

# CollabraSuite 5.1

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*Experience Revolutionary Collaboration*

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# CollabraSuite® Version 5.1

1	Introduction.....	3
2	CollabraSuite: The Platform for Collaboration.....	3
2.1	CollabraSuite Benefits.....	4
2.1.1	Industry-Standard Architecture.....	5
2.1.2	Existing Enterprise Information Systems.....	5
2.1.3	Server, Tool, and Component Choices.....	5
2.1.4	Scalability.....	6
2.1.5	Unified Security Model.....	6
2.1.6	Zero Client Administration.....	6
2.2	CollabraSuite Architecture.....	6
2.2.1	Performance and Scalability.....	8
2.2.2	CollabraSuite and Service Oriented Architecture.....	8
3	CollabraSuite: Next Generation Collaboration.....	9
3.1	CollabraSuite Components.....	10
3.2	CollabraSuite Administration.....	14
4	Conclusion.....	15

## **1 Introduction**

Since the onset of the Internet, both the public and private sectors have been seeking online collaboration tools as a means to increase communications among a geographically dispersed user community in order to create synergies and gain a competitive advantage. During the late 1990's users and organizations were introduced to basic collaborative functionality such as Instant Messaging. Initial solutions offered a variety of collaboration capabilities in a stand-alone environment utilizing a client-server architecture. As organizations began to adopt these technologies, the need became apparent for core collaborative functionalities such as session management, synchronized user conditions, presence awareness, shared whiteboards, audio and video conferencing, chat, and instant messaging. In the present, these capabilities need to be available to a very large and disparate user base where the common means of connection is via the Internet utilizing thin-client browsers. Many of the first-generation technology providers scrambled to add these capabilities to their existing offerings.

Issues such as enterprise security, firewall navigation, scalability, extensibility, and exorbitant deployment costs quickly became limiting factors in the effectiveness of prior legacy technologies. In addition, users lacked the capability to customize these tools to suit their needs, and consequently were restricted to using a single tool for collaboration no matter what forms of collaboration were required. These limitations forced organizations to set up isolated collaborative networks for unique purposes.

The predominance of J2EE technologies has largely mitigated many of the previous limiting factors listed above. The family of J2EE technologies enable today's enterprise requirements such as the ability to deliver rich functionality via web-based and mobile interfaces. It provides the expected system performance criteria by providing vertical and horizontal scaling. This also includes a robustness that is embodied via a proven High Availability model where clustering technology provides both High Availability and Load Balancing characteristics.

While the J2EE platform provides the platform for enterprise implementations, it does not directly support the collaboration and knowledge requirements for today's enterprise. CollabraSuite combines an innovative approach of unbundled collaborative components that leverage the J2EE foundation to provide the platform for the next-generation of collaboration capabilities for large government and commercial customers. By providing a set of reusable web-based software components that encapsulate multi-user features on an open, industry-standard architecture, customizable enterprise collaboration can be achieved in a manner that provides the flexibility and extensibility needed to satisfy a wide range of disparate collaboration requirements and challenges facing large geographically dispersed organizations.

CollabraSuite is a collection of graphical real-time collaboration components that can be used to build customized collaborative environments. The collaborative framework is made up of core functionality that addresses specific collaboration services. These services can be deployed stand-alone, can be combined together to create collaborative communities, or can be combined with other third party provided components to provide content rich web-based applications with integrated collaboration capabilities. Each collaboration component is designed to add powerful collaboration features to existing applications, web pages, and portal frameworks. This flexibility makes it possible and cost effective to easily integrate collaboration capabilities into various domains of operation where and when they are needed.

## **2 CollabraSuite: The Platform for Collaboration**

Based upon its experience with first generation collaborative tools and its knowledge of the needs of large customers, CollabraSpace believes that selecting the proper core architecture for providing collaboration services is just as important, if not more important, than the current collaboration capabilities offered by various vendors today. CollabraSpace's view is based on the premise that the core architecture will serve

as the foundation for satisfying many of the system requirements critical to enterprise-level collaboration including:

- Scalability and Performance
- Availability and Reliability
- Flexibility, Portability, and Adaptability
- Maintainability and Supportability
- Extensibility
- Unified Security
- Seamless Integration

In order to meet these requirements in the most cost effective manner, CollabraSuite leverages the J2EE architecture to provide a standard means to access the services required by multi-tier applications. It further provides standard ways to access middle-tier and back-end services such as database management systems and transaction monitors as well as a standard way to support a variety of client configurations with minimum effect on the application's core business logic. This allows a single server-side solution to be developed and maintained that provides support for a plethora of client-side solutions, dramatically reducing total cost of ownership while enabling collaborative capabilities to reach occasionally connected users wherever they are located.

