such modifications, enhancements, and other implementations, which fall within the true spirit and scope of the present disclosure. Thus, to the maximum extent allowed by law, the scope of the present disclosure is to be determined by the broadest permissible interpretation of the following claims and their equivalents, and shall not be restricted or limited by the foregoing detailed description. While various implementations of the disclosure have been described, it will be apparent to those of ordinary skill in the art that many more implementations are possible within the scope of the disclosure. Accordingly, the disclosure is not to be restricted except in light of the attached claims and their equivalents.

Claims

1. A computer-implemented method, performed by a pre-screening system, for fulfilling a pre-screen request, the method comprising: determining a candidate user for an offer set based on aggregated data that is associated with a common identifier of the candidate user, the common identifier generated by an identity resolution system to represent and maintain an anonymity of the candidate user at the pre-screening system, wherein the identity resolution system stores identifying information of the candidate user in association with the common identifier; generating and providing, to the identity resolution system, a candidacy list for the offer set, the candidacy list including the common identifier representing the candidate user; receiving, from a client system, a request to present the offer set to a user, the request including identifying information of the user; providing, to the identity resolution system, the identifying information and the offer set, wherein, when the user is the candidate user, the identity resolution system uses the identifying information to determine the common identifier based on the stored association, and identifies the common identifier in the candidacy list for the offer set; receiving, from the identity resolution system, a candidacy indication that the user is the candidate user for the offer set; and providing, to the client system, a response to the request, the response including the candidacy indication and one or more items of the offer set.
2. The computer-implemented method of claim 1, further comprising: generating, for the candidate user, a candidate dataset including the common identifier and the aggregated data; and providing the candidate dataset to the identity resolution system, wherein the identity resolution system generates and provides, to the pre-screening system, analytics data including the identifying information of the candidate user and the candidate dataset for use in one or more reconciliation processes.
3. The computer-implemented method of claim 2, wherein the one or more reconciliation processes include at least determining, based on the analytics data, an accuracy of the pre-screening system in determining the candidate user for the offer set.
4. The computer-implemented method of claim 2, wherein the aggregated data included in the candidate dataset is encrypted.

5. The computer-implemented method of claim 1, wherein the request received from the client system includes a request identifier, the response to the request includes the request identifier, and the method further comprises: using the request identifier to store the request and information associated with the request, including the response to the request, for use in one or more reconciliation processes.
6. The computer-implemented method of claim 1, wherein the aggregated data includes external data received from an external data source, and the method further comprises: receiving, from the identity resolution system, an indication of an inquiry transmitted by the identity resolution system to the external data source for use in one or more reconciliation processes.
7. The computer-implemented method of claim 1, wherein the request received from the client system is a first request, and the method further comprises: receiving, from the client system, a second request including at least a client identifier of the client system; querying a data store associated with the pre-screening system using the client identifier to obtain information associated with at least the offer set; and providing the information associated with at least the offer set to the client system for presentation.
8. The computer-implemented method of claim 7, further comprising: receiving, from the client system, an indication that the offer set has been presented.
9. The computer-implemented method of claim 1, wherein in response to receiving the request from the client system, the method further comprises: querying a data store associated with the pre-screening system to determine the client system is authorized to present the offer set.
10. The computer-implemented method of claim 1, wherein the identifying information of the user included in the request from the client system, and provided to receiving to the identity resolution system, is not persisted within the pre-screening system.
11. The computer-implemented method of claim 1, wherein the identifying information of the user included in the request is obtained by the client system in association with an authentication of the user.
12. The computer-implemented method of claim 1, wherein the aggregated data for the candidate user that is associated with the common identifier includes external data of the candidate user that is received from an external data source in association with an anonymous identifier of the external data source for the candidate user, and the anonymous identifier is associated with the common identifier as part of a key generated by the identity resolution system.
13. The computer-implemented method of claim 1, wherein the aggregated data for the candidate user that is associated with the common identifier includes internal data of the candidate user that has been anonymized and associated with the common identifier by the identity resolution system.
14. A computer-implemented method, performed by an identity resolution system, to facilitate fulfillment of a pre-screen request, the method comprising: generating and storing, in association with identifying information for a user, a common identifier representing and providing anonymity of the user; providing, to a pre-screening system, the common identifier, wherein the pre-screening system uses the common identifier to aggregate data for the user and determines the user is a candidate user for an offer set based on the aggregated data; receiving, from the pre-screening system, and storing a candidacy list of a plurality of candidate users, including the candidate user, for the offer set, the candidacy list including the common identifier representing the user; receiving, from the pre-screening system, identifying information of the user that was included in a client system request to present the offer set to the user; identifying, using the identifying information of the user, the common identifier representing the user based on the stored association; determining the common identifier representing the user is included in the candidacy list for the offer set; and generating and providing, to the pre-screening system, a candidacy indication that the user is one of the plurality of candidate users for the offer set for use in responding to the client system request.
15. The computer-implemented method of claim 14, further comprising: receiving, from the pre-screening system, a candidate dataset for the user including the common identifier and the

aggregated data; and generating and providing, to the pre-screening system, analytics data including the identifying information of the user and the candidate dataset for use in one or more reconciliation processes.

16. The computer-implemented method of claim 15, wherein the candidacy list references the candidate dataset.

17. The computer-implemented method of claim 14, wherein the aggregated data includes external data received from an external data source, and the method further comprises: transmitting an inquiry to the external data source associated with the client system request; and providing an indication of the transmitted inquiry to the pre-screening system for use in one or more reconciliation processes.

18. The computer-implemented method of claim 14, wherein the aggregated data used by the pre-screening system to determine the user is the candidate user for the offer set includes external data of the user received from an external data source in association with an anonymous identifier of the external data source for the user, and the method further comprises: receiving, from the external data source, the identifying information of the user and the anonymous identifier of the external data source for the user; and generating and providing, to the pre-screening system, a key associating the common identifier with the anonymous identifier of the external data source.

19. The computer-implemented method of claim 14, wherein the aggregated data used by the pre-screening system to determine the user is the candidate user for the offer set includes internal data of the user received from an internal data source associated with the pre-screening system, and the method further comprises: receiving, from the pre-screening system, the internal data of the user within a non-anonymized dataset that includes at least a portion of the identifying information of the user; identifying, using the identifying information of the user, the common identifier representing the user based on the stored association; and generating and providing, to the pre-screening system, an anonymized dataset including the internal data and the common identifier to enable the pre-screening system to include the internal data from the anonymized dataset as part of the aggregated data based on the common identifier.

20. The computer-implemented method of claim 14, wherein the pre-screening system generates a response to the client system request based on the candidacy indication, the response causing the client system to present the offer set to the user.