# Efficient Mail Submission and Delivery (EMSD) On Windows CE

Neda Document Number: 103-101-01.02

Last Updated: Author unspecified

Doc. Revision: source unspecified

Neda Communications, Inc.

First Published: March 3, 1997
Last Updated: August 16, 2000

## Executive Summary

The audience of this paper is technical and marketing management familiar with concepts of Wireless-IP and mobile networking, Windows CE and Efficient Mail Submission and Delivery (EMSD).

This paper examines the issues involved in enhancing the Windows CE electronic messaging environment by adding support for efficient wireless, mobile messaging over Wireless-IP using the EMSD protocol.

## Contents

## Preface

This article was originally published in March 1997. It is being included in the Manifesto, essentially unchanged from its original form.

# 1 Summary

Windows CE (WinCE) is a capable, general purpose mobile computing platform which, among other applications, comes bundled with an extensible e-mail application named "Inbox."

CDPD, the premier wireless, mobile network with full Internet connectivity has reached critical mass with its large scale deployment and CDPD wireless modems becoming available in ever-shrinking form factors (PCMCIA) with improving power consumption and other characteristics.

Interpersonal messaging is the most important and proven value proposition of the wireless medium. Existing Internet e-mail protocols have built-in assumptions, which makes them sub-optimal for use over wireless networks. The EMSD protocol fills this gap, allowing fully open, extensible (MIME) Internet e-mail connectivity over wireless networks.

Given that the fundamental components outlined above (WinCE, CDPD, EMSD) are real products and technologies, integrating them to create an end-user product is within reach. If the integration is performed properly, the availability of wireless E-mail capability can become straightforward for the end users of this system. Any Windows CE user can purchase a ”mobile e-mail kit,” which includes a CDPD modem, CDPD account activation and the necessary software add-ons to add the EMSD capability to the palmtop. In fact, there are several channel models which can be used to deliver the wireless messaging capability to the end user, so forming a ”mobile e-mail kit” is just one of them. This paper focuses on the technical issues of the integration effort at hand as opposed to marketing and channels issues. A WinCE based EMSD/CDPD wireless messaging solution, when coupled with the back-end EMSD Message Transfer Agent (MTA) offers a strong value proposition with minimal infrastructure. The EMSD MTA can be running at a central server at the CDPD Network Operator site (example mail address: john.doe@emsd.cdpdProvider.net) or as a Customer Premise Equipment (CPE) at the Internet ISP or IS Department of an Organization (example mail address: john.doe@emsd.boeing.com).

# 2 About This Document

This paper is available in many formats. You may wish to obtain a copy of this document in a more appropriate format before proceeding further. HTML, PDF, Postscript and plain text versions of this paper can be found at http://www.emsd.org/documents/whitePapers.html.

This paper is one of a series of white papers that introduces the ”world” of Efficient Mail Submission & Delivery (EMSD).

If you are not familiar with EMSD General, you may wish to read the ”Introduction to EMSD - White Paper” [**?**].

# 3 Background

## 3.1 Components involved

### 3.1.1 Wireless Network

In the context of this paper, any wireless, IP based network. Several networks such as the pACT network under development by AT&T Wireless Services, as well as the widely deployed CDPD network fit this description. Also applicable are a number of other proprietary wireless networks which expose an IP interface, such as Ricochet wireless IP network from Metricom, Inc.

CDPD is a wireless, mobile two-way data network offering coverage footprint equivalent to cellular voice in many markets. CDPD exposes an IP interface and a fixed, ”real” IP address to each subscriber node (End System) as assigned by the CDPD Network Service Provider at the time of end user provisioning. CDPD mobile nodes enjoy full mobile connectivity using the same IP address throughout the entire CDPD national coverage area due to inherent support of mobility built into CDPD.

### 3.1.2 EMSD

EMSD is an open, extensible and efficient message submission and delivery protocol designed specifically for the wireless network. It minimizes the network traffic required to send and receive messages, thus producing a messaging protocol that meets the needs of the mobile communicator. Fewer and smaller packets means extended battery life, efficient use of carrier bandwidth and support for marginal coverage areas. EMSD is an open specification that is an extension of the existing messaging world.