The industry standard J2EE architecture has been adopted as the development and deployment platform by many large organizations because its component-based architecture satisfies all of these requirements. Additionally, J2EE compliant application servers provide many robust capabilities out-of-the-box. The J2EE application architecture, when coupled with the CollabraSpace plug-n-play component-based approach, represents a powerful platform for collaboration.

CollabraSuite currently offers two separate versions of the user interface; an applet version and a Rich Internet Application (RIA) version. Both user interfaces provide a robust set of collaborative capabilities that respond instantly to collaborative events. The RIA user interface is most noteworthy because it leverages AJAX technology – thereby minimizing the use of JAVA applets which increases the time to load the web application and still provides the rich application like experience for the end user. AJAX technology focuses on a single screen interface which eliminates multiple page loading, all resulting in increased speed and instant feedback. It offers zero-install technology so that dissemination of an application to users is effortless. Similar to an applet, it also moves user interface processing to the client. This means there are fewer server requests and data transfers between server and client – all of which reduces bandwidth usage. AJAX, based on open standards, offers easy integration into any IT infrastructure. CollabraSuite's RIA user interface is an advancement in collaboration software.

## **2.1 CollabraSuite Benefits**

With features designed to expedite the process of developing distributed applications, the component-based approach of CollabraSuite offers several benefits:

- Industry-Standard Architecture
- Existing Enterprise Information Systems
- Server, Tool, and Component Choice
- Scalability
- Unified Security Model
- Zero Client Administration

### 2.1.1 Industry-Standard Architecture

The CollabraSuite product is based upon a component-based architecture. Because it is based on the Java 2 Standard Edition (J2SE™ platform), it offers "Write-Once-Run-Anywhere™" portability, supported by any server product that conforms to the Java 2 Enterprise Edition, J2EE, standard.

The component-based CollabraSuite architecture offers the following benefits:

- Component-based design simplifies application maintenance, since components can be updated and replaced independently.
- Components can expect standard services to be available in the runtime environment and can dynamically connect to other components by means of consistent interfaces. As a result, many application behaviors can be configured at application assembly or deployment time, without recoding.
- The user interface is the most dynamic part of many applications, particularly on the web. With the CollabraSuite architecture, web page authors can tweak the look and feel of JSP pages, portlets, and components.

### 2.1.2 Existing Enterprise Information Systems

As a result of the CollabraSuite® architecture being built upon the J2EE platform, it includes a number of industry standard APIs, including:

- The J2EE Connector architecture is the infrastructure for interacting with a variety of Enterprise Information System types, including ERP, CRM, and other legacy systems.
- The JDBC™ API is used for accessing relational data from the Java programming language.
- The Java Transaction API (JTA) is the API for managing and coordinating transactions across heterogeneous enterprise information systems.
- The Java Naming and Directory Interface™ (JNDI) is the API for accessing information in enterprise name and directory services.
- The Java Message Service (JMS) is the API for sending and receiving messages asynchronously.
- The JavaMail™ API is used for sending and receiving e-mail.
- Java APIs for XML provide support for integration with legacy systems and applications, and for implementing Web services in the J2EE platform.

### 2.1.3 Server, Tool, and Component Choices

The CollabraSuite architecture provides:

- A range of server choices—Organizations can leverage J2EE-branded platforms from a variety of vendors, providing a range of choices in hardware platforms, operating systems, and server configurations. This ensures that organizations get a choice of servers appropriate to their needs.
- A marketplace for components—Component-based design ensures that many types of behavior can be standardized, packaged, and reused by any J2EE application. Component vendors will provide a variety of off-the-shelf component solutions, including user interface templates and even vertical market functional components of interest in specific industries. Organizations, therefore, get a choice of standardized components to handle common or specialized tasks.

#### **2.1.4 Scalability**

The CollabraSuite architecture takes advantage of the out-of-the-box services provided by J2EE-compliant application servers to provide components with transaction support, database connections, life cycle management, and other features that influence performance, and can therefore be designed to provide scalability in these areas. For example, application servers may pool database connections in order to provide clients with quick, efficient access to data. Additionally, because application servers provide both the web and business tiers, CollabraSuite may run on multiple systems, with application servers automatically balancing load in response to fluctuating demand. Scalability and performance are areas where the different application server vendors can differentiate themselves based upon the robustness of their clustering solutions. CollabraSuite™ simply leverages these J2EE compliant application server provided capabilities to make collaboration functionality available in a reliable and scalable way.

