



www.hiplinkxs.com

HipLinkXS

– Wireless Messaging Software for the Enterprise –

White Paper

SEMOTUS SOLUTIONS
www.semotus.com

Semotus Solutions, Inc.
202 - 718 University Ave.
Los Gatos, CA 95032, USA
TEL: (408) 399-6120
FAX: (408) 395-5404

Copyright

© Copyright 2003 Semotus Solutions, Inc. All rights reserved

Warning: This document is for use of licensed users only. Any unauthorized copying, distribution or disclosure of information is a violation of copyright laws. Semotus Solutions has made every effort to ensure the accuracy of information contained within this document. However, Semotus Solutions makes no warranties with respect to this document and disclaims any implied warranties of merchantability or fitness for a particular purpose. All screen images used in this document are for illustrative purposes only and are intended to provide an example of the screen only. Screens may vary dependant upon the service provided. All rights reserved. No part of the contents of this document may be reproduced or transmitted in any form or by any means without the written permission Semotus Solutions. Information in this document is subject to change without notice and does not represent a commitment on the part of Semotus Solutions. This document contains information that is confidential and is the property of Semotus Solutions. It may not be copied, published or used, in whole or in part, for any purposes other than as expressly authorized by Semotus Solutions.

At the time of compiling this documentation it complies with HipLinkXS version 3.2

Document version: 3.0

Last revised: June 26, 2003

Disclaimer

Semotus Solutions makes no representations or warranties, either express or implied, by or with respect to anything in this document, and shall not be liable for any implied warranties of merchantability or fitness for a particular purpose or for any indirect, special or consequential damages.

Semotus Solutions shall not be liable for the truth, accuracy, or completeness of the information provided in this document or in the product itself, or for errors, mistakes or omissions, delays, interruptions therein from whatever cause. Semotus Solutions shall not be liable for any indirect, incidental, special or consequential damages resulting from the use or inability to use the product, the information within this document, or any Wireless Device.

Semotus Solutions, Inc.
718 Univeristy Ave., Suite 202
Los Gatos, CA 95032, USA
T 408.399.6120
F 408.395.5404
www.semotus.com

Trademark Notice

Semotus Solutions™ is a trademark of Semotus Solutions, Inc.

Other products and companies referred to herein are trademarks or registered trademarks of their respective companies or mark holders.

Contents

1	INTRODUCTION	4
1.1	OVERVIEW.....	4
1.2	IMPLEMENTATION OPTIONS	5
1.3	CRITICAL MESSAGING.....	5
1.4	ONE-WAY CAPABILITIES	6
1.4.1	<i>One-Way Wireless Messaging</i>	6
1.4.2	<i>One-Way Voice and Fax Messaging</i>	6
1.5	TWO-WAY CAPABILITIES	7
1.6	E-MAIL NOTIFICATIONS AND FILTERING	8
1.7	FEATURES AND BENEFITS	9
2	TECHNOLOGY	12
2.1	HIGH LEVEL ARCHITECTURE.....	12
2.2	LOW LEVEL ARCHITECTURE.....	12
2.2.1	<i>Two-Way Traffic</i>	13
2.2.2	<i>Scheduled Messages</i>	13
2.2.3	<i>Monitoring</i>	14
2.2.4	<i>E-mail Notifications and Filtering</i>	14
2.3	DEVICES AND PROTOCOLS	14
2.4	FUNCTIONALITY.....	15
2.4.1	<i>Sending Messages</i>	15
2.4.2	<i>Settings</i>	16
2.4.3	<i>Messenger</i>	17
2.4.4	<i>Log Files</i>	18
2.5	APPLICATION INTEGRATION	18
2.5.1	<i>Adding Two-Way Actions</i>	19
2.6	CUSTOMIZATION.....	19
3	CASE STUDY.....	20
	<i>The Challenge</i>	20
	<i>The K-Company</i>	20
	<i>The Solution</i>	20
	<i>The Configuration</i>	21
	<i>The Benefit</i>	21

1 Introduction

Forward-looking industry segments have been using wireless messaging services for many years. But now workers across all industries are driving up demand for these services, as the market realizes the potential to increase profits and efficiency.

Wireless messaging is the capability to send text messages to a variety of handheld wireless devices such as digital cellular phones, PDAs, and pagers. Enterprises and e-commerce businesses are using this technology to keep their employees and customers connected and apprised of mission-critical business information.

