



Cloud Customer Architecture for Enterprise Social Collaboration

Executive Overview

This document is intended for information technology (IT) and business decision makers exploring how Enterprise Social Collaboration can enable organizational engagement across employee, customer, and partner interactions. This document assists in understanding the technical capabilities and integration requirements necessary to deliver Enterprise Social Collaboration solutions. Social Collaboration solutions can be applied to different industries and can align with their key business initiatives. Their value becomes visible when helping different roles or departments meet their business needs within the context of an overall collaboration initiative and organizational goal.

This reference architecture is a vendor-neutral and best practices approach to describe the flows and relationships between business capabilities, functional areas and architectural components delivered as a cloud solution. The enterprise social services comprising the core components of the architecture are ideally delivered as a hosted cloud service (as described in this document) by the Cloud Service Provider (CSP), but could be also deployed on-premises as a private cloud solution.

This Enterprise Social Collaboration architecture explains the services available in an enterprise social platform along with the internal and external extension points necessary for data and services (capabilities) integration to/from an organization's internal environment or to/from third parties. The capabilities defined in the reference architecture can be applied modularly to address the needs defined in an organization or in a business initiative. The interfaces and/or dependencies between the Enterprise Social Collaboration platform and an organization's on-premises systems or third party systems are important factors when defining the final system architecture.

When applying social collaboration to advance organizational initiatives and business priorities, clear use cases emerge that benefit key business roles or functions. For more information, refer to the CSCC whitepaper, *Social Business in the Cloud: Achieving Measurable Business Results* [1]. Many organizations are able to get started quickly using social business patterns which provide proven models of success to address common business initiatives. Such patterns represent modernized processes with dynamic, repeatable and measurable "people interactions" created by integrating social collaboration into work and life.