#### **2.1.5 Unified Security Model**

The CollabraSuite architecture is designed to support single-sign-on access to application services. While CollabraSuite provides programmatic security control, the basic role-based security mechanism where groups of users share specific permissions, can also be specified entirely at application deployment time. This provides both greater flexibility and better security control. The CollabraSuite architecture provides the capability to support existing security models including basic user/password, PKI, and LDAP, providing organizations the capability to implement the level of security that satisfies their requirements.

#### **2.1.6 Zero Client Administration**

All CollabraSuite user interface components are automatically downloaded to the client requiring zero client administration. The applet version of the CollabraSuite user interface takes advantage of the applet JAR caching technology provided by the Java 1.3 and later platforms to eliminate unnecessary software downloads while still guaranteeing that the end user has the latest version of the software. Thus the software is only downloaded if the user's version of the software is out-of-date. The RIA uses a combination of javascript, XML and DHTML, requiring zero client administration.

### **2.2 CollabraSuite Architecture**

The CollabraSuite product line implements the best of breed design patterns as defined by the J2EE specification and thus provides robust collaboration capabilities to its customers on a platform that provides benefits such as scalability, availability, extensibility, and seamless integration.

Each component represents an N-Tiered application that can be divided into the following tiers:

- Presentation Tier
- Web Tier
- Business (EJB) Tier
- EIS or Data Persistence Tier

The CollabraSuite Data Persistence Tier maintains a relational database for logging and archiving all events that transpire between collaborating users. The data stored in the database can be used for auditing purposes, for reporting purposes, as well as for data sharing in clustered environments. Because it is built on the J2EE platform, CollabraSuite is database independent, thus allowing its customers to choose between the main database vendors for providing this component of the architecture. (e.g. Oracle, Sybase, Microsoft SQL Server, MySQL, etc.)

The CollabraSuite Business Tier leverages J2EE Entity Beans for implementing its object model and uses container-managed persistence (CMP) for storing data into its relational database. Also, CollabraSuite leverages J2EE Session Beans to implement the business logic for providing collaboration services to its many clients. Centralizing the business rules into a single tier greatly improves the maintainability and the extensibility of the product by standardizing the access to the collaboration services and isolating the frequently changing business requirements into a single location of the application architecture. All collaboration events are distributed within the J2EE application server through the use of the standards-based Java Messaging Service (JMS).

In addition to persistence, CollabraSuite leverages other container provided services including authentication and authorization. CollabraSuite provides support for user/password authentication, PKI certificates, as well as LDAP. CollabraSuite also provides support for single-sign-on capability. CollabraSuite is application server independent, allowing its customers to choose from the many J2EE-compliant application servers available.

CollabraSuite collaboration services are made available through the CollabraSuite web API located in the web tier of the application. The web API provides support for both HTTP and HTTPS protocols. HTTPS is leveraged from the Java Secure Sockets Extension (JSSE) and therefore can support 128 bit encryption. By using the HTTP/HTTPS protocols, CollabraSuite™ can easily tunnel through existing firewalls while still providing real-time collaboration. The web API leverages Struts and Java Servlets for standardizing access to the services provided by the business tier. The web API is event driven, sending notification events to the appropriate clients as the events occur. Events include incoming chat messages, paging events, document change events, whiteboard events, etc. Events are light-weight objects requiring little bandwidth. For example, whiteboard events only include items added, modified or deleted from the whiteboard versus publishing a graphic of the modified image.

CollabraSuite makes its collaboration services available to the presentation tier via RIA and/or Applet technology. Client interaction is presented through the use of a CollabraSuite component specification used within dynamically generated web pages or through a standalone application. The dynamically generated web pages can be produced by using Java Technologies specifically JSP and Java Servlets or by other means via the CollabraSuite API. In addition, components communicate using various standards: HTML, HTTP, SSL, and others. All communications, except for audio and video, are configured by default to use the standard HTTP and HTTPS ports, 80 and 443 respectively, making firewall configuration easy and non-intrusive.

