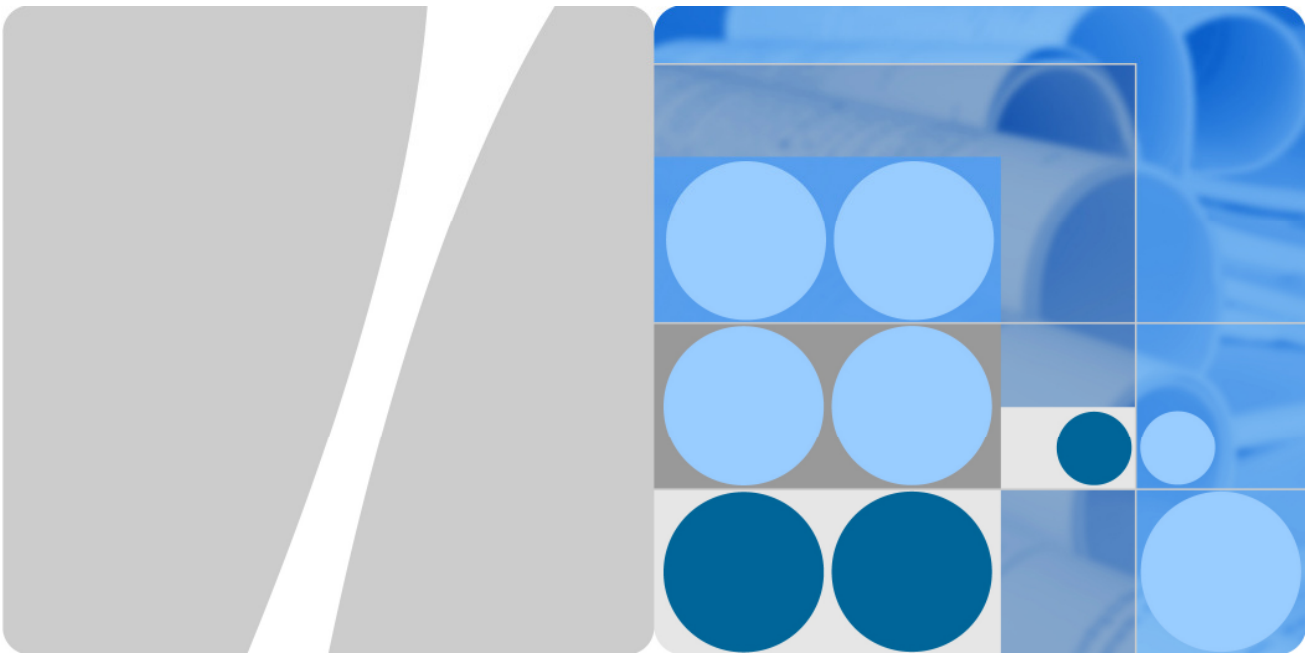

eBIMS
V100R001C00
Product Description

Issue 01

Date 2013-04-30

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About This Document

Intended Audience

This document is intended for:

- Sales specialist
- Technical support personnel
- Maintenance personnel

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Remarks
 DANGER	Indicates a hazard with a high level of risk that, if not avoided, could result in death or serious injury.
 WARNING	Indicates a hazard with a medium or low level of risk that, if not avoided, could result in minor or moderate injury.
 CAUTION	Indicates a potentially hazardous situation that, if not avoided, could cause equipment damage, data loss, and performance degradation, or unexpected results.
 TIP	Provides a tip that may help you solve a problem or save time.
 NOTE	Provides additional information to emphasize or supplement important points of the main text.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in previous issues.

Issue 01 (2013-04-30)

This issue is the first official release.

