WARNING

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Preface

Manual Purpose

This manual contains the instructions necessary to operate the product safely and in accordance with its function and intended use. Observance of this manual is a prerequisite for proper product performance and correct operation and ensures patient and operator safety.

This manual is based on the maximum configuration and therefore some contents may not apply to your product. If you have any question, please contact Mindray.

This manual is an integral part of the product. It should always be kept close to the equipment so that it can be obtained conveniently when needed.

Intended Audience

This manual is geared for clinical professionals who are expected to have a working knowledge of medical procedures, practices and terminology as required for monitoring of critically ill patients.

Illustrations

All illustrations in this manual serve as examples only. They may not necessarily reflect the setup or data displayed on your equipment.

Conventions

- *Italic text* is used in this manual to quote the referenced manuals, chapters, sections and formulas.
- **Bold text** is used to indicate the screen texts and names of hard keys.
- → is used to indicate operational procedures.
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Contents

1 Safety .............................................................................................................................................................................. 1 - 1
  1.1 Safety Information .......................................................................................................................................................... 1 - 1
    1.1.1 Warnings ................................................................................................................................................................... 1 - 1
    1.1.2 Cautions ................................................................................................................................................................... 1 - 1

2 Planning Your Deployment .............................................................................................................................................. 2 - 1
  2.1 Overview ........................................................................................................................................................................ 2 - 1
  2.2 Network Design and Software Installation Requirements ............................................................................................ 2 - 1
    2.2.1 Network Design ........................................................................................................................................................ 2 - 1
    2.2.2 Software Installation Requirements ......................................................................................................................... 2 - 3
    2.2.3 Operating System ..................................................................................................................................................... 2 - 3
    2.2.4 Specification ........................................................................................................................................................... 2 - 3

3 Installing the Mobile Server ......................................................................................................................................... 3 - 1
  3.1 Installing License Dongle Driver ..................................................................................................................................... 3 - 1
  3.2 Installing Mobile Server ................................................................................................................................................. 3 - 2
  3.3 Settings .......................................................................................................................................................................... 3 - 4
    3.3.1 Setting the Central Monitoring System .................................................................................................................. 3 - 5
    3.3.2 Setting Server Network ........................................................................................................................................... 3 - 5
    3.3.3 Other Settings ........................................................................................................................................................ 3 - 6
  3.4 Testing Configurations ..................................................................................................................................................... 3 - 6
  3.5 Mobile Server User Management ..................................................................................................................................... 3 - 7
    3.5.1 Using Local Accounts ............................................................................................................................................ 3 - 7
    3.5.2 Using Domain Accounts ........................................................................................................................................ 3 - 7
  3.6 Service Management ....................................................................................................................................................... 3 - 7
    3.6.1 Starting Service ...................................................................................................................................................... 3 - 8
    3.6.2 Stopping Service ..................................................................................................................................................... 3 - 8
    3.6.3 Checking Service Status ......................................................................................................................................... 3 - 8
  3.7 Importing License Information ....................................................................................................................................... 3 - 9
    3.7.1 Importing License from License Window .................................................................................................................. 3 - 9
    3.7.2 Importing License from License Dongle ................................................................................................................... 3 - 10
  3.8 Uninstalling .................................................................................................................................................................... 3 - 11

4 Checklist after Installation .............................................................................................................................................. 4 - 1

5 Troubleshooting .............................................................................................................................................................. 5 - 1
  5.1 Failed to Start Services after Installing Mobile Server ................................................................................................. 5 - 1
  5.2 Important Notes for Installing Mobile Server ................................................................................................................ 5 - 1
  5.3 Buttons in the Service Manager Window Are Grayed Out ............................................................................................. 5 - 1
  5.4 An Error Message Is Displayed While Starting Mobile Server ....................................................................................... 5 - 1
  5.5 Mobile Server Cannot Access the CMS Network When Deployed Outside the CMS Network ....................................... 5 - 1
  5.6 After Logging on to Mobile Viewer Successfully, No Patient Information Is Displayed .................................................. 5 - 2
1 Safety

1.1 Safety Information

**WARNING**

- Indicates a potential hazard or unsafe practice that, if not avoided, could result in death or serious injury.