Cloud Customer Reference Architecture for Enterprise Social Collaboration

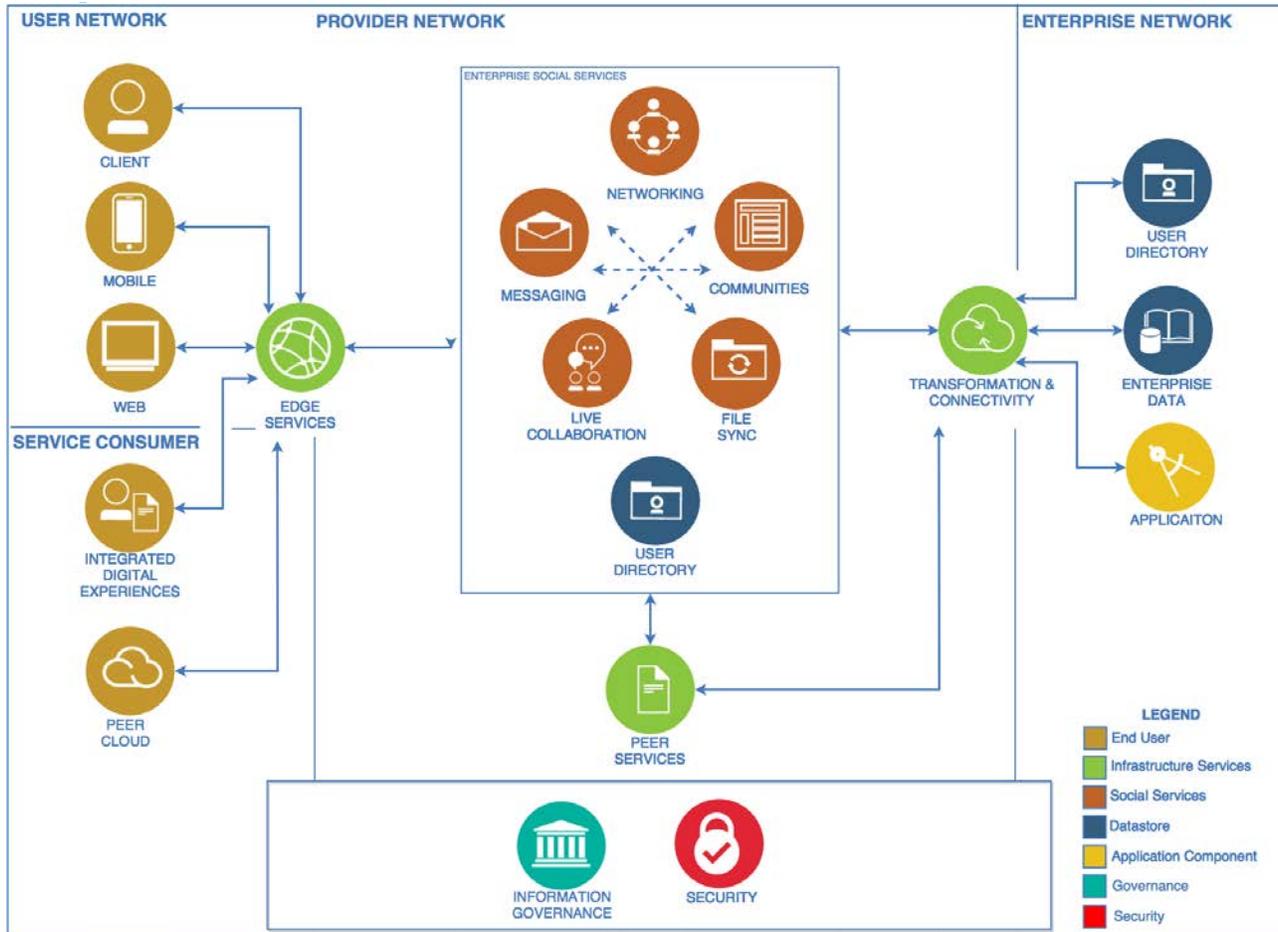


Figure 1: Elements of Enterprise Social Collaboration

The Enterprise Social Collaboration architecture provides the foundational capabilities and integration requirements that support and enable business patterns and social business scenarios. In alignment with business requirements, enterprise social services are integrated in a way to deliver the desired capabilities necessary to address a business objective.

The following section describes the various components in detail.

Components

User Network

The User Network contains applications allowing end users to interact with cloud services which are categorized as desktop clients (client), mobile applications (mobile), and web applications (web). The end user is an individual that provides inputs (e.g., requests) to the enterprise social collaboration services and receives outputs (e.g., results, confirmation) after services have been processed by the system. This includes interactions with other end users that are authorized and facilitated by the enterprise social services. In this context, the focus is on social network interaction which may be defined as digital inputs and outputs analogous to physical interaction. For example, a blog posting is akin to pinning up a memorandum on a notice board.



Client



Mobile



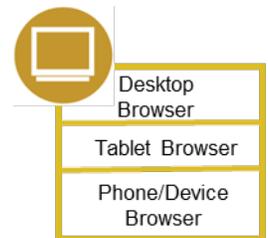
Web

The User Network is part of the broader internet or public network which contains elements such as data sources and APIs, users, and edge services needed to access the provider cloud. Enterprise users gain access to the Enterprise Social Services through *edge services* that secure access to the provider cloud. Access to enterprise social resources may be further restricted by an organization's user policy.

The end user's access to the Enterprise Social Services is supported using desktop clients, web applications, and mobile applications as described below:

- **Web Applications (via Web Browser)**

A web browser is an application that allows the end user to interact with the Enterprise Social Services (Social Services) from a desktop or mobile device. In addition to accessing information and interacting with the system, a web browser is also capable of accessing and storing information locally on the computer or device. It can also store other user specific information either locally or in the cloud (such as cookies and bookmarks) so that they may be used later on. These storage options are configurable and end users have the option to opt in or out of such services. Information (between end user and the system) is transmitted either in clear text or encrypted.



Mobile web browsers are an extension of a corresponding web browser application allowing end users to interact with Social Services from their handheld devices, such as smartphones and tablets, through mobile or wireless networks. The Mobile Web interface mimics that of the interface of the web browser but input (interaction) is captured from touch screen instead of keyboards and mice. Many web browser applications allow an end user to share and sync stored information (such as bookmarks) across multiple devices from the information stored in the end user's cloud storage.

- **Mobile Application**

The mobile application (mobile app) is an installable application designed to be run on mobile devices to allow end users to interact with Social Services. Similar to a desktop client, it provides interfaces that allow end users to interact with the system where the data may be in clear text or encrypted.

Access to the system from a Mobile App typically requires the end user to provide a user ID (such as username) and password. A Mobile App can leverage device specific capabilities such as a camera or a GPS location to provide additional (richer) interactions with the Social Services.

A Mobile App is commonly installed onto a handheld device by downloading it from a marketplace (App Store for iOS devices or Google Play for Android devices). Updates to Mobile Apps are provided through the same marketplace from which the app was originally installed.

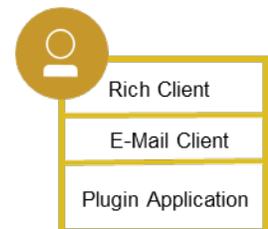


- **Desktop Rich Client**

A Desktop Rich Client is an installable application that allows an end user to interact with Social Services — it is designed for use on the end user’s computer system.

A desktop client is typically downloaded from the service provider's web site onto the end user’s computer system. Installation is often accomplished by a guided end user wizard or addressed via an enterprise's software provisioning solution. This can include installing the client and configuring it with the correct information and credentials to access the Social Services.

The end user interacts with the system by launching (opening) a desktop client. Transmission of information between the end user and the system is done using different data transmission protocols (such as HTTP or RDP) depending on the nature of the system being accessed and the company who developed the desktop clients. Information can be encrypted during data transmission as well as at rest (stored on the local and/or shared drive).



Service Consumer

In some cases, the end user may not directly interact with Social Services through the User Network, but may “consume a service” through a different application interface. A Service Consumer is a pattern where an end user or a peer cloud consumes from and/or contributes to the Social Services indirectly. This can be achieved through an external system consuming services from the Enterprise Social Services provider and then making those services available to its end users through the following patterns:

Integrated Digital Experience

An Integrated Digital Experience is a set of integrated capabilities that provides an engaging, personalized, relevant, and meaningful digital presence and interaction with the End User. Integrated Digital Experience represents the evolution and growth of traditional web portal solutions providing a comprehensive set of capabilities to provide a multi-channel digital experience.

