Presence Based Open Contact Center Leveraging Social Networks

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Abstract

In recent years, adoption of social networks such as Facebook, Twitter etc have witnessed a meteoric rise amongst users across the world. Much of this is due to such platforms' capability to create a community of users who are able to communicate updates in real-time and keep in constant touch with each other. Social networks are also enabling the delivery of a host of services irrespective of the user devices and the services delivered. Hence, social networks have drawn the attention of businesses and enterprises for various purposes such as new products advertising, trend mining, connecting to customers.

This paper demonstrates how social networks can be used to create business entities like contact centers. In contrast to current day contact centers, where a user must visit a company's web-site to engage in live-chat or call a 1-800 number, social networks offer a real-time channel to enable companies to reach individual users through a medium of their choice and at a time of their choosing. Rather than requiring customers to visit a company's website, companies are now able to interact with the customers where customers are already spending time, and can tailor the customer experience as a 1-on-1 channel for personalized, real-time interaction.

A presence based open contact center system (POCC) is presented in this paper. In the proposed system, presence of a customer i.e. the availability of a customer on social media is detected and then based on the capabilities of the social network, a real-time communication channel such as live-chat is established between an agent and the customer. The core components of the POCC are implemented using industry standard SIP protocol. The architecture of the POCC is flexible such that adding a new social network service is only a matter of writing a service specific adapter that can be easily plugged into the POCC.
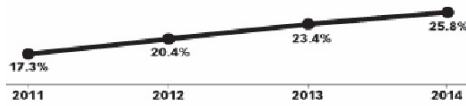
Background and Problem

- **Rapid growth in social networks adoption**
  - Voluminous increase in access of social networks through mobile devices
- **Variety of social networks**
  - Yahoo, GTalk for Messaging
  - Twitter for microblogging
  - Foursquare for location
  - Qik, Coolstreaming for live video
  - LinkedIn for Professional relationships
- **End users using social networks for various purpose**
  - Building personal relationships
  - Establishing communities of interest
  - Entertainment
- **Bring Your Own Service (BYOS) trend in social networks**
  - Facebook Application

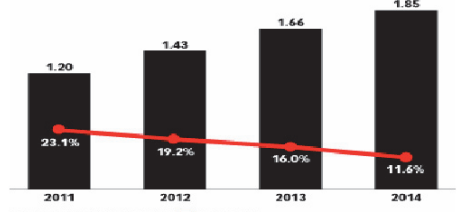**Social Network User Penetration Worldwide, 2011-2014**
% of population

17.3% 2011 | 20.4% 2012 | 23.4% 2013 | 25.8% 2014

Note: internet users who use a social network site via any device at least once per month
Source: eMarketer, Feb 2012
137581
www.eMarketer.com

Social Network Users Worldwide, 2011-2014
billions and % change

1.20 (2011) | 1.43 (2012) | 1.66 (2013) | 1.85 (2014)
23.1% | 19.2% | 16.0% | 11.6%

■ Social network users ■ % change
Note: internet users who use a social network site via any device at least once per month
Source: eMarketer, Feb 2012
136999
www.eMarketer.com

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Background and Problem

Recent studies on growth of social networks have predicted that the users of social networks have reached close to critical mass. A study by eMarketer in February 2012 establishes that even though the users penetration world wide has increased from 17.3% in 2011 to 20.4% in 2012, it is not expected to follow similar growth pattern in 2013 and 2014. Similarly, the number of users of social networks are rising but their percentage change rate is expected to decline. These forecasts imply that a large population world-wide already has access to social networks. Facebook has over 955 million active users as of June 2012 and more than half of these users are using Facebook on a mobile device [1]. Twitter has more than 500 million users worldwide in 2012 [2]. The other social networks like Myspace, Foursquare (20 million registered users in April 2012 [3]) are also depicting similar patterns. This tremedous growth of the social networks has encouraged developers to build and launch specialized networks such as Foursquare for location [3], Qik and CoolStreaming for sharing real-time videos, LinkedIn for professionals. Twitter [2] is a micro blogging social network that allows users to send text upto 140 characters. Twitter is often called as SMS of internet. On the other side, users of social networking sites use them for building personal or professional relationships, sharing information, forming similar interest group, gaming etc.

It has been reported [9] that 62% of adults worldwide use social media and that social networking is the most popular online activity with 22% of time online spent on social media channels like Facebook and Twitter. Obviously the economically enabled population in the world is spending a significant amount of time in social networking and they expect to avail various services over social media. This is corroborated by the facts [9] that 40% of the consumers prefer social logins over creating a new user/guest account to avail a service and 80% of US social network users prefer to connect with brands through Facebook. To cater such consumers, businesses are waking up to a new paradigm called "Bring Your Own Service" (BYOS), where they are increasingly allowing the customers to avail the offered services through another third party service of their choice. Thus, a Facebook user typically would want to reschedule a flight booking on one of his Facebook friend's suggestion by interacting with the airline booking representative using a Facebook channel only and not requiring to access and create a separate login for the airline service. The current practice for the businesses to cater to such users is to create accounts for individual social networks, which is evident from the fact [9] that 58% of Fortune 500 companies have an active corporate Facebook account and 62% have an active corporate Twitter account. However, the main problem with such a practice is that it doesn't enable the complete integration of the business processes with the third party social networking services and hence offers only limited service capability and flexibility.

Background and Problem

▪ Enterprises/Businesses have also started using social networks
- – Promotion of new products
- – Advertising of products and business

▪ Social Networks open a new channel for contact centers
- – Customers spending more time on social networks
- – Traditional contact centers are voice centric
- – From Voice to Emails to Chat

▪ The proposed solution allows to contact customers on social networks through live-chat
- – Enables to reach customers in a medium of their choice leading to grater customer satisfaction
- – Customers do not visit specific company's web-site instead contact center follow customers
- – Real-time, two way interaction with customers
- – Programmable
  - • Adding and Removing social network
  - • Choice of real-time attributes and sources of these for instilling intelligence in the matching logic, routing logic, in choosing media and customer end point
  - • Scalable, flexible and extensible platform
- – Based on Industry Standard SIP protocol

Background and Problem

Customers are increasingly spending more time on social networks [1-3]. Even the businesses and enterprises across the globe are innovating to find new ways to exploit the large volume of population present in social networks such as social media marketing. Following these growth trends, businesses and customers both are plunging in to use social networks in various ways from mining the trends to as platform for sharing information. Customers are interested in interacting with contact centers beyond traditional phone and email channels. Traditional phone based voice-centric contact center provides a synchronous channel of communication if customer is wiling to accept the call otherwise it leads to phone tag. Email is an asynchronous channel – send email and await response. Social networks, on the other hand, enable contact centers to reach customers in a medium of their choice and more importantly, when customer is available to interact in real-time. A second benefit is the ability for companies to engage in live-chat with customers without requiring the customers to visit a specific (company's) web-site. Today, multiple solutions exist for live-chat but they all require customers to visit a company's website. In other words, a customer has to follow where the company wants them to, before a customer can engage with the company in a real-time, interactive dialogue.

