

CUSTOMIZING FINANCIAL INSTITUTION SOFTWARE APPLICATIONS FOR CONSUMER PAYMENTS

Technical Field

[0001] The present disclosure generally relates to customizing financial institution software applications for consumer payments. Particularly, the present disclosure describes various embodiments of an electronic system and a computerized method for customizing software applications provided by financial institutions to consumers for consumer payments.

Background

[0002] The growth of financial technology companies has increased pressure on traditional financial institutions like banks in the form of competition and the potential to influence consumer payment transactions away from the banks. In India for example, financial technology company Paytm has already captured approximately 7 million merchants and 100 million active consumers. In addition to consumer payment transactions, other types of services around consumer payments, which would have served as ancillary channels for revenue, may be losing market share from banks to these financial technology companies.

[0003] Some banks have introduced digital technologies and consumer experiences to complement their traditional financial services, but these may not be introduced quickly enough to address fast-changing consumer needs. Banks usually take a multi-step approach in designing their software applications, such as mobile banking / payment applications for consumer payments. For example, banks firstly conduct research on features and functions relevant to their consumers, secondly formulate a prototype hypothesis, and thirdly work on sourcing the necessary application program interfaces (APIs) and software development kits (SDKs). This approach adopted by the banks is time-consuming and puts the banks at risk of being too slow in reacting to changes in consumer payments, which may consequently influence consumers to shift their business from the banks to other financial technology companies.

[0004] Therefore, in order to address or alleviate at least one of the aforementioned problems and/or disadvantages, there is a need to provide an improved electronic system and computerized method for customizing financial institution software applications for consumer payments.

Summary

[0005] According to a first aspect of the present disclosure, there is a payment network system, a computerized method, and a non-transitory computer-readable storage medium comprising instructions for financial institutions to customize software applications for consumer payments. The method is performed by the payment network system and comprises steps of: receiving, from a financial institution, a request to customize a software application provided by the financial institution to consumers for consumer payments, the request comprising identification data of the financial institution; retrieving, from an application services database, details of a set of application services available for integration into the software application, the application services associated with consumer payments; communicating, to the financial institution, the application services details for selection by the financial institution; receiving, from the financial institution, details of the application services selected by the financial institution; generating a customized solution package comprising the selected application services; and communicating the customized solution package to the financial institution for integrating the selected application services into the software application.

[0006] According to a second aspect of the present disclosure, there is a user interface accessible by financial institutions to customize software applications for consumer payments. The user interface is hosted on a payment network server and configured for performing steps comprising: communicating, to the payment network server, a request from a financial institution to customize a software application provided by the financial institution to consumers for consumer payments, the request comprising identification data of the financial institution; presenting details of a set of application services available for integration into the software application, the application services

associated with consumer payments; selecting, by the financial institution, one or more application services for integration into the software application; communicating, to the payment network server, details of the application services selected by the financial institution; and availing a customized solution package generated by the payment network server, the customized solution package comprising the selected application services, wherein the customized solution package is downloadable by the financial institution for integrating the selected application services into the software application.

[0007] An electronic system and a computerized method for customizing financial institution software applications for consumer payments according to the present disclosure are thus disclosed herein. Various features, aspects, and advantages of the present disclosure will become more apparent from the following detailed description of the embodiments of the present disclosure, by way of non-limiting examples only, along with the accompanying drawings briefly described below.

Brief Description of the Drawings

[0008] Figure 1 is an illustration of an electronic system for customizing financial institution software applications for consumer payments, in accordance with embodiments of the present disclosure.

[0009] Figure 2 is a flowchart illustration of a computerized method performed on a payment network server for customizing financial institution software applications for consumer payments, in accordance with embodiments of the present disclosure.

[0010] Figure 3A is a block diagram illustration of a user interface for customizing financial institution software applications for consumer payments, in accordance with embodiments of the present disclosure.

[0011] Figure 3B is a flowchart illustration of a computerized method implemented on the user interface for customizing financial institution software applications for consumer payments, in accordance with embodiments of the present disclosure.

[0012] Figure 4 is a flowchart illustration of a computerized method implemented on the user interface for designing consumer experiences, in accordance with embodiments of the present disclosure.

[0013] Figure 5 illustrates various options for customizing a software application for consumer payments, in accordance with embodiments of the present disclosure.

[0014] Figure 6 is a block diagram illustration of a customized solution package for the software application, in accordance with embodiments of the present disclosure.

[0015] Figure 7 is a block diagram illustration of the technical architecture of a server, in accordance with embodiments of the present disclosure.

Detailed Description

[0016] In the present disclosure, depiction of a given element or consideration or use of a particular element number in a particular figure or a reference thereto in corresponding descriptive material can encompass the same, an equivalent, or an analogous element or element number identified in another figure or descriptive material associated therewith. The use of “/” in a figure or associated text is understood to mean “and/or” unless otherwise indicated. For purposes of brevity and clarity, descriptions of embodiments of the present disclosure are directed to an electronic system and a computerized method for customizing financial institution software applications for consumer payments, in accordance with the drawings. While aspects of the present disclosure will be described in conjunction with the embodiments provided herein, it will be understood that they are not intended to limit the present disclosure to these embodiments. On the contrary, the present disclosure is intended to cover alternatives, modifications and equivalents to the embodiments described herein, which are included within the scope of the present disclosure as defined by the appended claims. Furthermore, in the following detailed description, specific details are set forth in order to provide a thorough understanding of the present disclosure. However, it will be recognized by an individual having ordinary skill in the art, i.e. a skilled person, that the present disclosure may be practiced without specific details,

and/or with multiple details arising from combinations of aspects of particular embodiments. In a number of instances, known systems, methods, procedures, and components have not been described in detail so as to not unnecessarily obscure aspects of the embodiments of the present disclosure.