Text messages can be generated and sent by an operator, or when integrated with an independent application, can be triggered and sent instantly as alerts to a device when a significant event occurs (e.g., a server failure).

1.1 Overview

Cross Communications developed the first generation messaging software package, HipLink, back in 1995. Cross Communications has been providing messaging solutions to hundreds of Fortune 1000 companies who have integrated HipLink with numerous enterprise applications. In 2000, Cross Communications became the wholly owned subsidiary of Semotus Solutions, Inc. Together, we introduced **HipLinkXS – Wireless messaging software for the enterprise**.

HipLinkXS provides the **Link** between enterprise applications, clients, customers, partners, and employees. HipLinkXS supports virtually any wireless device for secure, reliable, one-way and two-way communications via a single integration point, providing turnkey access to wireless carriers across North America and around the world.

One thing that is certain in the mobile enterprise is that there will be no single all-inclusive device used by everyone within a corporation. The number and type of devices will be as diverse as a company's workforce.

The solution is to make these disparate devices work together.



Whether the receiver is using a digital mobile phone, a one-way or two-way pager, or a PDA device, the message sender has access to the same user friendly graphical user interface (GUI).

A Command Line Interface (CLI) is available when integrating HipLinkXS into existing software solutions, such applications as help desk, CRM, ERP, SFA solutions, or network monitoring.

In addition to the CLI, system integrators and programmers have a COM object, a Java API and a SOAP web service to interface third party applications with HipLinkXS.

Using the File System Interface, HipLinkXS can accept messages as text files in a separate message queue.

HipLinkXS accepts also messages sent over SMTP (e-mail) via the E-mail Gateway. In a nutshell, in order to send messages to a receiver named "mypager", an e-mail has to be sent to mypager@HiplinkServer.com and HipLinkXS will forward the message to the "mypager" device using the appropriate protocol. The email gateway can also retrieve messages from an external mailbox using POP3.

Support documentation for integrating HipLinkXS with Remedy, HP OpenView, and NetIQ is also available.

1.2 Implementation Options

HipLinkXS software is ideally suited to service companies of all sizes. It is highly scalable and can handle the messaging needs of Fortune 1000 companies as easily as small, one-person operations. This is evidenced by HipLink's existing customer list, which includes names such as NASA, Ford, Qwest, and eBay – who currently integrate HipLink with their network monitoring applications.

HipLinkXS only requires a modem or Internet connection. One modem is sufficient for moderate messaging volumes. However, additional modems can be used to significantly improve the performance – to increase the speed to accommodate any increase in volume. HipLinkXS is capable of balancing messages between multiple ports, which translates added hardware into increased performance.

HipLinkXS runs on Windows(i.e., NT 4, 2000, XP), Linux and UNIX platforms (e.g., AIX, HP-UX, Solaris, and others).

1.3 Critical Messaging

Speed, reliability, and security are three of the top features of HipLinkXS. Unlike ordinary e-mail, which might be read the following evening or

weekend, HipLinkXS delivers critical messages in real-time to mobile devices that are carried at all times by their owners.

In order to comply with network security requirements imposed by large Fortune 500 customers, HipLinkXS supports HTTP proxy protocols for Internet delivery over HTTP or WCTP.

Keeping track of critical messaging is also an important function. HipLinkXS keeps track of phone numbers, access codes, message status (e.g., successfully sent and failed messages, message confirmation, etc.). The function of sending messages and receiving responses are processed within one system.

When installed on the customer's server, HipLinkXS can be configured with fail over capabilities, scaled up or scaled out to handle increased volumes, and deployed with a backup system. Different platforms and several modems can run in parallel as fully redundant systems. Multiple connections can be established to one carrier, and in case of Internet failure, the modem or dial-up connection can be used as a backup – or vice versa.

HipLinkXS redundant system synchronization allows the administrator to implement redundancy between two HipLinkXS servers and synchronize the databases.

HipLinkXS allows administrators to perform backup and restore tasks using the GUI just by pressing a button, instead of performing these tasks manually at the file system level. The backup service allows backups to be performed based on a predefined schedule.

