# COMMON APPLICATION LAYERS

V1.3

| Version | Modifications | Date |
|---|---|---|
| 1.0 | Initial version | 22/09/2017 |
| 1.1 | Separation of common applicative layer elements into a specific document | 07/06/2019 |
| 1.2 | Revision of the L6App table for backward compatibility | 01/02/2020 |
| 1.2.1 | Editorial corrections (references and table numbers) | 21/11/2020 |
| 1.3 | Minor improvements for passive roaming support :<br>- Modification of the semantics of COMMAND_WRITEKEY for simultaneous change of L6NetwId and KMAC<br>- Addition of an optional L6PrimaryNetwId to INSPONG mlessages | 08/07/2021 |

## Summary

This document outlines the Detailed Functional and Technical Specification of the Wize LAN protocol

common application layers (mandatory for any Wize device). The LAN network designates the medium range radio network between the devices and the gateways.

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# Tables and figures

## Contributors

See document [R1]

# 1 Introduction

This document **specifies the common Application layers** of the Wize LAN protocol : APP-INSTALL, APP-ADMIN, APP-DOWNLOAD.

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# 2 Reference documents

## 2.1 Applicable standards

See document [R1].

## 2.2 Main specifications

| Reference | Document | Version |
|---|---|---|
| R[1] | Wize Alliance : WIZE – 01 LAN protocol Specification | V1.3 |
| R[2] | Wize Alliance : WIZE – 02 Regional parameters | V1.1 |

# 3 Application Layers index

In addition to physical, data link and presentation layers, the Wize Protocol specifies several application layers to satisfy the requirements of all targeted end application, while using the same infrastructure and transport protocols. These application layers are part of the Wize Specification but specified in separate documents published under the control of the Wize Alliance Technical Committee.

The Wize application layers are split into two categories :

- **Common application layers** (mandatory for any Wize device).
- **Specific application layers** (optional, specific to each target end application. A given Wize device can support one or several specific application layers, or even no specific application layer (test devices for example).

The selection of the application layer for a given message is done through the L6App field, transmitted as part of the L6 presentation layer header

The L6App table lists all the L6App IDs corresponding to all application layers allocated by the Wize Alliance. The updated version shall be found on the Wize Alliance Website, an example can be found in Informative Appendix B of this document.

NOTE: Members are free to create a new Application layer tailored to their specific needs. If one member wishes to share a new Application layer with the Wize community please get in touch with the Wize Alliance in order to submit it, have it provided with a specific L6App ID and added to the L6App management table.

In this case, please send an email to contact@wize-alliance.com, with the subject “New L6App ID request”.

# 4 Detailed specification of the common application layers

Link Layer format is defined in Wize – 01 LAN Protocol document, see §2.1 Format of LLC- Exchange frames

## 4.1 Mode for representation of dates and times

Date and time representation formats can be freely defined by each application layer. However, to guarantee homogeneity and flexibility, the following format is recommended to transfer the time indications (dates and times) on the LAN interface in the application level frames:

- For an absolute time indication: in the form of an EPOCH encoded over 32 bits and corresponding to the number of seconds since the 1st of January 2013 at 00:00 (easily convertible into EPOCH Unix by adding a constant to the Head-End system).
- For a relative time indication during the day: in the form of the number of seconds since midnight on the current day (0 to 86399), divided by two (0 to 43200) and encoded over 2 bytes, thus with a resolution of 2 seconds.
- For L6TStamp : the 2 least significant bytes of the absolute EPOCH with one second resolution.

| Numerical value V to be represented | Byte 1 | Byte 2 | Byte 3 | Byte 4 |
|---|---|---|---|---|
| **Absolute, 1/1/2013 00:00:00 to 7/2/2149 06:28:00** | MSB EPOCH | MID1 EPOCH | MID2 EPOCH | LSB EPOCH |
| **Relative in a day, from 00:00 to 23:59:59** | MSB NSEC/2 | LSB NSEC/2 | | |
| **L6TStamp** | MID2 EPOCH | LSB EPOCH | | |

*Table 1 : Encoding time stamps*

If necessary, differences in time between two dates are represented by the number of seconds between the two times.

