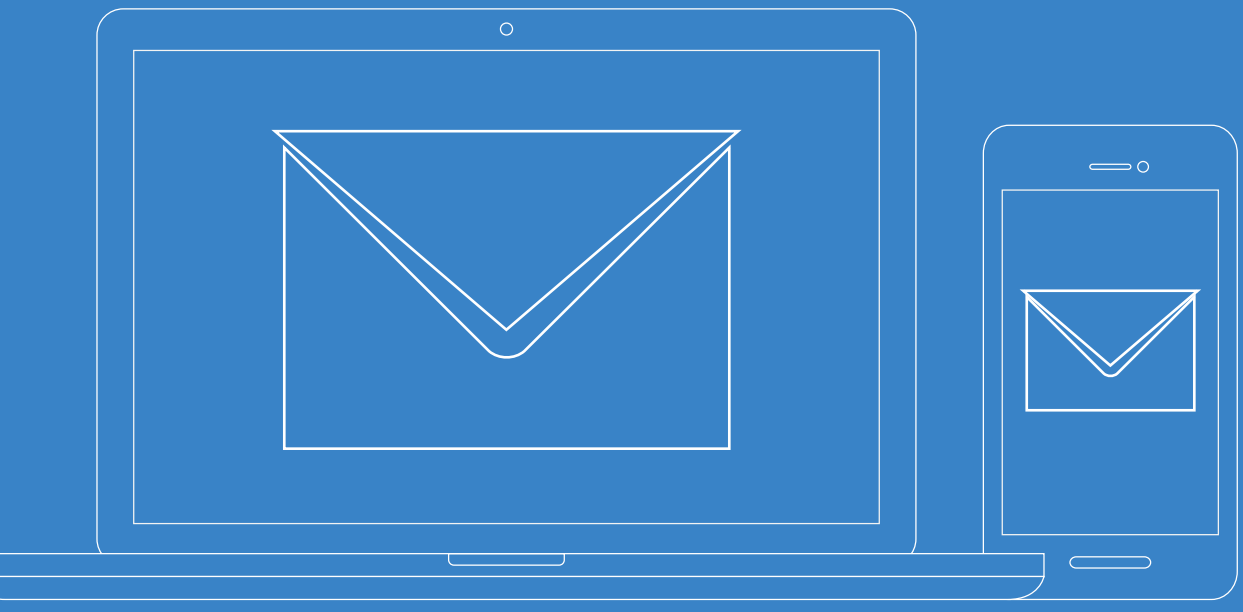
zimbra®
A SYNACOR PRODUCT

Protecting Your Zimbra Collaboration Environment

Zimbra Security and Privacy White Paper



zimbra®
A SYNACOR PRODUCT

Table of Contents

The Zimbra Approach to Security and Data Privacy

With the rise of mobile and cloud computing, sacrificing user experience for improvements to security is no longer an option. Normal modes of business communication have shifted from personal computers to mobile devices. With this shift, organizations must update legacy messaging and collaboration systems to better address the changing threat and technology landscape.

As a messaging and collaboration platform, Zimbra Collaboration is at the core of business communication, a mission-critical component of the organization's information infrastructure. Since no two organizations are the same, the need for flexible, extensible software is critical to the success of any information security and technology program.

This paper explores the native security and privacy features of Zimbra Collaboration. As organizations look to create comprehensive compliance and governance practices, and proactively mitigate malicious activity, Zimbra's approach to security and privacy will help guide evaluations of Zimbra Collaboration as a cornerstone of your information infrastructure.

Open Core

The Zimbra back-end code is mostly open source. Zimbra offers accountability and transparency via a well documented build process and publicly available Github repositories. Zimbra welcomes contributions from the community via a contributor license agreement.

The Zimbra Modern web client is based on technologies such as React, NodeJS and GraphQL while not released publicly, Zimbra offers a way for licensed customers to review the Zimbra source code.

Zimbra Collaboration is built on established and trusted open source components, including the Linux file system (message store), Jetty (Web server and Java servlet container), MariaDB (database), Postfix (mail transfer agent), OpenLDAP (configuration data and user directory) and others. Each draws from its own open source community, which further improves software quality and thus software security.