All of the CollabraSuite user interface components can be configured and made available as a standalone solution and accessed from a user's browser or as part of a portal application. If made available as part of a portal application, the CollabraSuite components are typically embedded inside one or more portlets. This allows customers to embed collaboration capabilities into their applications and combine them with other third-party provided portlets such as mapping, weather, and news components, thus allowing the customer to quickly assemble rich content portals that are configurable and customizable by the end user according to their needs.

### 2.2.1 Performance and Scalability

In order to satisfy scalability and performance requirements, CollabraSuite leverages the N-Tiered component based architecture provided by the J2EE platform as well as the additional clustering capabilities provided by some of the application server vendors. If necessary, a database cluster can be used to provide a high availability solution for the data tier. Additionally, a web-farm of application servers clustered together configured with an auto fail-over solution can be set up to satisfy the performance, availability, and scalability requirements for the business tier as well as the web tier, offering more than sufficient CPU processing power to handle the anticipated load. This platform architecture allows the CollabraSuite solution to scale vertically (size and class of server) as well as horizontally (number of CPUs and servers) to satisfy the scalability, availability, and performance requirements.

CollabraSuite allows users from separate campuses to interact using the Remote Campus Access feature, which creates a connection between the home campus and one or many other existing campuses. Using a remote campus, authorized users from one campus may log into and navigate another campus to which they have been given access. This allows users within different campuses to communicate without having to create duplicate users and information. In addition, users are also able to access the remote campus without having to log out of their own local campus, thereby creating a seamless link between campuses. The Remote Campus Access feature will work with any two or more instances of a CollabraSuite environment.

### 2.2.2 CollabraSuite and Service Oriented Architecture

Organizations are turning to service-oriented environments to achieve increased revenues, increased customer satisfaction, lower operational costs, and higher returns on their existing technology investments. Service-Oriented Architecture (SOA) is an IT strategy that organizes the discrete functions contained in enterprise applications into interoperable, standards-based services that can be combined and reused quickly to meet business needs.

CollabraSuite features a rich component set of collaborative SOA-ready processes and tools that bring geographically-dispersed people, processes and data together in real-time to increase productivity and improve workflows. CollabraSuite includes a graphical user interface tuned for collaboration; the ability to monitor collective activity; the ability to create and inject content into the collaborative environment, and integration with a SOA-based dashboard application.

CollabraSuite supports both GUI and infrastructure approaches to delivering collaborative services in SOA via:

- User Interfaces that are included in web applications, such as portals (implemented via WSRP). CollabraSuite's component-based suite of real-time collaboration services enables SOA designers and developers to select services to provide to end users (e.g. chat, whiteboard, etc).
- Collaboration capabilities presented as a service where applications and frameworks, e.g. ESBs and BPM applications, can both retrieve information from the collaboration services and create events within the collaboration service. CollabraSuite provides an API to support the retrieval of information from, or sending events to, the collaboration service.

CollabraSuite's open, standards-based application architecture speeds the development of scalable, web-based enterprise collaboration services. Built on the J2EE platform, CollabraSuite

components align with SOA services, enabling the creation of context-sensitive work environments that are integrated at every level with legacy systems and applications. Scalable, secure, and administered through a client portal or application server, CollabraSpace offers an SOA-integrated collaboration development environment that supports:

- Drag and drop collaboration services that integrate into SOA business processes – whiteboards, chat, etc.
- Collaboration services available within an SOA IDE
- J2EE-based authentication and authorization
- Ability to parse messages from ESBs and perform business processes. BPM applications provide evaluation or introspection of messages, and deliver the capability to define actions that should occur based on information within the messages.

In addition, CollabraSuite provides services that enable BPMs to:

- Dynamically create virtual workplaces/rooms where collaboration can occur.
- Assign roles and permissions in the rooms, based on real-time analysis of the relevant capabilities and expertise of on-line participants.
- Copy documents/folders to room file cabinets or user briefcases, providing the necessary artifacts to enable real-time interaction.
- Locate users currently on line with a particular skill set, for example locate an individual with air traffic expertise to respond to an air control incident.
- Place images on a whiteboard for real-time interaction and interchange.

CollabraSuite meets the requirements of users and developers of SOA environments for real-time collaboration services. Users in a geographically-dispersed organization are able to work as a team to resolve problems; SOA developers are able to speed time-to-market and significantly reduce the cost and time required to create and maintain the collaborative environment. Providers of SOA suites will find in CollabraSpace a partner capable of providing real-time, SOA based collaboration tools that can be integrated out-of-the-box into existing SOA deployments. CollabraSuite is an effective solution for integrating legacy applications into a collaborative, SOA services-based work environment.