Contents

1 Positioning and Characteristics

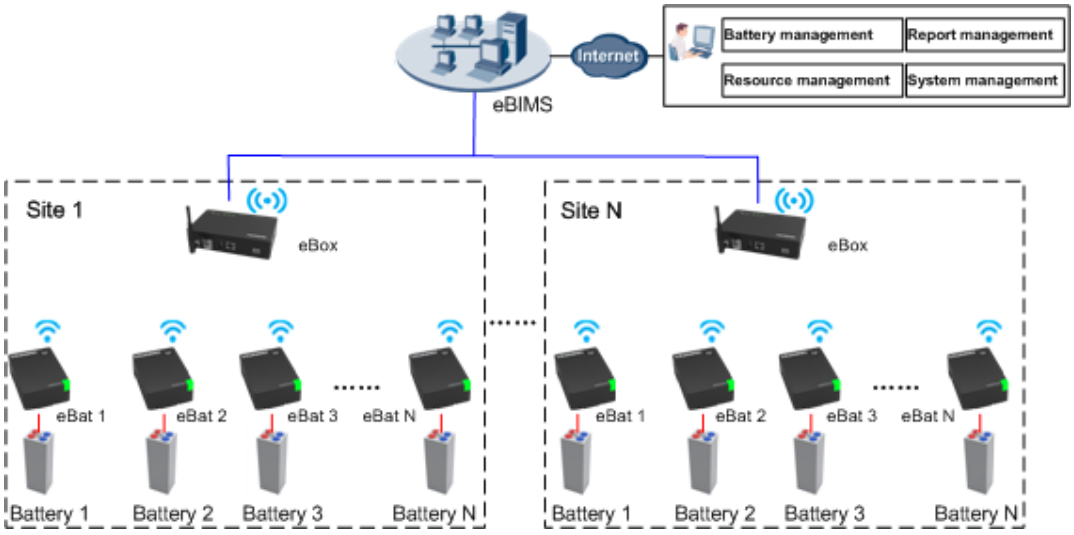
About This Chapter

1.1 Positioning

This product description is oriented to the battery intelligent management system (eBIMS) V100R001.

Batteries, an indispensable part of sites, are the O&M focus. The correctness of battery performance management, timeliness of battery fault rectification, and fix rate of network problems caused by battery faults have a large impact on network status. Therefore, low-cost automatic detection and analysis for batteries become key requirements of the management service center. The Huawei eBIMS fully meets battery maintenance requirements by remotely monitoring real-time battery status, detecting, predicting, and reporting battery faults, and identifying batteries reaching their replacement thresholds and guiding the battery replacement. Figure 1-1 shows the eBIMS solution.

Figure 1-1 eBIMS solution



1.2 Characteristics

The eBIMS supports client-free fast deployment, comprehensively monitors the battery temperature, voltage, and impedance, and achieves simple and fast operation.

Simple Structure, Achieving Fast Deployment

- The eBIMS uses the modular design. Wireless connection is used between the eBat and eBox, reducing cables and simplifying installation.
- The eBat connects to a battery using OT terminals. The eBox deployment is flexible and convenient because the eBox can be installed on a wall or by using hook-and-loop fasteners.
- The eBIMS supports client-free installation and has a built-in database.

Simple Operation, Improving User Experience

- The eBIMS uses the lightweight browser/server (B/S) architecture, uses the Web 2.0 technology, and allows users to perform access and operation using the Internet Explorer.
- The intelligent report analysis function displays the battery temperature, impedance, and voltage performance parameters using diversified graphs.
- The configuration management function allows batch processing, achieving fast setting of battery parameters.
- Users can customize the home page to know the information to be concerned.

Real-Time Fault Monitoring, Reducing Battery Maintenance Costs Effectively

- The eBIMS real-timely monitors and reports the temperature, voltage, and impedance alarms of all batteries, preventing network accidents caused by battery faults.
- The eBIMS monitors faults 24/7 and provides fault reminders in a timely manner, saving the routine onsite maintenance costs of batteries.

- The eBIMS identifies single batteries that reach their replacement thresholds, avoiding replacement of an entire battery string, reducing abnormal battery retirement from networks, and saving costs.

2 Architecture

About This Chapter

2.1 Overview

This chapter briefly describes the eBIMS hardware and software architecture.

The eBIMS uses the modular design and includes the following basic function modules:

- Battery detection module (eBat)
- Battery module data collection unit (eBox)
- eBIMS software management system

NOTE

The eBIMS software management system includes auxiliary facilities like the server hardware system and operating system.

2.2 Hardware

The eBIMS hardware includes the eBat and eBox.

eBat

The eBat is a battery detection module and communicates with the eBox using wireless connection. The eBat has the following functions:

- Detects the battery voltage.
- Detects the battery impedance.
- Detects the battery temperature.
- Transmits detected battery information to the eBox.

The eBat is connected to the positive and negative ends of a battery using cables. Figure 2-1 shows the eBat appearance.

Figure 2-1 eBat appearance

Table 2-1 lists relevant parameters of the eBat.

Table 2-1 Technical specifications of the eBat

No.	Item	Parameter	Remarks
—	Dimensions	48.5 mm (L) x 35 mm (W) x 17 mm (H)	—
1	Radio frequency (RF) 2.4 GHz	IEEE 802.15.4	The eBat communicates wirelessly with the eBox using RF 2.4 GHz.
2	Port	—	The eBat leads out four cables from the port. Two red cables and two black cables are connected to positive and negative ends of a battery.

eBox

The eBox is a battery module data collection unit for collecting the battery voltage/impedance/temperature data, and providing collected data to the eBIMS. The eBox has the following functions:

- Collects the battery voltage.
- Collects the battery impedance.
- Collects the battery temperature.
- Transmits battery parameters to the server.

Figure 2-2 shows the eBox appearance.

Figure 2-2 eBox appearance

Table 2-2 lists relevant parameters of the eBox.

