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Nurse Call Systems using the RS232/TAP connection

1. Overview

The RS232/TAP Interface enables the Mobility Server system to receive paging messages addressed to its users by wireless number. The TAP (Telocator Alphanumeric Protocol) version 1.8 [1] is used.

Nurse Call Systems are connected to the Mobility Server system directly or via a serial hub to provide multiple ports. Paging messages received from the Nurse Call System's message entry device are delivered to the wireless telephone. If delivery to the wireless telephone is not possible, the paging message will be diverted to another destination, stored for later delivery to the original destination or else lost.

The intended audience of this application note are those system administrators who are installing and configuring the Mobility Server system for Nurse Call System applications.

2. Technical Discussion

Text (paging) messages are sent to the Mobility Server system from a Nurse Call System message entry device via a serial (RS232) connection. No Nurse Call System specific functions are supported other than text messaging. The following Nurse Call Systems are supported:

- Dukane Procure 2600
- Executone Infostar / HCP 2.0
- Rauland-Borg Respond IV

The Mobility Server system supports single and multi-port RS232/TAP interfaces.

In a single-port configuration, the Message device is connected directly to the NT Server's serial port.

In a multi-port TAP configuration (up to a maximum number of 32 ports), one or several serial hub(s) need to be connected to the NT Server via an Ethernet connection. In the other end, the Message Entry Device is connected to the serial hub.

In a multi-port configuration, multiple Customers are identified through the port assignments.

The Java Runtime Environment (JRE) needs to be installed prior to configuring the TAP-interfaces in the Mobile Advantage System.

The maximum size of the text message delivered to the wireless phone is 190 characters. If more than 190 characters are entered from the message entry device, the message will be truncated before it is delivered to the wireless telephone. The Mobility Server System acknowledges the message when it is received on the RS232/TAP interface. Thereby it is NOT guaranteed that an acknowledged message has actually been delivered to the wireless telephone.

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A text message received via the RS232/TAP interface is handled, depending on the configuration of the Mobility Server System, in one of the following ways:

- The message is delivered to the wireless telephone
- Delivery with diversion: if a message can not be delivered to the wireless telephone, it will be diverted to another destination.
The destination is configurable per customer and also per Mobility Server System user. Per user configured diversion overrides per customer configured diversion.
If diversion to the destination configured per user fails, then diversion configured per customer is attempted.
The number to divert to must be a valid directory number within the own customer number series.
In case of chained diversion, the message will be lost.
- Store and forward. The message is stored and a delivery attempt to the mobile is made. Upon successful delivery, the message is deleted. If the message could not be delivered to the wireless phone, a new delivery attempt will be made when the wireless phone is found to be available.
The total number of messages that can be stored per user and per system is configurable up to an upper system limit.
Stored messages will automatically be deleted by the system after 31 days.
If none of the above, the message will be lost.

3. Solution

This section gives a brief description of recommended settings and configuration of the components involved in this application.

3.1 Physical Connection(s)

- For a **single port** RS232/TAP interface, connect the Message Entry Device to the NT Server's serial port using a **DB 9** cable.
- For a **multiple port** (a maximum of 32 ports) RS232/TAP interface, connect the Message Entry Devices to a serial hub with **RJ 45** crossover cables. Connect the serial hub with a **RJ 45** crossover cable to the Ethernet interface of the NT Server.

3.2 Nurse Call System Configuration

Generally, a PagerId needs to be entered or configured before sending a message from a Message Entry Device to the Mobility Server system. Some Message Entry devices will not support longer than 3 digit PagerId's

For further details, please refer to the configuration and installation manual of each Nurse Call System and Message Entry Device, [3],[4],[5].

3.3 Serial Hub for multi-port applications

It is recommended that the serial hub supports the following:

- Provides up to 32 native COM ports for Intel-based servers

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- It has Ethernet connectivity (10Base-T host interface) and RJ45 Female serial port interface
- Hot swappability is recommended in case the serial hub needs servicing (to be able to replace the unit without server shutdown)
- For security reasons, it's recommended that the serial hub does not communicate with the host using an IP address. Rather a mechanism such as communication on the MAC (Media Access Control) level is preferred.

The following steps are generally involved when setting up a serial hub:

- Connect the cables
- Follow the installation instructions for the hub, which may include installation of drivers or other software.
- When done, go to the NT Server's Control Panel, select Ports and make sure that the desired number of ports have been successfully detected by the operating system.

One or several hubs may be installed to provide up to 32 COM ports. For example, two 8-port hubs could be used to provide 16 ports.

For further details, please refer to the preferred vendor's serial hub Configuration and Installation Manual.

The RocketPort serial hub by COMTROL (www.comtrol.com) has been successfully used during the Mobility Server system testing.

3.4 Mobility Server System Configuration

1. Java Runtime Environment (JRE) Configuration:
 - Go to <http://java.sun.com/products> and download JRE.
 - Go to <http://java.sun.com/products/javacomm> and download Java Communication API 2.0 package.
 - Double click on the JRE package. It will start the installation process.
 - Choose the installation directory to D:/jre
 - Unpack the **javacomm** package. Copy **win32com.dll**, **commx.jar** and **javax.comm.properties** to D:/jre/bin.
 - Reboot the NT Server
2. Configure Board, Physical Link, Trunk, Route and Customer from the Mobility Server System (GUI).
3. End User(s) configuration:
 - From the Mobility Server System GUI select End User -> Create. Make sure that the Short Message Service (SMS) feature is added for the user.
4. Number of TAP Interfaces configuration:

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- From the Mobility Server System GUI select System Parameters -> Modify. Select 'TAP interface: TAP COM ports: Number of COM ports' and modify the value so that corresponds with the number of ports available (1 in single port setup, 2-32 in multi-port setup with a serial hub).
- 5. TAP Interface Configuration:
 - From the Mobility Server System GUI select Hardware Resources -> TAP Interface ->Create. These parameters have to be set to values supported/set in the Nurse Call System used. The following values are an example: COM Port Id = 4, Customer = Ascom, Pager Prefix=none, BaudRate=1200, ParityBit=even, FlowControlIn=Xon/Xoff In, FlowControlOut=Xon/Xoff Out, DataBits=7, StopBits=1. The COM Port Id corresponds to the ports as identified in the NT Server's Control Panel, Ports.
 - The creation of the first TAP interface will start the Java Runtime Environment (JRE) on the NT Server. Use the **Task Manager** to make sure that JRE is running.
- 6. NT Server Serial Port Configuration:
 - From the NT Server Main menu, select Control Panel, Ports, Settings. Configure the port to the same settings as in 5 above.
- 7. SMS Configuration:
 - From the Mobility Server System GUI select Personal Number -> Local SMS -> Create and configure it to the desired functionality (e.g. Diversion on failed message delivery or Store and Forward).

For more details on step 1-5 and 7, please refer to the Mobility Server System online-help and I&O manual [2].

4. Reference

1. TAP protocol specification: http://www.mot.com/MIMS/MSPG/pcia_protocols/tap_v1p8/index.html
2. Mobility Server System I&O Manual
3. Manual, Dukane Procure 2600
4. Manual, Executone Infostar / HCP 2.0
5. Manual, Rauland-Borg Respond IV