1.4 One-Way Capabilities

1.4.1 One-Way Wireless Messaging

HipLinkXS allows sending one-way wireless messages to a variety of wireless devices: one-way and two-way pagers, SMS phones, PDAs, and basically any e-mail enabled device. HipLinkXS one-way messaging function supports different protocols: TAP, DTMF, SMTP, WCTP, SNPP, HTTP, SMPP, GSM and BES push for Blackberry devices.

1.4.2 One-Way Voice and Fax Messaging

HipLinkXS provides also Voice and Fax support for one-way messaging as add-on modules.

HipLinkXS is able to send voice messages to any phone. The voice components are offered as a separate hardware and software module that is available for Windows platform only. Voice messages can be either pre-

recorded or typed as text and then converted to voice using Text-to-Speech (TTS) technologies.

HipLinkXS is able to send fax messages. The fax delivery uses the Windows 2000 fax services as standard. The fax component is offered as a separate module on Windows 2000 and XP.

1.5 Two-Way Capabilities

HipLinkXS supports two-way messaging either as a response to a message sent to the wireless device, functionality limited to certain networks and protocols (i.e., Skytel and Nextel over SNPP level 3 or WCTP two-way protocols) or as a complete remote control communication platform where the user initiates the dialog with the back end servers.

The HipLinkXS system makes it possible for receivers to respond to a page from their two-way device. HipLinkXS provides interfaces to two-way protocols that allow the receiving and processing of responses.

When creating a message, the sender can attach responses to the message, such as "accept job" or "decline job". When the receivers get the message, "Are you available to take a job at 3 pm?" they choose the response "accept job" or "decline job" and answer in that way.

When creating the message, the sender can furthermore link the response-options to predefined actions. One action might be forwarding the same message to a different receiver or a manager. The sender would link this action to the response "decline job". Another action can be to update a database. He would link to change the status of a job in the database from "pending" to "accepted" and link this action to the positive response "accept job".

Using the two-way capabilities can enhance the message escalation feature, which is in itself independent of two-way messaging.

Message escalation is the sending of one message to many people in a time-delayed fashion. For example, a text message can be sent to Tom, Helen, and Bob. Tom will receive the message immediately, Helen will get it in 10 minutes, and Bob will get it in 20 minutes. The time intervals can be set to any desired time period.

The escalation process stops when Helen or any one of the receivers in the Escalation Group confirms the message. Confirmation can be made directly from a two-way device, or by logging in to HipLinkXS. For example, Helen may choose to call in her confirmation and ask the administrator to enter her Message ID into the confirmation panel.

The full two-way communication feature allows mobile users to initiate messages from their devices in order to perform either predefined actions

(e.g., confirm received messages or send messages to other users) or custom defined actions (i.e., anything from performing system commands to querying inventory or customer information from the corporate databases). The two-way components are offered as part of a module licensed separately.

As part of the full two-way module, e-mail capable devices are able to initiate messages and perform predefined or custom commands on the HipLinkXS server or on the corporate servers.

While using the HipLinkXS Voice Module, users are able to dial in and perform over IVR (Interactive Voice Response) interfaces predefined or custom commands on the HipLinkXS server or on the corporate servers.

1.6 E-mail Notifications and Filtering

HipLinkXS provides e-mail messaging as an add-on option for the Windows based application. The HipLinkXS E-mail Assistant is a powerful tool that connects the Microsoft Exchange inbox to a wireless device, forwarding only the e-mails that the mobile worker deems important.

The E-mail Assistant monitors a specified e-mail inbox and automatically forwards important e-mails to their wireless device if it meets the criteria set up in one of the user defined filters. Filters can be set up, matching keywords in any of the following:

- Subject
- Body Text
- Sender
- Recipient Type
- Priority

For example the user can set up a filter to forward any e-mail containing "jim@company.com" in the sender field and "contract" in the subject line. The e-mail is sent to the device specified in the individual Receiver settings in HipLinkXS.

A user using the E-mail Assistant can choose the format of the message that will be sent to his/her device from one of two default templates, or he/she can choose to create a custom template. The template specifies which portions of the e-mail will be forwarded to the wireless device, for example only sender and subject line or the first 100 characters of the body text.

E-mail Assistant helps users to manage the flow of e-mail to their wireless device; hence, e-mail-only alerts generated by legacy systems or other 3rd party applications can now be received on a wireless devices. With the filtering capability, only important messages that match pre-defined criteria will be sent to the wireless device.