Current solutions in the contact center domain are focused on building company's page on a social network, forming communities to gather contents for mining, sending and receiving messages and analyze them to drive business intelligence. The SocialMiner [4] from Cisco is a social media customer care solution which enables an enterprise to proactively respond to customers on Twitter and Facebook or other compatible blogging sites. This solution gathers customer posts from social media networks, filters (e.g. for a campaign) the post, analyses and then instructs dedicated social media customer care team to respond to customers in real time through the same social network they are using to communicate. SocialMiner does not allow customers to initiate chat with the contact centers i.e. it supports only outbound sessions. Avaya Social Media Manger [5] also collects data from social media channels for deriving business intelligence. *A much better solution in terms of customer satisfaction and usability is for companies to go where the customer is already spending time, viz. social networks. A unified contact center with flexible and extensible architecture supporting both inbound and outbound live-chat sessions between agents and customers leveraging the capabilities offered by social networks does not exist today.* In this paper, we propose a Presence based Open Contact Center (POCC) enabling contact centers to follow customers to medium of their choice and at their convenience. The internal architecture of POCC is programmable and is based on industry standard SIP protocol .

Choice of SIP, Presence and Virtualized Presence

- Social networks are on internet viz Internet protocol (IP)
- Communication services e.g. VoIP are now IP based
- Session Initiation Protocol (SIP) is industry standard protocol for establishing sessions over IP networks
- SIP based Presence architecture is basis for Instant messaging systems
  - Presence is the ability and willingness to communicate using a variety of devices and mediums
  - SIP based presence is used in Yahoo Messenger
- An abstract and more rich view of presence from multiple sources can be provided by Virtual Presence
  - A Virtual Presentity (VP) in a presence system represents a query that operates on top of a collection of physical or virtual presentities, and represents a computation on the resulting presence data
  - A physical presentity refers to the standardized definition of the presence attributes of a single entity/user. The state of a VP represents an execution of the query logic on the presentities
- Why SIP and Presence/Virtual Presence in the Open Contact Centers
  - Presence of customers is to be made available to agents for establishing real-time chat
  - Presence of agents is to be made available to customers for establishing real-time chat
  - Complex agent selection logic requires virtual presence e.g. chose available java expert nearest to the customer
    - A selection criteria like the above one requires to gather location of the customer from social network like Foursquare and then chose the agent nearest to the customer

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Choice of SIP, Presence and Virtualized Presence

Session Initiation Protocol, or SIP [5], is the core technology behind unified communications. It represents the next step in the evolution of Internet technologies - within the larger public Internet, as well as inside corporate intranets. SIP has been designed to establish sessions over internet that can be used for multimedia communication - whether it be a voice conversation (e.g., voice-over-IP [VoIP]), or a quick, short interaction through instant messages (IM), or simply knowing whether a person is available (presence), all over single network viz. internet.

Presence [6] denotes the willingness of an entity to communicate. It forms the basis of today's instant messaging systems. Presence has evolved over the years and is now intensively used in context-aware systems to capture the real-time attributes such as location, skill etc of entities. SIP provides a separate set of standards illustrating the messages and procedures required for enabling presence systems.

Arup et al [7] have introduced the notion of virtual presence, a programmable abstraction on top of presence of individual or multiple entities. Often many applications require to compute a composite presence state derived by applying some logic over presence information, for example, 'which bar has maximum of my friends' or 'nearest available taxi'. Virtual presence in a presence system thus represents a query that operates on top of a collection of physical or virtual entities, and represents a computation on the resulting presence data.

Why SIP, Presence and Virtual Presence in Open Contact Centers?

Social networks have been designed and developed for internet and also operate over internet. A large population of users of social networks still access them over internet. In order to facilitate, (i) *Presence*, to capture real-time state of both customers and agents (ii) *live-chat*, to establish one to one communication channel between agents and customers, we need technologies which operate over internet. SIP and SIP based presence are the industry standards and an obvious choice. The concept of virtual presence is required to carry out complex agent selection logic such as 'nearest available java expert'.

Presence based Open Contact Centers (Key Concepts)

- **Contact Centers**
  - Inbound
  - Outbound
- **Open Contact Centers**
  - Based on industry standard SIP protocol
  - Scalable architecture
  - Flexible
    - Addition of a new social network only requires plugging in adapters for extracting presence and other features
- **Customer Virtualization**
  - hides the actual social network where customer is currently available and agent sees the presence of the customers not the social media where they are available
- **Agents Virtualization**
  - collective view of contact center to customers
- **Agents Selection**
- **Social Media Gateway**
  - Establishes and manages chat sessions between customer and selected agent and vice-versa