## 4.2 Device configuration model

For a simple and consistent administration and monitoring model, the devices are managed via data table readings and writings. This table contains two types of data:

- Status variables and parameters relating to actual LAN protocol management and common application layers, specified in this document (see 5.1), numbered from $00 to $5F
- Status variables and parameters relating to specific application layers, numbered from $60 to $FF

*Note: the same reading/writing mechanism for a generic parameter table is used to access the device via the local interface.*

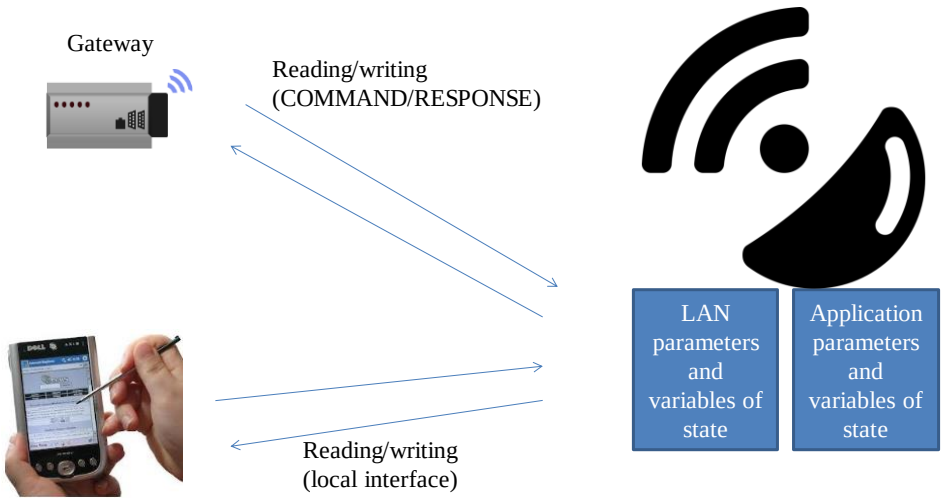



*Figure 1 : Configuration model*

The devices allow reading and/or modification of the values of each of the LAN and application parameters via COMMAND/RESPONSE messages of the APP-ADMIN application layer (see 4.4), even for variables and parameters defined by other specific application layers if they follows the recommended Wize model.

An error code must be returned by the device in the event of illegal operations :

- Attempt to read or write a non-existing parameter
- Attempt to read a parameter only accessible in writing or to write a parameter only accessible in reading
- Attempt to write a parameter with a value outside the acceptable ranges
- Other error cause specified by the manufacturer

## 4.3 APP-INSTALL application layer (mandatory)

### 4.3.1 INSTPING message

Only one message can be sent by a device using the APP-INSTALL application layer, named INSTPING. The format of the application Layer payload of this INSTPING message, sent by a device to determine the gateways and LAN modems nearby, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7DownChannel | Frequency channel to be used by the gateway for the response (same coding as RF_UPLINK_CHANNEL parameter, see Regional Parameters document) |
| 2 | L7DownMod | Modulation to be used by the gateway for the response (same coding as RF_UPLINK_MOD parameter, see Regional Parameters document ) |
| 3 | L7PingRxDelay | Value of the current PING_RX_DELAY parameter of the device, see APPENDIX A. |
| 4 | L7PingRxLength | Value of the current PING_RX_LENGTH parameter of the device, see APPENDIX A. |

*Table 2 : INSTPING application message format*

INSTPING and INSTPONG messages are never encrypted (L6Ctrl.L6KeySel=0) and only contain an authentication footprint calculated using the Kmac key, see LAN Protocol document, section 6.1.

*Note 1: in terms of security, INSTPING/INSTPONG exchanges will thus be on the same level as Kmac authentication.*

*Note 2: the L7DownChannel and L7DownMod parameters are positioned by the device at the values defined by the RF_DOWNLINK_CHANNEL and RF_DOWNLINK_MOD parameters, respectively. These parameters allow a gateway to respond to an INSTPING message even if there is no connection with the Head-End system.*

On reception of an INSTPING message, the gateway respond by an INSTPONG message for each LAN modem that has received the message.