Table 2-2 Technical specifications of the eBox

No.	Item	Parameter	Remarks
—	Dimensions	145 mm (L) x 95 mm (W) x 33 mm (H)	-
1	RF 2.4 GHz	IEEE 802.15.4	The eBox communicates wirelessly with the eBat using RF 2.4 GHz.
2	GPRS antenna	-	The eBox communicates with the upstream device using GPRS wireless connection.
3	Universal Serial Bus (USB) port	One	Used for device debugging.
4	FE port	One	Using an RJ45 network cable to communicate with the upstream device.
5	SIM card	One	Allowing GPRS wireless

No.	Item	Parameter	Remarks
	connector		communication using a SIM card.
6	Power port	One	Supplies power to the eBox.

NOTE

The eBox provides two types of upstream ports:

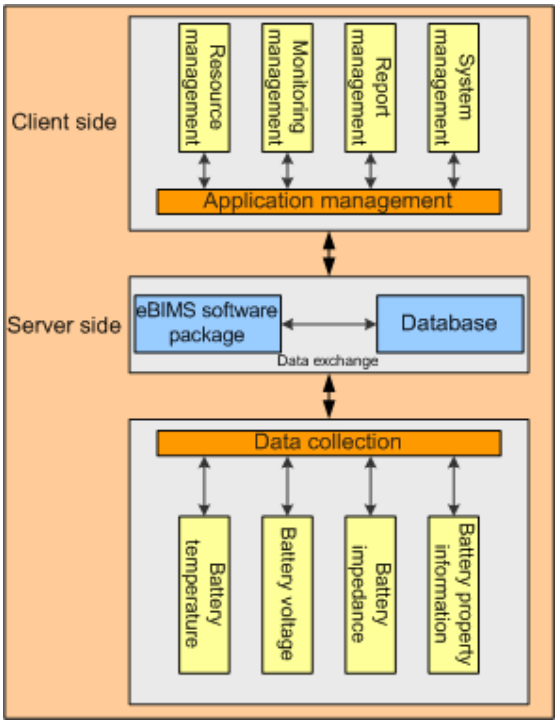
- GPRS wireless port
- FE port

2.3 Software

The eBIMS software architecture includes three parts: data collection, data exchange, and application management.

Figure 2-3 shows the basic architecture.

Figure 2-3 Software architecture of the eBIMS



3 Functions and Features

About This Chapter

3.1 Overview

The eBIMS provides comprehensive battery management functions. The eBIMS real-timely monitors and collects the battery temperature, impedance, and voltage to identify batteries reaching their replacement thresholds, report alarms, guide replacement, and output relevant reports.

3.2 Resource Management

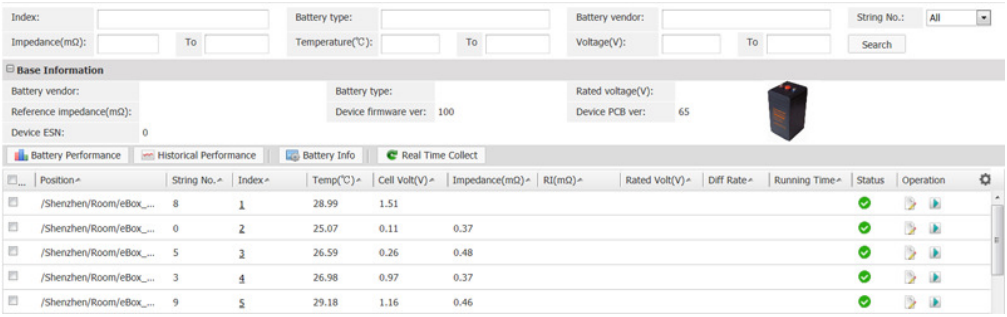
The eBIMS resource management covers management domains and physical resources connected to the eBIMS.

- Physical resources refer to all the devices connected to the eBIMS.
- Management domain refers to a small network separated from a larger network by a certain principle (region or device type) for easy network management. In resource management, this type of small network is called a management domain. The eBIMS **management domains** are classified by **region**, **site**, and **equipment room**.

Resource Management

- Supports creation of a single management domain.
- Supports creation of a single device or devices in batches.
- Supports modification of management domain and device information.
- Supports display of complete information of every battery as shown in Figure 3-1.

Figure 3-1 Battery information list



3.3 Monitoring Management

Monitoring management includes functions like monitoring, collecting, displaying, confirming, clearing, and shielding device alarms, and querying historical events and alarms. These functions facilitate fast discovery, location, and handling of network or device faults.

Alarms are classified into critical, major, minor, and warning alarms.

- Critical alarm: indicates that services have been affected and requires immediate rectification measures.
- Major alarm: indicates that services have been affected and severe results may occur if the alarm is not handled in a timely manner.
- Minor alarm: indicates that services have not been affected but requires rectification measures to prevent more severe faults.
- Warning: indicates that services have not been affected, but potential faults that will affect services have been detected.

Displaying and Collecting Statistics on Alarms

The eBIMS real-timely monitors and receives alarms generated by managed devices, and displays and collects statistics on alarms in various modes.