**CAUTION**

- Indicates a potential hazard or unsafe practice that, if not avoided, could result in minor personal injury or product/property damage.

**NOTE**

- Provides application tips or other useful information to ensure that you get the most from your product.

1.1.1 Warnings

**WARNING**

- The equipment should be used by hospital IT personnel or Mindray service engineers or under their instructions. The user of the equipment should receive sufficient training. Anyone unauthorized or untrained must not perform any operation on it.
- To avoid inadvertent disconnection, route all cables in a way to prevent a stumbling hazard. Wrap and secure excess cabling to avoid risk of entanglement or strangulation by patients or personnel.
- When disposing of the package material, observe applicable local or hospital's waste control regulations and keep it out of children's reach.
- The hospital should provide an Uninterruptible Power Supply (UPS) to the Mobile Server. Before connecting the equipment to the power line, check that the voltage and frequency ratings of the power line are the same as those indicated on the equipment's label or in this manual.
- The Mobile Server cannot directly support the monitoring equipment of other manufacturers.

1.1.2 Cautions

**CAUTION**

- The hospital should provide an Uninterruptible Power Supply (UPS) to the Mobile Server. If the Mobile Server system is powered off unexpectedly, the system may become abnormal and fail to operate properly when it is turned on next time or even lead to a more severe consequence.
- The Mobile Server system should be maintained every 3 to 6 months. Continuous operation for a long term may cause the system to operate abnormally.
- Always install or carry the equipment properly to avoid damage caused by drop, impact, strong vibration or other mechanical force.
2 Planning Your Deployment

2.1 Overview

The Mobile Viewer is a mobile application independent of the Central Monitoring System, supporting Android and iOS systems. Doctors, nurses and other medical personnel can use Mobile Viewer to view the data from patient monitors, telemetry devices, and other monitoring devices admitted by the BeneVision Central Monitoring System (hereinafter referred to as the CMS).

The Mobile Server provides monitoring data to the Mobile Viewer and acts as an interface to the BeneVision CMS.

This chapter will provide the necessary technical information for you to plan your deployment of the Mobile Server within your healthcare facility. It will cover network design requirements/guidelines for connecting your facilities network to the BeneVision Patient Monitoring System, software deployment requirements, configuration of the software, and troubleshooting problems.

WARNING

• The Mobile Viewer is not intended for real-time or primary monitoring. It cannot be used as a device for issuing alarms. There is no audible alarm sound in the Mobile Viewer, and all the data is delayed. Always refer to your primary monitoring source for current information, real-time patient data and combine this data with personal clinical observation of the patient before administering interventions.

2.2 Network Design and Software Installation Requirements

2.2.1 Network Design

For a single network card

The hospital network is connected to the Mindray CMS monitoring network via a router. It is recommended to use a firewall to protect the server in the CMS monitoring network.

![Network Topology of Mobile Server (Single Network Card)](image)
For a dual network card

Mobile Server is connected to the Mindray CMS monitoring network and hospital network respectively via two network cards.

![Network Topology of Mobile Server (Dual Network Card)](image)

**Figure 2-2 Network Topology of Mobile Server (Dual Network Card)**

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Mobile Server Port</th>
<th>Remote Port</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP</td>
<td>Any</td>
<td>6588</td>
<td>Communicate with the CMS</td>
</tr>
<tr>
<td>TCP</td>
<td>Any</td>
<td>7588</td>
<td>Communicate with the CMS</td>
</tr>
<tr>
<td>TCP</td>
<td>Any</td>
<td>6600</td>
<td>Communicate with the CMS</td>
</tr>
<tr>
<td>TCP</td>
<td>Any</td>
<td>7600</td>
<td>Communicate with the CMS</td>
</tr>
<tr>
<td>TCP</td>
<td>Any</td>
<td>9999</td>
<td>Communicate with master server</td>
</tr>
</tbody>
</table>

