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| --- |
| Controller Message Protocol |
| Version 0.15.10.23 |
| 2015.10.23 |

Table of Contents

[Controller Message Protocol 1](#_Toc433381464)

[*Version 0.15.10.23*  1](#_Toc433381465)

[Table of Contents 2](#_Toc433381466)

[1. Introduction 4](#_Toc433381467)

[1.1. Overview 4](#_Toc433381468)

[1.2. Glossary 5](#_Toc433381469)

[2. Controller Message Protocol 6](#_Toc433381470)

[2.1. CMP PDU Type and Format Definitions 6](#_Toc433381471)

[2.2. CMP PDU Format 6](#_Toc433381472)

[2.3. CMP PDU Layout 6](#_Toc433381473)

[2.4. CMP Session Description 8](#_Toc433381474)

[2.5. CMP PDU Definition 9](#_Toc433381475)

[2.5.1. Bind request syntax 9](#_Toc433381476)

[2.5.2. Bind response syntax 10](#_Toc433381477)

[2.5.3. Authentication request syntax 10](#_Toc433381478)

[2.5.4. Authentication response syntax 11](#_Toc433381479)

[2.5.5. Authorization request syntax 11](#_Toc433381480)

[2.5.6. Authorization response syntax 12](#_Toc433381481)

[2.5.7. Access log request syntax 12](#_Toc433381482)

[2.5.8. Access log response syntax 13](#_Toc433381483)

[2.5.9. Enquire link request syntax 13](#_Toc433381484)

[2.5.10. Enquire link response syntax 14](#_Toc433381485)

[2.5.11. Unbind request syntax 14](#_Toc433381486)

[2.5.12. Unbind response syntax 15](#_Toc433381487)

[2.5.13. Update request syntax 15](#_Toc433381488)

[2.5.14. Update response syntax 16](#_Toc433381489)

[2.5.15. Reboot request syntax 16](#_Toc433381490)

[2.5.16. Reboot response syntax 17](#_Toc433381491)

[2.5.17. Configuration request syntax 17](#_Toc433381492)

[2.5.18. Configuration response syntax 18](#_Toc433381493)

[3. CMP Parameter Definition 19](#_Toc433381494)

[3.1. Command Header Parameters 19](#_Toc433381495)

[3.1.1. Command length 19](#_Toc433381496)

[3.1.2. Command id 19](#_Toc433381497)

[3.1.3. Command status 20](#_Toc433381498)

[3.1.4. Sequence number 21](#_Toc433381499)

[3.2. Mandatory CMP Parameters 21](#_Toc433381500)

[3.2.1. Authentication Info 21](#_Toc433381501)

[3.2.2. Authentication Result 21](#_Toc433381502)

[3.2.3. Authorization status 21](#_Toc433381503)

[3.2.4. Access log 21](#_Toc433381504)

[3.2.5. Configuration item 21](#_Toc433381505)

[3.2.6. Configuration Result 22](#_Toc433381506)

[3.3. Optional Parameter 22](#_Toc433381507)

[4. Notes 22](#_Toc433381508)

# Introduction

## Overview

Controller Message Protocol (CMP)主要提供前端Controller與後端Control Center的通訊服務與管理，Controller主要負責特定服務或特定平台的控制，Controller會將需要集中管理的資訊或管理透過CMP與Control Center做資料交換，後端Control Center除了集中管理每個Controller外，亦負責各平台的服務互相溝通的機制，達到服務互聯的機制，讓不同的服務透過相同的溝通介面來互傳需要的資訊。Control Center伺服器亦會紀錄溝通的相關資訊。

specification.emf

## Glossary

|  |  |
| --- | --- |
| API | Application Programming Interface |
| MSB | Most Significant Bit |
| CMP | Control Message Protocol |
| CMPS | Control Message Protocol Server |
| PDU | Protocol Data Unit |
| HEADER | Leading portion of the CMP message, common to all CMP PDUs |
| SPS | Smart Power Station |

# Controller Message Protocol

The Controller Message Protocol (CMP) is designed to provide a flexible data communications interface for transfer of message data between a server and client.