### **3 CollabraSuite: Next Generation Collaboration**

CollabraSuite software offers a suite of reusable collaboration components designed to add powerful collaboration features to existing applications, web pages, and portal frameworks. The CollabraSuite system is built on the J2EE architecture to provide a standards based, secure, scalable, web-based, enterprise collaborative solution.

CollabraSuite software offers a metaphorical representation of a physical workplace. The virtual environment is made up of campuses, buildings, floors, and rooms that can communicate seamlessly over distributed systems. This flexible architecture provides a means of hosting private meetings, group communications, or seminar style conferences for an entire enterprise.

When a user logs into the CollabraSuite system, they are entering a virtual room where they can meet other users, chat with users, share documents, or participate in audio and/or video conversations. Not only can users collaborate with others in their current room, but they can see users working in other virtual rooms via a presence awareness capability. Users can instantly join users in another room by simply clicking a button. As users move around the collaborative environment, they can bring their virtual briefcase with them—a file folder filled with documents that only they can see. In addition to storing private documents in a user's briefcase, CollabraSuite provides the ability to store documents within rooms (virtual

file cabinets). Documents in a user's briefcase can easily be shared with other users by dropping the document into a room's file cabinet. These documents can be then be viewed by any user within the room.

The metaphorical representation of a physical workplace provided by CollabraSuite software also offers security aspects of the physical environment. The rooms that users meet in can be arranged into a virtual floor of unlimited rooms, thus allowing for the grouping of like rooms by functionality or other common means. The floors can then be arranged within a virtual building, and numerous buildings can be grouped to create a virtual campus. Finally, multiple campuses can be connected with one another through the user of the CollabraSuite Remote Campus Access feature.

The Remote Campus Access feature is tailored toward organizations that need to collaborate with a subset of users from one or more remote campuses. For example, consider the situation where a corporation has multiple subsidiaries, each having their own CollabraSuite environment. The corporate headquarters could enable the Remote Campus Access feature of CollabraSuite to enable users from the subsidiaries to seamlessly enter and collaborate in the CollabraSuite environment at the corporate headquarters and vice-versa. Another example is within the law enforcement community where a state law enforcement agency would have their own campus where users collaborate on cases, issues and policies, but only certain users would have access to the Department of Homeland Security campus to collaborate with personnel at the Federal level, such as the FBI. In this scenario, the FBI could enable specific users from the state level agencies to access specific areas of their collaborative environment while still protecting their most sensitive data. In both scenarios, all of the security features, such as access controls on rooms and documents, still exist within the software to provide a secure environment for both local and remote campus users to collaborate.

Strong security features make it possible to permit or deny access to all areas of the collaborative environment and its contents. Individual rooms can be locked with access control lists (ACLs). In addition, ACLs can limit access to floors, buildings and even campuses. Not only can the rooms be locked, but access to documents stored within the rooms can also be controlled with read and write ACLs. Whether moving around the collaborative environment, chatting, drawing on a whiteboard, or accessing documents, every event that a user performs is logged in the database for later retrieval by the appropriate personnel. All communications are encrypted via commercial standards of Secure Socket Layer (SSL) encryption via HTTPS. In addition, existing corporate authorities and identity management mechanisms (LDAP) can be integrated.

### **3.1 CollabraSuite Components**

CollabraSuite consists of a collection of graphical real-time collaboration components that can be used to build customized collaborative environments. This flexibility makes it possible to easily integrate collaboration into various domains of operation where needed. The collaborative framework consists of core functionality that addresses specific collaboration services with all communications being handled over HTTP and HTTPS (except for audio and video) making firewall configuration easy and non-intrusive. All communications are also encrypted via the commercial Secure Socket Layer (SSL) encryption standard and compressed for increased network performance. The following CollabraSuite collaboration components are described in detail below:

- Presence awareness
- Online Users
- Room Occupants
- Associates
- Text Chat
- Instant Messaging

- Whiteboard
- Room Locking
- Room Document Storage (File Cabinets)
- Personal Document Storage (Briefcases)
- Navigation
- User Skills
- Audio/Video Conferencing
- Profile Manager

**Presence Awareness:** The CollabraSuite technology offers a suite of rich, customizable features to facilitate a user's ability to rapidly identify the people actively participating in the collaborative environment. Presence Awareness is the term most commonly used to describe the collaborative capability of determining whether or not other users within a specific collaborative environment are currently present. CollabraSuite offers three unique Presence Awareness features: the Online Users list, the Room Occupants list and an Associates List.