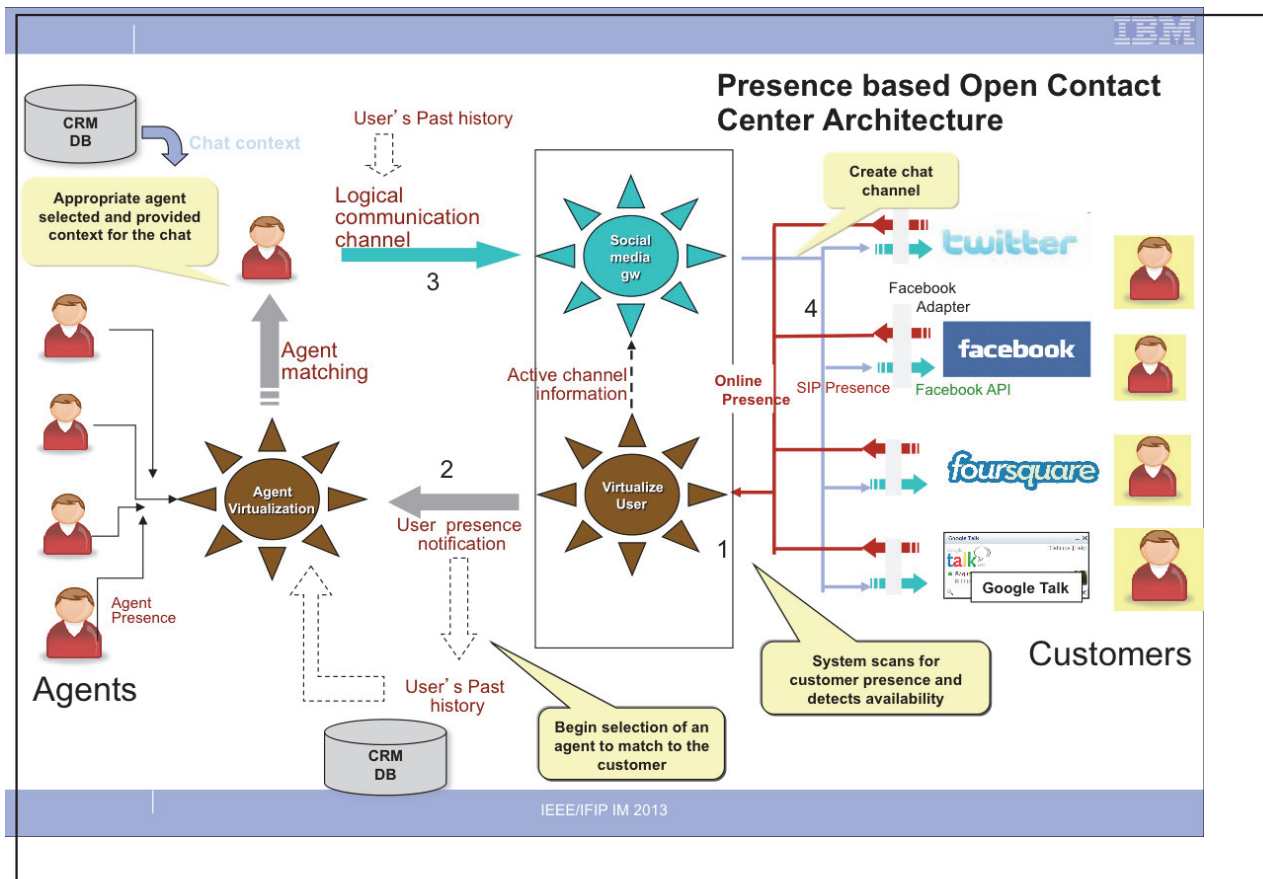**Presence based Open Contact Centers (Key Concepts)**

In a simplistic contact center architecture, there are agents on one side and customers on the other. Agents have a list of customers whom they have to contact. This form of contact center where agents contact customers is called outbound contact centers. The other form of contact center is known as inbound contact centers where a customer calls a helpdesk number and the request is routed to an available agent. The media of communication between agents and customers can be voice, emails, video or live chat. The core architecture of proposed Presence based Open Contact Centers is 'open' architecture in many ways. It is based on the common core built from a set of middleware such as Presence Server, Databases, SIP Session control glued together. The core is scalable and flexible as it is fully programmable to support the exact needs of a business interested in establishing customized contacts with their customers. The four key components in the architecture of open contact center are:-

Customers/Users Virtualization: Now a days, a customer may have presence on more than one social media. Virtualize User component hides the where about of the customer in front of the agent. Agent sees the presence of the customers and not the social media where they are available. For example, a customer may be present on Facebook, Twitter and GTalk. Moment, the customer becomes available on any of these three social networks, its presence is detected and the customer is shown as available to the agent population.

Agents Virtualization: Another aspect of the architecture is the agents virtualization. This component shows a collective view of contact center to customers. Customers do not see presence/identity of individual agents. As long as at least one agent is available for interacting with customer, the virtualized agent (i.e. contact center entity) is available to customers.

Agents Selection: With agents virtualization comes the task of agent selection. When a customer contacts the center, then the task is to chose an agent who can fulfill the request. The agent selection criteria can be simple (any free) to complex (nearest free agent). The agent selection module carries out the matching of the customer with the agents population based on past chat history of the customer. This module makes use of presence information available in the system.

Social Media Gateway: The social media gateway is responsible for (a) deciding which Social network to use (e.g. Facebook or Twitter) to communicate (b) setting up the communication channel specific to selected social network e.g. live-chat for Facebook, Tweets or directed messages for Twitter etc. There is a logical communication channel between agent and the customer or vice-versa. Each logical channel has two segments : from agent to social media gateway (SIP channel) and from social media gateway to customer (this channel is specific to the social network).
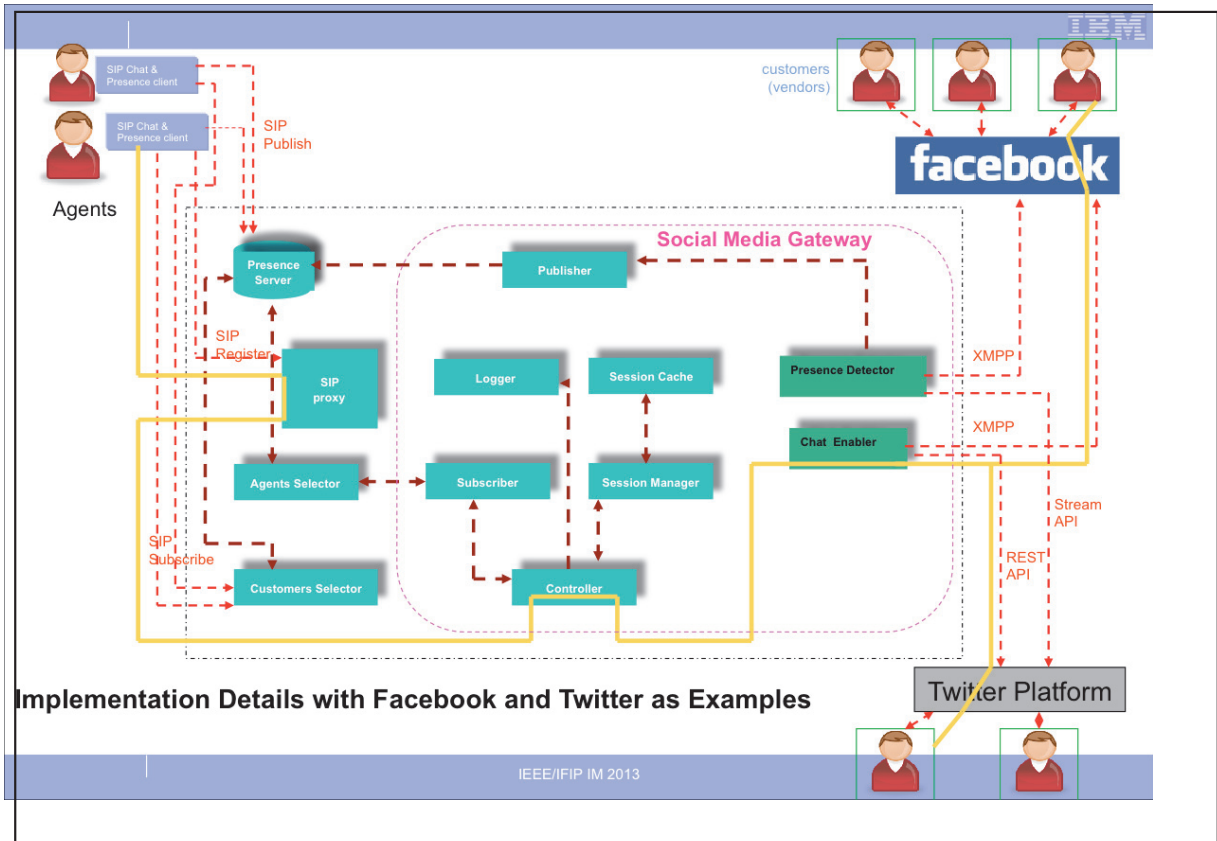
Presence Based Open Contact Center Architecture