**Table 2-1 Ports Used When Communicating with the CMS**

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Mobile Server Port</th>
<th>Mobile Viewer Port</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP</td>
<td>80</td>
<td>Any</td>
<td>Real-time data communication (configurable)</td>
</tr>
<tr>
<td>HTTPS</td>
<td>443</td>
<td>Any</td>
<td>Real-time data communication (configurable)</td>
</tr>
</tbody>
</table>

**Table 2-2 Ports Used When Communicating with the Mobile Viewer**
2.2.2 Software Installation Requirements

2.2.2.1 Software Requirements When Installing on a Physical PC

Basic requirements for the Mobile Server platform are shown below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>2.9GHz or above, quad core or above</td>
</tr>
<tr>
<td>Memory</td>
<td>4G DDRIII 1600MHz or above</td>
</tr>
<tr>
<td>Hard disk</td>
<td>Free memory space of 10GB or above</td>
</tr>
<tr>
<td>Network adapter</td>
<td>100M, Ethernet 802.3</td>
</tr>
</tbody>
</table>

Table 2-3 Basic Requirements for the Mobile Server Platform

2.2.2.2 Software Requirements When Installing on a Virtual Machine

The Mobile Server supports virtualization. It can be installed in a virtual machine (hereinafter referred to as the VM) using VMware ESXi 5.1. The software requirements are the same as installing the Mobile Server on a physical PC.

2.2.3 Operating System

The following operating systems are supported in both the physical PCs and in the virtual machines:

- Windows Server 2008 R2 Standard SP1 32 bits
- Windows Server 2008 R2 Standard SP1 64 bits
- Windows 7 Professional SP1 32 bits
- Windows 7 Professional SP1 64 bits
- Windows Server 2012R2 64 bits

Environmental resource consumption of the Mobile Server in the recommended environment:

- The CPU utilization is not higher than 80%;
- The incremental memory usage is not higher than 20%;
- The hard disk throughput is not higher than 200 KByte/s;
- The network throughput is not higher than 100 KByte/s.

2.2.4 Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Maximum Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of beds supported by a single Mobile Server</td>
<td>200</td>
</tr>
<tr>
<td>Number of simultaneous online apps supported by a single Mobile Server</td>
<td>500</td>
</tr>
</tbody>
</table>

Table 2-4 Specification
This page intentionally left blank.
3 Installing the Mobile Server

There are two methods to install the Mobile Server:

- **Common installation:** you can install the Mobile Server manually on a physical PC or on a virtual machine.
  - A dongle driver dedicated for Mobile Server is required for this installation method.
  - Upon completion of installation, the Mobile Server supports up to 600 Mobile Viewers to be online simultaneously.
  - The method to install the Viewer on a physical PC and on a virtual machine is the same. The BeneVision Mobile Viewer CD Kit (P/N: 115-047959-00) is required to install the Mobile Server.

- **All-in-one installation:** you can install the Mobile Server via the CentralStation.
  - A dongle driver used by Mobile Server should be supported by the CentralStation.
  - The Mobile Server can be connected to this CentralStation only.
  - The number of Mobile Viewers that can be connected to the Mobile Server is the same as that supported by the CentralStation.

This chapter concentrates on common installation and provides notes for all-in-one installation where necessary.

**NOTE**
- The Mobile Server should be installed by authorized Mindray personnel.

### 3.1 Installing License Dongle Driver

**NOTE**
- Skip this section for all-in-one installation, because the dongle drive has been installed during installation of the CentralStation.


   ![Figure 3-1 No Dongle Driver](image)

   **Figure 3-1 No Dongle Driver**

2. Select the driver that needed to be installed, and select **Install Driver**.

3. After the installation, the driver status changes to "The driver has been installed successfully!", as shown in Figure 3-2.
3.2 Installing Mobile Server

NOTE

- Mobile Server must be installed using administrator privileges. Otherwise, installation will fail.
- If Default-Notify me only when programs try to make changes to my computer is selected in User Account Control (UAC) settings, when ordinary users install Mobile Server, they are prompted to enter a user name and password. If other options are selected in UAC settings, when ordinary users install Mobile Server, the message Administrator rights required! is displayed.
- For all-in-one installation, skip Step 1 below. Select the system menu area in the upper left corner of the CentralStation's screen → select the Network tab → select the MobileServer tab → select Install Mobile Server.