EMSD is up to 5 times more efficient than SMTP both in terms of the number of packets transmitted and in terms of number of bytes transmitted (see Efficiency Study of EMSD vs. SMTP/POP3/IMAP (PDF ¡61 KB)¿ (Postscript ¡165 KB¿)

EMSD protocols are openly available through online RFC Library (ftp://ftp.isi.edu/in-notes/rfc2524.txt)

As with other open standards like SMTP, POP, etc., multiple implementations of EMSD are available and various development tools and products are emerging. Being the premier developer of the EMSD Protocols and Implementations, Neda Communications, Inc. offers several products for the mobile device manufacturers, network operators and corporate IS organizations.

| **Functions Protocols** | SMTP | IMAP | POP | EMSD |
|---|---|---|---|---|
| Submission | XXX | | | XXX |
| Delivery | XXX | | | XXX |
| Relay | XXX | | | |
| Retrieval | | XXX | XXX | XX |
| Mailbox Access | | XXX | X | |
| Mailbox Sync. | | XXX | | |

Table 1: Messaging Protocols vs. Supported Functions

#### 3.1.3 Windows CE

Microsoft Windows CE is an open, scalable Windows operating system platform for a broad range of communications, entertainment and mobile-computing devices. Unlike previous PDA offerings from various vendors, Windows CE enjoys multiple implementations from various hardware vendors, a rich development environment, which leverages the large community of windows developers, and a core set of ”Windows Companion” applications. These ”Companion Apps” make WinCE useful from the get-go not as a stand-alone PDA but as an extension of the office environment.

Built-in applications come in two categories: (1) Personal Productivity Apps: These include the compact yet capable ”Pocket Word”, ”Pocket Excel” and the Calendar/Contact/Task manager apps. (2) Communications/Networking Apps: These include the capable ”Pocket Internet Explorer” and the extensible ”Inbox” e-mail front end.

All of these applications combine to provide an environment which feels ”intuitive” for Windows9x and NT4.x users.

#### 3.1.4 Messaging protocols

Various Internet Messaging Protocols are mentioned throughout this paper. Although all are used for messaging purposes, functions supported by these protocols do not necessarily match but in many cases complement each other. Given that these protocols came about in an evolutionary fashion over time, this makes sense. The following table illustrates this point.

In Table 1, the number of ”X”es in each box denote to what extent a particular function is supported by a particular protocol.

It is important to note that the scope of EMSD protocols was deliberately limited to the primary requirement for mobile messaging which is: ”submission and delivery of time critical important messages.” EMSD is designed to complement existing mailbox access protocols such as IMAP.

Although there are proprietary implementations of messaging protocols offered by various vendors over various wireless networks, EMSD is the only open efficient messaging protocol available. The openness of EMSD is a key attribute to help expand the wireless messaging, just as SMTP and POP helped to establish and expand the (now large) Internet e-mail industry years ago.

# 4 CDPD, EMSD and Windows CE: High Level Architecture

## 4.1 EMSD and WinCE Messaging

WinCE OS architecture supports a ”local message store” which can be used by any application to send/retrieve messages through a set of defined APIs.

Each message in the local message store has many attributes associated with it, such as the ”Mail Folder” it belongs to (Inbox, Sent Items, ...), the ”Mail Transport Service” responsible for handling the message (SMTP/POP3, Fax, EMSD,...), and other miscellaneous attributes.

WinCE OS architecture also supports the concept of a ”Mail Transport Service Provider” which works as an abstraction layer and handles sending/receiving of messages marked as handled by that ”Mail Transport Service.”

The ”MSInetEmail” Mail Transport Service Provider, which implements the POP3/SMTP message retrieval/submission protocols, is included with the base WinCE system. Consequently, for users with mailboxes on ISPs, Intranets, etc., WinCE offers a plug-and-play e-mail solution over dial-up IP connections.

The ”Inbox” application allows the user to choose which Mail Transport Service should be selected as the default one at any given time. In the WinCE architecture, the EMSD software would be just another ”Mail Transport Service” next to ”SMTP/POP3”, ”IMAP”, ”Fax” and so on.

EMSD is layered on top of UDP datagram service offered by the IP stack and as such, is oblivious to the how the IP connectivity is achieved. In other words, whether a direct serial link, a wireline modem or a CDPD modem is used is transparent to the EMSD layer. In fact, much of EMSD development and testing is done over LAN and direct serial links by simply adjusting a few tunable parameters.

The following block diagram illustrates the components involved as well as the layering of services.

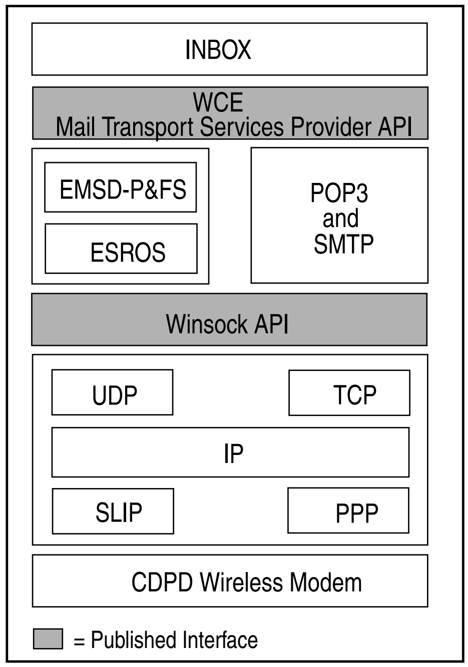


Figure 1: Components of WCE Mail Transport Service Provider with EMSD

As illustrated in Figure 1, upper and lower interfaces used by the EMSD user agent correspond to fully published WinCE APIs defined in WinCE development environment (SDK). It is also visible that the EMSD Mail Service Transport Provider is a peer to the Microsoft provided MSInetMail Mail Service Transport Provider. The WinCE published APIs enable any third party to develop a Mail Service Transport Provider.