The common contact center core provides a full-fledged engagement platform for customers to reach out to customer care through social networks. The customers can connect to a contact center in real-time using the service of their choice such as Twitter or Facebook instead of being tied to a particular system or service dictated by the businesses for interacting with a contact center agent. The open contact center leverages presence technology to enable real-time, two-way interaction based on availability of both customers and contact center agents and provides choice of real-time attributes and sources of these for instilling intelligence in the matching logic, routing logic, in choosing media and customer end point.

The agent virtualization module shows the availability of the contact center on the social network. Either the agent or the customer can initiate chat session. In case, the customer begins chat session, a agent is selected and an end to end chat session is established between customer and the agent. In the other case, an agent can also initiate the chat session after seeing the customer as 'available'. The social media gateway chooses the appropriate adapter to establish/send chat message to the customer.

Upon initialization, the social media gateway application starts, the controller module registers with the SIP proxy to enable the two-way messaging flow. Whenever an agent logs onto the portal, the online status ('available') of the agent is published to the presence server. The system scans for the presence of customers on different configured social networks and detects their availability at regular interval. Once a customer is available on a social network, his presence is published in the enterprise domain presence server. The list of all the associated customers along with their presence status is shown to the available agents. On the other side, the customer sees virtualized contact center entity available on its social network.

Implementation Details with Facebook and Twitter as Examples

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Implementation Details with Facebook and Twitter as an Example

Implementation of the presence based open contact centers has been described with Facebook or Twitter as an example. The Social Media Gateway loads various adapters specific to a social network e.g. for Facebook and for Gtalk, it uploads XMPP based adapters. The various modules are:

1.Customers Selector: This module hides the presence of the customers on various social medias. It implements the customers virtualization module.

2.Agents Selector: This module virtualizes the presence of agents. Agents can be selected based on their availability, location, expertise or any other specification.

3.Presence Server: It is repository of presence information of both agents and customers.

4.SIP Proxy: This module routes the SIP requests to SIP endpoints e.g. agents, presence server etc. All the agents register to SIP proxy.

5.Components of Social Media Gateway

  i. **Subscriber:** This module subscribes to agents selector module to find the 'best' agent with whom a chat session can be established for inbound requests

  ii. **Publisher:** This module publishes presence of customers to presence server.

  iii. **Session Cache**: A catalog of all the running/active chat sessions at any point of time.

  iv. **Session Manager:** This module is responsible for creation, deletion and management of the logical chat sessions. A timer based mechanism to manage sessions is implemented.

  v. **Controller:** This module (i) converts SIP message into required social network format and vice versa (ii) interacts with Session Manager to identify new chat sessions (iii) interacts with subscriber to find "best" agent for a chat request originated by the customer

  vi. **Presence detector**: This module detects presence of customers on various social networks. It uses social network specific protocol to carry out its function e.g. XMPP for Gtalk and Facebook.

  vii. **Chat Enabler:** This module is responsible for managing the live chat functionality. Again, based on the social network capabilities, protocol and exposed APIs, this module uploads adapters accordingly. A good example is Twitter.

  viii. **Logger:** Logger logs chat messages onto the external storage.