1.7 Features and Benefits

HipLinkXS Messaging Software provides a full line of features.

- **Group messaging** – allows users to send messages to a predefined group of receivers set up by the administrator.
- **On-duty groups** – allows users to send messages only to staff that are on-duty at the time that the message is sent.
- **Escalation** – allows users to send messages using a time-delay between receivers. Receivers can be individuals or groups.
- **Follow-me groups** – is a group defined and used by a person who has multiple devices and depending on the time of the day or other criteria can redirect messages to any of his devices. It is similar to the On-Duty group, but it will be used by one person with multiple devices rather than by multiple persons with one device each.
- **Quick send** – allows users to send messages to any receiver (not already defined in the system), as long as the device PIN number and carrier are provided.
- **Personal Favorites** – an additional personal address book, called favorites, is available to each GUI User in order to better manage the send screen when dealing with a large number of receivers. The users are able to define their own favorites list with receivers and groups that they use the most often. The favorites list will be used as the default list of receivers to populate the send screen.
- **Resend** – allows the resending of the most recent standard message.
- **Scheduling** – allows the user to schedule messages for later or recurring delivery.
- **Monitor** – allows an administrator to receive an e-mail notification or a page if there is a problem with sending messages.
- **Two-way messaging** – allows receivers with two-way devices to respond from their device. Responses are pre-defined by senders.
- **Application logs** – allows administrators to track messages and monitor HipLinkXS activity.
- **Advanced System Statistics** – allow administrators to assess HipLinkXS performance based on daily statistics for each

messenger.

Resulting benefits that help improve the efficiency of your organization:

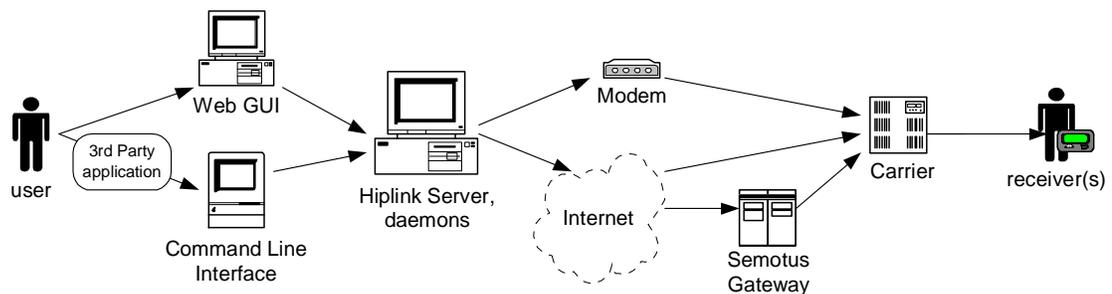
- **Highly Scalable** – HipLinkXS is designed to be a highly scalable product that can operate on several servers within an organization. This allows for a greater volume of messages and increased speed of delivery to meet virtually any messaging criteria that your organization requires.
- **Ease of Integration** – HipLinkXS can easily integrate with enterprise applications via the command line interface (CLI), or by building a message file (following our content format) and writing that message file into a certain directory.
- **Broad Support** – HipLinkXS supports a wide range of standard wireless protocols including TAP, SNPP one-way and two-way, WCTP one-way and two-way, DTMF, SMPP, HTTP, GSM and SMTP. This support allows HipLinkXS to deliver messages to nationwide carriers, thus, a wide range of devices including one-way pagers, two-way pagers, PDAs, and mobile phones.
- **Two-Way Messaging Ability** – HipLinkXS two-way messaging allows user to send messages and request a response back from the receiver, with the ability to trigger server processes based on responses from two-way devices.
- **High Service Quality** – HipLinkXS offers several Quality of Service features that help the organization assess the quality and timeliness of its message delivery.
 - **Persistent Message Delivery** allows users to define the number of retries for sending out a message. The delivery of message will continue to be re-tried until successful, or until the number of retries is reached.
 - **Message Tracking** from the originator to the receiver and throughout the wireless network provides important information to the administrator that can be used to improve message delivery in the future.
- **Extensive Tech Support** – HipLinkXS offers comprehensive annual support packages. Standard business-coverage solutions includes telephone and e-mail support from 7:00am to 5:00pm PST, Monday to Friday. Premium support package provides 24x7 support.
- **Highly Secure** – HipLinkXS resides behind the company's firewall and integrates with the legacy security systems in the enterprise; hence, it is as secure as the company's LAN network.