Overview

[0017] In representative or exemplary embodiments of the present disclosure, there is an electronic system 100 including a payment network system 102 for financial institutions 104 to customize software applications 106, as illustrated in Figure 1. The software applications 106 are provided by the financial institutions 104 to the consumers 108 for consumer payments, including payments in transactions between the consumers 108 and merchants 109. The payment network system 102 is operated by an intermediary entity / payment network operator 101 such as a card association. The intermediary entity 101 further provides and operates a user interface 110 that is hosted on the payment network system 102 and is accessible by the financial institutions 104 to customize their software applications 106. Each financial institution 104 operates a computer system 112 for accessing the user interface 110 to customize their software application 106. The software applications are operable on electronic devices 114 of the consumers 108, such as mobile devices. The payment network system 102, financial institution computer systems 112, consumer electronic devices 114, and computer systems of the merchants 109, are communicable with one another through a communication network 116.

[0018] Further with reference to Figure 2, there is shown a computer-implemented or computerized method 200 implemented on the payment network system 102 for the financial institutions 104 to customize their software applications 106 for consumer payments. The payment network system 102 includes various modules / components for performing various operations or steps of the method 200, including a request module 103a, a database module 103b, a selection module 103c, and a packaging module 103d. Optionally, the payment network system 102 includes other modules for performing other operations or steps of the method 200, such as a simulation module 103e. Each module 103a-e includes suitable logic, circuitry, and/or interfaces to

execute such operations or steps. These modules collectively form an orchestration engine 103 used by the financial institutions 104 to customize their software applications 106.

[0019] In a step 202 of the method 200, the request module 103a of the payment network system 102 receives, from a financial institution 104, a request to customize a software application 106 provided by the financial institution 104 to consumers 108 for consumer payments. The request includes identification data of the financial institution 104, such as bank name and identification number.

[0020] In a step 204 of the method 200, the database module 103b of the payment network system 102 retrieves, from an application services database 118, details of a set of application services available for integration into the software application 106. The application services database 118 stores details of various application services that are associated with consumer payments. For example, the application services relate to various stages in transactions between consumers 108 and merchants 109, and provide improved payment experiences to the consumers 108 and/or merchants 109.

[0021] In a step 206, the selection module 103c of the payment network system 102 communicating, to the financial institution 104, the application services details for selection by the financial institution 104. The financial institution 104 then selects the application services that are suitable for their software application 106 and/or relevant to their commercial interest. In a step 208, the selection module 103c receives, from the financial institution 104, details of the application services selected by the financial institution 104.

[0022] In a step 210, the packaging module 103d of the payment network system 102 generates a customized solution package including the selected application services. In a step 212, the packaging module 103d communicates the customized solution package to the financial institution 104 for integrating the selected application services into the software application 106. For example, the customized solution package includes a set of application program interfaces (APIs) of the selected application

services a set of software development kits (SDKs) for integrating the selected application services into the software application 106.

[0023] Optionally, the simulation module 102e of the payment network system 102 simulates the selected application services to the financial institution 104 so that the financial institution 104 can beta test the selected application services before releasing the customized software application 106 to the consumers 108.

Description of Embodiments

[0024] References to “an embodiment / example”, “another embodiment / example”, “some embodiments / examples”, “some other embodiments / examples”, and so on, indicate that the embodiment(s) / example(s) so described may include a particular feature, structure, characteristic, property, element, or limitation, but that not every embodiment / example necessarily includes that particular feature, structure, characteristic, property, element or limitation. Furthermore, repeated use of the phrase “in an embodiment / example” or “in another embodiment / example” does not necessarily refer to the same embodiment / example.

[0025] The terms “comprising”, “including”, “having”, and the like do not exclude the presence of other features / elements / steps than those listed in an embodiment. Recitation of certain features / elements / steps in mutually different embodiments does not indicate that a combination of these features / elements / steps cannot be used in an embodiment.

[0026] As used herein, the terms “component”, “module,” “system”, “apparatus”, “interface”, and the like are generally intended to refer to a computer-related entity, either hardware, a combination of hardware and software, software, or software in execution. For example, a component or a module may be, but is not limited to being, a process running on a processor, a processor, an object, an executable, a thread of execution, a program, and/or a computer. By way of illustration, both an application running on a controller and the controller can be a component / module. One or more components / modules may reside within a process and/or thread of execution. A

component / module may be localized on one computer and/or distributed among a plurality of computers.

[0027] As used herein, the terms “a” and “an” are defined as one or more than one. The term “set” is defined as a non-empty finite organization of elements that mathematically exhibits a cardinality of at least one (e.g. a set as defined herein can correspond to a unit, singlet, or single-element set, or a multiple-element set), in accordance with known mathematical definitions. The recitation of a particular numerical value or value range herein is understood to include or be a recitation of an approximate numerical value or value range.

[0028] While various terms as used in representative or exemplary embodiments of the present disclosure are defined herein, the definitions of these terms are not intended to be limited as such and are in addition to their plain meanings according to standard English dictionaries.

[0029] In various embodiments of the present disclosure as illustrated in Figure 1, the electronic system 100 includes the payment network system 102 for financial institutions 104 to customize their software applications 106 for consumer payments. The payment network system 102 may also be referred to as a payment network computer system or payment network server 102. The system 100 further includes the financial institution computer systems 112, consumer electronic devices 114, and computer systems of the merchants 109, wherein one or more of which are communicable with one another through the communication network 116.