Steps of live-chat Sessions

- **Agent Initiated Chat Sessions**
  - Agents find a customer online
  - A logical live-chat session between agent and customer
  - Routing of messages
  - Release of logical and physical sessions
- **Customer Initiated Chat sessions**
  - Customer finds virtualized contact center entity online
  - Sends a message
  - Gateway receives message, perform checks, creates a new logical live-chat session
  - Routing of messages
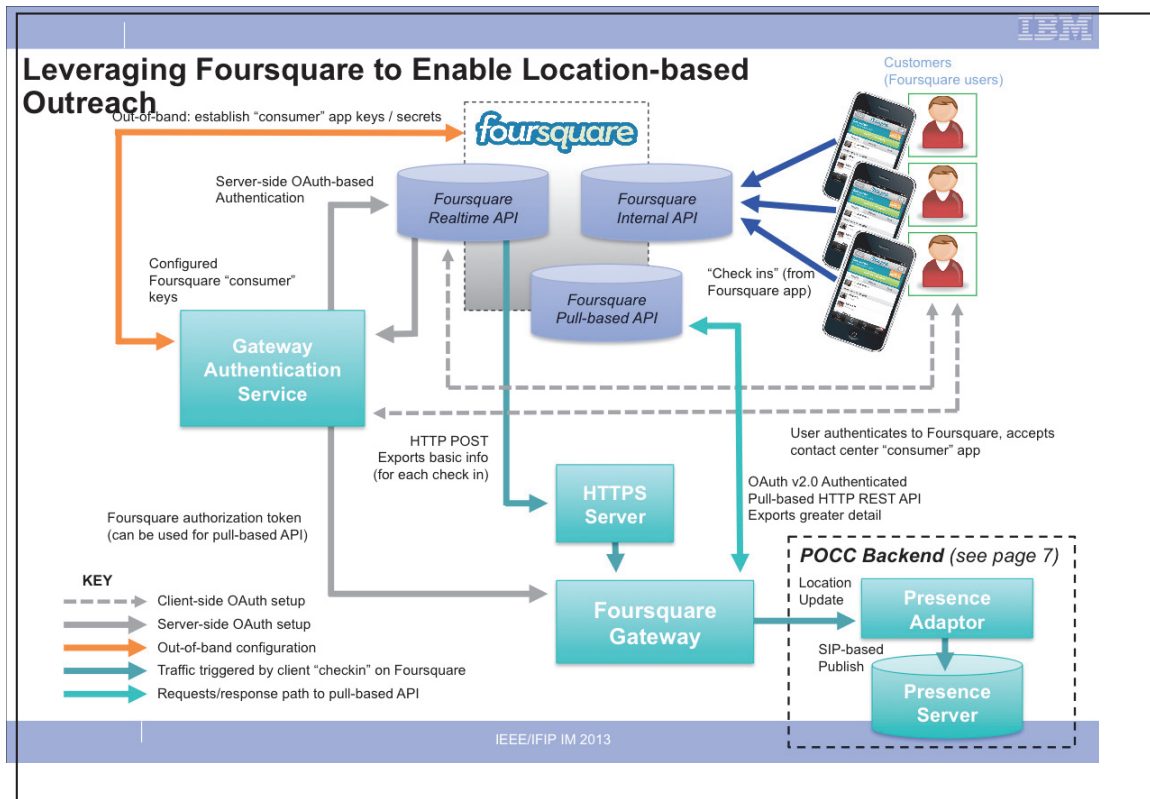 - Release of logical and physical sessions

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Agent Initiated Chat Sessions

1. Agent finds a customer online and available in his chat window inside the agent portal and initiates chat.

2. Agent portal creates INVITE (for the gateway) and sends it to SIP proxy to create a new session.

3. The typed message is encapsulated in the SIP MESSAGE and is sent to gateway (the TO URI is the gateway URI and a parameter "target id" identifying the customer on the social media e.g. Facebook) and is sent inside the INVITE transaction Agent Publishes 'BUSY' status to the presence server.

4. Gateway maintains a cache (i.e. session which is the mapping of agent to customer viz <agent-id, fb user-id, timer> . If timer expires, delete entry) of all the active chat sessions. When gateway recognizes a new chat session, it creates a new entry in this cache and transfers the message to social network (e.g. Facebook) interfacing module.

5. The session is maintained for a pre-configured duration (the timer is run when chat is initiated) and there after it is released by the gateway.

Customer Initiated Chat Sessions

1. Customer finds "contact center" virtual presentity online on Facebook.

2. Customer initiates a chat session. The request reaches gateway.

3. Gateway checks in his session cache if there is an ongoing session for that customer. If not then gateway creates a new INVITE, marks the state of the session as pending and sends it to SIP proxy (which implements the agent selection module).

4. When gateway receives response from the SIP proxy agent selection module back with selected agent id, it updates that in the session cache.

5. Gateway then sends SIP MESSAGE inside the INVITE transaction to the selected agent.

6. The session is maintained for a pre-configured duration and there after it is released by the gateway.

Leveraging Foursquare to Enable Location-based Outreach

With the growing saturation of high-end smartphones (e.g., IPhone, Android Nexus, etc.) many consumers frequently the Internet through pervasive 3G and 4G cellular connectivity, A rising use of location-based mobile-social services parallels this trend. For example, Foursquare allows its growing user base to "check in" at shops, restaurants, offices, or other venues to earn points, virtually explore nearby places, and engage with peers in real time. We outline how a POCC can leverage the rich, location-specific that Foursquare collects and shares about its users.

1.Out-of-band: A POCC administrator establishes a Foursquare "consumer" app, subscribing to Foursquare data and establishing a secret key between POCC and Foursquare.
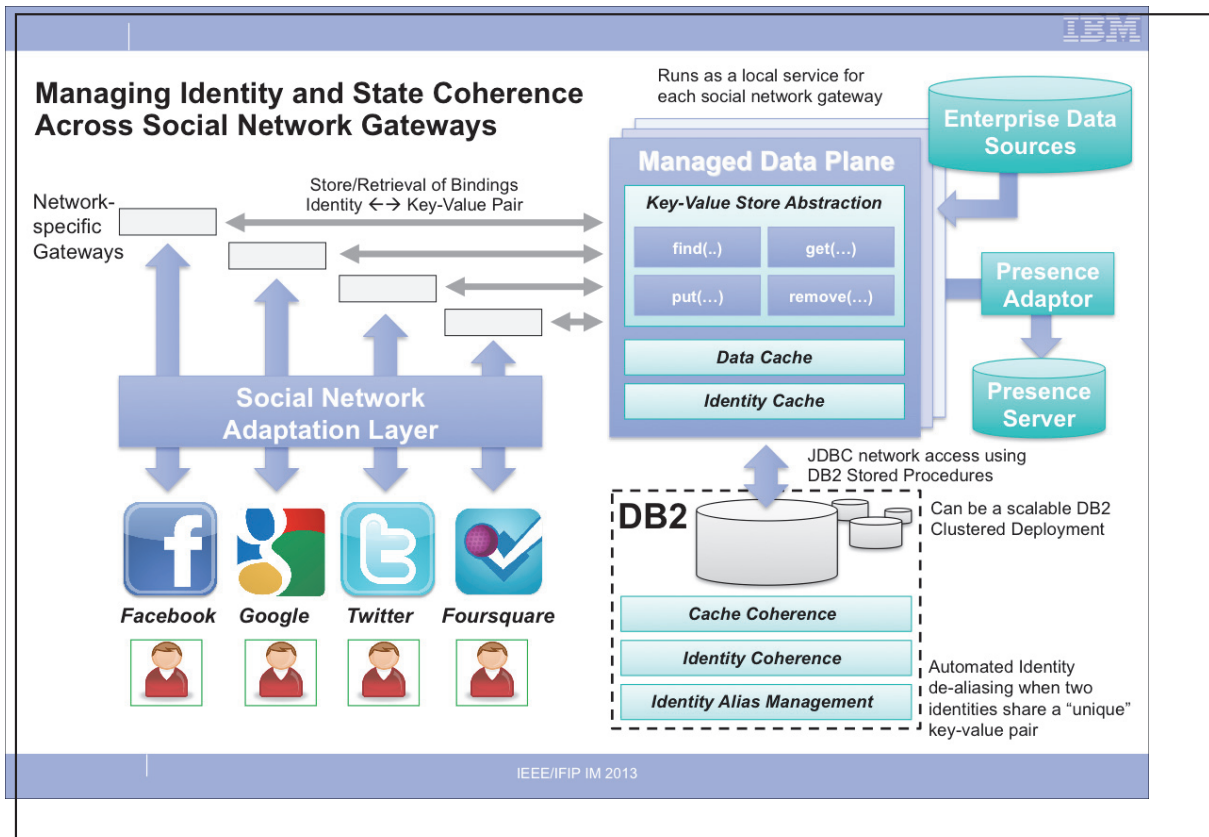
2.Authorization: The POCC establishes authorization for a particular user's data, either manually by redirecting a potential user to a Foursquare login page (shown above in the client and server-side OAuth setup), or implicitly, by subscribing to all incoming data for a particular "venue" (after proving authority over that venue out-of-band with Foursquare).