The freedom of Zimbra!

Zimbra is highly extendable. Zimbra integrates with existing or third-party systems.

*

Zimbra gives the freedom to choose the best apps and combine them with Zimbra.

*

Zimbra can be installed on-premises, in a private, public or hybrid cloud.

*

Zimbra provides full data sovereignty.

Zimbra does not read or sell your data.

As an active participant in the open source community, Zimbra contributes code to open source projects. Not only does this give back to the community that provides so much value—it helps Zimbra Collaboration by validating, enhancing and streamlining the architecture through community input. Commitment to open source provides business continuity, which protects your messaging and collaboration technology investment by ensuring that the core product has a strong, diverse and developer-led open source community.

Adherence to Open Standards

Zimbra Collaboration uses widely adopted industry standards:

- Lightweight Directory Access Protocol (LDAP)
- Secure Sockets Layer/Transport Layer Security (SSL/TLS)
- Simple Mail Transfer Protocol (SMTP)
- Secure/Multipurpose Internet Mail Extensions (S/MIME)
- Security Assertion Markup Language (SAML) 2.0

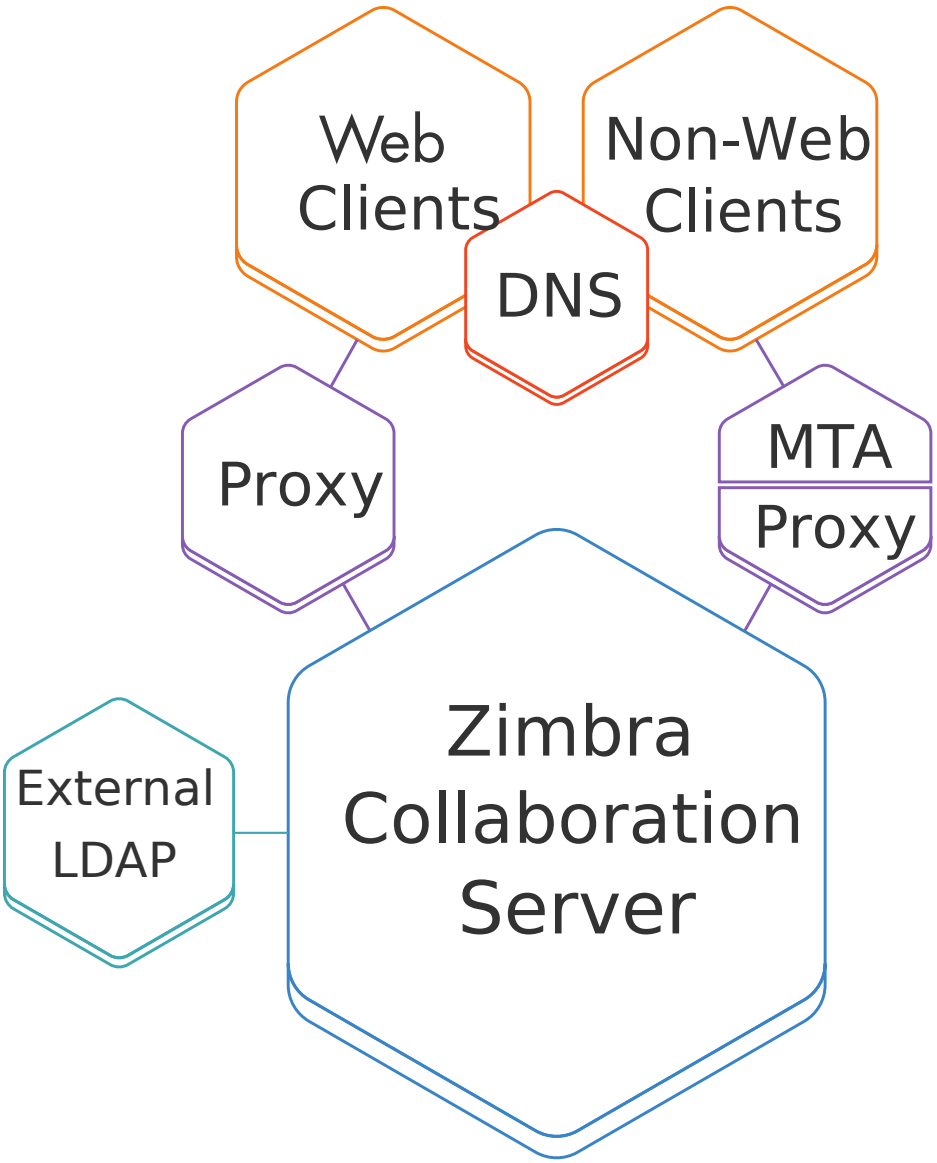
Commitment to standards improves interoperability across mobile, desktop and cloud environments, as well as ensures partners are making calls into a consistent set of APIs. By using open standards, sophisticated users can create their own security and privacy tools or layer in a third-party solution.