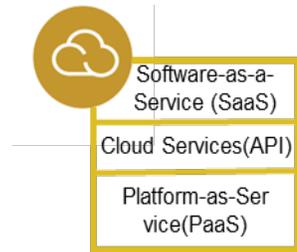
Key capabilities of an Integrated Digital Experience may include:



- **Content:** Enables relevant personalized content to help attract and educate visitors on the benefits of the brand and strengthen the affinity with that brand. A typical Content Management System provides content related capabilities including content authoring tools, lifecycle management, search, and personalization tools. To create a more compelling experience, an organization may infuse social capabilities contextually with the right business data and traditional web content.
- **Digital Messaging:** This component allows direct communication between the solution and end users either in real time via instant messaging (aka chat session) or asynchronously via email. Digital messaging extends the communication channel with end users and may include direct marketing messages, notifications (e.g. payment/renewal) or other context specific messages.
- **Social Engagement:** This component enables end users to provide feedback on the digital experience solution through interactions such as comments, reviews and ranking. When end users interact with social media networks it is essential that the digital experience solution captures this interaction to enhance and expand its reach. This includes basic social content creation which links content from the digital experience solution to its corresponding social media networks allowing for seamless transition between them. Social digital interactions engage end users in meaningful dialogs and strengthen relationships between end users and the brand, turning users into brand advocates.
- **Federated Search:** Federated search enables end users to find information about products, services, user reviews and recommendations, marketing content, how-to and knowledge repositories such as blogs and wikis, using a single interface across multiple domain (internal and external) applications and devices.
- **Personalization:** This component can recognize a specific user based on a profile or can determine characteristics of a user's behaviors, i.e. previous page viewed, purchase history, etc. Personalization then selects content that is appropriate for that profile. There are several types of personalization, such as simple filtering, rules based filtering and collaborative filtering. Simple filtering displays content based on predefined groups of site visitors. For example, if a site visitor is in the Human Resources department, the site provides access to contents containing Human Resources policy manuals. In a rules based system, the site owner defines a set of business rules which determine what category of content is shown when a user of a certain profile type visits the site. Collaborative filtering allows a site visitor to rate a selection of products, explicitly or implicitly. Those ratings are compared with the ratings offered by other visitors. Software algorithms detect similarities in these users and their ratings. For example, a visitor receives book recommendations based on the purchases by similar users.
- **Analytics:** This component provides insight into end user behaviors as they interact with the digital experience platform and its integrated social networks. Site and social analytics allow the solution to be modified and adapted to meet end users' needs.

Peer Cloud

Business users regularly use and access cloud services to meet various needs. Whether these experiences are used for core business processes or used to meet just-in-time needs, it can be very compelling to integrate social and collaborative cloud services into them. These cloud services provide user experiences that consume content, services, and interfaces from the Social Services.



- **Software-as-a-Service:** A fit-for-purpose cloud service that provides an end-to-end business service that is typically used by select users within an organization. By integrating Social Services and content, line of business experiences can connect with the broader organization and enhance collaborative work in the context of the business process. [e.g., collaborative team spaces from the Social Services can be integrated into the business process to capture key collaborative work items outside of the formal process].
- **Cloud Services (API):** The cloud experience is generally applicable to a broad range of users. Cloud based utility experiences can be extended by integrating Social Services and content into them. [e.g., a file sharing utility may include a document editor from the Social Services].
- **Platform-as-a-Service (PaaS):** Many organizations rely on integrated cloud platforms for core business functions. By integrating Social Services content and services with existing PaaS experiences, business users have a context for their collaborative work. Social Services connect the organization while the experiences of the integrated cloud platform are focused on driving the business function. Through integration, Social Services add a human context to the business function or process. As an example, a social directory integrated into a cloud PaaS platform can expose expertise to new and experienced users in the context of the business functions provided by the cloud service.

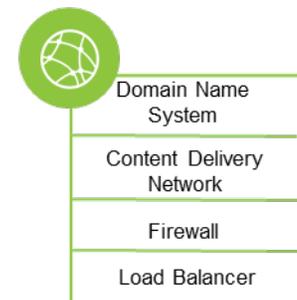
Provider Cloud Components

Edge Services

To access the Enterprise Social Services, cloud providers need to offer connectivity options to allow these services to be delivered to end users. Edge Services provide the capabilities needed to allow data to flow safely from the internet into the provider cloud and into the enterprise.

Key capabilities in this domain include:

- **Domain Name System (DNS):** Resolves the URL for a particular web resource to the TCP-IP address of the system or service that can deliver that resource. When using the Messaging Enterprise Social Service, a mail exchange record (MX record) is also needed to specify the mail server(s) responsible for accepting email messages for the recipient's mail domain.
- **Content Delivery Networks (CDN):** Supports end user applications by providing geographically distributed systems of servers deployed to minimize the response time for serving resources to geographically distributed users, ensuring that content is highly available and provided to users with minimum latency. The servers that are engaged will depend on the server proximity to the user, and where the content is stored or cached.