3.Asynchronous Notification: Whenever a user conducts a subscribed Foursquare action, Foursquare servers will make an asynchronous HTTP-over-SSL/TLS (HTTPS) POST to a POCC server, including JSON-formatted details about the event and key for authentication.

4.Synchronous Data Pull: Upon receiving the asynchronous notification, the POCC Foursquare Gateway can (optionally) make a HTTP GET request to a Foursquare server to request additional details regarding a notification.

5.Presence Update: Foursquare data combined from (3) and (4) are distilled to an XML-formatted presence document and fed to the Presence Adaptor which makes a SIP-based publish to the Presence Server.

The above design has been implemented to inject location of customers into the customer record (presence document) on the Presence Server. Current work-in-progress includes using location of customers and agents stored in the presence server to route chat sessions to the nearest available agent. For example, nearest tow-truck that gets dispatched to a disabled vehicle (- http://jalopnik.com/5638294/onstar-brings-facebook-to-cars)
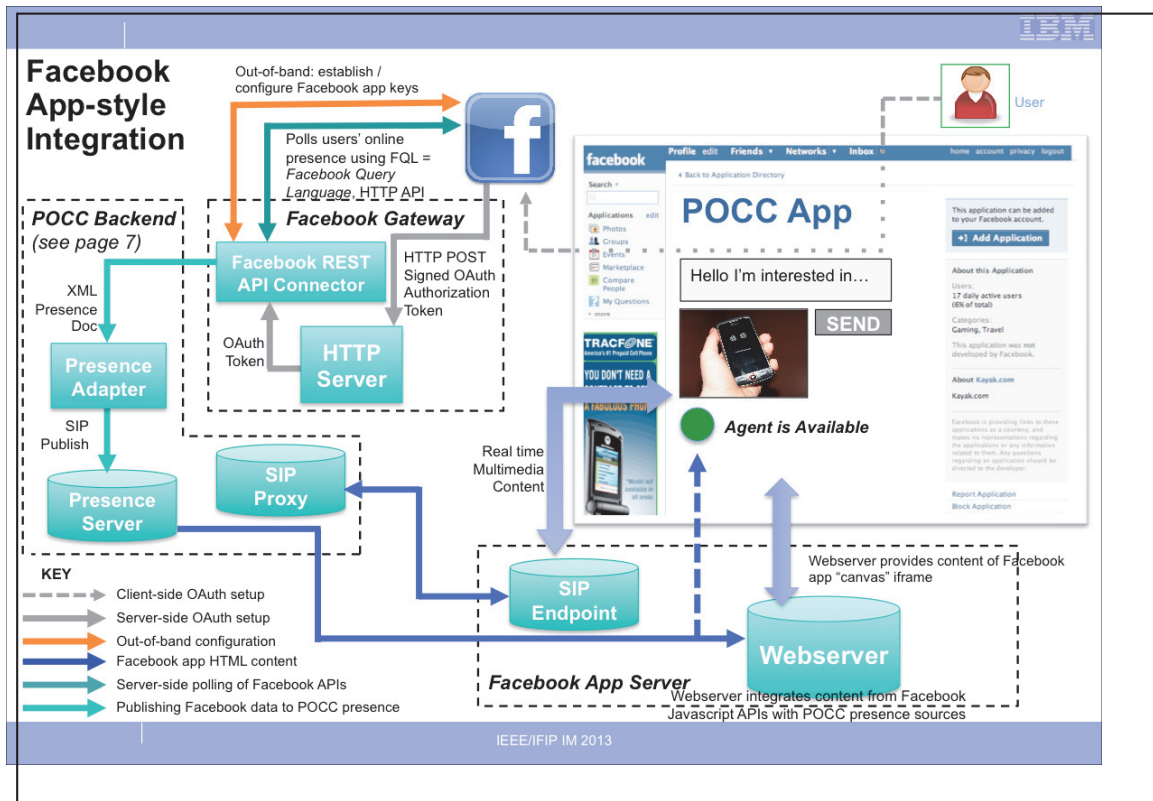
Managing Identity and State Coherence Across Social Network Gateways

The POCC supports multiple social networks (including Facebook, Google Talk, Twitter, and Foursquare) to reach as many potential users as possible. By leveraging the superset of data available across networks POCC maintains a pervasive awareness of the user's presence as their network preferences change over time. Importantly, since users may utilize multiple networks simultaneously (or rapidly switch among them), the POCC must be able to maintain coherent, linear conversation with back-end Agents. Therefore, the POCC must manage state carefully, especially, (1) to provide a shared, coherent view of data across multiple Social Network Gateways; (2) to export real-time data from Social Network Gateway inputs to a Presence Server for system-wide consumption; and (3) de-duplicate aliased identities for the same real-world person across multiple networks.

1.Persisting State: Each Social Network Gateway maintains operational state by way of a managed date plane, abstracted as a binding map between a unique user ID and a corresponding key-value store. Within the data management module, recently used ID $\leftrightarrow$ key-value pair bindings are cached locally and persisted to a shared DB2 database or database cluster. Social Network Gateway implementations must only consider reading/writing/searching data for particular keys (e.g., find_user[FACEBOOK_ID, "john.smith72"]).