CMP is based on the exchange of request and response protocol data units (PDUs) between the client and the server over an underlying TCP/IP network connection.

## CMP PDU Type and Format Definitions

|  |  |
| --- | --- |
| **Integer** | An unsigned value with the defined number of octets.  The octets will always be transmitted MSB first (Big Endian). |
| **C-Octet String** | A series of ASCII characters terminated with the NULL character. |
| **C-Octet String**  **(Decimal)** | A series of ASCII characters, each character representing a decimal digit (0 - 9) and terminated with the NULL character. |
| **C-Octet String**  **(Hex)** | A series of ASCII characters, each character representing a  Hexadecimal digit (0 - F) and terminated with the NULL character. |
| **Octet String** | A series of octets, not necessarily NULL terminated. |
| **Octet String**  **(Decimal)** | A series of ASCII characters, each character representing a decimal digit (0 - 9) and not necessarily NULL terminated. |

## CMP PDU Format

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PDU Header (Mandatory) | | | | PDU Body (Optional) |
| Command  Length | Command  Id | Command  Status | Sequence  Number | PDU Body |
| 4 octets | Length = (Command Length value - 4) Octets | | | |

## CMP PDU Layout

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| H  E  A  D  E  R | CMP PDU Field | Size Octets | Type | Description |
| command length | 4 | Integer | The command length field defines the total octet length of the CMP PDU packet including the length field. |
| command id | 4 | Integer | The command id field identifies the particular CMP PDU.  A unique command identifier is allocated to each CMP request PDU in the range:  0x00000000 to 0x000001FF  A unique command identifier is also allocated to each CMP response PDU in the range:  0x80000000 to 0x800001FF  The complete list of CMP command codes is defined in |
| command status | 4 | Integer | The command status field indicates the success or failure of a CMP request.  It is relevant only in the CMP response PDU and it must contain a NULL value in a CMP request PDU.  The complete list of CMP Error codes is defined in |
| sequence number | 4 | Integer | This field contains a sequence number which allows CMP requests and responses to be associated for correlation purposes. The use of sequence numbers for message correlation allows CMP PDUs to be exchanged asynchronously.  The sequence number should be increased monotonically for each request PDU and must be preserved in the associated CMP response PDU.  The sequence number may range from:  0x00000001 to 0x7FFFFFFF. |
| B  O  D  Y | Mandatory Parameters | Var. | mixed | A list of mandatory parameters corresponding to that CMP PDU defined in the command id field. |
| Optional Parameters | Var. | mixed | A list of Optional Parameters corresponding to that CMP PDU defined in the command id field. |

## CMP Session Description

A CMP session between a server and a client is initiated by the client first establishing a network connection with the server and then issuing a CMP Bind request to open a CMP session.

session.emf

CMP Client and CMP Server entire communication process, mainly divided into Bind, Commands, Unbind three parts.

## CMP PDU Definition

### Bind request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to bind request. |  |
| command status | 4 | Integer | Set to STATUS\_ROK |  |
| sequence number | 4 | Integer | Set to a unique sequence number.  The associated bind response PDU will echo the same sequence number. |  |
| B  O  D  Y | Controller ID | Var. | C-Octet String | Mandatory Parameter.  Set to a unique recognition ID. |  |
|  |  |  |  |  |

### Bind response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to bind response. |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to sequence number of original bind request. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Authentication request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to authentication request |  |
| command status | 4 | Integer | Set to STATUS\_ROK |  |
| sequence number | 4 | Integer | Set to a unique sequence number. The associated authentication response PDU will echo this sequence number. |  |
| B  O  D  Y | Authentication Info | Var. | C-Octet String | Mandatory Parameter.  Information of authentication. |  |
|  |  |  |  |  |

### Authentication response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to authentication response |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to sequence number of original authentication request PDU. |  |
| B  O  D  Y | Authentication result | Var. | C-Octet String | Mandatory Parameter. |  |
|  |  |  |  |  |