In particular, the INSTPING/INSTPONG mechanism do support passive roaming. More precisely, if several Wize operators provide service in a given area then all of them respond to the INSTPING message sent by a device, as long as the L6NetwId field of the INSTPING message is one of their supported virtual networks. In particular, if the L6NetwId field of the INSTPING message is the L6NetwId of the OneWize easy commissioning virtual network then all networks supporting OneWize service must answer with an INSTPONG.

### 4.3.2 INSTPONG message

The format of the application layer payload of the INSTPONG message, returned by each gateway for each LAN modem that has received an INSTPING message, is as follows:

When L6NetwId of the INSPING message is NOT the L6NetwId of OneWize easy commissioning service :

| Byte | Description | Comments |
|---|---|---|
| 1 | L7ConcentId | Gateway numerical identification: same as the ID |
| 2 | | |
| 3 | | Used in WAN messages.<br>MSBs first |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | L7ModemId | Numerical identification of the LAN modem that has received the message |
| 8 | L7RSSI | Reception RSSI by the LAN modem of the INSTPING message transmitted by the device.<br><br>Value in steps of 0.5dBm, from 0 (-147.5dBm) to 255 (-20dBm) |

When L6NetwIf of the INSTPING message is the L6NetwId of OneWize easy commissioning service :

| Byte | Description | Comments |
|---|---|---|
| 1 | L7ConcentId | Gateway numerical identification: same as the ID |
| 2 | | |
| 3 | | Used in WAN messages.<br>MSBs first |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | L7ModemId | Numerical identification of the LAN modem that has received the message |
| 8 | L7RSSI | Reception RSSI by the LAN modem of the INSTPING message transmitted by the device.<br><br>Value in steps of 0.5dBm, from 0 (-147.5dBm) to 255 (-20dBm) |
| 9 | L6PrimaryNetwId | Primary L6NetwId of the receiving network/gateway |

*Table 3 : INSTPONG application message format*

*Note: as a reminder, INSTPING and INSTPONG messages are never encrypted and only contain an authentication footprint calculated using the Kmac key*

## 4.4 APP-ADMIN application layer (mandatory)

### 4.4.1 COMMAND messages

#### 4.4.1.1 COMMAND_READPARAMETERS

The format of the application part of the COMMAND_READPARAMETERS message allowing the Head-End system to read one or more parameters in a device, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7CommandId | Fixed value $10 ID COMMAND_READPARAMETERS |
| 2 | ParamId1 | ID of the first parameter to read |
| 3 | ParamId2 | ID of the second parameter to read |
| 4 | … | Etc. |

*Table 4 : COMMAND_READPARAMETERS application message format*

*The parameter IDs are defined in appendix A.*

On reception of a COMMAND_READPARAMETERS message, the device must respond by a RESPONSE_READPARAMETERS message (see 4.4.2.3).

#### 4.4.1.2 COMMAND _WRITEPARAMETERS

The format of the application part of the COMMAND_WRITEPARAMETERS message allowing one or more parameters to be written in a device, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7CommandId | Fixed value $20 ID COMMAND_WRITEPARAMETERS |
| 2 | ParamId1 | ID of the first parameter to write |
| 3 | ParamValue1 | Value of the first parameter (number of bytes T1) |
| … | … | … |
| 3+T1 | ParamId2 | ID of the second parameter to write |
| 4+T1 | ParamValue2 | Value of the second parameter (number of bytes T2) |
| … | … | Etc. |

*Table 5 : COMMAND_WRITEPARAMETERS application message format*

*The parameter IDs are defined in appendix A.*

Each device can support the reception of application level frames of a given maximum length, according to its internal design, which in turn depends on the maximum size of the application messages to be received. This length is defined by the MANUFACTURER and is accessible by reading the parameter L7RECEIVE_LENGTH_MAX.

Should the gateway send the device a message of a size greater than the maximum size supported in reception by the device, the latter must ignore the command. A minimum value of parameter L7RECEIVE_LENGTH_MAX is defined in 5.1.