- **Firewall:** Controls communication access to or from a system permitting only traffic meeting a set of policies to proceed and blocking the rest. Firewalls can be implemented as separate dedicated hardware, or as a component in other networking hardware such as a load-balancer or router or as integral software to an operating system.
- **Load Balancers:** Provides distribution of network or application traffic across many resources (such as computers, processors, storage, or network links) to maximize throughput, minimize response time, increase capacity and increase reliability of applications. Load balancers can balance loads locally and globally. Load balancers should be highly available without a single point of failure. Load balancers are sometimes integrated as part of the provider cloud analytical system components like stream processing, data integration, and repositories.

Enterprise Social Services

An Enterprise Social Services platform provides a collaborative information exchange with intelligent and secure social applications. While users experience an integrated ecosystem of collaboration and communication applications and services, the underlying services can be infused into business processes, integrated with other applications and services, and aggregated into other experiences. Users meet their various business needs by directly accessing various capabilities within the enterprise social service platform. Organizationally, many different business needs can be met by applying social technologies to enable collaboration and process integration within the enterprise and outside with partners and suppliers.



Key capabilities in this domain include:

- **Networking:** Networking capabilities connect the organization and can expose previously hidden insights about the relationships between people within an organizational context. When people form stronger relationships with each other they are better able to discover and connect to expertise to solve various business challenges. Networked information improves access to insights and knowledge. Highly connected organizations are better able to leverage human capital while maintaining security. Capabilities such as tagging can be used to link content and people and to follow updates and revisions. Other mechanisms such as liking, rating, bookmarking, and pinning not only have an immediate value to the individual, but can also be leveraged to expose content relevance, recommendations, and search.

- **Communities:** Communities are aggregation spaces for people to come together and assemble the right functions to meet their needs. Communities are leveraged by teams where people can collaborate and share ideas. Communities can be set up with the right scope and scale to meet the needs of large user populations and are used to drive key organizational initiatives. Within a community, various roles are defined to support the efficient use of the community. Typical roles are community leaders, editors, contributors, or consumers. Whether private or public, a community provides the means for users to make connections, stay in touch, get organized, share information, and exchange ideas. Communities provide an excellent way to connect members of a project team, organize a task force, or bring together a group of people who share a common interest.
- **File Sync:** Enterprise file sync-and-share is a service that allows users to save files such as documents, photos and videos in a secure data repository in the cloud, and then access and share their files with others and across multiple devices. While meeting the various document needs of individual users, File Sync enables the organization to build a secure knowledge repository that allows for faster discovery and increased re-use. File sync and share services can connect people and content to accelerate innovation, crossing the internal divides within the organization without violating policies or over-riding desired constraints. File sync and share services increase productivity, in the context of collaboration, because users have the right versions of their files across desktop and mobile devices. Social documents are often contributed by individuals and are intended for a user within a specific network. These files can be shared, tagged, organized in folders, and accessed from other web applications. Social files can be distributed or shared among communities or can be managed within social document libraries. Social documents are often discovered and connected via tags and via people. Although it is still common to create a file using an external document suite and save or upload a file to the social platform, social documents are increasingly collaboratively created through live document co-editing via browser and mobile productivity tools whereby the co-editors can work simultaneously on content.
- **Live Collaboration:** Live collaboration provides real-time communication options, such as instant messaging, multi-way audio/video calls and on-line web conferencing. It allows people to connect with co-workers internally and business partners externally to work together in engaging interactions and exchange knowledge in real-time. In a connected organization, live collaboration allows users to connect when they need to get important work done. These services break down the barriers of time and space, by allowing individuals, teams, or large populations to meet, co-create and collaborate without the costs and logistics of physical meetings or conversations. Live collaboration services help the organization adapt and react based on ever changing priorities.
- **Messaging:** Person-to-person electronic messaging (email) is foundational to collaboration and is the most natural communication method for many enterprise employees. Messaging in the cloud has elevated the role of email to be a primary entry point and elevated the experience for integrated collaboration. Asynchronous messaging has gone beyond the inbox to allow individuals to connect to and work with anyone using any of the Enterprise Social Services.
- **User Directory:** A user directory is a place where information about users and user groups is stored and managed. User information includes the person's full name, username, password, email address, department information and other personal information. Group information includes the name of the group and the users and/or groups that belong to the groups. The cloud user directory is used to support authentication and authorization, and may contain profile data for access to cloud experiences and services.

Peer Services

As part of a social implementation, an organization may want to incorporate capabilities that are not inherently provided as a core service from the Enterprise Social Service cloud provider. These capabilities could include functionality that is provided by an external solution at the request of the consumer organization or capabilities that the service provider makes available through an external (3rd party) service.