An **open standard** is a standard that is publicly available and has various rights to use associated with it, and may also have various properties of how it was designed (e.g. open process) There is no single definition and interpretations vary with usage.

Source: Wikipedia

Flexible, Open Architecture

Zimbra Collaboration uses a modular architecture that supports flexible, secure deployments and helps organizations easily fit the software into their unique information infrastructure. Additionally, the use of a modular platform allows organizations to use existing components of their infrastructure, limiting the need to rip and replace.



Web Client Protocols

HTTPS

IMAPS/IMAP+STARTTLS

POP3S/POP3+STARTTLS

Non-Web Client Protocols

SMTP

LMTP+STARTTLS

MTA Components

AS/AV

DKIM

DMARC

ZCS Components

ActiveSync

Databases

Message Store

OpenLDAP

Zimbra Web Clients (ZWC)

APIs

Admin UI

REST/SOAP/DAV

Extensions

Zimlets

Tour of the Security Life Cycle

Defense in depth, the coordinated use of multiple security measures to increase the security of the system as a whole, is still considered one of the best approaches to securing your information infrastructure. Identity and information security are central to Zimbra Collaboration, and by exposing rich interfaces to administrators, organizations can dramatically improve their security posture.

Identity and Access Management

Identity Lifecycle Management

The first step to ensuring organizational security is understanding your users and their rights and privileges. Zimbra Collaboration leverages a native Lightweight Directory Access Protocol (LDAP) Directory for all Create, Read, Update and Delete (CRUD) functionality related to user administration specific to Zimbra Collaboration. The use of an external LDAP Directory is optional; however, all attributes specific to Zimbra Collaboration are stored and managed through the native LDAP Directory.

The **Lightweight Directory Access Protocol** (LDAP) is an Internet protocol for accessing distributed directory services that act in accordance with X.500 data and service models.

Source: IETF

First-factor Authentication

The primary authentication method into mail clients (Zimbra Collaboration or third-party) is username and password. The user store, whether Zimbra Collaboration or external, is used to store the appropriate login credentials. When the native directory is leveraged, all authentication takes place within Zimbra Collaboration, which ships with OpenLDAP.

Zimbra Collaboration automatically stores a salted hash of the password. The hash is used for comparison against the entered password's salted hash, which is then rejected or accepted for login.

If an external directory (LDAP or Active Directory) is preferred, the appropriate login credentials can be stored within this external LDAP directory, or similar. Additional attributes, specific to Zimbra Collaboration, are maintained within the native OpenLDAP Directory.

For setting up external user stores or custom external authentication, refer to the Zimbra Collaboration Administrator Guide.

Mobile Device Authentication

For certain mobile devices, Zimbra Collaboration can ensure that the device complies with ActiveSync mobile security policies before allowing access. These policies might include timeouts, personal identification numbers (PINs) and local device wipe. For example, the user must enter a PIN to unlock the device; if a preconfigured number of incorrect PINs are entered, the device performs a local wipe.

Identity Federation and Single Sign-On (SSO)

To help organizations reduce user identity proliferation, Zimbra Collaboration can be set up as a Relying Party (RP) in a federated identity ecosystem, as well as streamline the user login process through SSO.