**Online Users:** The CollabraSuite Online Users list allows a user to arrange the display of those users logged into the collaborative environment, grouping and filtering users based on attributes such as user name and location. This provides a vehicle for users to easily organize virtual teams and quickly navigate the virtual environment, instantly transporting them to select locations in order to join their peers or initiate new collaboration threads. Users can also retrieve profile information of other users such as full name, homeroom, skill set, and contact information and last login date and time. In addition, the Online Users feature offers users an easy mechanism to send private instant messages to other users and place point-to-point audio/video calls to selected individuals. In this way, users gain access to isolated team members and intellectual capital critical to business and mission operations and planning.

The Online Users list provides an intuitive mechanism for all authorized users to display the following information about the other active users of the collaborative environment:

- Name – The full name of the specific user.
- Home Campus – The campus where the user's home room resides
- Organization – The organization to which the user belongs.
- Idle – Identifies the current status of the user, which can be active or idle.
- Campus – Shows the specific Campus the user is located within the collaborative environment.
- Building – Shows the specific Building the user is located within the collaborative environment.
- Floor – Shows the specific floor the user is located within the collaborative environment.
- Room – Shows the specific room the user is located within the collaborative environment.

**Room Occupants:** The CollabraSuite Room Occupants component provides a visual indication of other users in the room. When a user enters a room, their presence in the room is indicated in the Room Occupants component. The users get a choice of seeing either a detailed list of users in the room or image icons that users have selected for themselves in their user profile. The Room Occupants list also allows a user to pull up contact information for other users, send them a private instant message, and place point-to-point calls to them.

**Associates:** While in the collaborative environment, users may view and come in contact with many other users. To aid in more efficient collaboration, users may set an associates list to include users who frequently collaborate with them, including users in accessible remote campuses. The

Associates component allows users to view detailed presence awareness information about those associates. Additional icons are displayed beside each user indicating if the user is logged on, idle, in the room, or viewing the whiteboard.

Likewise, CollabraSpace recognizes that user anonymity can be important. Since CollabraSuite is component-based, the Online Users list is not required and can be customized to restrict Presence Awareness capabilities to those users located in the same room. Presence awareness can also be disabled at the room level. This allows the ability to conceal the presence of users and groups for unique mission requirements.

**CollabraSuite Text Chat:** This functionality allows users to engage in timely group discussions or one-on-one communications. All text chat is recorded in the database and can be searched for repeated use or as a context for discussion history.

**Public Text Chat:** Users within a CollabraSuite room are able to collaborate through public chat mechanisms that are date/time/user stamped and to easily identify author and message. Public chat is exchanged among users located in individual rooms throughout the campus, creating a communication channel for direct discussion. Public text chat allows virtual communities and team members to share and exchange thoughts and ideas in a public forum in real-time. Chat can be typed in or cut and pasted from other information sources.

**Private Text Chat:** The CollabraSuite private text chat is provided via Instant Messaging and Directed Chat. Both features can be made available to all users. Instant Messaging provides a mechanism for users to exchange text chat messages with users located anywhere in the virtual campus or for private discussions with users located in the same virtual room. Instant Messages can be archived and retrieved for repeated use or as a context for discussion history. Additionally, Directed Chat can be enabled and used to communicate with users located in the same virtual room.

Regardless of the type of Text Chat used, each Text Chat IM component contains the following features:

**URL Link:** Users may type URLs into the text chat which will then create a link within the chat window, enabling users to direct web page displays to individual users or groups of users. This can be used to quickly direct other users in the collaborative environment to web pages, data sources and web-based presentations.

**Manual Scrolling:** CollabraSuite provides users with the ability to enable or disable real-time chat message updates. Users can scroll through room chatter as it is being posted or review previous chatter at their convenience. This allows users to review discussions held prior to entering the room.

**Mark Current Chat:** This feature within CollabraSuite marks the messages in your current view as having been read. This is beneficial in rooms containing fast paced textual discussions.

**Chat Priorities:** This feature allows users to assign priorities to certain messages by using color tags and icons. Users may then use this feature to view and sort messages based on high, medium, or low priority.

**Instant Messaging:** CollabraSuite provides two mechanisms for users to send instant messages to others outside the context of a room: paging and sidebar conversations. Users have the ability to send pages or real-time emails to both online and offline users. Pages, like email, are persistent until deleted; however, they appear instantly to the recipient when they are online. Optionally, pages to offline users can be

forwarded to email. Users can also initiate sidebar conversations with other online users. These sidebars can include text chat and whiteboard collaboration and can be recalled by the participants for later use.