- Alarm panel
  - The alarm panel displays the alarm quantity and cleared alarms in the current alarm list by severity.
- Alarm histogram
  - The alarm histogram is an eBIMS window displaying alarms. The alarm histogram displays alarms of the managed objects by severity in graphs and numbers.

Querying Alarms

The eBIMS supports view of current alarms and query of historical alarms, events, and performance statistics. Alarms that users need to pay attention to and handle are displayed in the current alarm list.

Acknowledging an Alarm

Acknowledging an alarm indicates that a user has handled this alarm, which does not need to be concerned. If needing to pay attention to this alarm again, unacknowledge this alarm and take corresponding measures.

Clearing Alarms

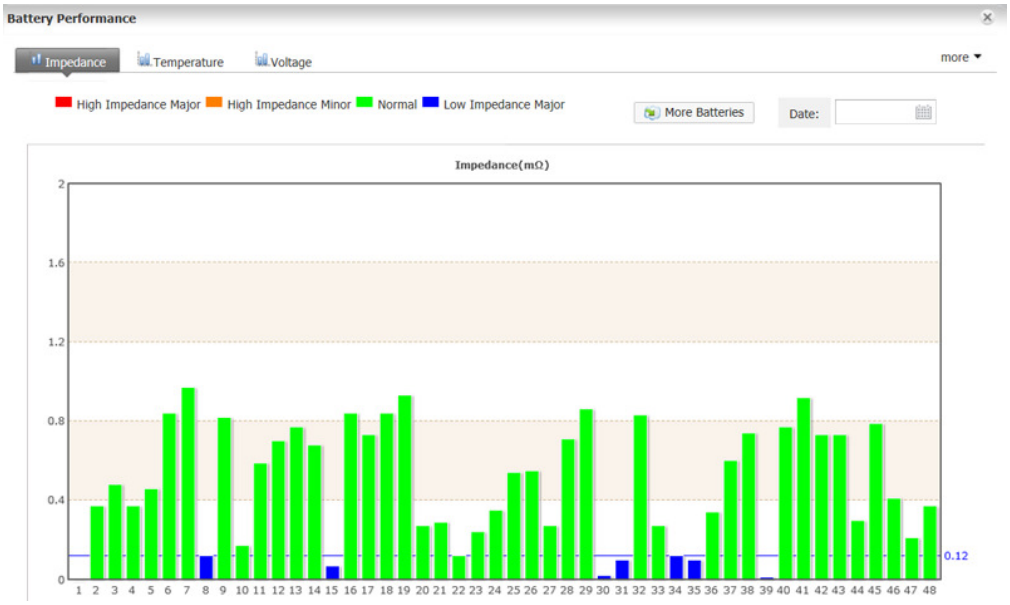
Clearing alarms in a timely manner can effectively prevent service exceptions caused by device malfunctions. The eBIMS supports automatic and manual clearing of alarms.

Shielding Alarms

Shielding rules can be set to shield the alarms that comply with the shielding rules. Shielded alarms can be viewed in the list of shielded alarms.

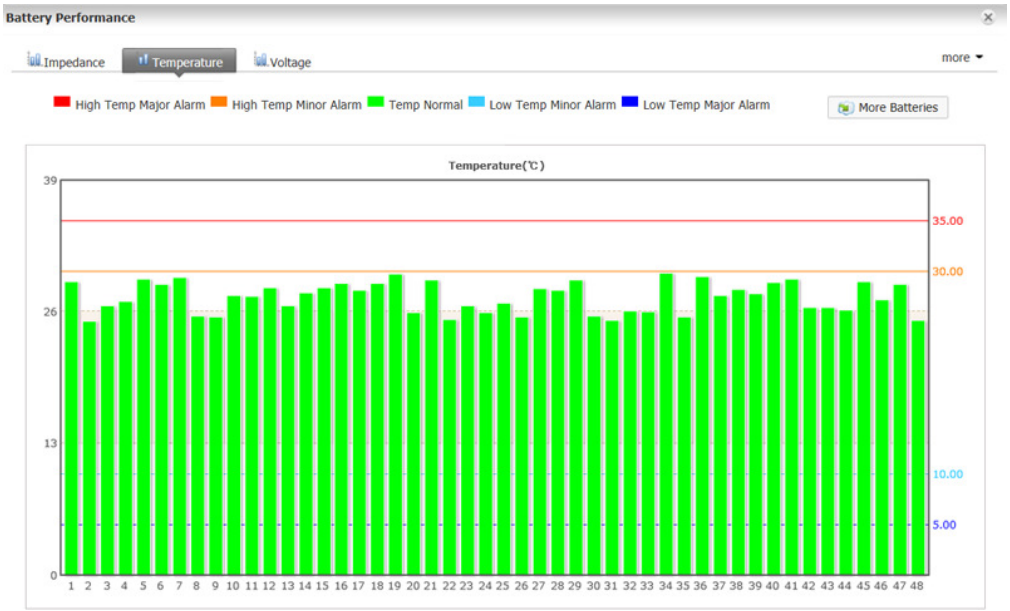
Supports graphic display of the battery impedance