As an RP, Zimbra Collaboration can consume identity assertions from SAML (including Shibboleth), OAuth and Connect ID Identity Providers (IDP). The IDP and Zimbra Collaboration mutually authenticate. Once a secure, trusted connection is established, the IDP will pass an identity assertion through to Zimbra Collaboration, which will allow or reject access.

To reduce friction for users, Zimbra Collaboration can pass through authenticated credentials to connected services that rely on the same credentials. To achieve SSO, Zimbra Collaboration uses Kerberos (and an associated Kerberos5 service) or an LDAP pre-authentication key.

For setting up a Kerberos service or becoming an RP (custom authentication), refer to the Zimbra Collaboration Administrator Guide.

Federated identity management enables identity information to be developed and shared among several entities and across trust domains. Tools and standards permit identity attributes to be transferred from one trusted identifying and authenticating entity to another for authentication, authorization and other purposes, thus providing "single sign-on" convenience and efficiencies to identified individuals, identity providers and relying parties.

Source: Gartner, Inc.

Two-factor Authentication

Two-factor authentication is a technology that provides identification of users with the combination of two different components. These components may be something that the user knows (like a password and username) and something that the user possesses (a good example can be a smartphone)

Zimbra supports two-factor authentication out of the box, for more information refer to the Zimbra Collaboration Administrator Guide.

Authorized Access

After users connect to Zimbra Collaboration, authorization processes control what data they can see and which functions they can perform. For example, most users can use their own email and calendars, while some may be able to check someone else's calendar.

Zimbra Collaboration supports highly granular authorization frameworks. Attributes, permissions and policies drive everything in Zimbra (including accounts, domains, mail folder, contacts, calendar, tasks and briefcase folder). Administrators can easily create groups and assign access permissions to support specific business objectives.

Permissions

Zimbra Collaboration offers flexible permissions for shared mail folders, contacts, calendars, tasks lists and briefcase folders. You can grant internal users or groups permission to view, edit or share folders. You can also grant external users read-only or password-based access to shared objects. For example, you might give a colleague the permission to create, accept or delete meetings for your calendar but not to share your calendar with other users.

Delegated, Role-Based Administration

Zimbra Collaboration lets you delegate administrative tasks with highly configurable permissions. An administrator's role can be as simple as managing a distribution list or resetting forgotten passwords for a specific group of users. You can create roles from a plethora of attributes and for a number of tasks in Zimbra Collaboration. It also provides predefined roles for domain administrators and distribution-list managers.

Information Security and Privacy

The next layer to our defense-in-depth approach is to ensure that the information generated by users remains secure and private. Zimbra has taken several steps to ensure the privacy and security of user information, including shipping the product with security and privacy-enhancing mechanisms and protocols enabled as the default.

Message Security, Integrity and Privacy

By using cryptographic services, specifically public key or asymmetric cryptography, users can ensure message security, integrity and privacy, as well as sender authentication. To perform these functions, Zimbra Collaboration supports the use of S/MIME certificates, which can be provided by a publicly trusted Certification Authority (CA). Alternatively, an internal PKI may be used if public trust is not required.

Cryptography

Cryptography is the practice and study of techniques for secure communication in the presence of third parties (called adversaries).

Public Key Cryptography

Public key cryptography, also known as asymmetric cryptography, is a class of cryptographic algorithms, which requires two separate keys, one of which is secret (or private) and one of which is public. Although different, the two parts of this key pair are mathematically linked. The public key is used to encrypt plaintext or to verify a digital signature, whereas the private key is used to decrypt ciphertext or to create a digital signature.

Source: Wikipedia

An S/MIME certificate can provide message authentication, integrity and non repudiation through a digital signature, as well as message confidentiality through encryption. In addition, many nations have digital signature laws, which equate a digital signature to a physical signature and provide non-repudiation for digitally signed emails, transactions or documents.

Additional message authenticity methods available in Zimbra Collaboration:

- DomainKeys Identified Mail (DKIM) signatures can be added to email headers to verify the sender's domain.
- Domain-based Message Authentication, Reporting and Conformance (DMARC) expands on DKIM capabilities to provide message authentication and includes explicit guidance on message handling if DKIM signatures aren't present.

