



TECHNICAL WHITEPAPER

MindLink XMPP Gateway

— Company
MindLink

— Website
mindlinksoft.com

Overview

This document describes the MindLink XMPP Gateway, a standalone solution designed to natively bridge chat messaging between users on XMPP-based systems and their partners homed on Microsoft collaboration products – Skype for Business or Microsoft Teams.

We detail the motivation behind the product, discuss the technical architecture, and outline typical deployment and operational processes. Further technical information is available on the MindLink documentation website at docs.mindlinksoft.com.

Background

Enabling seamless, secure, and efficient information sharing is key to mission outcomes in National Security and Defence (NS&D). In practice, however, the modern mission landscape represents a heterogeneous mix of different collaboration technologies, making interoperability and connectivity an on-going and prevalent concern.

The MindLink engineering team has a pedigree in delivering reliable mission-critical systems for chat messaging in classified operational scenarios, and a deep expertise in protocol-level specifications, behaviours, and integrations. In pursuit of our vision of secure mission-wide real-time information sharing, we have developed a standalone “gateway” component capable of seamlessly connecting XMPP-based chat to Microsoft Teams or Skype for Business.

XMPP

The use of XMPP as a collaboration protocol is widespread throughout National Security and Defence, with multiple third-party and open-source solutions in use. Such on-premises installations are especially prevalent in forward-deployed mission scenarios, where the protocol has proved itself to be compatible with low-bandwidth and constrained networks.

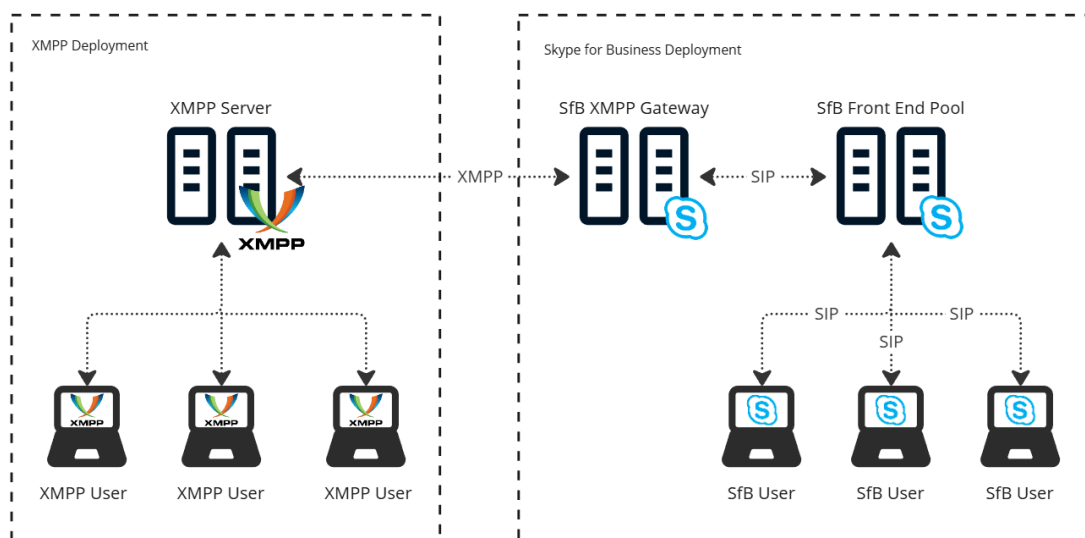
XMPP servers are typically configured as individual clusters within a federated network architecture. Users may communicate with other users homed on different clusters via a user@domain addressing system, with connectivity made between peer backends using the server-server flavour of the XMPP protocol.

The XMPP protocol is, by definition, extensible. However, the basic set of chat functionalities is defined by the [core specification](#) and available in all typical client and server implementations.

Skype for Business

Microsoft Skype for Business has a proven track record of providing collaboration functionality in mission contexts and continues to do so in environments decoupled from the wider cloud. In Skype for Business version 2015, the product included an XMPP gateway server component, such that users on XMPP-based chat systems could interact with Skype for Business users as externally federated contacts, and vice-versa.

Deployed as part of the on-premises Skype for Business topology, the gateway exposed the Skype for Business system as an externally visible XMPP domain. External XMPP servers see and treat the Skype for Business deployment as a peer XMPP server, with the gateway performing bidirectional translation between federated XMPP and the Session Initiation Protocol (SIP) that Skype for Business uses internally.