## 4.2 WinCE and CDPD Modem integration

Today, all CDPD modems, including the PCMCIA types, expose a ”SLIP” interface on the serial port they are associated with. Some newer CDPD modems have started supporting the ”PPP” interface as well. Manufacturers of existing modems are also developing new firmware to add PPP support to their modems. WinCE comes with a built-in IP stack and offers Winsock v1.1 subset functionality. Today, off-the-shelf, WinCE supports only ”PPP” over serial links, however add-on drivers for SLIP support are appearing from third parties.

For those CDPD modems supporting PPP, WinCE integration is straightforward.

As far as WinCE is concerned, there is no difference between connecting to the CDPD network via that CDPD modem and connecting to an Internet ISP using a standard PCMCIA wireline modem: the same PPP interface is used.

## 4.3 EMSD Message Transfer Service and Back End Mailbox Issues

There are many scenarios in which EMSD can be used to provide messaging services, but for the purposes of this paper, we will consider only the scenario where the following are true:

- Target end user already has an e-mail mailbox.
- The mailbox mentioned is accessible via POP3/SMTP
- The end user would like to be able to access this mailbox via EMSD

In all cases, the ”EMSD Mail Transport Service Provider” in the WinCE will communicate directly with an EMSD Message Transfer Agent (MTA) which functions as a gateway between EMSD and SMTP. In other words, messages exchanged between the WinCE and the EMSD MTA are in the efficient EMSD format (in the airlink where EMSD's attributes are needed). The EMSD MTA handles translating EMSD format messages to the Internet format (RFC-822) and sending them on, or translating incoming Internet messages destined at the EMSD WinCE node to EMSD format and handing them over using EMSD protocols.

The EMSD MTA can reside anywhere on the Internet, including the CDPD service provider, at an ISP or as Customer Premise Equipment (CPE) at the customer site. Because EMSD MTAs maintain their own subscriber base, all of the above schemes can be deployed simultaneously. For example, The Neda Customer Premise Message Center (http://www.neda.com/products/ETWP/DataSheets/etwp-cpmc-solaris.fm5.pdf) was designed as a CPE MTA.

When a user is going mobile, he/she can initiate forwarding of all or certain classes of messages (for example all URGENT messages) to the assigned EMSD address. A mailbox sorter scheme similar to the ”Procmail” utility fits well into this model.

If the system where the user's mailbox resides is EMSD-aware or is the node where the EMSD-MTA entity is running, then a variety of features can be included. An example would be setting up the attributes of EMSD forwarding on the fly and delivering a message to a user only once...

All messages originated from the mobile WinCE unit would simply be sent via EMSD to the EMSD-MTA without any secondary filter processing. Filter processing at the user mailbox level is relevant only for delivery of messages coming from the Internet destined to the EMSD user.

# 5 Windows CE Inbox integration with EMSD

Once the EMSD Service Provider for WinCE Inbox is installed, all that is needed to be done is:

1. Establishing the IP network connectivity by using the appropriate ”dial-up networking” setup
2. Choosing ”EMSD” in the ”Service-¿Connect” from the Inbox menus, which are standard operations for Inbox.

# 6 End User Experience

## 6.1 Assumptions

- User is already familiar with Win95, e-mail concepts
- User has a mailbox on an Internet host, accessible via SMTP.
- User has acquired a WinCE unit.

## 6.2 Acquisition

- The same channel user purchased the WinCE from has ”CDPD Wireless e-mail kits.”
- Multiple kits can be set up by working with various CDPD modem manufacturers.
- Each kit would include modem, CDPD activation info and the EMSD add-on software.
- Alternatively (or as an extra service) the CDPD activation info and the EMSD add-on software can be made available on-line over the Internet.

### 6.3 Installation

1. Activate the CDPD modem.
2. Verify CDPD network connectivity via the activated modem using provided program.
3. Install the EMSD Mail Service Provider
4. Verify the EMSD setup using provided program.
5. Start forwarding of urgent (or other mailbox filter criteria) messages to EMSD at the host maintaining the user's primary mailbox.
6. Use the standard WinCE Inbox program with the EMSD Mail Service Provider.

## 7 Conclusions

Integrating true Internet e-mail connectivity to the WinCE platform using EMSD over CDPD is very feasible and is a natural fit to the WinCE's "Companion" model.

## A Bibliography