Peer Services integrate into Social Services, providing additional functional capabilities and enhanced experiences for users. Such peer services can be hosted within the provider cloud, but are explicitly consumed by users of the Social Services. As such, these services are integrated into the Social Services but may have components that run elsewhere. All Peer Services rely on the provider cloud governance and security models.

- **Extended Capabilities:** Functional experiences integrated into defined extension points of the Enterprise Social Services experience. Such experiences are often developed by third-party vendors. They are purchased and activated as validated services within the Enterprise Social Service offering.
- **Enhanced Experiences:** Typically these are added tools (e.g. extended authoring tools) and extensions to the existing Enterprise Social Service. They often provide additional capability but by themselves are not fully self-contained experiences. Their utility comes from the additional benefit they provide to existing experiences.
- **Foundation Services:** Provide or enhance the underlying functions of the Social Service. Typically these services are experienced by administrators, with a secondary impact on business users. Examples include migration, onboarding, archiving, analytics, and integration.

Information Governance

This component consists of processes for assuring achievement of an organization's policies. It focuses mainly on the policies and procedures governing access to capabilities and information sharing which may include the following processes:



- Sign-on / On-boarding approval process
- Legal compliance
- Regulatory compliance (i.e. PII, PCI, HIPPA, FINRA, FedRAMP, etc.)
- Audit reporting
- Data loss protection
- Corporate policies

Security

The Enterprise Social Collaboration reference architecture provides the basis for an integrated suite of collaboration tools that combines the business social network with web conferencing and collaboration capabilities, like file storing and sharing, instant messaging and activity management. As an integrated suite, there may be security considerations that address or are applicable across the platform while others may be unique to a specific service or integration (internal/external).



Authentication to the Service

Organizations must ensure that authorized users in their enterprise and external network have access to data, tools, and applications that they need whenever they need it while unauthorized access is blocked. Synchronizing Enterprise User directories can be extremely beneficial to extend the on-premises environment to the cloud, where SaaS providers could be provisioned with enterprise users. The Enterprise Social Services facilitates essential user lifecycle management by providing:

- On/off boarding of users
- User bulk provisioning and updates
- Provisioning of user through an administrative tool

Federated Identity Management uses single sign-on (SSO) to secure the transfer of user ID and password information that is used to authenticate with the system. With SSO, users can switch to different applications without needing to authenticate again.

Security Assertion Markup Language (SAML) is used to facilitate single sign-on with third parties or corporate directories. SAML is a public OASIS standard which leverages signed assertion documents instead of passwords to verify identity. Customers can maintain passwords internally for web application resources allowing organizations to:

- Manage password requirements
- Manage 2-factor authentication requirements
- Set password change intervals

Open Authorization (OAUTH) flow is suited for web applications, desktop applications, and third-party extensions. OAuth is an open, freely-implementable and open methodology for API authorization

(www.oauth.net). OAuth 2.0 removes the need to store username-password pairs, allows for granular access to data, and works in concert with SAML authentication.

Data Security

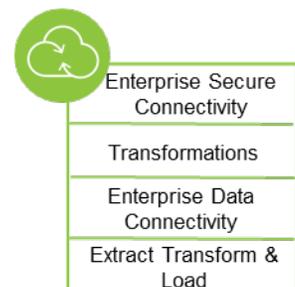
Data security is an all-encompassing construct to ensure customer data is secure and available only to authorized users. Data security requires protection of customer data by service providers against vulnerabilities in the services and the physical security of the data centers. Overall security requires a combination of technology as well as process and procedures followed by the CSP which can include, but is not limited to the following areas:

- Platform and Process
 - Security checklist against every release
 - Security compliance with ongoing automated health checks
- Data Center
 - Redundancy - Redundant systems to prevent a single point of failure in providing services including application, power, network, etc.
 - Monitoring of the physical environment and logging of staff activities
 - Access controls and fire prevention systems
- Network and Infrastructure Defenses
 - Layered firewall infrastructure
 - Deployed network intrusion detection
- Process for People
 - Separation of duty definitions
 - Segregation of activities including personnel with change access to the code base and those with operational configuration control
 - Code reviews prior to deployment
 - Regular ethical hacking penetration testing
 - Audit logs and analysis of security related events
- Data Privacy and Data Ownership Policies
- Encryption and Email Security
 - Data in transit
 - Data at rest
 - Real-time anti-virus at application and server levels
 - Anti-spam protection on email messages

Please refer to the CSCC's *Practical Guide to Cloud Computing* [2] and *Security for Cloud Computing: 10 Steps to Ensure Success* [3] for a thorough discussion on deployment and security considerations for cloud computing including recommendations on how best to address specific requirements.

Transformation and Connectivity

The transformation and connectivity component enables secure connections to enterprise systems with the ability to filter, aggregate, modify, or reformat



data as needed. Data transformation is often required when data formats are inconsistent across enterprise applications.

Key capabilities in this domain include:

- **Enterprise secure connectivity:** Leverages security services to integrate with enterprise data security to authenticate and authorize access to enterprise systems.
- **Transformations:** Transform data between enterprise systems.
- **Enterprise data connectivity:** Enables components to connect securely to enterprise data. Examples include VPN and gateway tunnels.
- **Extract Transform & Load:** User data and information may be imported into the system for those instances where a direct, on-going exchange of information is not required or desired.