2. Enter the installation wizard, select the installation language, and then select the OK button.

3. Select the desired installation location for the server, and then select Install.

NOTE

- We recommend installing the Mobile Server in a disk other than system disk, due to default Windows permission for user account control.
4. After the related files are installed, the configuration window is displayed, as shown below. Complete configurations. For details on how to configure these items, see Section 3.3 Settings.

NOTE

- The settings shown in Figure 3-5 for illustration only, the actual settings to be used are specific to the installation environment.
- As installation of Mobile Server is not completed yet, the status, the Start button, the Stop button, and the Test button below Service Manager are grayed out.
- The dongle type and the number of devices that can be connected to the Mobile Server are displayed in the status bar at the bottom of the setting screen.

Upon completion of configurations, the installer will check if the configurations are correct.
5. Upon completion of configurations, select the “Submit” button in the lower right corner of the window to close the configuration window.

6. Select whether to start the service. If you select Yes, the service will be started automatically; if you select No, you can start the service manually in the Start menu later.

7. Select Finish to complete the installation procedure.

### 3.3 Settings

To configure the Mobile Server in the Windows Start menu, select MobileServerManager.

**NOTE**

- Whenever the configuration is changed, the Mobile Server should be restarted.
3.3.1 Setting the Central Monitoring System

Follow this procedure to set the central monitoring system:

1. Enter the IP address and DNS domain name of the CentralStation that has been configured to be the Master Server.
2. Set **Connection Type** to **Only Private Encryption** or **SSL Encryption Priority**. The default is **Only Private Encryption**. The Mobile Server needs to be restarted if you change the setting of **Connection Type**. The Mobile Server also needs to be restarted if you change the connection type at the CentralStation.
3. Set the IP address list of central stations to be connected in **Central Stations**.
4. Add or remove CentralStations from the CentralStation list.
   - **Add**: Enter the IP address of the Central Station that needs to be viewed and select the **Add** button.
   - **Delete**: Select an IP address from the list and select the **Delete** button.
5. After finishing settings, select **Submit** to save the settings.

**NOTE**

- When the Mobile Server is installed via the CentralStation, the local CentralStation is connected by default. In this case, the settings described in this section are not applicable.
- The language, units of measure, and ECG standard in the Mobile Server are synchronized with that of the CentralStation.

3.3.2 Setting Server Network

Setting the server network is necessary for installation and maintenance of the Mobile Server system.
Follow this procedure to set the server:

1. Select the IP address for listening by the server in **IP Address**. If **All** is selected, all the local IP addresses will be listened to.
2. Enter the HTTP port number for listening by the server in **Port**. The default value is **80**.
3. Enter the HTTPS port number for listening by the server in **SSL Port**. The default value is **443**.
4. After setting, select **Submit** to save the settings.

**NOTE**
- The working directory of the current server is displayed in **ServerRoot** and cannot be changed.

### 3.3.3 Other Settings

Select the client user authentication mode in **Authentication**. The default is **Windows**.

- **Windows**: the Mobile Viewer App uses the local account of computer to log in.
- **Active Directory**: Domain needs to be configured, and the Mobile Viewer App uses the domain account of the domain which the computer joined to log in.
- **Mindray LDAP**: the IP address and port need to be configured, and the Mobile Viewer App uses the Mindray MLDAP account of the MLDAP server to log in. Only the authorized patient monitors can be viewed on the Mobile Viewer App.

### 3.4 Testing Configurations

After finishing configurations, Select the **Test** button in the **Service Manager** window to check Mobile Server settings. If the prompt “**Syntax OK**” is displayed, it indicates that the configurations are correct.
3.5 **Mobile Server User Management**

The Mobile Server supports two ways for a user utilizing the Mobile Viewer to authenticate to the Mobile Server to access the BeneVision CMS system. The authentication method can be configured in the MobileServerManager.

The two authentication methods are:

- Use local accounts of the Mobile Server PC.
- Use domain accounts from the domain that the Mobile Server PC has joined.