Figure 3-2 Battery impedance comparison



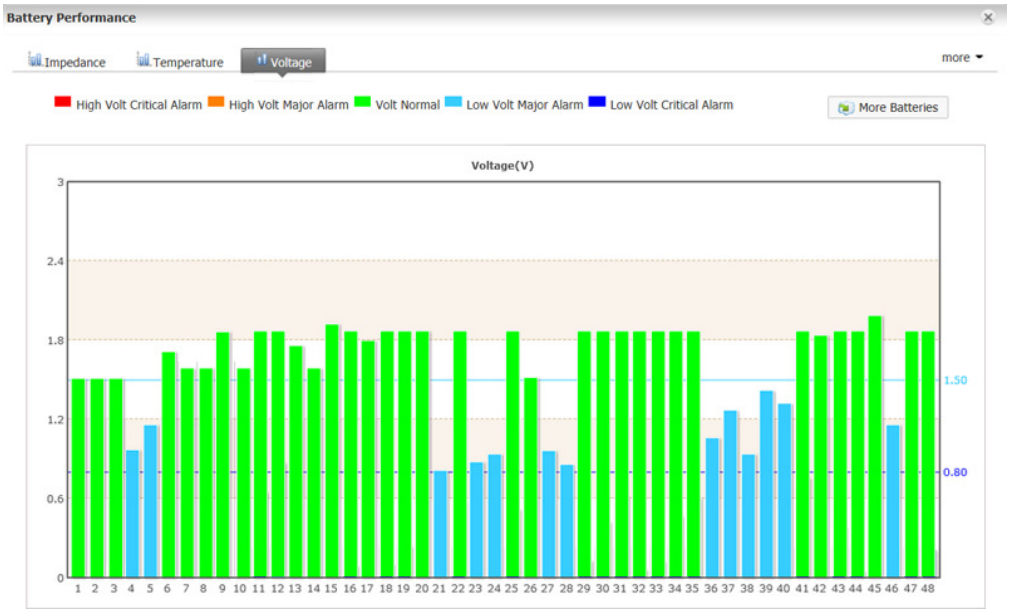
Supports graphic display of the battery temperature

Figure 3-3 Battery temperature comparison



Supports graphic display of the battery voltage

Figure 3-4 Battery voltage comparison



3.4 Report Management

The eBIMS allows users to view and download basic report information, or output reports in the Word, Excel, or PDF format.

By default, the eBIMS outputs the following types of reports:

- Site battery statistics report
- Battery analysis report

Report Management

Report management includes generating, viewing, enabling, disabling, modifying, and deleting a report.

- Generating a report
  - Users can create a report task to generate a report. After a report is generated, the report is saved in the storage area and sent by e-mail if configured.
- Viewing a report
  - After a report is generated, users can view all report contents.
- Enabling a report
  - Users start a report task.
- Disabling a report
  - Users stop a report task.

- Modifying a report
  - Users modify a report task based on needs.
- Deleting a report
  - Users delete an unnecessary report task.

3.5 System Management

System management includes user management, log management, and system configuration.

User Management

The eBIMS supports user information management and system security configuration.

- Creating and modifying users
- Creating and modifying roles
- Changing user passwords
- Setting account policies
- Controlling login IP addresses
- Controlling login time
- Managing user sessions
- Setting idle timeout

Log Management

The eBIMS allows users to view logs to learn about the eBIMS operating status and operations. The eBIMS logs include security logs, system logs, and operation logs.

- Security logs record security operations for the eBIMS, such as user login, changing a password, creating a user, and user logout.
- System logs record events for the eBIMS such as abnormal running, device faults, periodical operations, and database dump.
- Operation logs record user operations on the eBIMS such as adding a device.

System Configuration

System configuration includes component upgrade, database setting, and e-mail server setting.

- Component upgrade
- Setting database dump
- Setting the notification e-mail server

NOTE

Database dump settings are as follows:

- Setting log database dump
- Setting alarm database dump
- Setting performance database dump

4 Application Scenarios

About This Chapter

4.1 Overview

The eBIMS can be deployed inside an outdoor cabinet or indoor equipment room. An equipment room can be a data center power battery room or a site equipment room.

- Deployment inside an outdoor cabinet
  - Both the eBats and eBox are installed inside the outdoor cabinet. The eBats are connected to batteries and the eBox is installed inside the cabinet using hook-and-loop fasteners. One eBox is installed for each cabinet.
- Deployment inside a data center power battery room
  - Both the eBats and eBox are installed inside the indoor equipment room. The eBats are connected to batteries and multiple eBoxes are installed on a wall using screws. One eBox manages 250 eBats.
- Deployment inside a site equipment room
  - Both the eBats and eBox are installed inside the indoor equipment room. The eBats are connected to batteries and the eBox is installed on a wall using screws. One eBox manages 250 eBats.