[0030] The payment network server 102 is a computer server associated with a payment network which is operated by an intermediary entity / payment network operator 101. The payment network server 102 may be a cloud-based server residing in a cloud computing environment provided by a cloud host, or may alternatively be a dedicated server operated by the intermediary entity 101. Typically, the intermediary entity 101 is a card association, such as a credit card association, that facilitates communications between acquirers and issuers to authorize and process transactions, including transactions between consumers 108 and merchants 109, both of whom are

end customers of the financial institutions 104. The payment network settles the transactions between various financial institutions 104 including the acquirers and issuers, when payment instruments such as credit cards are used for paying the transactions. An example of the payment network is the Banknet payment network operated by Mastercard®. It will be readily apparent to the skilled person that the processing of transactions occurs via the conventional four-party system or three-party system.

[0031] A consumer 108 is an individual who is an account holder of an account which refers to any financial account, such as current account, savings account, trading account, or any account associated with a payment instrument. The account may be a bank account maintained by a financial institution 104, such as an issuer or bank. A merchant 109 is a business or commercial entity that offers various goods, products, and/or services in exchange for payments. The merchant 109 may establish an account with a financial institution 104, such as an acquirer or bank to accept the payments from the consumers 108. Alternatively, the merchant 109 may establish an account with a payment aggregator which provides a service for merchants 109 to process payment of transactions. Typically, the merchant 109 operates a computer system, e.g. a merchant computer server and/or point of sale (POS) terminal, communicable with the acquirer or payment aggregator via the communication network 116. As used herein, the term “financial institution” is not necessarily limited to organizations which are legally constituted as banks. In some jurisdictions or countries, other organizations may be permitted to maintain financial accounts.

[0032] The consumer 108 may hold an electronic device 114 that enables the consumer 108 to purchase goods, products, and/or services through e-commerce sites or at a POS terminal (e.g. physical in-store payment transactions) associated with the merchants 109. The consumer electronic device 114 may be a mobile device, mobile phone, smartphone, personal digital assistant (PDA), tablet, phablet, laptop, computer, or the like.

[0033] The software applications 106 provided by the financial institutions 104 is executable / operable on the consumer electronic devices 114 for consumer payments,

including payments of transactions with merchants 109. For example, the software applications 106 are installable on the consumer electronic devices 114, e.g. mobile devices, and may be referred to as a mobile application or app. Each software application 106 is hosted on an application server of the respective financial institution 104 and the application is communicable with the consumer electronic devices 114, via the communication network 116, for performing various operations of the software application 106. The software application 106 is customizable with a number of application services selected by the financial institution 104 for improving user experiences of the consumers 108 and merchants 109, as described further below.

[0034] The communication network 116 is a medium or environment through which content, notifications, and/or messages are communicated among various entities, including the payment network server 102, financial institution computer systems 112, consumer electronic devices 114, and application servers hosting the software applications 106. Some non-limiting examples of the communication network 116 include a virtual private network (VPN), wireless fidelity (Wi-Fi) network, light fidelity (Li-Fi) network, local area network (LAN), wide area network (WAN), metropolitan area network (MAN), satellite network, Internet, fiber optic network, coaxial cable network, infrared (IR) network, radio frequency (RF) network, and any combination thereof. Various entities in the communication network 116 may connect to the communication network 116 in accordance with various wired and wireless communication protocols, such as Transmission Control Protocol / Internet Protocol (TCP/IP), User Datagram Protocol (UDP), 2nd to 5th Generation (2G to 5G) communication protocols, Long Term Evolution (LTE) communication protocols, and any combination thereof. Each of the payment network server 102, financial institution computer systems 112, consumer electronic devices 114, and application servers includes a data communication or transceiver module to communicate and transmit / receive data over the communication network 116. Some non-limiting examples of a transceiver module include an antenna module, a radio frequency transceiver module, a wireless transceiver module, a Bluetooth transceiver module, an Ethernet port, a Universal Serial Bus (USB) port, or any other module / component / device configured for transmitting and receiving data.

[0035] The application services database 118 is a repository of various application services that are associated with consumer payments. For example, the application services relate to various stages in transactions between consumers 108 and merchants 109, and provide improved payment experiences to the consumers 108 and/or merchants 109. The application services may be sourced or obtained from various entities or organizations, including but not limited to, the intermediary entity 101 operating the payment network, financial institutions 104, and independent third parties or service providers such as financial technology companies. The application services database 118 may reside locally on the payment network server 102, or alternatively on a remote or cloud server communicatively linked to the payment network server 102.

[0036] In various embodiments with reference to Figure 3A, the intermediary entity 101 provides and operates a user interface 110 hosted on the payment network server 102. The user interface 110 may be a graphical user interface (GUI) and separated into three sub-interfaces or portals. The user interface 110 includes a designer portal 110a that is accessible by relevant personnel of the intermediary entity 101 or payment network for designing and creating application services, including obtaining third-party application services from elsewhere. The user interface 110 further includes a customer portal 110b that is accessible by relevant personnel of the financial institutions 104 to customize their software applications 106. Specifically, the personnel use the respective financial institution computer systems 112 for accessing the customer portal 110b to customize their software application 106. Similar to the payment network system 102, the financial institution computer system 112 may be a server such as a cloud-based server or a dedicated server operated by the financial institution. The user interface 110 further includes an administration portal 110c that provides technical support to all entities and personnel accessing the user interface 110.

[0037] Further with reference to Figure 3B, there is a computer-implemented or computerized method 300 complementary to the method 200 for customizing the software applications 106. The method 300 is implemented on the user interface 110,

specifically the customer portal 110b accessible by the financial institutions 104. Various steps of the method 300 are broadly described as follows.