Enterprise Network Components

The enterprise network is where a customer's on-premises systems and users are located. Although integration between the Enterprise Social Services and enterprise applications is not required, there may be use cases where integration between cloud services and on-premises applications is valuable.

User Directory

Provides storage and access to user information to support authentication, authorization, or profile data.



Enterprise Data

Hosts a number of applications that deliver business solutions along with supporting infrastructure like data storage. For some use cases, such applications may be sources of data that can be used with services provided by the Enterprise Social solution.



Enterprise Applications

These are typically existing applications in a customer's data center which accomplish business goals and objectives which may interact with cloud services. Integrating an existing on-premises email environment with the Enterprise Social Services is an example of an enterprise application interacting with the Enterprise Social cloud environment to create a hybrid solution. The Hybrid email scenario is outlined below, but integration scenarios could include other legacy applications and use cases.



Electronic Mail (e-mail): The Hybrid Mail architecture highlights customer choice and flexibility. Messaging services (mailbox, user management, calendaring, and personal information management) can be hosted for users in a SaaS environment and/or on mail servers hosted within the enterprise network. Having users distributed across cloud and internal resources allows organizations to stay connected reducing total cost of ownership. This architecture also provides rich experiences and client choice with continuity of service.

Implementation Example

There are numerous scenarios across different industries for which the reference architecture can be applied. Using social services to facilitate collaboration across teams in support of a New Product Innovation use case is an example of applying social technology to improve a business outcome. Organizations are continually challenged to create competitive differentiation, enable new growth, and deliver quickly while managing costs. Organizations can leverage integrated networks in the cloud to remove the bottlenecks to innovation, to promote collaboration and to organize information that powers innovation. Figure 2 illustrates a more detailed view of the social components, sub-components, and services used in a new product innovation use case at the Acme Company (components in gray are not required for this scenario).

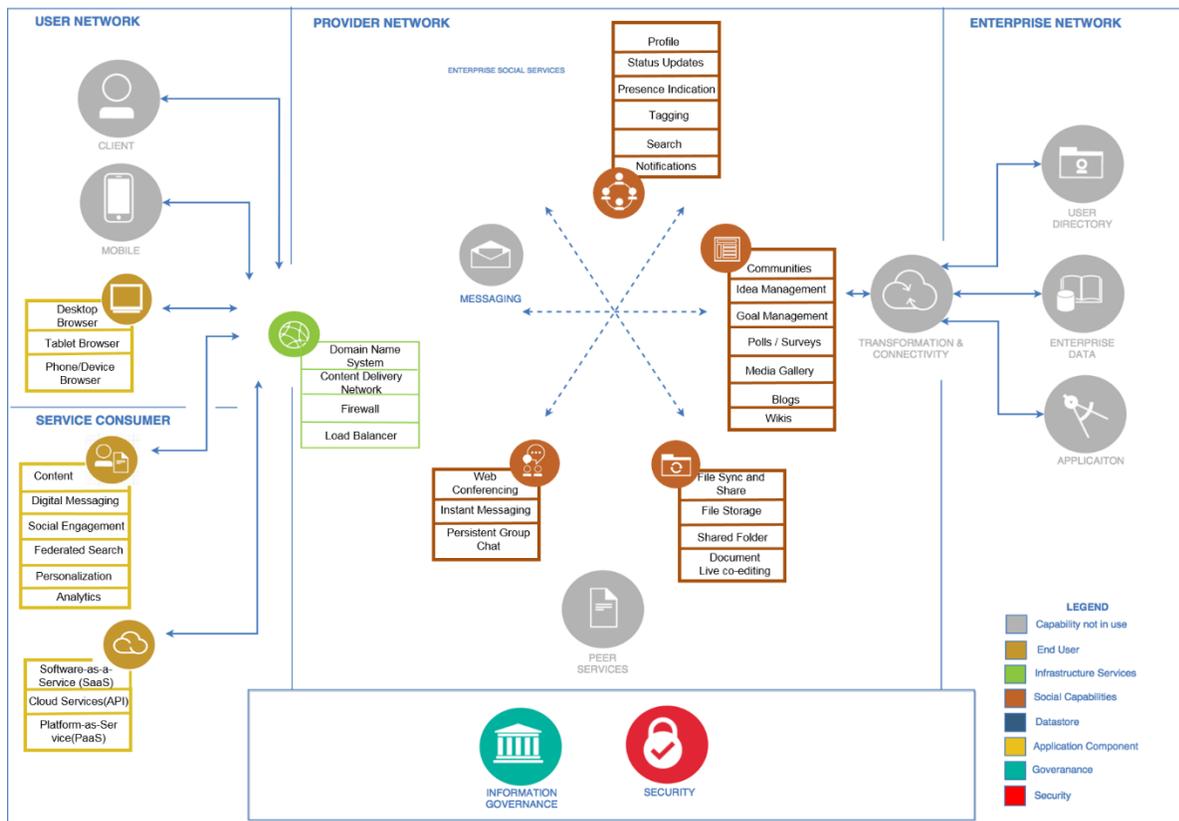


Figure 2: Implementation of Enterprise Social Collaboration for the New Product Innovation Use Case

Runtime Flow

Figure 3 illustrates an implementation of the reference architecture for New Product Innovation. By leveraging integrated Enterprise Social Services, organizations can harvest the conversations that are occurring inside and outside of the organization. Those conversations and ideas fuel innovation and drive ideas into action. In the following example, three user roles demonstrate New Product Innovation at the Acme Company.