The Head-End system can thus either use this minimum value, by definition supported by all the devices, or optimise its requests to the capacities of a given device by reading the value of this parameter.

On reception of a COMMAND_WRITEPARAMETERS message, the device must first respond by a RESPONSE_WRITEPARAMETERS message (see 4.4.2.4), before taking into account the new parameters immediately after sending the response. The response must thus be sent using the old parameters (in particular in case of change of radio channel or similar).

#### 4.4.1.3 COMMAND_WRITEKEY

The format of the application part of the COMMAND_WRITEKEY message allowing modification of the key of a device, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7CommandId | Fixed value $28 ID COMMAND_WRITEKEY |
| 2 | L7KeyId | ID of the key to be modified. Values authorised = 01,corresponding to the Kmob key,<br>02 for the Kmac Key<br>The other values are reserved for future upgrades of the protocol. |
| 3 to 34 | L7KeyVal | New value of the key (256 bits, MSB first) |
| 35 | L7KIndex | Index of new key<br><br>For Kmob key, this field contains L7KmobIndex in case of Kmob,<br><br>For Kmac key, this field :<br><br>- Must be set to 0 if the device must keep its L6NETWID |

| | | |
|---|---|---|
| | | unchanged<br>- Must be set to the new L6NETWID value of the device if the device must change simultaneously its L6NETWID.<br><br>Value from 0 to 255 |

*Table 6 : COMMAND_WRITEKEY application message format*

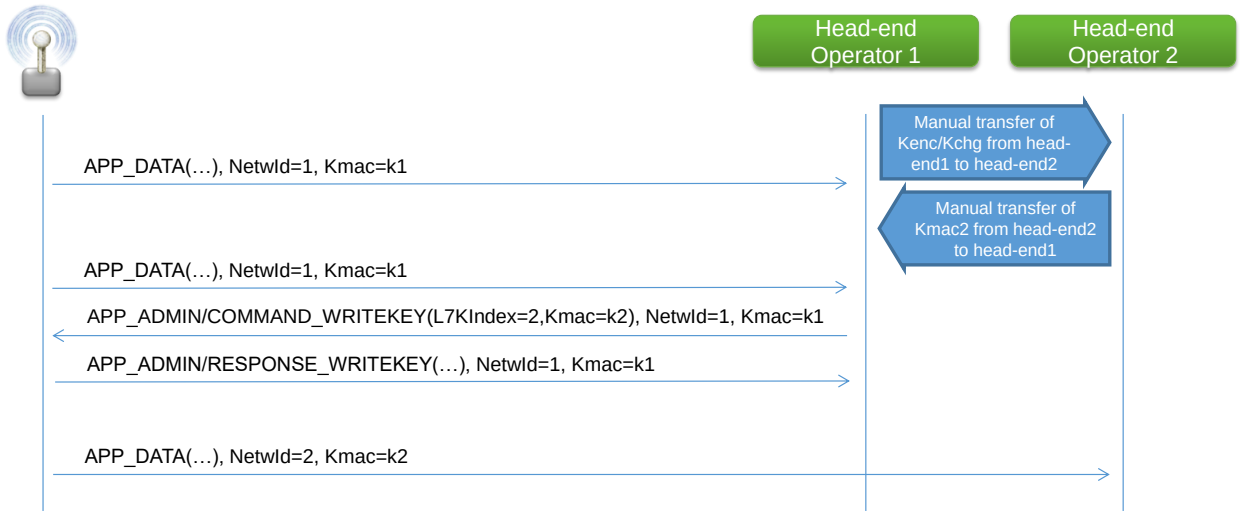
This message is always sent using the Kchg encryption and authentication key, where the L6Ctrl.L6KeySel key equals 15. The device must refuse the command and return an error code if this is not the case.