[0038] In a step 302, the user interface 110 communicates, to the payment network server 102, a request from a financial institution 104 to customize a software application 106 provided by the financial institution 104 to consumers 108 for consumer payments, the request including identification data of the financial institution 104. In a step 304, the user interface 110 presents details of a set of application services available for integration into the software application 106, the application services associated with consumer payments. In a step 306, the financial institution 104 selects one or more application services for integration into the software application 106. In a step 308, the user interface 110 communicates, to the payment network server 102, details of the application services selected by the financial institution 104. In a step 310, the user interface 110 avails a customized solution package generated by the payment network server 102, the customized solution package including the selected application services, wherein the customized solution package is downloadable by the financial institution 104 for integrating the selected application services into the software application 106.

[0039] Before the financial institutions 104 are able to customize their software applications 106 using the methods 200 and 300, there is a registration or enrollment procedure for the financial institutions 104. The registration procedure is performed via the customer portal 110b of the user interface 110. Each financial institution 104 provides their identification data. Some non-limiting examples of such identification data include bank name, bank identification number (BIN), and Interbank Card Association (ICA) identifier. The identification data may also be imported from existing databases of the intermediary entity / payment network operator 101, since the intermediary entity 101 operates the payment network which links together various financial institutions 104. Optionally, the financial institutions 104 provide details of their stand-alone service domain if available.

[0040] A customer account is then set up for each successfully registered financial institution 104 and the customer account is accessible by a customer administrator of

the financial institution 104 with his/her login credentials. The customer administrator (super user) may subsequently add or assign additional users to access the customer account. These additional users may be referred to as project authors and project approvers, the project being for customization of the financial institution's software application 106. Each project author and approver would be able to setup his/her own login credentials. The customer administrator may grant different permissions to the project authors and approvers, such as configuring what type of application services they are able to customize into the software application 106. Generally, one or more project authors create a project for customizing the software application 106 and selects the relevant application services to be integrated into the software application 106, and one or more project approvers are assigned to approve the project.

[0041] As stated above, the application services stored on the application services database 118 are sourced or obtained from various entities or organizations and include in-house application services created and developed by the intermediary entity 101. The application services are associated with consumer payments based on the principle that consumers 108 can be digitally engaged at different points of their respective journeys across everyday payment use cases. This is largely due to the proliferation of consumer electronic devices 114, specifically mobile devices and smartphones, mobile internet access or connectivity, and the present economy of application services where conventional transactions are increasingly digitized.

[0042] Potential points of interaction for any merchant 109 or business to digitally engage and interact with consumers 108 are referred to as Digital Touch Points (DTPs). The DTPs are separated into consumer-side and merchant-side. Specifically, the consumer-side DTPs represent critical moments at which a consumer 108 makes a decision to either move on to another DTP or abandon the current journey. The consumer-side DTPs have counterparts in the merchant-side DTPs and the merchants 109 also have a role to ensure that the digital interactions designed for consumers 108 are indeed compelling. The merchants 109 may also undertake tasks that can have digital manifestations to influence a consumer's payments journey, such that the consumer 108 do not always necessarily have to initiate an interaction within a payment journey.

[0043] Digital interactions are designed as combinations of application services that relate to specific behavior of the consumers 108 at a particular DTP that would engage and attract the consumers 108 to continue their journey so that they are eventually led to another DTP for payment (indicated as DTP 6 below). Preferably, the consumers 108 are encouraged and inspired to repeat the journey in future. In availing such application services to financial institutions 104 for customization of their software applications 106, said customization performed by the methods 200 and 300 helps the financial institutions 104 to retain their existing consumers 108 or attract new consumers 108 in at least one DTP. The digital interactions and consequently the application services are designed to align with also the merchant journeys where possible so that both the consumers 108 and merchants 109 are able to benefit from these application services.

[0044] The digital interactions are designed as part of a method 400 implemented on the designer portal 110a for designing consumer experiences, as shown in Figure 4. The method 400 includes a first stage 402 of designing the target consumer segment and use cases. The target consumer segment may be identified based on target consumer segment data that relates to at least one of demographics, mobile connectivity, financial services accessibility, location, and education level. It will be appreciated that the target consumer segment data may relate to other parameters readily known to the skilled person. Some research studies have indicated that there is a significant opportunity to tap the spending power of a young, urban mass segment in India. Specifically, this target consumer segment includes males and females who are aged 50 and below, have smartphones with mobile data connectivity, have access to financial service such as savings or salary accounts, are located at certain predefined cities, and have a tertiary education. The target use cases for this target consumer segment are identified as mobile recharge, commute, bill payments, retail, dining, and recreation.

[0045] The method 400 includes a second stage 404 of drawing the DTPs for the target consumer segment. Given the identified target use cases, the most common consumer-side DTPs which need to be addressed are identified as DTP 1 (Generate

Demand), DTP 2 (Find Store), DTP 4 (Arrive at Store), DTP 5 (Decide on Purchase), DTP 6 (Payment), and DTP 8 (Review, Refer, Reuse). The method 400 includes a third stage 406 of designing consumer interactions and interfaces in the identified DTPs. Specifically, digital interactions are designed to combine application services from various sources, preferably including or leading to the use of in-house application services, i.e. created by the intermediary entity / payment network operator 101. The digital interactions are choreographed to provide context so that consumers 108 would feel these are more naturally embedded in a target use case, as opposed to being invoked as a separate transaction or activity. One example is to provide context-sensitive recommendations on follow-on transactions after a payment transaction has been completed, such as automatically splitting a bill and/or setting a reminder for the next bill date after a bill payment. Another example is to provide actionable items on eligible transactions, such as the ability to exchanges points for a cash rebate on a purchase, or to leave feedback on a dining experience after payment.