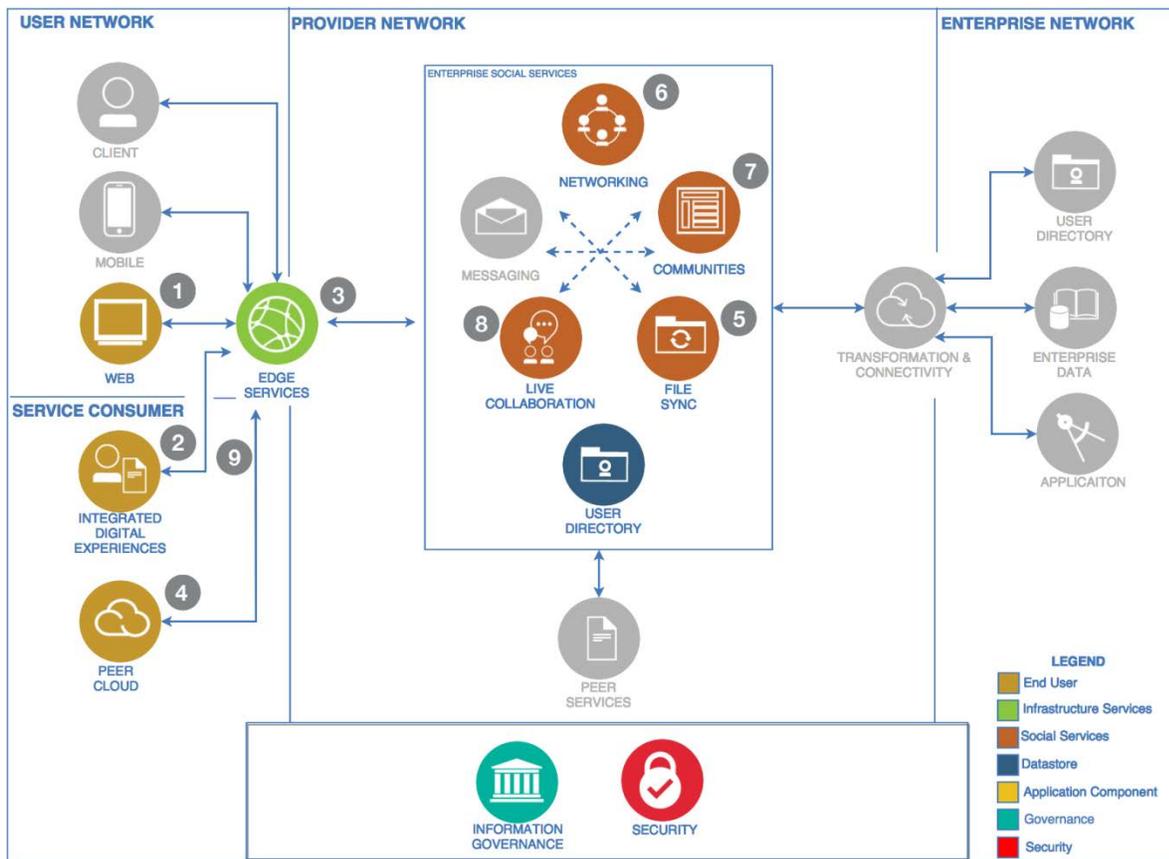


Figure 3: Flow for the New Product Innovation Use Case

1. An existing Acme customer accesses the organization's web site with his/her mobile device to get information on one of the organization's new products.
2. The customer is invited to join a customer community, where he/she can discuss product needs and experiences with other customers as well as Acme's product manager. The customer community is a service provided by the Social Services component and is integrated into the Acme Company website using its integrated digital experience platform. This mobile experience enables the customer to interact with the Acme product team in conjunction with other types of data and applications on the organization's website.
3. Through the interaction on the website, the user invokes components that are provided by the Social Services SaaS offering. The user's requests to the Social Services are routed by the CSP's Edge Services.