### Authorization request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to authorization  request |  |
| command status | 4 | Integer | Set to STATUS\_ROK |  |
| sequence number | 4 | Integer | Set to a Unique sequence number. The associated authorization \_response PDU will echo this sequence number. |  |
| B  O  D  Y | Authentication Info | Var. | C-Octet String | Mandatory Parameter.  Information of authentication. |  |
|  |  |  |  |  |

### Authorization response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to authorization  \_response |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to sequence number of original authorization \_request PDU. |  |
| B  O  D  Y | Authorization status | Var. | C-Octet String | Mandatory Parameter. |  |
|  |  |  |  |  |

### Access log request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU |  |
| command id | 4 | Integer | Value corresponding to access log request |  |
| command status | 4 | Integer | Set to STATUS\_ROK |  |
| sequence number | 4 | Integer | Set to a unique sequence number. The associated access log response PDU should echo the same sequence number. |  |
| B  O  D  Y | Access log | Var. | C-Octet String | Mandatory Parameter. |  |
|  |  |  |  |  |

### Access log response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to access log response |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to the same sequence number of original access log request PDU |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Enquire link request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to enquire link request. |  |
| command status | 4 | Integer | Set to STATUS\_ROK. |  |
| sequence number | 4 | Integer | Set to a unique sequence number. The associated enquire link response PDU should echo the same sequence number. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Enquire link response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to enquire link response. |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to the same sequence number of original enquire link request PDU. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Unbind request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to unbind request. |  |
| command status | 4 | Integer | Set to STATUS\_ROK |  |
| sequence number | 4 | Integer | Set to a unique sequence number. The associated unbind response PDU should echo the same sequence number. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Unbind response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU |  |
| command id | 4 | Integer | Value corresponding to unbind response |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to the same sequence number of original unbind request PDU. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Update request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to update request. |  |
| command status | 4 | Integer | Set to STATUS\_ROK. |  |
| sequence number | 4 | Integer | Set to a unique sequence number. The associated update response PDU should echo the same sequence number. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Update response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to update response. |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to the same sequence number of original update request PDU. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Reboot request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to reboot request. |  |
| command status | 4 | Integer | Set to STATUS\_ROK. |  |
| sequence number | 4 | Integer | Set to a unique sequence number. The associated reboot response PDU should echo the same sequence number. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Reboot response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to reboot response. |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to the same sequence number of original reboot request PDU. |  |
| B  O  D  Y |  |  |  |  |  |
|  |  |  |  |  |

### Configuration request syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to configuration request. |  |
| command status | 4 | Integer | Set to STATUS\_ROK. |  |
| sequence number | 4 | Integer | Set to a unique sequence number. The associated configuration response PDU should echo the same sequence number. |  |
| B  O  D  Y | Configuration item | Var. | Octet  String | Mandatory Parameter.  Item of Configuration.  Terminated with the space character. |  |
| Configuration value | Var. | C-Octet  String | Mandatory Parameter.  Value of Configuration.  Terminated with the NULL character. |  |

### Configuration response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to configuration response. |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to the same sequence number of original configuration request PDU. |  |
| B  O  D  Y | Configuration result | Var. | C-Octet  String | Mandatory Parameter. |  |
|  |  |  |  |  |

### Power port setting request syntax

This syntax is defined for smart power station.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to power port setting request. |  |
| command status | 4 | Integer | Set to STATUS\_ROK. |  |
| sequence number | 4 | Integer | Set to a unique sequence number. The associated configuration response PDU should echo the same sequence number. |  |
| B  O  D  Y | Wire number | Var. | Octet String  (Decimal) | Mandatory Parameter. | 3.2.7 |
| Port number | Var. | C-Octet String  (Decimal) | Mandatory Parameter. | 3.2.8 |

### Power port setting response syntax

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| H  E  A  D  E  R | Field Name | Size  octets | Type | Description | Ref. |
| command length | 4 | Integer | Set to overall length of PDU. |  |
| command id | 4 | Integer | Value corresponding to power port setting response. |  |
| command status | 4 | Integer | Indicates status of original request. |  |
| sequence number | 4 | Integer | Set to the same sequence number of original power port setting request PDU. |  |
| B  O  D  Y | power port setting result | Var. | C-Octet  String | Mandatory Parameter. |  |
|  |  |  |  |  |

# CMP Parameter Definition

This section describes the parameters which can be specified in a CMP command.