**Shared Whiteboard:** The CollabraSuite whiteboard component is a multi-user interactive tool that allows users to review, create, and update graphic information in real-time. Presence awareness mechanisms make it possible to differentiate participants and their annotations. Additionally, visual displays indicate the level of a user's participation in the whiteboard session, including a date/time/user stamp for each annotation to easily identify the author. Whiteboards can have tabs allowing users to switch between multiple views in a single session. The whiteboard background can easily be changed to display a variety of color-coded graphical data. Whiteboard backgrounds can consist of images, HTML web pages, and near real-time image feeds. All whiteboard activity is recorded in the database and can be searched for repeated use or as a context for discussion history

**Room Locking:** Room access within CollabraSuite can be controlled by room administrators through the use of access control lists prior to use of the room. Additionally, rooms can be locked on the fly during real-time use of the space. A user making use of a room for private collaborative sessions can invite participants and then lock the room for ad-hoc private collaboration. This allows users to instantly restrict access to a room for real-time sensitive discussions.

**Room Document Storage (File Cabinets):** CollabraSuite provides a means to collaborate on critical business data via room file cabinet data storage. Contents can be bulk imported from a user's desktop to facilitate knowledge sharing. CollabraSuite provides fine grained access control by assigning read and write privileges for both groups and individuals. Documents can be checked out for editing to prevent users from making conflicting changes. An audit trail provides a detailed history of the evolution for every document. Subscription services are also available for all content stored in the environment. Through subscriptions, groups or individuals can receive instant message notification when content is changed that may require their attention.

**Personal Document Storage (Briefcases):** CollabraSuite provides a means to transport and collaborate on critical business data via a private data storage briefcase. The contents can only be viewed by the briefcase owner and move with the user as they traverse the virtual environment. Briefcase contents can easily be moved to a room file cabinet and shared with other users when needed.

**Navigation:** The CollabraSuite environment is easily navigated by way of a hierarchical display of campuses, buildings, floors, and rooms. The navigator provides a detailed description and image of each component within the virtual space and allows users to instantly enter a selected room. The hierarchical display also allows authorized users to seamlessly navigate between local and remote campuses.

**User Skills:** CollabraSuite allows users to be mapped to a set of skills. The list of available skills is customizable at the campus level. Once skills are assigned to users, others can search for available personnel with a particular skill set. By enabling users to find others based on skill, this feature facilitates both knowledge sharing and problem solving.

**Audio/Video Conferencing:** CollabraSuite provides a rich media communication capability that supports point-to-point or multicast audio and video conferencing. Point-to-point audio and video conferencing can be accomplished with users present in the collaborative environment regardless of their virtual location. Multicast audio and video conferencing can be accomplished with those users located within the same room. CollabraSuite takes advantage of existing telephone infrastructure, such as Voice Over IP (VOIP), and leverages the Session Initiation Protocol (SIP) to allow users to phone other users. Softphones need only be configured for use by CollabraSuite and users can make calls to other online users as easily as if they were using their own cell phone. Conference participants are identified via presence awareness mechanisms as well as visual displays that indicate their level of participation.

**Profile Manager:** CollabraSuite users can manage their own profile information via the personal information management tool. Account information, such as name and user icon, is overseen by the individual user. Additionally, the account owner maintains their default room, contact information, and skills. Information concerning other users can be viewed by browsing the user list in the personal information management tool.

### 3.2 CollabraSuite Administration

CollabraSuite makes available an administrative web application, utilizing AJAX technology, which allows administrators to configure and manage the CollabraSuite collaborative environment. The CollabraSuite collaborative environment is a virtual workplace environment that consists of multiple campuses with each campus configured to have a set of buildings, with each building having a set of floors, and each floor having a set of rooms. Access between these entities has been simplified by the addition of a navigation tree within the administration application. Links between campuses may also be created allowing specified users access to other campuses as remote users with the applet version.