4. An Acme product manager (PM), while checking the related Acme product in the cloud-based ERP system, notices an alert about the customer's feedback on the same product through the integration of the Social Services customer community. The Acme PM launches the customer community from the ERP web experience to review the details of the customer feedback. While the feedback was positive, the customer comments that the single size currently available greatly reduces use of the product.
5. The Acme PM creates a document cataloging the customer's insights and shares it with his/her network in the Social Services cloud. The Acme PM is able to access the same Enterprise Social Services directly rather than going through the organization's external digital experience site.
6. The Acme PM assembles experts by searching the organization's profiles service to identify talented people with appropriate experience to address the customer's feedback.
7. A team is formed within the Social Services community where outside experts can be invited to validate product changes and to execute a plan to bring these changes to the market.
8. The team, being distributed, holds several web conferences to review plans, discuss product details, and make key decisions.
9. The new solution is brought to market as the marketing team leverages multi-channels to drive awareness including the organization's customer-facing integrated digital experience.

Deployment Considerations

Deployment of the components needed for Enterprise Social Services depends on the capabilities of the cloud service(s) which are chosen. These architectural decisions are rarely certain and many factors must be considered before drawing a conclusion. The guidance provided below is intended to provide a starting point for the issues that must be considered in making a selection. Each situation will vary.

Selecting the Service and Deployment Model

Consideration: Customers can reduce the effort required to design and configure IT systems and services if they are willing to let a cloud service provider do that work for them. A SaaS solution provides the quickest time to value by allowing an organization to focus on user adoption rather than installation and deployment.

Factors: Skill level, culture, ability and willingness to adopt changes.

Recommendations:

- Consider the benefits of SaaS including governance, external collaboration (with customers and partners), elimination of software maintenance costs, features, integration options, and the provider's partner ecosystem.
- Create a decision frame work that helps to evaluate applications and determine the most appropriate cloud deployment model (public, on-premises or hybrid).
- Based on the decision if the customer selects SaaS as a first option, then both the customer and the SaaS provider need to work together so that all the requirements have been met by the SaaS provider.

Determine the License Model

Understanding the costs and implications of the software license model is important to not only the one-time and reoccurring costs of the solution, but it may also influence the selection of service provider and service model through which the social services are obtained.

Consideration:

- The primary advantages of SaaS solutions are cost effectiveness, scalability, and increased time to value. SaaS license acquisition is typically considered an operational expense.
- The perpetual license model requires a customer to purchase a license to install and run the software. Customer must then install, run, and maintain the software on their own hardware or select a cloud hosting provider. Customers in this model typically find themselves in back level versions and are not able to capitalize quickly on new features and capabilities. Perpetual license acquisition is typically considered a capital expense.

Factors:

Service Levels

- Availability / Uptime of the Service
- Disaster Recovery Requirements
- Recovery Time Objective (RTO) - Maximum time required to return the service to normal operation
- Recovery Point Objective (RPO) - Maximum amount of data in “hours' worth” that could be lost in the event of a disaster

Financial / Accounting

- Capital Expense (CapEx)
- Operational Expense (OpEx)

Recommendations: The SaaS Model is recommended for new deployments and should also be considered by those with existing on-premises installations that want to take advantage of the capabilities of a cloud solution.

Special Note on Integration:

The ability to integrate with other business applications is key to extending enterprise social services platforms. For users, integration provides social experiences in different contexts. It enables various business services to participate in collaborative work flows that drive the business. An enterprise social service platform offers built-in integration options with Application Program Interfaces (APIs) that are available for developers who can create applications that integrate social capabilities, features, and functionalities. APIs commonly use the Open Authorization (OAuth) protocol for authentication and authorization. OAuth is a protocol that provides a way for third-party applications to interact with an API on a user's behalf without knowing the user's authentication credentials [5].

One of the most commonly used APIs by enterprise social services platforms is the OpenSocial REST APIs, part of the W3C Social Web Working Group standards to facilitate access to social functionality as part of the Open Web Platform [4]. First amongst these is the Activity Stream API which has been

adopted by the Open Social community [7]. Activity Stream is a list of recent, relevant social and integrated business process activities occurring in a user's personal network or community, allowing the user to view and take action quickly on content and events in context, without navigating to another process or application. Other popular social services APIs include the Files CMIS API, which is used to expose file application data using the Content Management Interoperability Services (CMIS) standard via Open Authorization (OAuth) [6]. Also, the CardDAV API allows vCard Extensions to the WebDAV (CardDAV) standard for synchronizing users' contacts across different systems and devices such as the iPhone and iPad [8].

The value of integration is extending Social Services and consuming Social Services in other applications for contextual social collaboration. The key to successful integration is following open standards based approach to development. Most Social CSP's provide online application development documentation and an API reference for developers to understand the integration capabilities and usage.

References

[1] Cloud Standards Customer Council 2014, *Social Business in the Cloud: Achieving Measurable Business Results*. <http://www.cloud-council.org/deliverables/social-business-in-the-cloud-achieving-measurable-business-results.htm>

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Acknowledgements

The major contributors to this whitepaper are: John Bruylant (TheCloudTurbo), Craig Cunningham (IBM), Mike Kudla (IBM), Maryann Hondo (State Street), Heath McCarthy (IBM), Sanjay Mundergi (Albertsons), Nya Alison Murray (TRAC-Car), Kamie Ngam-Nield (IBM), Anna Pasupathy (Equinix), Yaron Raps (IBM), Christine Zhang (IBM).

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