4.2 Application Scenarios

This section briefly describes the scenarios requiring the eBIMS and typical eBIMS deployment scenarios.

Scenarios Requiring the eBIMS

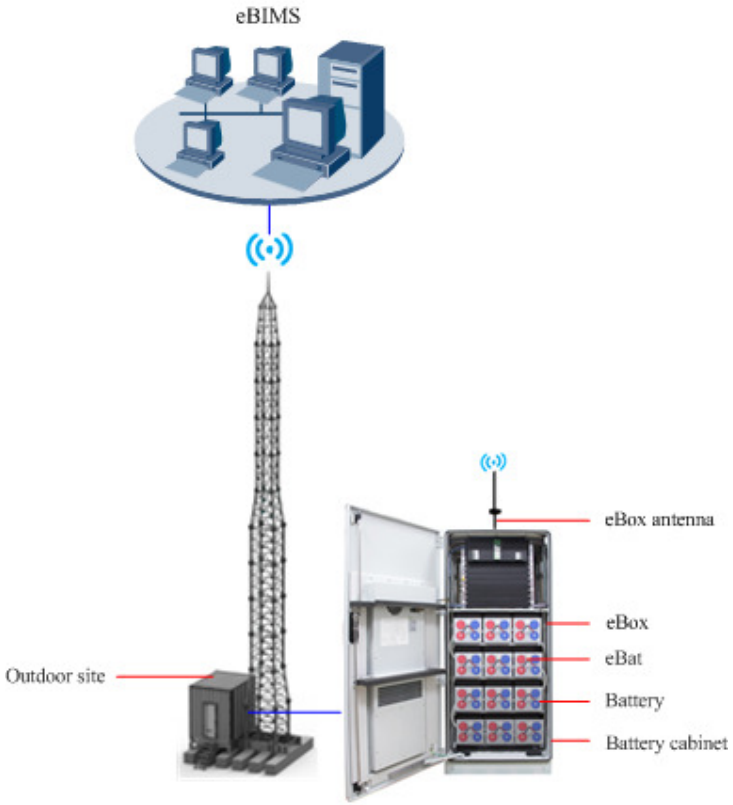
Typical scenarios:

1. Outdoor sites encounter network problems because battery aging due to overcharge/overdischarge/undercharge/underdischarge deteriorates backup time. In this case, maintenance costs are increased because multiple site visits are required to confirm the battery location and quantity, check battery performance, and determine whether to replace batteries.
2. Routine testing and inspection of batteries inside equipment rooms require much human power. Moreover, one-by-one battery check cannot accurately determine the battery status, causing much waste.

Deployment Inside an Outdoor Cabinet

The eBats and eBox are deployed in an outdoor cabinet. They communicate with each other wirelessly. The eBox transmits collected battery data to the server. Users log in to the server to perform real-time monitoring and operations. This solution achieves real-time monitoring and detection of battery status, predicts fault risks, and avoids futile site visits. Maintenance costs are reduced. Figure 4-1 shows details of this scenario.

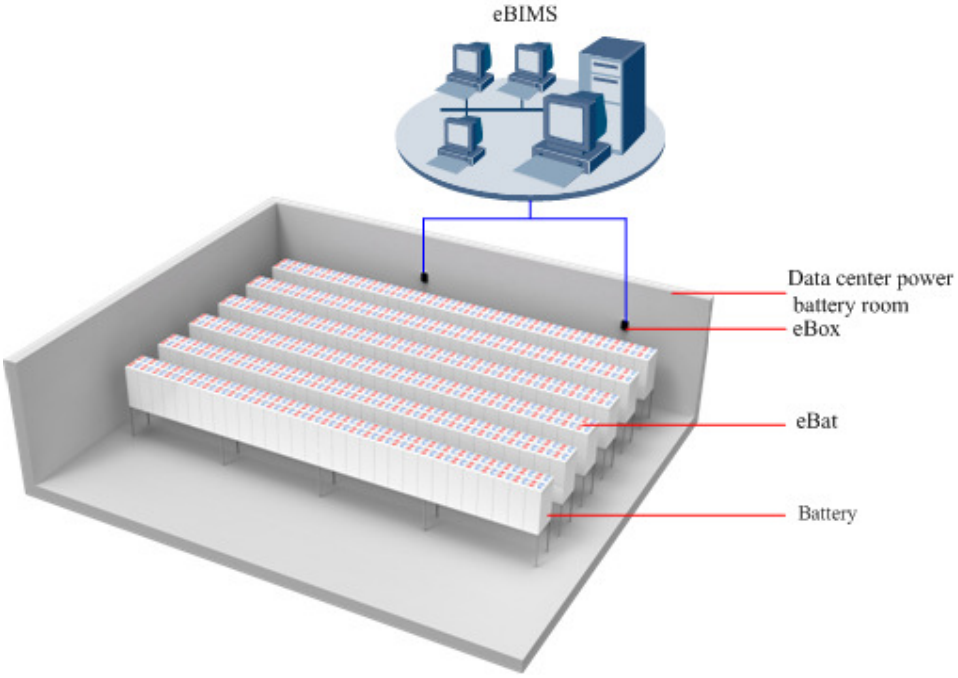
Figure 4-1 Deployment inside an outdoor cabinet