[0046] The method 400 includes a fourth stage 408 of determining capabilities of the financial institutions 104 to participate in the DTPs. The digital interactions are designed to ensure that basic financial services or banking capabilities of the financial institutions 104 are leveraged so that they can participate in enhancing the DTPs. For example, information on the financial institution capabilities may be communicated to the payment network server 102 in the form of APIs so that they can be processed as part of the digital interactions. Non-limiting examples of such capabilities include displaying of payment account options, payment account balances, transaction histories, and loyalty points.

[0047] The method 400 includes a fifth stage 410 of designating application services to deliver the consumer interactions and interfaces in the DTPs. Given that the financial institutions 104 communicate their capabilities information in the form of APIs, the intermediary entity 101 would be able to utilize this information and search the application services database 118. The application services and associated APIs can subsequently be mapped out to deliver the desired consumer experiences. Some of these application services may relate but are not limited to installments, spend alerts and controls, and QR (Quick Response) code payments.

[0048] In some cases, searching the application services database 118 may not identify suitable application services to deliver some of the desired consumer experiences, meaning that there are gaps in the DTPs that need to be addressed. To address this, the method 400 includes a sixth stage 412 of developing partnerships to fill in gaps in the DTPs. Specifically, partnerships with third parties such as financial technology companies are explored and developed as they may be able to provide other types of application services to complement existing application services stored on the application services database 118. One example is that there is currently no application service to determine the potential reward or loyalty points to be earned based on the transaction amount, payment instrument type, and/or merchant type. Another example is that there is no application service to build the visualization of transaction velocity to track spending across various spend categories.

[0049] From the method 400, various application services are obtained to deliver the digital interactions and enhance consumer payments experience. These application services are customizable and integratable into the software applications 106 of the financial institutions 104, as described above in the methods 200 and 300. Additionally, these application services are packaged in a way that they are logically linked to address everyday target use cases, resulting in the generation of the customized solution packages. The customized solution packages are also referred to as developed Experience Solutions for the consumers 108.

[0050] In various embodiments, a financial institution 104 accesses the customer portal 110b of the user interface 110 to perform the methods 200 and 300 for customizing their software application 106 for consumer payments. Specifically, in the steps 202 and 302, the financial institution 104 sends a request to customize the software application 106. The request includes identification data of the financial institution 104, such as but not limited to the bank name, BIN, and ICA identifier. The request further includes the login credentials of authorized personnel of the financial institution 104, such as the project authors and approvers. The payment network server 102 then authenticates the financial institution 104 based on the request. Upon successful authentication, the financial institution 104 would be able to begin

developing the Experience Solutions. Figure 5 shows various options 500 including “Experience Solutions” option 502, “Segments” option 504, “Stories” option 506, and “Interactions” option 508.

[0051] The “Experience Solutions” option 502 presents a predefined set of Experience Solutions, each associated with a predefined set of application services, tailored or curated for specific Segments, i.e. target consumer segments. Optionally, the request includes target consumer segment data input by the financial institution 104, such that the application services are presented or availed based on the target consumer segment data in the request. Selecting a particular Experience Solution displays the Segment it is designed for and the Stories included therein. The “Segments” option 504 presents a predefined set of target consumer segments for which Experience Solutions have been created. Selecting a particular Segment displays the Stories applicable and available to the Segment. The “Stories” option 506 presents a predefined set of Stories that are applicable to multiple Segments and that can be bundled into the Experience Solutions. Selecting a particular Story displays the Segments where the Story would be relevant and could be applied. The Stories show the Interactions that they use, along with indications of which DTPs they are addressing. The “Interactions” option 508 presents a predefined set of Interactions that are applicable to multiple Stories, Segments, and Experience Solutions. Selecting a particular Interaction displays the Stories where the Interaction would be relevant and could be applied. Each Interaction also shows an indication of which DTPs it is addressing. The project author(s) of the financial institution 104 thus has to navigate through the inventories of Segments, Stories, and Interactions that collectively develop into the Experience Solutions.

[0052] In the steps 208, 306, and 308, the project author selects the application services that are suitable for the software application 106 and/or relevant to the financial institution’s commercial interest. In one embodiment, the project author selects from predefined sets of Experience Solutions. In another embodiment, the project author specifically tailors or customizes an Experience Solution by selecting the relevant Interactions suitable for the consumers 108 of the financial institution 104.

[0053] Once the selection is completed, there is an indication of the application services and the associated APIs for the use of the Interactions 508 in the selected Experience Solution. For example, the conditions relate to the contracting and onboarding requirements of the APIs and other APIs which the financial institution 104 may be required to provide to supplement the selected Experience Solution. Configuration of the Experience Solution may include placeholders for onboarding application services / assets of the financial institution 104 so that they can be automatically orchestrated into the Experience Solution.

[0054] In some embodiments, the financial institution 104 is able to beta test or trial the selected Experience Solution and Interactions. Specifically, the customer portal 110b presents a simulation of the selected application services associated with the Experience Solution and Interactions. The simulation allows the project author to visualize the workflow of the selected application services such as in the form of sample screens of the selected application services in use. The simulation may be iterative to allow the financial institution 104 to make changes to the Experience Solution, such as to correct errors and/or refine certain Interactions and application services.

[0055] Upon finalizing the Experience Solution, the project author submits the project for approval by the project approver. The project approver then checks out and the payment network server 102 generates the customized Experience Solution in the form of the customized solution package, in accordance with the steps 210 and 310. Moreover, by replacing the placeholders with application services / assets of the financial institution 104, the customized solution package would provide support for these application services / assets. The customized solution package is subsequently communicated to and downloaded by the financial institution 104. With reference to Figure 6, the customized solution package enables the financial institution 104 to customize their software application 106 for consumer payments, and provides an improved Experience Solution 600 for the consumers 108 using the software application 106 on their electronic devices 114. The customized solution package includes a set of Digital Recipes 602 and Digital Technology Packages 604 to deliver the selected application services.