2.Real-time Presence: The managed data plane monitors changes to state tracked by the Social Network Gateways and publishes updates, in real-time, to the Presence Server.

3.Managing Identity: The data management module of each Social Network Gateway interacts with a DB2 database through a set of custom stored procedures. As these procedures read/write ID $\leftrightarrow$ key-value pair bindings, they monitor for shared key-value pairs for multiple IDs. If the corresponding key has been designated "unique," the data for both IDs are automatically linked. Further references to either ID are treated as interchangeable pointers the same set of key-value pair bindings.

Facebook App-style Integration

Out-of-band: establish / configure Facebook app keys

Polls users' online presence using FQL = Facebook Query Language. HTTP API

POCC Backend (see page 7)

Facebook Gateway

Facebook REST API Connector

HTTP POST Signed OAuth Authorization Token

XML Presence Doc

OAuth Token

HTTP Server

Presence Adapter

SIP Publish

Presence Server

SIP Proxy

Real time Multimedia Content

KEY
- Client-side OAuth setup
- Server-side OAuth setup
- Out-of-band configuration
- Facebook app HTML content
- Server-side polling of Facebook APIs
- Publishing Facebook data to POCC presence

SIP Endpoint

Facebook App Server

facebook — Profile edit Friends ▾ Networks ▾ Inbox — home account privacy logout

Search ▾
‹ Back to Application Directory

Applications edit
- Photos
- Groups
- Events
- Marketplace
- Compare People
- My Questions
▸ more

POCC App

Hello I'm interested in…

SEND

TRACFONE America's #1 Prepaid Cell Phone
YOU DON'T NEED A
A FABULOUS PHO

Agent is Available

This application can be added to your Facebook account.

+] Add Application

About this Application
Users:
17 daily active users (6% of total)

Categories:
Gaming, Travel

This application was not developed by Facebook.

About Kayak.com
Kayak.com

Facebook is providing links to these applications as a courtesy, and makes no representations regarding the applications or any information related to them. Any questions regarding an application should be directed to the developer.

Report Application
Block Application

User

Webserver provides content of Facebook app "canvas" iframe

Webserver

Webserver integrates content from Facebook Javascript APIs with POCC presence sources

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Facebook App-style Integration

Facebook provides several integration points for third-party app development. Each can be leveraged in the context of POCC to achieve an engaging and seamless user experience across various social network contexts. Previously, we have considered a chat-only integration, leveraging Facebook's XMPP API. Here, we consider connecting POCC using the "App on Facebook" model. The user visits a Facebook app page that blends functionality with a fully customizable "canvas," implemented as an HTML iframe. Through the use of its own webserver, the POCC has near complete control over the content of this iframe, enabling it to integrate HTML content from presence. Further, POCC can be extended to integrate real time multimedia, embedded in the app experience, by leveraging Javascript or Flash libraries.
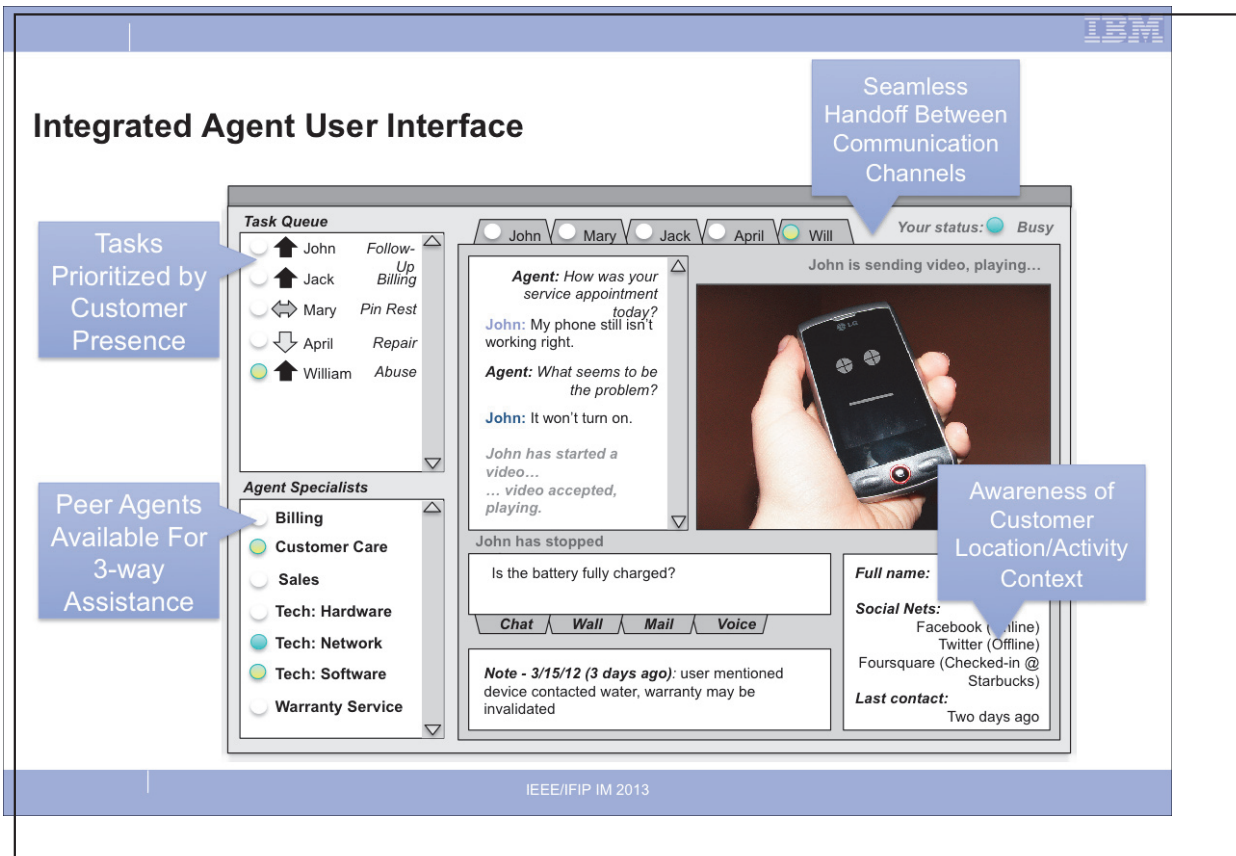
1.Out-of-band: A POCC administrator establishes a Facebook app, requesting a selected set of data permissions. When authorizing the app, the user will grant or deny these permissions.