Each campus can be configured to have multiple levels of administration including:

- Campus administrators can:
  - Create users, groups, organizations, skills, etc for the campus
  - Add buildings to the campus
  - Add users or groups as campus administrators
  - Do everything building administrators can do for their campus
- Building administrators can:
  - Add floors to the building
  - Add users or groups as building administrators
  - Do everything floor administrators can do for their building
- Floor administrators can:
  - Add rooms to the floor
  - Add users or groups as floor administrators
  - Do everything room administrators can do for their floor
- Room administrators can:
  - Add users or groups as room administrators
  - Control who has access to a room
  - Can manage the room file cabinet

By using the CollabraSuite user interface, users can create folders and documents that only they can view in their own private briefcase. They can then copy their folders and documents into a file cabinet of any room for which they have access. They can further set the access control list for the document or folder to control who can view or edit their document or folder.

This allows for enterprise-level administration as well as the ability to delegate to lower levels of administrators from building, to floor, to room, and finally to user for documents and folders for the collaborative environment.

#### 4 Conclusion

In summary, the advent of the Internet and rapid advances in software development platforms have made it cost feasible for large organizations to look for ways to bring together their intellectual assets and human resources to collaborate across vast distances to create a competitive advantage. Many product vendors recognized the need for and aggressively pursued putting together proprietary collaborative environments to satisfy them. Many organizations adopted and implemented first-generation collaboration tools in an effort to better utilize their geographically dispersed resources. Over time, organizations experienced the shortcomings and limitations of the first generation tools and identified the need for new capabilities as well as the need for an open, robust, secure platform that could scale sufficiently to handle large numbers of concurrent users. As a result, large organizations began to look for and desire a well-defined set of next-generation collaboration capabilities delivered upon the next-generation collaboration platform.

CollabraSpace, through its flagship product CollabraSuite, is a leading provider of the next-generation collaboration platform, offering next-generation collaborative capabilities. As opposed to a one-solution-fits-all approach or the development of a monolithic collaboration application, CollabraSuite's set of SOA-ready plug-n-play components can be configured and customized to provide the appropriate collaboration capabilities required to satisfy an organization's user requirements. These components and the collaborative services that they provide can be made available over the web and accessed via the user's browser. The CollabraSuite API provides a standard interface and simplifies the component configuration and customization process for application developers.

Best of all, CollabraSuite components deliver their next-generation capabilities over the component-based, open, industry standard J2EE platform. This provides CollabraSuite's customers with the flexibility to purchase the right-sized hardware platform to satisfy their scalability, availability, and performance requirements. It allows them the freedom to choose COTS products (application server, database server, components providers, etc.). It allows them to seamlessly integrate with their existing production environments. It allows them to maintain a single set of collaboration services in support of many different client types, thus extending their reach to include occasionally connected users. Finally, it allows them to implement a unified security model that satisfies their requirements. The platform allows all these functionalities while laying a firm foundation for multi-level reuse and extensibility for the lowest total cost of ownership possible.

The CollabraSuite component-based architecture:

- Puts into place an open, standards-based application architecture that lays a firm foundation for providing enterprise-wide collaboration services
- Provides standardized access to services and for multiple types of clients (web, mobile, thin, thick)
- Provides standard APIs for integration with existing systems (web services)
- Provides freedom of choice and minimizes vendor dependence (app servers, database servers, open software, third-party components)
- Provides access to a wealth of other third party provided components and COTS products
- Provides a tiered, layered, component based solution that allows low-cost replacement of poor performing parts of the total collaboration solution
- Addresses scalability and performance requirements (N-tiered architecture, horizontal and vertical scaling, multiple campuses)
- Addresses availability and reliability requirements (support for clustering and automatic failover).
- Provides flexibility, portability, and adaptability (layered, modular, component-based architecture, availability of plug-n-play interchangeable COTS products and components)
- Provides maintainability and supportability (readily available skill sets, easy to adapt to changes in requirements, decoupling and isolation of business rules, single server side solution)

- Promotes extensibility (single architecture that supports multiple clients, web, thin, thick, mobile, Availability of standard APIs)
- Security (single-sign-on, leverage existing mechanisms)
- Requires zero client administration

Finally, as a result of CollabraSuite's component based approach, organizations are afforded the opportunity to combine collaboration components with other third party provided components within a portal framework. This allows organizations the flexibility to embed collaboration capabilities with their mission critical applications as well as gives them the opportunity to assemble a menu of various component capabilities that are user selectable. It also allows organizations to develop and maintain a single set of services while allowing its user base to control the selection and layout of its capabilities simultaneously lowering support and maintenance costs while dramatically improving user productivity.

***CollabraSuite: The Source for Your Revolutionary Collaboration Platform.***

For more information on how your organization can benefit from CollabraSuite's revolutionary collaboration, contact us directly.

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