Deployment Inside a Data Center Power Battery Room

The eBats and eBoxes are deployed in a data center power battery room. They communicate with each other wirelessly. Multiple eBoxes transmit collected battery data to the server. Users log in to the server to perform real-time monitoring and operations. This solution achieves real-time detection of battery status and avoids onsite tests, saving costs. Moreover, this solution accurately identifies batteries reaching their replacement thresholds, avoiding waste. Figure 4-2 shows details of this scenario.

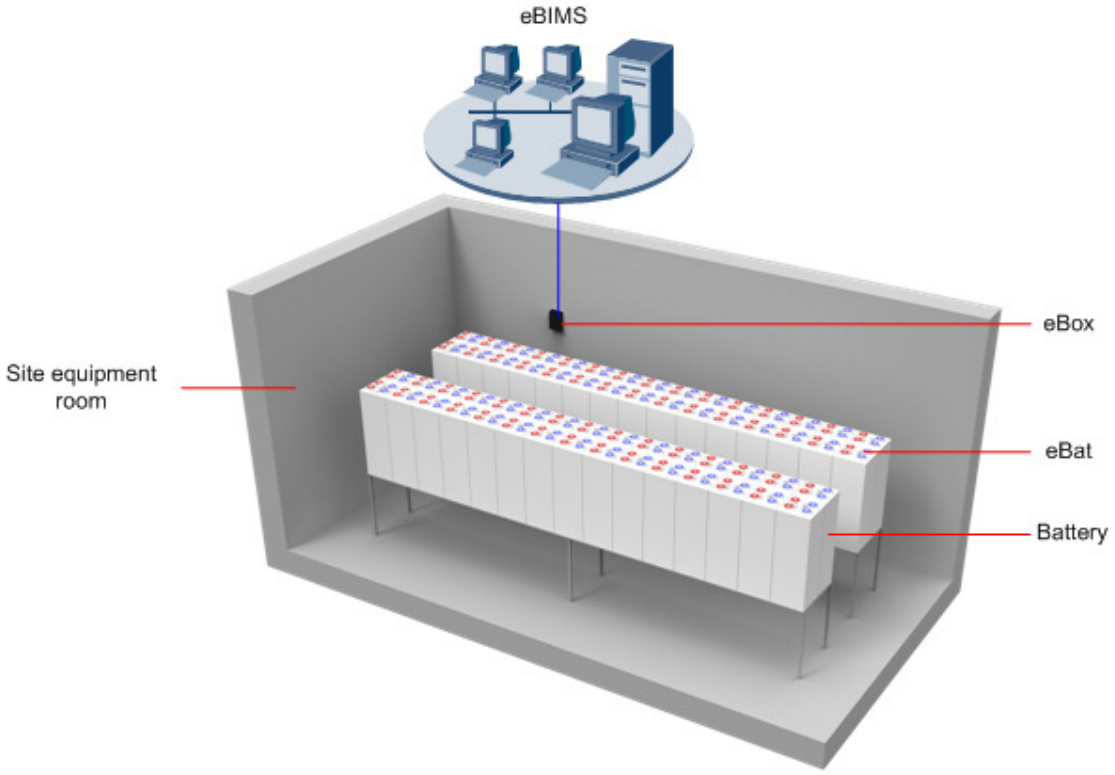
Figure 4-2 Deployment inside a data center power battery room



Deployment Inside a Site Equipment Room

The eBats and eBox are deployed in a site equipment room. They communicate with each other wirelessly. The eBox transmits collected battery data to the server. Users log in to the server to perform real-time monitoring and operations. This solution achieves real-time detection of battery status and avoids onsite tests, saving costs. Moreover, this solution accurately identifies batteries reaching their replacement thresholds, avoiding waste. Figure 4-3 shows details of this scenario.

Figure 4-3 Deployment inside a site equipment room



5 Configuration

About This Chapter

5.1 Overview

The eBIMS uses modular deployment. The typical configuration includes the software system, a set of matched hardware, multiple eBats, and one eBox.

- The eBats, connected to batteries using cables, real-timely monitor the battery voltage, current, and impedance, and wirelessly communicate with the eBox.
- The eBox manages the eBats and transmits collected battery data to the server of the software system.
- Users log in to the eBIMS client to real-timely monitor battery status and take corresponding measures based on actual situations.

5.2 Typical Configuration

The typical eBIMS configuration includes the software system, matched hardware facilities, eBats, and eBox as shown in Table 5-1.

NOTE

The software system requires matched facilities on both the server and client sides.