Amavisd-new leverages the integration with the Zimbra Collaboration OpenLDAP directory for domain attribute validation, including DKIM keys. Amavisd-new is housed in the Mail Transfer Agent (MTA) and manages the incoming and outgoing DMARC policies.

In-Transit Encryption

Zimbra recommends the use of, and defaults to, secure alternatives of all mail protocols and communications channels between Zimbra Collaboration services and endpoints. In fact, to further improve security and privacy, Zimbra provides the option to use opportunistic TLS or to require encrypted communications. For supported versions of Zimbra Collaboration, OpenSSL's cryptographic library is embedded into the product.

Secure connections between endpoints/services use TLS; additional security is protocol specific:

- SMTP
- LMTP+STARTTLS
- HTTPS
- IMAPS/IMAP+STARTTLS
- POP3S/POP3+STARTTLS

S/MIME (Secure/Multipurpose Internet Mail Extensions) provides a consistent way to send and receive secure MIME data. Based on the popular Internet MIME standard, S/MIME provides the following cryptographic security services for electronic messaging applications: authentication, message integrity and non-repudiation of origin (using digital signatures), and data confidentiality (using encryption). As a supplementary service, S/MIME provides for message compression.

Source: IETF

Zimbra Backup

With Zimbra backup administrators can restore accounts to a specified time and date. It is also possible to restore deleted emails. Zimbra backup can operate on a new account so the restored data can be reviewed and compared to the latest state of an account.

Antivirus and Antispam

Email-based malware remains a prominent threat for businesses, and while usually not as insidious, spam clogs email systems and increases user frustration. Zimbra addresses malware and spam through both native functionality and third-party plugins.

Amavisd-new is the interface for information exchange between MTA, ClamAV and SpamAssassin.

ClamAV is open source antivirus software with traditional signature-based matching and heuristics. The rules and signatures are updated daily.

SpamAssassin is open source antispam software that supports ongoing spam-filter training (i.e., teaching the filter what is spam and what isn't), enabling organizations to optimize performance in their own environments. Users can train spam filters by moving messages in and out of their junk folders.

Zimbra and block Lists

Zimbra can be configured to use third-party services to identify IP addresses and domains that are known spam sources, either because they are just bad guys (in the eyes of the block list provider) or because they are nice guys that have been hacked. Some block lists are very aggressive in their listing policies; others less so. There are three types of block lists:

- Left-hand side block lists for checking IP addresses ("RBLs");
- Right-hand side block lists for checking domains ("RHSBLs"), and;
- URI block lists for checking links within an email body ("URIBLs").

Refer to the Zimbra Collaboration Administrator Guide to set up block lists.

According to the AV-TEST Institute, over 450,000 new malicious programs are registered by their systems daily. By mid 2021, there were over 1269 million malicious programs (total), with 140 million of those being new malware as of 2021.

Source: AV-TEST Institute

Administration

While the user is busy sending and receiving email, scheduling appointments and collaborating with others, Zimbra Collaboration is logging activity. Based on your audit and compliance needs, you can set different levels of logging.

Zimbra Collaboration logs a wide range of activities:

- User and administrator activity
- Login failures
- Slow queries
- Mailbox activity
- Mobile synchronization activity
- Database errors

Zimbra Collaboration supports the syslog format and Simple Network Management Protocol (SNMP). Log events, alerts and traps can be forwarded to log-management and event correlation systems to create centralized policies and notifications based on your security and compliance requirements.

The Zimbra logger component makes it easy to use Zimbra log events in Elastic Stack. Zimbra logging is extensive and can be used for forensic analysis, which is useful for incident response.

Incident Response

Even with the layers of security we've defined so far, you may need to take action to respond to a problem or mitigate risk. For example:

- A user's account credentials have been stolen.
- An executive left his or her smartphone in a taxicab.
- Log analysis reveals problematic activity on an administrator account.

Zimbra supports incident response in several ways.

An extensive guide on how to use Zimbra with Elastic Stack is published on Github.