- **Extremely Reliable** – HipLinkXS is designed to maintain maximum uptime to allow reliable delivery. Multiple messengers and redundancy in the HipLinkXS architecture ensure maximum uptime in the event of network, modem, or phone line failures. A Monitor are is available to check if HipLinkXS Messengers are up and running.
- **Great Flexibility** – HipLinkXS is available for multiple platforms including Windows (NT, 2000, and XP), Linux, Solaris, HP-UX, AIX and other UNIX platforms. And multiple user interfaces including GUI and CLI are available to cater to different needs of desktop and application messaging.
- **Improve Efficiency** – HipLinkXS offers multiple features including group messaging, on-duty group setting, message prioritisation, scheduling, escalation, system monitoring, message handling (including split, truncate, and resend). These varieties of features provide an effective messaging system that helps improve efficiency of any organization.

2 Technology

2.1 High Level Architecture

The HipLinkXS software product offers two interfaces for a user to send text messages: the HipLinkXS Graphical User Interface (GUI) and the Command Line Interface (CLI). Both interfaces allow the creation of text messages, by specifying receiver (device) and message text.



The HipLinkXS server hosts a Web GUI that can be accessed from any browser. The Command Line Interface can reside on any remote computer, as long as the IP address is registered on the HipLinkXS server.

The HipLinkXS server delivers messages either using a modem connection or over the Internet.

When using a dial-up modem, the protocol between the HipLinkXS server and the carrier is either TAP (for dial-up and leased line) or DTMF. When using an IP connection the WCTP, SNPP, SMPP, HTTP or SMTP protocols are used. Using a GSM modem messages can also be sent over the air to another GSM phone. In this case there is no need for dial-up or Internet connectivity.

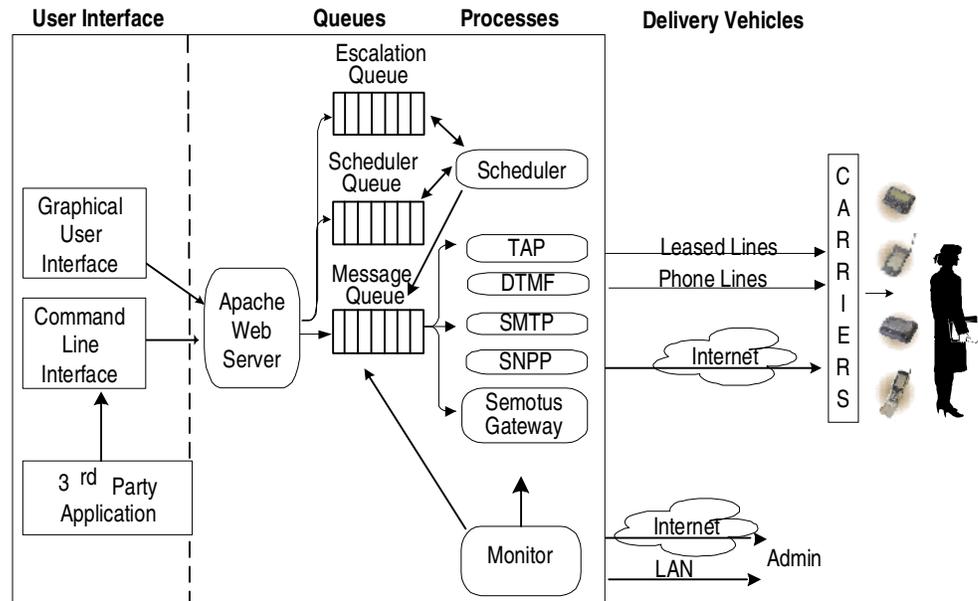
2.2 Low Level Architecture

Message files are created using the HipLinkXS GUI or non-GUI interfaces and placed into the Message Queue. The Messenger monitors the Message Queue for new messages, processing new ones, and sending them to the modem or IP connection.