*Note: the L7KeyVal field is defined over 128 bits in the current version of the LAN protocol specification. If a longer key needs to be supported, this will occur through a change in LAN specification, identified by the L6Ctrl.L6Vers protocol version number.*

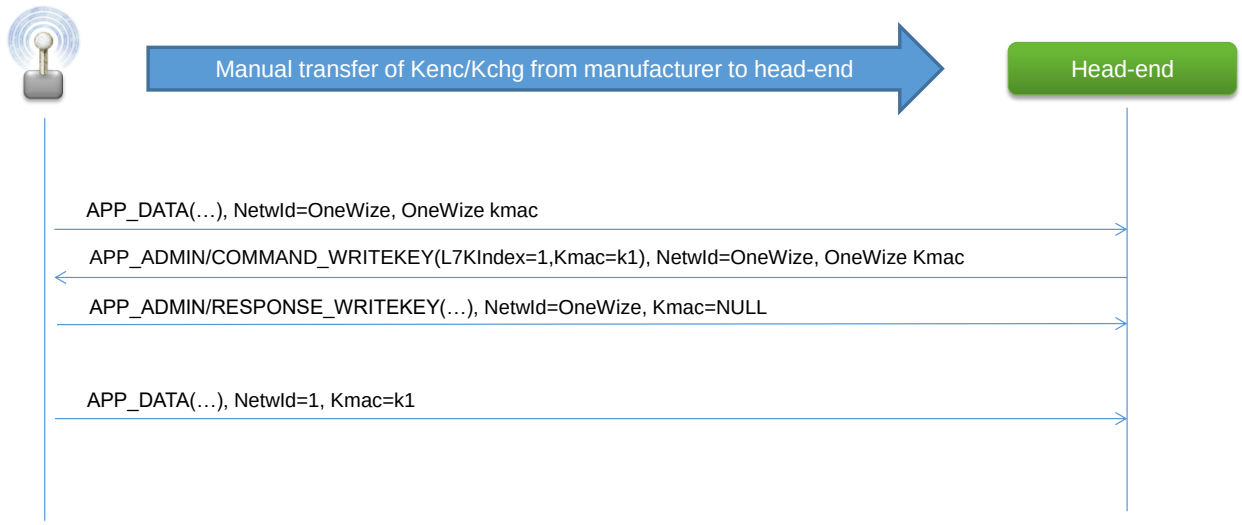
On reception of a COMMAND_WRITEKEY message, the device must respond by a RESPONSE_WRITEKEY message (see **Erreur ! Source du renvoi introuvable.**), using the Kchg encryption and authentication key.

Nota : The COMMAND_WRITEKEY message is then used to move a device from a virtual network to another virtual network. This can be used either to effectively change from one Wize operator to another one, or to reconfigure the device from OneWize virtual network to an actual Wize network identifier :

Example of moving from network 1 to network 2 :




Example of moving from OneWize to actual network identifier :




#### 4.4.1.4 COMMAND_ANNDOWNLOAD

The format of the application part of the COMMAND_ANNDOWNLOAD message allowing notification of a software download sequence, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7CommandId | Fixed value $30 ID COMMAND_ANNDOWNLOAD |
| 2<br>3<br>4 | L7DwnldId | Identification number of the software download sequence (the same ID is then used in the L2Dwnld field on effective download of the software, see **Erreur ! Source du renvoi introuvable.**)<br><br>MSBs first |
| 5<br>…<br>20 | L7Klog | Encryption key used for software download<br><br>128 bits, MSBs first |
| 21<br>22 | L7SwVersionIni | Initial software version of the device<br><br>MSBs first |
| 23<br>24 | L7SwVersionTarget | Final software version of the device<br><br>MSBs first |
| 25<br>26 | L7MField | Indication of the device MANUFACTURER as per EN13757-4 (LSBs first) |
| 27<br>28 | L7DcHwId | Identification of the hardware version of the device<br>MSB first |
| 29<br>30 | L7BlocksCount | Number of software download blocks |
| 31 | L7ChannelId | Identification of the software download channel (same coding as RF_UPLINK_CHANNEL parameter, see Regional Parameters document) |
| 32 | L7ModulationId | Identification of the modulation used for software download<br>(same coding as RF_UPLINK_MOD parameter, see Regional Parameters document) |
| 33<br>34<br>35 | L7DaysProg | First broadcasting date, encoded over 4 bytes as EPOCH. The device must check :<br>Current_epoch-(10x24x3600)<= L7DaysProg and<br>L7DaysProg <= Current_epoch+(60x24x3600).<br>If not error is returned |