Elastic Stack Guide

Remote Device Wiping

If a tablet or smartphone that uses Zimbra Collaboration is lost or stolen, the administrator can wipe the data from the device remotely. This mitigates the risk of someone accessing the Zimbra Collaboration data remotely. It also reduces the risk of the data on the device being compromised.

Account Lockout

You can configure a policy that automatically locks an account after a specific number of failed login attempts. The administrator can also immediately disable any account at any time.

An administrator with appropriate access privileges can also view the email messages of the suspect account to help determine if the account has been compromised.

If you are using a federated identity management solution or an internal directory with Zimbra Collaboration to implement SSO, you can disable access from the central directory or identity store to prevent authentication to the Zimbra Collaboration account.

Archiving and Discovery

Zimbra Archiving and Discovery is an optional feature of Zimbra Collaboration. With this integrated solution, you can select which users' email messages to archive and set retention policies for both archived and live mailboxes. Zimbra Archiving and Discovery offers powerful search indexing in a simple, cost-effective platform. You can also integrate third-party archiving solutions with Zimbra Collaboration.

Zimbra Partner Ecosystem

As part of a broader information and identity security infrastructure, Zimbra Collaboration can integrate with additional security and privacy solutions. Zimbra's reliance on open-based standards helps make integrations and inter-application communications easy.

Zimbra Collaboration supports two types of third-party integrations:

- MTA-level integration
- Zimlets

Zimbra partners with hosting providers to provide in-region hosting of Zimbra Collaboration. By relying on in-region hosting, customers and end users are ensured their data is under the auspices of only the most directly applicable regulations, legislations and jurisdictions.

MTA-Level Integration

Through its support for SMTP protocols, Zimbra Collaboration offers gateway-level integration with a wide range of third-party solutions. For example, Zimbra Collaboration can be configured to send all messages to an SMTP-enabled gateway, which can then provide email archiving, content filtering, data-loss prevention, etc.

Zimlets

Zimlets make it easy to customize and extend Zimbra Collaboration to suit your needs, allowing you to add new features to suit your particular requirements. Zimlets are a mechanism for integrating with and extending the functionality of Zimbra Collaboration. Zimlets enable the "mash-up" of web-based technologies with enterprise messaging (e.g. email, IM, voice) and collaboration systems. With Zimlets, message content and collaboration objects can be made live by dynamically linking to web content and third-party services.

Visit Zimbra.com to view the Zimbra Gallery of community-contributed Zimlets. Please note that this is not an exhaustive list of available Zimlets, as many Zimbra partners create and deploy their own.

Conclusion

Messaging and collaboration solutions are business-critical applications and should be put through the same risk assessments and considerations as other critical applications. The best defense remains defense in depth, which has multiple layers of security. This approach should properly balance the needs for administrative control, information and identity security, privacy and the user experience.

As security paradigms shift and the threat landscape evolves, leveraging open source and open standards will define best-in-class software. Community-driven innovation will ensure that Zimbra Collaboration meets the constantly changing business needs of organizations. By building around an open source core, Zimbra Collaboration provides a robust platform for organizations to offer secure, private messaging and collaboration, whether mobile, desktop or in the cloud.

If you are interested in more information on the Zimbra Security Vulnerability Disclosure and Response Program, visit the below links.

- Security Center
- Security Response Policy
- Vulnerability Rating Classification
- Responsible Disclosure Policy
- Reporting Vulnerabilities to Zimbra

Acronyms

AS
Antispam

AV
Antivirus

DKIM
Domain Keys Identified Mail

DMARC
Domain-based Message Authentication, Reporting and Conformance

IDP
Identity Provider

LDAP
Lightweight Directory Access Protocol

MTA
Message Transfer Agent

RP
Relying Party

SAML
Security Assertion Markup Language

S/MIME
Secure Multipurpose Internet Mail Extensions

SMTP
Simple Mail Transfer Protocol

SSL
Secure Socket Layer

SSO
Single Sign-On

TLS
Transport Layer Security

Synacor, Inc., 40 La Riviere Drive, Suite 300, Buffalo, New York www.zimbra.com