Typical eBIMS Configuration

Table 5-1 Typical eBIMS configuration

Configuration Item	Configuration Description
eBIMS software	eBIMS
eBat	Multiple

Configuration Item	Configuration Description
	NOTE • The number of eBats is determined by the eBox management capacity and the battery quantity. One eBox manages a maximum of 250 eBats and one eBat is used for each battery. • There are 2 V and 12 V batteries.
eBox	One. The eBox quantity varies with management scenarios.
Matched facilities of the software system	Refer to Table 5-2 and Table 5-3.

Matched Facilities of the Software System on the Server Side

Table 5-2 Matched facilities of the software system on the server side

Configuration Item	Configuration Description
Basic hardware configuration	• CPU: 2 x four-core, 2.4 GHz or above • Memory: 32 GB or above • Disk: 2 TB or above
Operating system	Windows 7 or Windows Server 2008 R2 Standard
Database	MySQL 5.5

Matched Facilities of the Software System on the Client Side

Table 5-3 Matched facilities of the software system on the client side

Configuration Item	Configuration Description
Hardware configuration	• CPU: Intel(R) Pentium(R) dual CPU E2180 @ 2.00 GHz • Memory: 2 GB or above
Operating system	Windows XP, Windows 7, or Windows Server 2008
Browser	Internet Explorer 8.0 or later **NOTE** • Ensure that the Internet Explorer 8.0 works in standard browsing mode. Perform the following steps to check whether the Internet Explorer 8 is in standard browsing mode: 1. Open Internet Explorer 8.0 and choose **Tools > Compatibility View**.

Configuration Item	Configuration Description
	• In the **Compatibility View** dialog box, check **Display intranet sites in Compatibility View** and **Display all websites in Compatibility View** and ensure that they are not selected. • Windows 2008 has a strict security policy. Contact the operating system administrator to modify the security policy before using Internet Explorer 8.0 to log in to the client that runs on Windows 2008.
Monitor resolution	1024 x 768 or higher

6 Technical Specifications

The eBIMS involves eBIMS, eBat, and eBox technical specifications.

Table 6-1 Key technical specifications of the eBIMS

Technical Specifications	Description
Maximum eBoxes managed by the eBIMS	The eBIMS supports a maximum of 3000 eBoxes.
Maximum eBats managed by an eBox	One eBox supports a maximum of 250 eBats.
Maximum clients connected to a server	A maximum of 100 clients can visit one server at the same time.
Effective transmission distance between the eBat and eBox	50 meters to 100 meters
Wireless transmission frequency band between the eBat and eBox	2.4 GHz

Table 6-2 Key technical specifications when an eBat monitors a 2 V DC battery

Technical Specifications	Description
Working voltage	1.5 V DC to 3.3 V DC
Working temperature range	-20°C to 65°C
Voltage detection range	1.5 V DC to 3.3 V DC
Temperature detection range	-20°C to 65°C
impedance detection range	0.1 Mohms to 20 Mohms
Voltage detection precision	2%
Temperature detection precision	The temperature difference is ±2°C in an environment with the temperature range of -25°C to 70°C.

Technical Specifications	Description
impedance detection precision	0.01 Mohms
Quiescent Current	21 mA

Table 6-3 Key technical specifications when an eBat monitors a 12 V DC battery

Technical Specifications	Description
Working voltage	11 V DC to 17 V DC
Working temperature range	-20°C to 65°C
Voltage detection range	11 V DC to 17 V DC
Temperature detection range	-20°C to 65°C
impedance detection range	1.5 Mohms to 60 Mohms
Voltage detection precision	2%
Temperature detection precision	The temperature difference is ±2°C in an environment with the temperature range of -25°C to 70°C.
impedance detection precision	0.1 Mohms
Quiescent Current	7 mA

NOTE
An eBat can monitor a 2 V or 12 V DC battery.

Table 6-4 Key technical specifications of the eBox with GPRS

Technical Specifications	Description
Frequency band supported by GPRS communication	850 MHz/900 MHz/1800 MHz/1900 MHz
Working voltage	-36 V DC to -72 V DC
Working current	300 mA DC Max.
Working temperature range	-20°C to 65°C
Working relative humidity (RH)	5% to 95% RH
Working altitude	-60 meters to 4000 meters

Table 6-5 Key technical specifications of the eBox with FE

Technical Specifications	Description
Working voltage	-36 V DC to -72 V DC
Working current	200 mA DC Max.
Working temperature range	-20°C to 65°C
Working relative humidity (RH)	5% to 95% RH
Working altitude	-60 meters to 4000 meters

7 Acronyms and Abbreviations

Acronym or Abbreviation	Full Name
eBIMS	Battery intelligent management system
eBox	Battery module data collection unit
eBat	Battery detection module
B/S	Browser/Server
FE	Fast Ethernet
RF	Radio frequency

8 Safety Precautions

FCC Part 15B

1. FCC Caution - §15.21:

"Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment."

2. FCC Statement - §15.105(b):

"This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help."