[0056] The Digital Recipes 602 include instructions on how to implement the selected application services on everyday target use cases. Each Digital Recipe 602 refers to the Story 606 or storyboard that depicts how an everyday target use case can be digitally enhanced. The storyboard shows the Story Name describing the general digital enhancement to the target use case, the identified DTPs 608 that are addressed for the target use case. The Digital Interactions 610 address the various DTPs 608 and are sequenced logically so show how they engage consumers 108 at each DTP 608 and how they attract the consumers 108 to move on to another DTP 608. The selected application services are associated with the APIs 612 shown in the Digital Recipe 602. The APIs 612 are used to integrate the selected application services in the software application 106 in order to realize the Digital Interactions. The APIs 612 come with relevant information on the contracting and onboarding requirements of the APIs 612. As will be readily understood by a skilled person, an “API” may be defined as a set of functions, procedures, and/or routines that allow the creation of applications which access the features and/or data of an application service. The APIs 612 may be developed based on the Swagger (OAS) or RAML specification. The Sample UI/UX (user interface / user experience) Screens 614 accompany each Digital Interaction 610 and show visual simulations of how the Digital Interactions 610 would be realized on the software application 106.

[0057] The Digital Technology Packages 604 facilitate integration with compatible technology that the financial institution 104 uses in order to simplify the integration of the selected application services together with other services / assets of the financial institution 104 in the software application 106. Typically, financial institutions 104 access or consume the APIs 612 via one or a combination of two domains – a software application / application server domain and a stand-alone service domain. In the software application / application server domain, the APIs 612 are directly accessed by the software application 106. Alternatively, the software application 106 interacts with the application server that accesses the APIs 612 instead. The stand-alone service domain is defined as a system that is deployed and run separately from the software application / application server domain. When required, the stand-alone service domain provides the application / application server domain the necessary

APIs 612 needed to realize the Digital Interactions 610 and Experience Solutions 600. Some non-limiting examples in this domain include Virtual Machines, Application Containers, and API runtimes, as will be readily understood by the skilled person.

[0058] The customized solution package includes appropriate delivery mechanisms to facilitate integration of the selected application services in the domain(s). In one embodiment, the Digital Technology Packages 604 include a client-side software development kit (SDK) 616 for integration into the software application 106 executable by consumer electronic devices 114. As will be readily understood by a skilled person, an “SDK” may be defined as a set of programs used by a computer programmer to write application programs. In addition to the APIs 612, the client-side SDK 616 may additionally include UI/UX components (e.g. screens, local rendering logic, and local computational logic) and mobile hardware invocation tools (such as QR scanning, NFC (near field communication) tapping, and biometric activation).

[0059] In another embodiment, in addition or alternative to the client-side SDK 616, the Digital Technology Packages 604 include a server-side SDK 618 for integration into the application server hosting the software application 106. In addition to the APIs, the server-side SDK 618 may additionally include security integration (such as OAuth) and computational logic.

[0060] In yet another embodiment, the APIs 612 are deployed into the stand-alone service domain 620. In one example, deployment of the APIs 612 is a true stand-alone implementation. The financial institution 104 would be able to instantly run this instance along with other instances within the stand-alone service domain 620. In another example, the APIs 612 are input into an integration or application orchestration service or engine used by the financial institution 104.

[0061] The customized solution package may be designed such that the selected application services can be integrated without the financial institution 104 introducing new technology into any of its domains. In other words, the customized solution package may be designed to be technology-agnostic such that it can be utilized by existing technology within the software application / application server and stand-alone

service domains. This may be achieved by automatically programming the customized solution package based on a single universal standard or a collection of standards commonly employed by financial institutions 104. However, this may be complicated and costly to achieve given the technology stacks available today.

[0062] One alternative may be where a separate orchestration engine is used for creating and hosting the application services in the application services database 118, but excludes the application services / assets of the financial institution 104. While these application services / assets may be indicated in the placeholders during creation of the Experience Solution, the financial institution 104 is required to manually code the inclusion of these application services / assets in order to complete the Experience Solution.

[0063] Another alternative may be where two separate orchestration engines are used. The first orchestration engine being for the application services in the application services database 118 but excludes application services / assets of the financial institution 104. The second orchestration engine is used by the financial institution 104 to create and host its own application services / assets. Both orchestration engines are similar to each other to facilitate the integration to the various application services / assets. To achieve this, the customized solution package includes instructions, e.g. code, of the first orchestration engine for the financial institution 104 to host their application services / assets, thereby facilitating their integration into the software application 106 and completion of the Experience Solution. Provision of the instructions or code of the first orchestration engine automates the configuration of the second orchestration engine used by the financial institution 104, reducing the time and effort as compared to having to manually write code.

[0064] As described in various embodiments herein, an Experience Solution is envisioned to be a customized solution package provided to a financial institution 104 to deliver various selected application services to be integrated with those of the financial institution 104 in order to digitally enhance an everyday target use case. Specifically, the selected application services are integrated into a software application 106 which is used by consumers 108 for consumer payments. Preferably, the

Experience Solution is configured such that there are placeholders included for standard payment processing rails so as to allow the financial institution 104 to seamlessly switch from using one payment scheme to another on the payment processing rail.