### 3.5.1 Using Local Accounts

1. Right click Computer.
2. Select Manage, or select Control Panel → System and Security → Administrative Tools → Computer Management.
3. Select System Tools → Local Users and Groups → Users in menu tree in the left.
4. Create, modify, or delete the local accounts.

Mobile Viewer user can log in using these local accounts.

### 3.5.2 Using Domain Accounts

If the computer joined the domain, Mobile Viewer user can log in using the domain accounts in this domain.

3.6 **Service Management**

You can manage services in either of the following ways:

- Select Control Panel → System and Security → Administrative Tools → Services → right-click on Mobile Server → select the Start or Stop button
- Access the MobileServerManager window

This section only describes how to manage services in the MobileServerManager window. Managing the service in Windows requires an account with administrative privileges. If the account currently used does not have administrative privileges, please right click and choose Run as Administrator when running the commands in this section.

Double click on the MobileServerManager icon. The MobileServerManager window is displayed as shown below.

**Figure 3-12 Service Manager Screen**
NOTE

- If an ordinary user logs on the MobileServerManager, after MobileServerManager is running, the buttons below Service Manager are grayed out. In this case, right-click on the MobileServerManager icon and then select Run as Administrator.

3.6.1 Starting Service

On the Service Manager screen, select Start. Starting the service takes about one minute, due to internal initialization and communication with the CMS. If no error is displayed in the window and “Press any key to continue” is prompted, the service has started successfully.

After the service is started successfully, Started is displayed below Service Manager, as shown below.

![Figure 3-13 Service Started Successfully](image)

If Stopped is displayed, it indicates that starting service failed, as shown below.

![Figure 3-14 Service Stopped](image)

When starting service failed, follow this procedure:
- Check that valid license dongle has been inserted or valid license file has been imported. The service cannot be started without a valid license dongle or license file.
- Check that there are no network port conflicts configured at the Mobile Server and at other applications.
- Check the FrontendLog.log and \Mindray\MobileServer\Logs\error.log in the installation path Mindray\MobileServer\bin.

NOTE

- Before starting the service for the first time, please insert the license dongle to the Mobile Server computer and import the license file. Otherwise, Mobile Server cannot be started. For how to import the license file, see 3.7 Importing License Information.
- Before starting the service for the first time, configure Mobile Server. Upon completion of configurations, select the Test button in the Service Manager window to verify that all the configurations are correct.

3.6.2 Stopping Service

Select the Stop button in the Service Manager window to stop the service. If the prompts “The Mobile Server service has stopped.” and “Press any key to continue...” are displayed, it indicates that the service has stopped.

3.6.3 Checking Service Status

The current service status is displayed below Service Manager. For example, Stopped in Figure 3-16.

![Figure 3-15 Service Status](image)
3.7 Importing License Information

3.7.1 Importing License from License Window

1. Double click on the icon. The License window is displayed, as shown below.

![Example License Window](image)

**NOTE**

• Generating MID requires an account with administrative privileges. If the account currently used does not have administrative privileges, please right click the icon and choose Run as Administrator.

2. Send MID as shown in Figure 3-17 to your customer service personnel and save the license file provided by customer personnel in the desired location. Note: the MID in Figure 3-17 serves as an example only.

3. On the right of File Path, select Import. The File Path window is displayed.

![Example File Path](image)

4. Select the directory where the license file is located and then select OK. The license will be imported automatically.
### 3.7.2 Importing License from License Dongle

1. Insert License dongle into the computer that Mobile Server is installed, and start the Mobile Server.
2. Visit http://127.0.0.1/admin or http://localhost/admin through the browser of computer that Mobile Server is installed.

![Figure 3-18 Example Admin Page](image)

If the license dongle is not inserted, the page will prompt "Cannot find USB dongle!". In this case, insert the license dongle into the computer where the Mobile Server is installed and refresh the page.

![Figure 3-19 License Dongle Not Found](image)

3. Select **Import License**. If the page displays as shown, the import is successful. Otherwise, please retry.

![Figure 3-20 License Imported Successfully](image)
4. After a license has been successfully imported, restart the Mobile Server.

3.8 Uninstalling

1. From the Windows Start menu access the Mobile Server, and select Uninstall.
2. Select Next.
3. Confirm the uninstall directory, and select Uninstall.
4. Upon completion of uninstallation, select **Finish**.