| | | |
|---|---|---|
| 36 | | |
| 37 | L7DaysRepeat | Number of broadcasting days (From 1 to 15). |
| 38 | L7DeltaSec | Time between the transmission of the two data blocks from beginning to beginning in tele distribution, in seconds<br>According to the value of parameter L7ModulationId :<br>• The parameter of L7DeltaSec can take on a value of 10 to 255 to 2400 bauds, and of 5 to 255 to 4800 bauds<br>• The recommended value of L7DeltaSec is of 10 (10 seconds) to 2400 bauds, and of 5 (5 seconds) to 4800 bauds |
| 39<br>40<br>41<br>42 | HashSW | Integrity check of the complete software. This field is defined by the MANUFACTURER, transmitted in the software download notification by the Head-End system, and checked by the software developed by the MANUFACTURER once all the blocks for a software download have been received |

*Table 7 : COMMAND_ANNDOWNLOAD application message format*

This message is always transmitted using the Kch encryption and authentication key, where the L6Ctrl.L6KeySel field equals 15. The device must refuse the command and return an error code if this is not the case.

*Note: the L7Klog field is defined over 128 bits in the current version of the LAN protocol specification. If a longer key needs to be supported, this will be achieved by a change in LAN specification, identified by the L6Ctrl.L6Vers protocol version number*

On reception of a COMMAND_ANNDOWNLOAD message, the device must respond by a RESPONSE_ANNDOWNLOAD message (see 4.4.2.6), using the Kchg encryption and authentication key.

#### 4.4.1.5 COMMAND_EXECINSTPING

The format of the application part of the COMMAND_EXECINSTPING message requesting carrying out of an INSTPING connectivity verification sequence by the device, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7CommandId | Fixed value $40 ID COMMAND_EXECINSTPING |

*Table 8 : COMMAND_EXECINSTPING application message format*

On reception of a COMMAND_EXECINSTPING message, the device must carry out an INSTPING sequence (see **Erreur ! Source du renvoi introuvable.**) and then respond by a RESPONSE_EXECINSTPING message.

### 4.4.2 RESPONSE messages

#### 4.4.2.1 RESPONSE_CMDERROR

Should the device receive an unsupported command, the format of the application part of the returned message is as follows:

| Byte | Field name | Description |
|---|---|---|
| 1 | L7ResponseId | Value of the L7CommandId field of the unsupported command |
| 2 | L7ErrorCode | Fixed value 255 (0xFF) identifying the “unsupported command” error type |

*Table 9 : RESPONSE_CMDERROR application message format*

#### 4.4.2.2 Response in the case of a supported command

In the case of a supported command being received by the device either a response message or an error message is transmitted back to the gateway.

The general format of a response message is as follows:

| Byte | Field name | Description |
|---|---|---|
| 1 | L7ResponseId | Value of the L7CommandId field of the command |
| 2 | L7ErrorCode | 00 if correct execution, see details in following sections |
| 3 .. n | Fields of the response message | The response message data, see following sections |

*Table 10: Response format in the case of a supported command*

The general format of an error message is as follows:

| Byte | Field name | Description |
|---|---|---|
| 1 | L7ResponseId | Value of the L7CommandId field of the command |
| 2 | L7ErrorCode | Error code, see details in the following sections |
| 3 | L7ErrorParam | See details in the following sections |

*Table 11: Response format in the case of an error*

#### 4.4.2.3 RESPONSE_READPARAMETERS

The format of the application part of the RESPONSE_READPARAMETERS message returned in response to a COMMAND_READPARAMETERS message, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7ResponseId | Fixed value $10 ID RESPONSE_READPARAMETERS |
| 2 | L7ErrorCode | 00 if correct execution, see below |
| 3 | L7SwVersion | Current software version of the device |
| 4 | | (MSBs first) |
| 5 | L7Rssi | Reception RSSI by the device of the corresponding COMMAND message<br><br>Value in steps of 0.5dBm, from 0 (-147.5dBm) to 255 (-20dBm) |
| 6 | ParamId1 | ID of the first parameter read |
| 7 | ParamValue1 | Value of the first parameter (number of bytes T1, as per 5.1) |
| … | … | … |
| 7+T1 | ParamId2 | ID of the second parameter read |
| 8+T1 | ParamValue2 | Value of the second parameter (number of bytes T2, as per 5.1) |
| … | … | Etc. |

*Table 12 : RESPONSE_READPARAMETERS application message format*

The parameter IDs are defined in appendix A.