[0065] The financial institution 104 can advantageously customize their software application 106 to be integrated with various application services offered through the methods 200 and 300. These application services are obtained from various sources, including in-house application services created and developed by the intermediary entity / payment network operator 101 and from other third-party companies such as financial technology companies. These application services are specifically to enhance consumer payments for end customers of the financial institution 104, i.e. both consumers 108 and merchants 109, across a variety of target use cases. The software application 106 can thus be enhanced with the integration of these application services which are customizable and selectable by the financial institution 104. The financial institution 104 would benefit from being more agile in reacting to changes in consumer payments and from delivering a more compelling digital experience to their consumer 108 and merchants 109, potentially retaining their customers and attracting new customers.

Technical Architecture

[0066] As used herein, a server is a physical or cloud data processing system on which a server program runs. The server may be implemented in hardware or software, or a combination thereof. Some non-limiting examples of the payment network server 102 include computers, laptops, mini-computers, mainframe computers, any non-transient and tangible machines that can execute a machine-readable code, cloud-based servers, distributed server networks, and a network of computer systems.

[0067] Figure 7 is a block diagram illustrating a technical architecture 700 of the payment network server 102. The technical architecture 700 includes a processor 702 (also referred to as a central processor unit or CPU) that is in communication with memory devices including secondary storage 704 (such as disk drives or memory

cards), read-only memory (ROM) 706, and random-access memory (RAM) 708. The processor 702 may be implemented as one or more CPU chips. Various modules or components for performing various operations or steps of the methods described herein are configured as part of the processor 702 and such operations or steps are performed in response to non-transitory instructions operative or executed by the processor 702. The processor 702 includes suitable logic, circuitry, and/or interfaces to execute such operations or steps. Some non-limiting examples of the processor 702 include an application-specific integrated circuit (ASIC) processor, a reduced instruction set computing (RISC) processor, a complex instruction set computing (CISC) processor, a field-programmable gate array (FPGA), and the like.

[0068] The technical architecture 700 further includes input/output (I/O) devices 710, and system connectivity / network devices 712. The secondary storage 704 typically includes one or more memory cards, disk drives, tape drives, or other storage devices and is used for non-volatile storage of data and as an over-flow data storage device if RAM 708 is not large enough to hold all working data. Secondary storage 704 may be used to store programs which are loaded into RAM 708 when such programs are selected for execution.

[0069] The secondary storage 704 has a processing component 714 including non-transitory instructions operative by the processor 702 to perform various operations or steps of the methods described herein according to various embodiments of the present disclosure. The ROM 706 is used to store instructions and perhaps data which are read during program execution. The secondary storage 704, the ROM 706, and/or the RAM 708 may be referred to in some contexts as computer-readable storage media and/or non-transitory computer-readable media. Non-transitory computer-readable media include all computer-readable media, with the sole exception being a transitory propagating signal per se.

[0070] The I/O devices 710 may include printers, video monitors, liquid crystal displays (LCDs), plasma displays, touch screen displays, keyboards, keypads, switches, dials, mice, track balls, voice recognizers, card readers, paper tape readers, and/or other known input devices.

[0071] The system connectivity / network devices 712 may take the form of modems, modem banks, Ethernet cards, universal serial bus (USB) interface cards, serial interfaces, token ring cards, fiber distributed data interface (FDDI) cards, wireless local area network (WLAN) cards, radio transceiver cards that promote radio communications using protocols such as code division multiple access (CDMA), global system for mobile communications (GSM), long-term evolution (LTE), worldwide interoperability for microwave access (WiMAX), near field communication (NFC), radio frequency identity (RFID), and/or other air interface protocol radio transceiver cards, and other known system connectivity / network devices. These system connectivity / network devices 712 may enable the processor 702 to communicate with the Internet or one or more intranets. With such a system / network connection, it is contemplated that the processor 702 might receive information from the network, or might output information to the network in the course of performing the operations or steps of the methods described herein. Such information, which is often represented as a sequence of instructions to be executed using processor 702, may be received from and outputted to the network, for example, in the form of a computer data signal embodied in a carrier wave.

[0072] The processor 702 executes instructions, codes, computer programs, scripts which it accesses from hard disk, floppy disk, optical disk (these various disk-based systems may all be considered secondary storage 704), flash drive, ROM 706, RAM 708, or the system connectivity / network devices 712. While only one processor 702 is shown, multiple processors may be present. Thus, while instructions may be discussed as executed by a processor, the instructions may be executed simultaneously, serially, or otherwise executed by one or multiple processors.

[0073] The technical architecture 700 may be formed by one computer, or multiple computers in communication with each other that collaborate to perform a task. For example, but not by way of limitation, an application may be partitioned in such a way as to permit concurrent and/or parallel processing of the instructions of the application. Alternatively, the data processed by the application may be partitioned in such a way as to permit concurrent and/or parallel processing of different portions of a data set by

the multiple computers. In an embodiment, virtualization software may be employed by the technical architecture 700 to provide the functionality of a number of servers that is not directly bound to the number of computers in the technical architecture 700. In an embodiment, the functionality disclosed above may be provided by executing the application and/or applications in a cloud computing environment. Cloud computing may include providing computing services via a system / network connection using dynamically scalable computing resources. A cloud computing environment may be established by an enterprise and/or may be hired on an as-needed basis from a third-party provider.

[0074] It is understood that by programming and/or loading executable instructions onto the technical architecture 700, at least one of the CPU 702, ROM 706, and RAM 708 are changed, transforming the technical architecture 700 in part into a specific purpose machine or apparatus having the functionality as taught by various embodiments of the present disclosure. It is fundamental to the electrical engineering and software engineering arts that functionality that can be implemented by loading executable software into a computer can be converted to a hardware implementation by known design rules.