The XMPP gateway component was deprecated in Skype for Business version 2019, resulting in a key capability gap in mission collaboration between users on disparate Skype and XMPP-based systems. The MindLink XMPP gateway has been designed in partnership with Microsoft to replace this functionality like-for-like for Skype for Business 2019 and SE editions, and to provide a platform for more advanced behaviour in future versions.

Microsoft Teams

Microsoft Teams is being increasingly adopted as a collaboration tool within NS&D, though its cloud-based architecture means it is generally used as an enterprise tool for well-connected users within headquarters elements. Unfortunately, the Teams platform does not offer the ability to federate chat with XMPP-based systems – resultingly, real-time information flow to the many users on external forward-deployed IT infrastructure is typically severely limited.

Microsoft Teams does, however, offer the ability to federate chat messages with users on Skype for Business deployments, using an integrated SIP-based federation service. In partnership with Microsoft, the MindLink XMPP gateway has been designed to bridge XMPP connectivity into this Teams SIP federation service, such that a Teams user may communicate bidirectionally with XMPP users, interacting with the same user experience as with external Skype for Business partners.

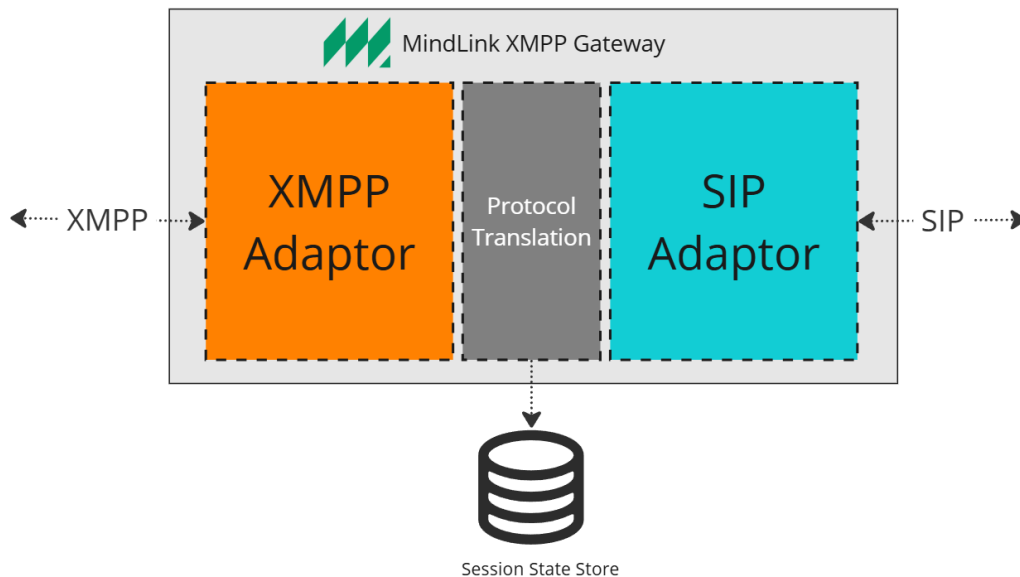
Solution overview

The MindLink XMPP gateway is a backend middle-tier server designed to broker chat messaging functionality bi-directionally between federated XMPP and Session Initial Protocol connections. Unlike alternative chat bot or “bridging” solutions for achieving interoperability, the gateway approach delivers a true native federated experience – users interact directly with each other as federated identities within their normal chat messaging client UX, rather than implicitly through a third-party bot or agent application.

The MindLink XMPP gateway provides the following functionality:

- Bidirectional one-to-one IM messages.
- Bidirectional presence state subscriptions and updates.
- Bidirectional exchange of user contact cards.
- Configuration against a single XMPP domain.
- Configuration against a single Skype for Business deployment or a single Microsoft Teams tenant.