2.Asynchronous Authorization: The user searches for or follows a link to the Facebook app (within the standard Facebook website). When the iframe loads, it uses Javascript to redirect the user to an OAuth authorization dialog. To proceed, the user will accept the corresponding permissions. A Facebook server makes an HTTP post to a POCC server to receive authorization credentials.

3.Synchronous Data Pull: Periodically, the Facebook Gateway uses received Oauth credentials to poll users' online status, etc., to be published to the Presence Server.

4.Content: Once an app is authorized, the user is again redirected, back to the app. As the Facebook app page loads, the POCC webserver combines static content with dynamic presence data. For example, as pictured, the app might inform the user of Agent availability and provide a chat interface to the next available agent. The app can also provide integrated real time multimedia communications with backend Agents.

The above design sketch is an alternative method connecting Facebook to POCC. We mention it to validate the design of the SIP core of POCC which should be able to support both multiple social networks but also more than one way of connecting to a given social network.

Integrated Agent User Interface

A contact center based on social networks can be realized utilizing existing agent-side client software platforms for customer care. Throughout the POCC design, we rely on open standards such as SIP for connecting the various components. However, we can create additional value by tailoring the agent-side experience to more-directly leverage inputs from social networks. In the design above, we see an agent-side GUI. The enhancements coming from social networks, though subtle, can add immersive value in enhancing agent productivity. Following is a design sketch of how we envision the agent UI to be :

1.Presence-enhanced Task Queue: The key differentiating characteristic of this agent interface is the focus on outbound communication. That is, instead of waiting to respond incoming customer messages, agents can proactively reach customers when necessary or desirable. By prioritizing and highlighting those customers that are currently available and active on a social network, this GUI directs agents attention to those customers that are currently most-amenable to being engaged.

2.Presence-enhanced Peer Agent Directory: In various customer contact scenarios, it is necessary to bring in an expert from a different domain, someone with a different level of authorization, or simply a manager in case the customer is unhappy. This design enhances the agent GUI with a presence-aware "buddy list" of peer agents.

3.Seamless Switching Across Communication Channels: Social networks support a variety of communication modalities. Accordingly, so too should the agent interface provide flexibility for the users to pick and switch seamlessly on demand, without warning.

4.Awareness of Customer Activities and Location: Social networks can provide an abundant source of information regarding a user's activities prior to and during agent contact. If the agent is aware of what else might be distracting to the customer, it may be possible to tailor the conversation accordingly.

Value Proposition

Value Proposition

Presence based open contact center leverages inrceasing use of social netwoks by consumers. It provides a single infrastructure based on SIP that supports presence (of both customers and agents), as well as communication capabilities such as messaging or voice/video communications. Additionally, agents use a single common interface to interact with customers regardless of the actual social network where customers are connected. This is expected to lower both setup and operational cost of the overall infrastructure & service, e.g. agents do not need to receive channel-specific training. This system also helps increase customer satisfaction since it leverages customers' increasing familiarity with social networks and using presence to setup chat sessions based on availability (as opposed to leaving voice messages and expecting a call-back). Since the diversity of social networks will only increase with time, this architecture is extensible to support future social networks by creating the appropriate plugins to the core architecture.

Deployment of POCC

Deploy customized solution : Our architecture allows deployment of the system to support a subset of social networking connectors only. Every deployment of the system will not need to support all channels possible, and hence the ability to deploy a customized subset is very desirable.

Deployment issues : (a) Customer opts-in to the system to allow agents to contact customer via social media, e.g. at time of car-purchase, a buyer is given the option to opt-in to real-time customer care via presence or at the time of buying an insurance policy, a customer opts in for real-time interaction over social media. **(b)** Today, most social networks require human intervention to add a user to a friend's list which increases the time to onboard a customer into the system, but this is a one-time process. **(c)** In terms of supporting media sessions besides chat, most social networks support chat/text, while some support voice and video interactions. However, there is no common way to support voice/video integration **(d)** Agents publish 'busy' status onto presence server when they are in a chat session. This notion of 'busy' state is more in the context of voice where an agent can only handle one call at a time. When an agent is handling multiple chat sessions then how and when to publish 'busy' state is unclear – depending on the nature of the use-case, the number of simultaneous sessions supported by an agent could be different.

A platform for targeted marketing : Most leading companies are exploring ways to connect with customer via social media for marketing purposes. IBM has launched a collaborative program named, CMO/CIO leadership exchange program, to explore new ways of leveraging social media to create a personalized marketing campaigns and reach out to customers. In our view, systems such as POCC as presented in this paper, can provide a tangible solution towards that goal.
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Conclusion and References

Conclusion

- Unified contact center supporting both inbound and outbound live-chat sessions leveraging social network specific capabilities
- Extensible and flexible design
- Contact Centers for M2M Interaction
- Upgradation from PSTN to IP
  - As the transition from traditional PSTN (public switched telephony) to IP progresses, contact centers need to move beyond PSTN style telephony. Proposed Open contact center extensible platform is based on modern technologies like IP, Presence and also provides PSTN support. Contact Centers can move to our proposed platform once and for all and be future proof.

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Conclusion

In this paper, we present a presence based open contact center (POCC) that leverages the capabilities of the social network to establish 2-way live-chat sessions between customers and agents. Some social networks like Twitter does not offer the live-chat feature. In such cases, the appropriate mechanism is chosen to convert the chat messages to and fro. The design of the open contact center is based on constructing a common core such that addition of a new social network requires changes i.e. plugging the specific adapter at the boundary. Hence, open contact center is extensible and flexible in nature. The advantage of the open contact center solution over the current products available in the market lies in the fact that it offers a new channel of communication to contact customers just like voice.

The implementation of the POCC is in SIP and the protocol is agnostic to the entity viz. humans, devices or virtual. Agents need not be human. It can be machines. Similarly, customers on social networks can also be devices/machines. The POCC thus is suitable for situations where machines/ devices communicate with human users on social networks or vice-versa.

With the world moving towards voice over IP (VoIP), the contact centers in future have to deploy solution that are based on IP to replace traditional voice based systems. The proposed open contact center is thus right technology for such contact centers because (i) social networks have started supporting voice and video (ii) open contact center is SIP based and SIP session is independent of the media. Today, POCC has been tested for live-chat but it can easily support voice and that is the future area.