Each Messenger supports one protocol and monitors the queue only for messages that require this protocol. There can be multiple messengers supporting the same protocol. In this case these messengers will perform

load balancing, by dividing the messages among themselves and each taking over a percentage or share of the load.

The Messengers wrap the messages in the carrier specific protocol and direct them to the modem or to the Internet connection.



2.2.1 Two-Way Traffic

The Messenger also manages the two-way traffic. When a two-way protocol is used, the messenger monitors for possible responses. Once a response is received, the messenger will execute a linked action (if applicable) or merely save the response to a log file. For example the response "Decline job" can be linked to a notification (action) where the manager receives a message informing them of the response. A response can also trigger other actions such as write to database "job xx123 has been rejected".

2.2.2 Scheduled Messages

Using HipLinkXS, the user can also create messages for later sending. The message can be recurrent, which is scheduled for a specific time, or delayed, which is scheduled for later sending or within an escalation. The Scheduler process monitors the Scheduler Queue; picking up messages when their delivery time is reached and placing them in the Message Queue.

2.2.3 Monitoring

HipLinkXS utilizes a Monitor process for self-monitoring. The Monitor monitors the Messengers, the Message Queue and the Error log. The Messengers periodically send an "alive" message to the Monitor. If this "alive" message is not received, the Monitor will take measures to correct it, such as restarting the Messenger and alerting the system administrator. If the Message Queue is full or the error log exceeds a predefined daily threshold, the Monitor is programmed to alert the system administrator.

HipLinkXS also allows monitoring the operations of 3rd party programs within the network and is able to send alerts to the administrator about occurring malfunctions.

Additionally the Monitor can be utilized to monitor 3rd party output stream and 3rd party generated log files by identifying specific keywords. The HipLinkXS monitor would send an alert to the administrator when one of the keywords is matched.

2.2.4 E-mail Notifications and Filtering

HipLinkXS E-mail Assistant is a filtering tool that monitors the e-mail inbox and forwards e-mails that contain certain keywords to a wireless device.

This monitor integrates with the HipLinkXS CLI application. CLI is used to send the e-mail message to the HipLinkXS server, where the message is dispatched to the wireless device.

Users can set up filters, which consist of keywords that are matched against the content of different fields inside the e-mail, such as the subject line or the body text. Combining different keywords in different fields allows intelligent filtering; the user can pinpoint exactly what e-mails he requires to be forwarded to his device.

Inside a template, the user can define which fields of the e-mail and how much of the content he wants to be sent to his device. The user can accommodate for device limitations and customize the message.

A copy of the e-mail will remain in the user's inbox.

2.3 Devices and Protocols

HipLinkXS messaging software supports every paging device:

- One-way pagers,
- Two-way pagers (e.g., Talkabout, Timeport),
- Motorola PageWriters (e.g., 2000, 2000X),

- SMS phones,
- RIM devices,
- E-mail systems.

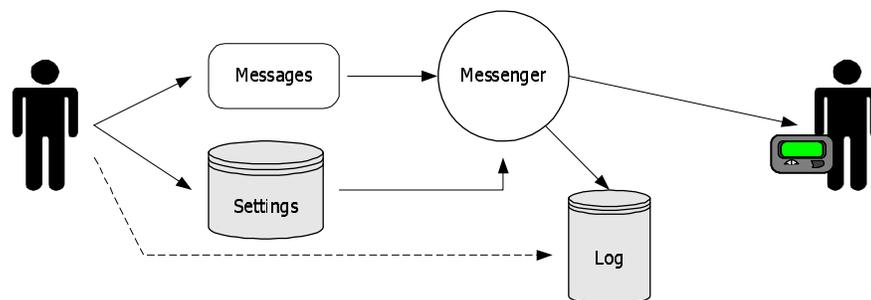
The protocol that is used depends on the receiving device, the carrier, and the connection type. HipLinkXS supports TAP (Telocator Alphanumeric Protocol) for dial up connections and leased lines, as well as DTMF (for numeric pagers). The Internet protocols supported by HipLinkXS are SMTP, WCTP, SNPP, SMPP and HTTP. SNPP is supported in two levels, SNPP 2 and SNPP 3. The SNPP 3 protocol is capable of two-way communication.

RIM Blackberry devices are also supported, either as one-way devices, in which case a page can be sent using SMTP, paging or SMS or as two-way devices, users having access to their corporate servers using the powerful HipLinkXS client for Blackberry. The HipLinkXS client is also available on PocketPC PDAs and Smart Phones.