In event of error in carrying out of the COMMAND_READPARAMETERS command by the device, the L7ErrorCode byte and the L7ErrorParam byte of the message are positioned at one of the following values according to the first error detected by the device:

| L7ErrorCode | Cause | L7ErrorParam |
|---|---|---|
| 1 | Number of the unsupported parameter | Faulty ParamId value |
| 2 | Attempt to read a “write only” parameter | Faulty ParamId value |
| 3 | Response too long to be transmitted | Length of the response to be transmitted |
| 4 to 255 | Reserved errors | Reserved |

*Table 13: Encoding the error causes of the READPARAMETERS command*

Regarding L7ErrorCode 3 in this case, each device can support the transmission of application level frames of a given maximum length, according to its internal design, which in turn depends on the application messages to be transmitted. This length is defined by the MANUFACTURER and is accessible by reading the parameter L7TRANSMIT_LENGTH_MAX (see 5.1).

In event of a read request generating a response from the device to the gateway that is larger in size than the maximum size supported, the device must return the error code “Response too long to be transmitted” in its response.

#### 4.4.2.4 RESPONSE_WRITEPARAMETERS

The format of the application part of the RESPONSE_WRITEPARAMETERS message returned in response to a COMMAND_WRITEPARAMETERS message, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7ResponseId | Fixed value $20 ID RESPONSE_WRITEPARAMETERS |
| 2 | L7ErrorCode | 00 if correct execution, see below |
| 3 | L7SwVersion | Current software version of the device |
| 4 | | (MSBs first) |
| 5 | L7Rssi | Reception RSSI by the device of the corresponding COMMAND message<br><br>Value in steps of 0.5dBm, from 0 (-147.5dBm) to 255 (-20dBm) |

*Table 14:RESPONSE_WRITEPARAMETERS application message format*

*The parameter IDs are defined in appendix A.*

In event of error in carrying out of the COMMAND_WRITEPARAMETERS command by the device, the L7ErrorCode byte and the L7ErrorParam byte of the message are positioned at one of the following values according to the first error detected by the device:

| L7ErrorCode | Cause | L7ErrorParam |
|---|---|---|
| 1 | Number of the unsupported parameter | Faulty ParamId value |
| 2 | Attempt to write a “read only” parameter | Faulty ParamId value |
| 3 | Attempt to assign an illegal value to a parameter | Faulty ParamId value |
| 4 to 255 | Reserved errors | Reserved |

*Table 15 : Encoding the error causes of the WRITEPARAMETERS command*

#### 4.4.2.5 RESPONSE_WRITEKEY

The format of the application part of the RESPONSE_WRITEKEY message returned in response to a COMMAND_WRITEKEY message, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7ResponseId | Fixed value $28 ID RESPONSE_WRITEKEY |
| 2 | L7ErrorCode | 00 if correct execution, see below |

| | | |
|---|---|---|
| 3 | L7SwVersion | Current software version of the device<br><br>(MSBs first) |
| 4 | | |
| 5 | L7Rssi | Reception RSSI by the device of the corresponding COMMAND message<br><br>Value in steps of 0.5dBm, from 0 (-147.5dBm) to 255 (-20dBm) |

*Table 16 : RESPONSE_WRITEKEY application message format*

In event of error in carrying out of the COMMAND_WRITEKEY command by the device, the L7ErrorCode byte and the L7ErrorParam byte of the message are positioned at one of the following values according to the first error detected by the device:

| L7ErrorCode | Cause | L7ErrorParam |
|---|---|---|
| 1 | Incorrect frame length | Real length of frame |
| 2 | Illegal value of a parameter | Number of faulty field (0 for the first, etc) |
| 3 | Kchg encryption key not used | L7Ctrl.L7KeySel value of message received |
| 4 to 255 | Reserved errors | Reserved |