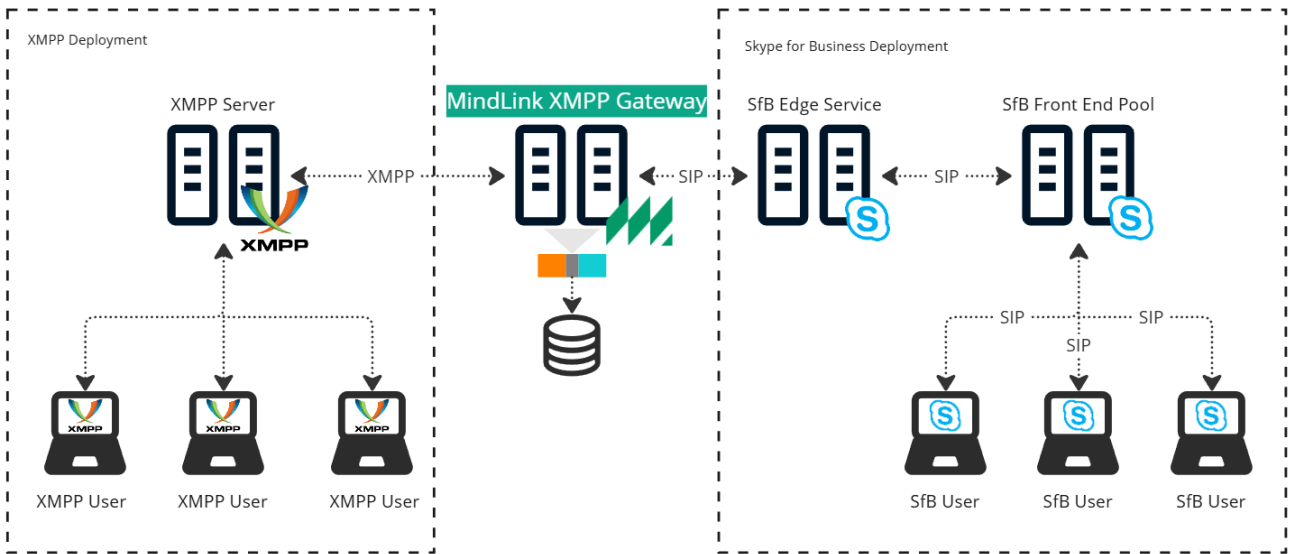
Conceptually, the MindLink XMPP gateway comprises two complementary chat messaging protocol adaptor components (XMPP and SIP). The gateway connects these adaptors with a protocol translation logic layer to broker interactions, state, and identities bi-directionally between the two:



This same general architecture enables connectivity between XMPP and both SIP-based Microsoft collaboration systems. For each gateway installation, however, connectivity to only one of Skype for Business or Microsoft Teams may be supported at any given time.

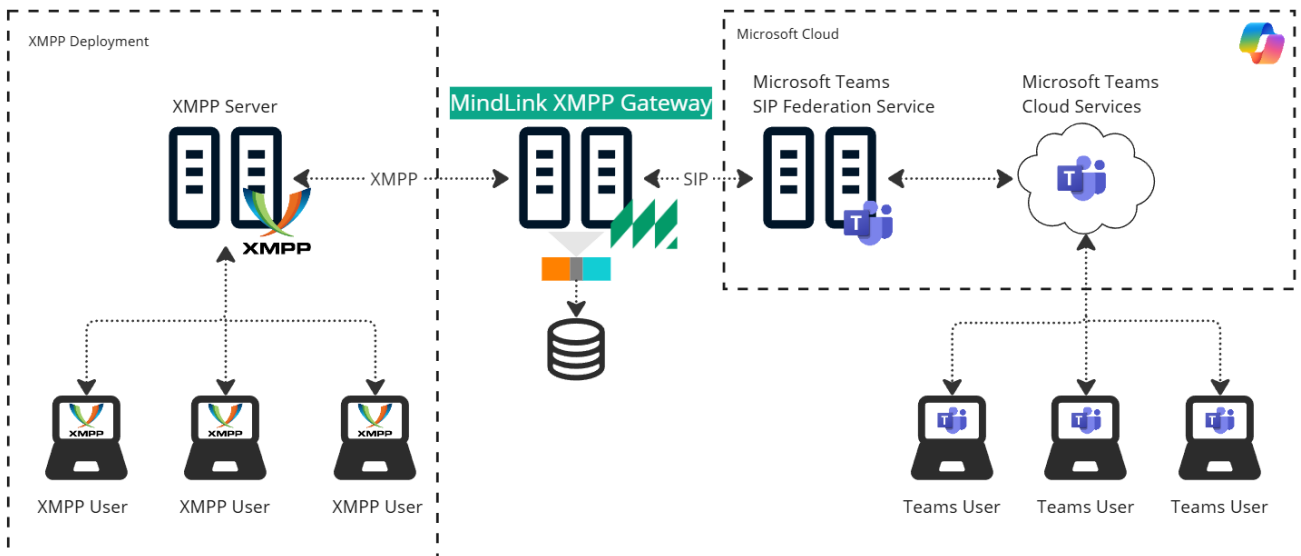
Skype for Business

In a Skype for Business environment, the MindLink XMPP gateway acts as a next-hop federated peer to the Skype for Business edge service, and a federated partner domain to the XMPP server:



Microsoft Teams

When configured for Microsoft Teams, the MindLink XMPP gateway acts as a next-hop federated peer to the Microsoft Teams SIP federation service, and a federated partner domain to the XMPP server:



Deployment

The MindLink XMPP gateway is a headless .NET server process. It is designed to be flexible and agnostic to the compute infrastructure, runnable on any virtualized Windows infrastructure.