Additional to this list, other phones and Palm devices are supported through their e-mail capabilities. Please note, that Palm devices do not notify the receiver upon receiving a message (they don't ring, beep, or vibrate) and are therefore not considered a paging device.

2.4 Functionality

HipLinkXS can be subdivided into four major parts: Messages, Settings, Messengers, and Log information.



2.4.1 Sending Messages

The user can initiate the sending of messages by writing and sending from the HipLinkXS GUI, or, indirectly, by having an application that is integrated with HipLinkXS send a message (the application interface is the CLI).

Sending message options include:

- **Standard** – sending to receivers and/or receiver/on-duty/escalation/rotate/follow-me groups.
- **Custom Escalation** – sending to a custom defined group in a time-delayed fashion.
- **Schedule** – sending at a preset date and time, or set it as recurrent.
- **Two-Way** – adding actions for receivers to respond from their two-way device.
- **Quick Send** – sending to any device outside of the receiver list, by adding the carrier and PIN number.
- **Resend Standard** – resend the most recent standard message.

The HipLinkXS GUI allows the user to check the status of sent messages in the reports menu. Messages waiting in the Message Queue may be checked and cancelled. These messages include scheduled and recurring messages. For recurring messages, one instance or the entire recurrent message can be cancelled.

Message queues are available for:

- **Main** – messages that are queued to be sent,
- **Escalation** – escalation messages that are waiting to be sent,
- **Schedule** – scheduled messages that are waiting to be sent,
- **Completed** – successfully sent messages,
- **Failed** – undeliverable messages.

2.4.2 Settings

The HipLinkXS administrator will have access to all licensed functions on the Settings menu. Other users may be assigned to a user group with less permission. The administrator can define settings for:

- **Change Password** – change password for user,
- **License Key** – modify license key to set up messenger,
- **Directories** – modify location of HipLinkXS directories,
- **Monitor** – modify monitor settings and parameters,
- **Messengers** – configure messengers,
- **Carriers** – configure carrier information,
- **Users** – create user accounts,
- **User Groups** - set up groups of users and their permissions,
- **Receivers** – create receiver devices,
- **Receiver Groups** – create groups of receivers,
- **On-Duty Groups** – create groups according to staff schedules,
- **Escalation Groups** – create time-delayed intervals to send messages,
- **Response Actions** – create actions for two-way message responses.

HipLinkXS Settings save receiver's device information for easy access when sending messages. Once the settings are set up, the user can send messages by simply specifying the receiver name.

Administrators will follow a few simple steps to get started.

1. A customer **license key** must be in place to begin the initial set up. This key determines the number of messengers that can run at one time, the protocols that are supported, the number of users and devices, as well as the IP address of the HipLinkXS server.
2. First at least one **messenger** and a **carrier** have to be created. The **messenger** is the process that implements a specific text messaging protocol and connects to the wireless provider, and the **carrier** contains the information required for that connection.
3. A list of individual **receivers** and **groups** should be established to facilitate a quick way to select receivers.
4. **User Groups** should be set up to assign various access privileges to different users.
5. Users should be set up in **User Account**. A user has to be assigned a user group to determine their user privileges.
6. **On-duty groups** may be set up to send messages to a group of staff that are "on-duty" when a message is generated.
7. **Escalation groups** may be set up to send escalating messages.
8. Administrators can set up actions for the two-way sending option. This will enable users to select actions that can be executed as a result of a response from a two-way device. Every response can be connected to a pre-defined action.

2.4.3 Messenger

Messengers are processes (daemons) that monitor the message queue. Each messenger supports messages for one paging protocol. The messenger receives its set up information from a settings file.

A Messenger executes the following routine:

1. Collect message files,
2. Sort message files (by carrier and priority),
3. Send message files (using supported protocol),
4. Check for message status (SNPP 3 only),
5. Process possible response (SNPP 3 only).

Messengers have to be started upon set up, and restarted each time their settings are changed. An Administrator with permissions can manually start or stop them any time in the Messenger menu.

One or more Messengers can run at the same time. The customer license determines the number of messengers and the protocols they support.