[0075] Furthermore, various embodiments of the present disclosure may be implemented as a method, apparatus, or article of manufacture using standard programming and/or engineering techniques to produce software, firmware, hardware, or any combination thereof to control a computer to implement the disclosed embodiments. For instance, various embodiments may be implemented as a computer-readable medium embedded with a computer-executable program, which encompasses a computer program accessible from any computer-readable storage device or storage media. For example, computer-readable media can include but are not limited to magnetic storage devices (e.g. hard disk, floppy disk, or magnetic strips), optical discs (e.g. compact disc (CD), digital versatile disc (DVD), or Blu-ray disc), smart cards, flash memory devices (e.g. card, stick, or key drive), and solid state drives / memory devices.

[0076] In the foregoing detailed description, embodiments of the present disclosure in relation to an electronic system and a computerized method for customizing financial institution software applications for consumer payments are described with reference to the provided figures. The description of the various embodiments herein is not intended to call out or be limited only to specific or particular representations of the present disclosure, but merely to illustrate non-limiting examples of the present disclosure. The present disclosure serves to address at least one of the mentioned problems and issues associated with the prior art. Although only some embodiments of the present disclosure are disclosed herein, it will be apparent to a person having ordinary skill in the art in view of this disclosure that a variety of changes and/or modifications can be made to the disclosed embodiments without departing from the scope of the present disclosure. Therefore, the scope of the disclosure as well as the scope of the following claims is not limited to embodiments described herein.

Claims

1. A computerized method for financial institutions to customize software applications for consumer payments, the method performed by a payment network system and comprising:

receiving, from a financial institution, a request to customize a software application provided by the financial institution to consumers for consumer payments, the request comprising identification data of the financial institution;

retrieving, from an application services database, details of a set of application services available for integration into the software application, the application services associated with consumer payments;

communicating, to the financial institution, the application services details for selection by the financial institution;

receiving, from the financial institution, details of the application services selected by the financial institution;

generating a customized solution package comprising the selected application services; and

communicating the customized solution package to the financial institution for integrating the selected application services into the software application.

2. The method according to claim 1, further comprising simulating the selected application services to the financial institution.

3. The method according to claim 1 or 2, wherein the request further comprises data of a target consumer segment, and the set of application services is availed based on the target consumer segment data.

4. The method according to claim 3, wherein the target consumer segment data relates to at least one of demographics, mobile connectivity, financial services accessibility, location, and education level.

5. The method according to any one of claims 1 to 4, wherein the application services database comprises application services obtained from independent service providers.

6. The method according to any one of claims 1 to 5, wherein the customized solution package comprises a set of application program interfaces (APIs) of the selected application services and a set of software development kits (SDKs) for integrating the selected application services into the software application.

7. The method according to claim 6, wherein the SDKs comprise a client-side SDK for integrating the selected application services into the software application executable by consumer electronic devices.

8. The method according to claim 6 or 7, wherein the SDKs comprise a server-side SDK for integrating the selected application services into an application server hosting the software application.

9. The method according to any one of claims 1 to 8, wherein the application package further comprises instructions of an orchestration engine for the financial institution to facilitate integration of the selected application services with other application services / assets of the financial institution in the software application.

10. A non-transitory computer-readable storage medium storing computer-readable instructions that, when executed, cause a payment network system to perform steps of a method according to any one of claims 1 to 9.

11. A payment network system for financial institutions to customize software applications for consumer payments, the payment network system comprising:

a request module configured for:

receiving, from a financial institution, a request to customize a software application provided by the financial institution to consumers for consumer payments, the request comprising identification data of the financial institution;

a database module configured for:

retrieving, from an application services database, details of a set of application services available for integration into the software application, the application services associated with consumer payments;

a selection module configured for:

communicating, to the financial institution, the application services details for selection by the financial institution; and
receiving, from the financial institution, details of the application services selected by the financial institution; and

a packaging module configured for:

generating a customized solution package comprising the selected application services; and
communicating the customized solution package to the financial institution for integrating the selected application services into the software application.

12. The payment network system according to claim 11, further comprising a simulation module configured for simulating the selected application services to the financial institution.

13. The payment network system according to claim 11 or 12, wherein the request further comprises data of a target consumer segment, and the set of application services is availed based on the target consumer segment data.

14. The payment network system according to any one of claims 11 to 13, wherein the customized solution package comprises a set of application program interfaces (APIs) of the selected application services and a set of software development kits (SDKs) for integrating the selected application services into the software application.

15. The payment network system according to claim 14, wherein the SDKs comprise a client-side SDK for integrating the selected application services into the software application executable by consumer electronic devices.

16. The payment network system according to claim 14 or 15, wherein the SDKs comprise a server-side SDK for integrating the selected application services into an application server hosting the software application.

17. The payment network system according to any one of claims 11 to 16, wherein the application package further comprises instructions of an orchestration engine for the financial institution to facilitate integration of the selected application services with other application services / assets of the financial institution in the software application.

18. A user interface accessible by financial institutions to customize software applications for consumer payments, the user interface hosted on a payment network system and configured for performing steps comprising:

- communicating, to the payment network system, a request from a financial institution to customize a software application provided by the financial institution to consumers for consumer payments, the request comprising identification data of the financial institution;

- presenting details of a set of application services available for integration into the software application, the application services associated with consumer payments;

- selecting, by the financial institution, one or more application services for integration into the software application;

- communicating, to the payment network system, details of the application services selected by the financial institution; and

- availing a customized solution package generated by the payment network system, the customized solution package comprising the selected application services,

- wherein the customized solution package is downloadable by the financial institution for integrating the selected application services into the software application.

19. The user interface according to claim 18, the steps further comprising presenting a simulation of the selected application services.

20. The user interface according to claim 18 or 19, the steps further comprising receiving, from the financial institution, data of a target consumer segment, wherein the target consumer segment data is included in the request and the set of application services is availed based on the target consumer segment data.