## Command Header Parameters

### Command length

The command length parameter indicates the length in octets of the CMP message. The CMP message header (including the command length field itself), the mandatory parameters and the optional parameters are all considered.

### Command id

The command id field identifies the type of message the CMP PDU represents, for example, bind request, bind response etc.

#### CMP Command set

The complete set of Packet Command IDs and their associated values are defined in the following table.

|  |  |
| --- | --- |
| Command ID | Value |
| Generic nack | 0x80000000 |
| Bind request | 0x00000001 |
| Bind response | 0x80000001 |
| Authentication request | 0x00000002 |
| Authentication response | 0x80000002 |
| Authorization request | 0x00000004 |
| Authorization response | 0x80000004 |
| Access log request | 0x00000005 |
| Access log response | 0x80000005 |
| Enquire link request | 0x00000015 |
| Enquire link response | 0x80000015 |
| Unbind request | 0x00000006 |
| Unbind response | 0x80000006 |
| Update request | 0x00000007 |
| Update response | 0x80000007 |
| Reboot request | 0x00000010 |
| Reboot response | 0x80000010 |
| Configuration request | 0x00000011 |
| Configuration response | 0x80000011 |
| Power port setting request | 0x00000012 |
| Power port setting response | 0x80000012 |

### Command status

The command status field of a CMP message response indicates the success or failure of a CMP request.

It is relevant only in the CMP response message and should be set to NULL in CMP request messages.

The complete set of CMP Error Codes and their associated values are defined in the following table.

|  |  |  |
| --- | --- | --- |
| Error Code | Value | Description |
| STATUS\_ROK | 0x00000000 | No Error |
| STATUS\_RINVMSGLEN | 0x00000001 | Message Length is invalid |
| STATUS\_RINVCMDLEN | 0x00000002 | Command Length is invalid |
| STATUS\_RINVCMDID | 0x00000003 | Invalid Command ID |
| STATUS\_RINVBNDSTS | 0x00000004 | Incorrect BIND Status for given command |
| STATUS\_RALYBND | 0x00000005 | Already in Bound State |
| Reserved | 0x00000006 | Reserved |
| Reserved | 0x00000007 | Reserved |
| STATUS\_RSYSERR | 0x00000008 | System Error |
| Reserved | 0x00000009 | Reserved |
| STATUS\_RBINDFAIL | 0x0000000D | Bind Failed |
| STATUS\_RINVCTRLID | 0x0000000F | Invalid Controller ID |
| STATUS\_RINVBODY | 0x00000010 | Invalid Packet Body Data |

### Sequence number

A sequence number allows a response PDU to be correlated with a request PDU.

The associated CMP response PDU must preserve this field.

The allowed sequence number range is from 0x00000001 to 0x7FFFFFFF.

## Mandatory CMP Parameters

### Authentication Info

This parameter is defined by user.

### Authentication Result

The authentication result parameter specifies the result of the authentication request.

“Y”：Authorization successful

“N”：Authorization failed

### Authorization status

The authorization status parameter specifies the result of the authentication request.

“Y”：Authorization successful

“N”：Authorization failed

### Access log

This parameter is defined by user.

### Configuration item

|  |  |  |
| --- | --- | --- |
| **Item Name** | **Item Value** | **Description** |
| Enquire Link Timer | “enquire\_timer” | How many times to send enquire link PDU. |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### Configuration Result

“Y”：success

“N”：fail

### Wire number

This parameter is defined for smart power station.

The value will set number “1”、”2”、”3”、”4”.

### Port number

This parameter is defined for smart power station.

The value is four numbers.

“0”：Power port off.

“1”：Power port on.

Ext：”1011” is “on” “off” “on” “on”

### Power port setting result

“Y”：success

“N”：fail

## Optional Parameter

Optional Parameters are fields, which may be optionally included in a CMP packet.

Optional Parameters must always appear at the end of a packet.

# Notes