To persist long-running presence subscription records and other protocol-translation state, the gateway requires a Microsoft SQL Server. This may be on-premises or cloud-based and supports Always On high-availability functionality.

XMPP System Configuration

The MindLink XMPP Gateway is designed to integrate with any XMPP server implementing the core XMPP specification, for one-to-one messaging, presence, and contact cards. The XMPP interface of the gateway server must be configured and accessible as a federated peer from the XMPP system, i.e.:

- The DNS names of the gateway and XMPP systems must be resolvable to both parties.
- Bidirectional TCP/IP connectivity must be available between gateway and XMPP systems.
- Certificate trust chains must be in place between gateway and XMPP systems.
- The gateway domain must be allowed as a federated partner in the XMPP system.

XMPP users address SIP-based users via the gateway using a **user@<SIPDomain>** JID syntax. The <SIPDomain> portion of the JID address system is configurable and may be translated by the gateway to mask the true domain in use on the Skype or Teams system.

Skype for Business Configuration

The MindLink XMPP Gateway is compatible with Skype for Business 2019 and SE editions. The SIP interface of the gateway must be accessible as a federated peer from the Skype for Business Edge server, i.e.:

- The DNS names of the gateway must be auto-discoverable by the external network interface of the Skype for Business edge service.
- The DNS name of the Skype for Business Edge service must be resolvable from the gateway.
- Bidirectional TCP/IP connectivity must be available between gateway and external network interface of the Skype for Business edge service.
- Certificate trust chains must be in place between the gateway and Skype for Business.
- The gateway domain must be allowed as a federated partner in the Skype for Business.

Skype for Business users address XMPP-based users via the gateway using a **sip:user@<XMPPDomain>** SIP address syntax. The <XMPPDomain> portion of the SIP address system is configurable and may be translated by the gateway to mask the true domain in use on the XMPP system if environmental or operational constraints require.

Microsoft Teams Configuration

The MindLink XMPP Gateway is compatible with any Microsoft Teams instance that has the Teams SIP federation service enabled – this typically includes public and classified/sovereign clouds. The SIP interface of the gateway must be accessible as a federated peer from the Skype for Business Edge server, i.e.:

- The DNS names of the gateway must be auto-discoverable by the Teams SIP federation service – i.e. DNS records must be available in the public internet.
- The DNS name of the Teams SIP federation service must be resolvable from the gateway.
- Bidirectional TCP/IP connectivity must be available between gateway and Teams SIP federation service.

- Certificate trust chains must be in place between the gateway and Teams SIP federation service, i.e. the certificate used to authenticate and secure the gateway SIP interface must be issued by a public certificate authority.
- The gateway domain must be allowed as a federated partner in Microsoft Teams.

Microsoft Teams users address XMPP-based users via the gateway using a **user@<XMPPDomain>** address syntax. The <XMPPdomain> portion of the address system is configurable and may be translated by the gateway to mask the true domain in use on the XMPP system if environmental or operational constraints require.

Security

The MindLink XMPP Gateway is designed to uphold best-practice security posture of XMPP, Skype for Business, and Microsoft Teams platforms:

- All connectivity is secured using TLS 1.3.
- No message content or other sensitive protocol data is persisted at-rest.
- No message content or other sensitive data is logged.

The gateway is designed to integrate with the native federation architecture of the XMPP or SIP-based platform. All data sent and received via the gateway will therefore be captured and handled by the existing regulatory/compliance/data-loss prevention mechanisms already applied to each system.

Operations

The MindLink XMPP Gateway is designed to have minimal operational overhead. Once configured, users on either XMPP or SIP-based systems interact with each other using addressing conventions without requiring further intervention from an administrator role.

The gateway emits metrics, tracing, and logging using OpenTelemetry observability protocols. As such, this data may be marshalled, consumed and aggregated as necessary by any modern monitoring and alerting platform.

Benefits

The MindLink XMPP Gateway has been specifically designed to meet the information sharing requirements and operational constraints of NS&D environments:

- Integrated native federation UX for seamless low-overhead collaboration.
- Flexible deployment model with minimal infrastructure or administration overheads.
- Extensible adaptor-based architecture with scope for plugin behaviours to facilitate migration or other operational requirements.

To learn more, or to provide feedback into future development cycles, please contact info@mindlinksoft.com. Further technical documentation is available on the MindLink documentation website at docs.mindlinksoft.com.