Every messenger performs the following functions periodically:

- Check content of message queue,
- Read new messages that are to be sent using this messenger's protocol,
- Sort messages by carrier/priority,
- Send messages to carrier(s),
- Store message copies in the archive directory,
- Store failed messages in the failed directory,
- Log results in the appropriate log file,
- Check for message status (only for SNPP3),
- Perform action based on message status (only for SNPP3),
- Log "alive" message in the log file.

The messengers look up the following settings in their settings file:

- Message directory,
- Archive directory,
- Log directory and filenames,
- Time interval for checking for new messages,
- License key.

2.4.4 Log Files

Every event is logged into the appropriate log file. Permissioned users can view the following logs:

- Main,
- Errors,
- Messengers,
- Monitor,
- Scheduler,
- Messages,
- Confirmations.

2.5 Application Integration

Using the Command Line Interface (CLI), HipLinkXS software can be integrated into other business applications. Prominent examples include HP

Openview, Remedy, Tivoli, Vantive, SCOPUS, Informix, NNM, BMS, Patrol, Bay Networks' Optivity, NetView, SunNet Manager, etc.

CLI is an executable, which allows the user to perform all functions related to sending messages. Using the CLI, the user or application can send messages to receivers, groups, on-duty or escalation groups and utilize two-way functions.

CLI supports two-way messaging, allowing the integration of responses, such as the execution of defined action commands.

2.5.1 Adding Two-Way Actions

When the two-way paging and action response is used with an integrated messaging system, it can produce a powerful tool for the mobile administrator.

For example, when HipLinkXS is integrated into a network monitoring system, the administrator can set up to receive an alert when a malfunction is detected. The alert message can include response options that trigger important actions, such as "reboot system", "kill process", and "start alternative process".

This remote capacity enables the administrator to start and shut down processes as if they were in front of the terminal. This can effectively cut down system down-time by allowing the administrator to react to problems in real-time.

2.6 Customization

HipLinkXS can be customized to meet any requirements and challenges presented by a customer. HipLinkXS is highly modularized and configurable to varying connection types and message volumes.

Integration into existing applications is straightforward and does not require expensive support and training.

HipLinkXS uses an open structure to add enhanced features for very specific applications, and can be custom designed and implemented according to customer needs.

3 Case Study

The Challenge

The connection of Help desk systems to mobile support staff often requires the involvement of an operator. The operator monitors or even answers the incoming requests and propagates them to the appropriate staff personnel – the best way being paging.

If the paged person does not reply, the operator – using a help desk application – needs to keep track of this call and page a second person. If the second paged person does not reply – ... you get the idea!

The help desk operator also keeps track of answered pages and the status of client's requests.

The K-Company

The K-company faced this challenge.

The K-company is a service company with a large mobile maintenance staff. On average, 3500 job requests come in each day, which need to be filled by available field technicians.

The K-company services phone systems and provides repair and maintenance services to both commercial and private telephone systems.

As a first step, the K-company equipped their field technicians with pagers, as they are never inside the office during their workday.

To keep track of phone calls from renters, an operator was needed to enter requests into the help desk application and to page the repair personnel.

The Solution

The solution for the K-company was the utilization of the HipLinkXS software.

Instead of paging single persons, the operator can intelligently page specific groups – receiver groups, on-duty groups and escalation groups.

The HipLinkXS software keeps track of which field technician is on duty, which area this technician provides service for and also what to do if this

person does not reply. In the case of a negative reply – such as "not available", the system has information on how to react.

The Configuration

To optimize this solution the K-company monitored the performance of HipLinkXS.

Initially, the K-company used four modems to cover their message volume. HipLinkXS provided a TAP messenger for each modem to establish dial-up connections to their paging service provider (carrier).

However, as the pagers were set up with different carriers, multiple messages to pagers required new dial-up connections every time a message was sent.

An Internet connection was added to provide a connection that did not require dial-up time. HipLink provided one SNPP messenger for this connection.

The Benefit

The SNPP connection improved the speed of the sending process, and added two-way messaging capability. The field technicians were now able to respond to service requests directly from their device.

This lets the K-company add more automated functionality to their paging dispatch system and provided more freedom to the technicians who no longer need a phone to reply to a page.

The efficiency of this system has resulted in improved customer service, which is appreciated by the K-company's clients, as well as the operator and the field technicians.