![Figure 3-24 Mobile Server Uninstalled](image)
# 4 Checklist after Installation

Upon completion of installing the Mobile Server, check the following items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check that the desired CentralStation is configured as the master server.</td>
<td>For details on how to perform configurations, see Section 3.3.1 Setting the Central Monitoring System.</td>
</tr>
<tr>
<td>Check that the IP address, port, and SSL port configured are correct.</td>
<td>For details on how to perform configurations, see Section 3.3.2 Setting Server Network.</td>
</tr>
<tr>
<td>Check that user authentication is correct.</td>
<td>For details on user authentication, see Section 3.5 Mobile Server User Management.</td>
</tr>
<tr>
<td>Test the configuration items are correct.</td>
<td>For details on how to perform the test, see Section 3.4 Testing Configurations.</td>
</tr>
<tr>
<td>Start the Mobile Server.</td>
<td>For details on how to start the Mobile Server, see Section 3.3 Settings.</td>
</tr>
<tr>
<td>Find the log under the installation directory bin\FrontendLog.log, search for <strong>JDogDataCollectorWrapper</strong>, and check the dongle status is correct.</td>
<td>Check the dongle status by referring to the prompt in the log.</td>
</tr>
<tr>
<td>Visit the testing page <a href="http://127.0.0.1/index.html">http://127.0.0.1/index.html</a> using the browser of the PC where the Mobile Server is installed. If the following page is displayed, it indicates that the Mobile Server service is started properly.</td>
<td>If the prompt &quot;It Work!&quot; is not displayed, it indicates that the Mobile Server service is not started. In this case, check the items in this table one by one.</td>
</tr>
</tbody>
</table>

![Figure 4-1 Checklist after Installation](image)

**NOTE**

- In case of any damage or abnormality, do not use the equipment. Contact your hospital biomedical engineers or Mindray service personnel immediately.
This page intentionally left blank.
5 Troubleshooting

5.1 Failed to Start Services after Installing Mobile Server

Please try the following operations:

■ Check that the license dongle or license file is available.
■ Check that there are no port conflicts between the Mobile Server and other software.
■ Find the Mobile Server menu in the Start menu, select Test to check the server configuration. If “Syntax OK” is prompted, the server configuration is correct.
■ Try to start the service as you do for other applications:
1. If the configuration is correct, double-click on bin\httpd.exe in the installation directory. Wait for completion of server initialization.
2. Access http://127.0.0.1:port/index.html in the browser (port is the port in Apache Settings of Mobile Server). If “It Works!” is displayed, it indicates that the Mobile Server service can run normally.
3. Stop the Mobile Server service and then try to start it again.
4. If the problem cannot be fixed yet, contact the service personnel for support.

5.2 Important Notes for Installing Mobile Server

Only one Mobile Server can be installed in a computer, so Mobile Server can be installed once only. To reinstall Mobile Server, uninstall the original one or overwrite the existing installation.

5.3 Buttons in the Service Manager Window Are Grayed Out

The Mobile Server Manager needs to run using administrator privileges.

5.4 An Error Message Is Displayed While Starting Mobile Server

An error message is displayed while starting the Mobile Server, as shown below. This message is caused by domain name issue, and this issue doesn’t affect the functions of Mobile Server.

![Figure 5-1 Error Message While Starting Service](image)

5.5 Mobile Server Cannot Access the CMS Network When Deployed Outside the CMS Network

■ TCP ports 6588, 7588, 6600, 7600 and 9999 need to be unblocked to allow the Mobile Server to connect to the central monitor system through the Internet.
■ Port 80 and Port 443 need to be enabled for Mobile Server. These ports are used for real-time data communication and can be configured via MobileServerManager. If you need to configure ports to a number other than 80 and 443, ensure that firewalls are open and these ports can be accessed.
5.6 After Logging on to Mobile Viewer Successfully, No Patient Information Is Displayed

Verify that Mobile Server, connection type, and CMS settings are correct. Besides, verify that bedside monitoring devices have been online at the CentralStation.