*Table 17 : Encoding the error causes of the COMMAND_WRITEKEY command*

#### 4.4.2.6 RESPONSE_ANNDOWNLOAD

The format of the application part of the RESPONSE_ANNDOWNLOAD message returned in response to a COMMAND_ANNDOWNLOAD message, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7ResponseId | Fixed value $30 ID RESPONSE_ANNDOWNLOAD |
| 2 | L7ErrorCode | 00 if correct execution, see below |
| 3 | L7SwVersion | Current software version of the device<br><br>(MSBs first) |
| 4 | | |
| 5 | L7Rssi | Reception RSSI by the device of the corresponding COMMAND message<br><br>Value in steps of 0.5dBm, from 0 (-147.5dBm) to 255 (-20dBm) |

*Table 18 : RESPONSE_ANNDOWNLOAD application message format*

In event of error in carrying out of the COMMAND_ANNDOWNLOAD command by the device, L7ErrorCode byte and the L7ErrorParam byte of the message are positioned at one of the following values according to the first error detected by the device:

| L7ErrorCode | Cause | L7ErrorParam |
|---|---|---|
| 1 | Illegal value of a parameter | Number of faulty field (0 for the first, etc) |
| 2 | Incorrect frame length | Real length of frame |
| 3 | Incorrect initial software version | LSB of the current software version |
| 4 | Incorrect hardware version of the device | LSB of the current hardware version |
| 5 | Kchg encryption key not used | L7Ctrl.L7KeySel value of the message received |

| | | |
|---|---|---|
| 6 | Incorrect broadcasting start day | Current day minus day of first broadcast (signed integer in complement on two, bounded at -128/+127) |
| 7 | Operation refused as an update is in progress on the local interface | LSB of the software version currently being received via the local interface |
| 8 | Target software version | LSB of current software |
| 9 | Target version already downloaded, waiting for update | LSB of current software |
| 10 | Diffusion time out of broadcasting window | Local time proposed from 0 to 23 |
| 11 to 255 | Reserved errors | Reserved |

*Table 19 : Encoding the error causes of the ANNDOWNLOAD command*

#### 4.4.2.7 RESPONSE_EXECINSTPING

The format of the application part of the RESPONSE_EXECINSTPING message returned in response to a COMMAND_EXECINSTPING message, is as follows:

| Byte | Description | Comments |
|---|---|---|
| 1 | L7ResponseId | Fixed value $40 ID RESPONSE_EXECINSTPING |
| 2 | L7ErrorCode | 00 if correct execution, see below |
| 3<br>4 | L7SwVersion | Current software version of the device<br><br>(MSBs first) |
| 5 | L7Rssi | Reception RSSI by the device of the corresponding COMMAND message<br>Value in steps of 0.5dBm, from 0 (-147.5dBm) to 255 (-20dBm), rounded to the nearest value or to the lower value in event of equality. |
| 6 | L7NbPong | Number of different INSTPONG messages received in response to the last connectivity test |
| 7 to 15 | L7Pong1 | Response 1 received for the last connectivity test (most significant L7RssiDown). Formed by concatenation of the following fields:<br>• L7ConcentId (6 bytes coded in BCD)<br>• L7ModemId (1 byte)<br>• L7RSSIUp (1 byte)<br>• L7RssiDown (1 byte) |
| 16 to 24 | L7Pong2 | Response 2 received for the last connectivity test (next most significant L7RssiDown). Formed by concatenation of the following fields:<br>• L7ConcentId (6 bytes coded in BCD)<br>• L7ModemId (1 byte)<br>• L7RSSIUp (1 byte)<br>• L7RssiDown (1 byte) |

| | | |
|---|---|---|
| 25 to 33 | L7Pong3 | Response 3 received for the last connectivity test (next most significant L7RssiDown). Formed by concatenation of the following fields:<br>• L7ConcentId (6 bytes coded in BCD)<br>• L7ModemId (1 byte)<br>• L7RSSIUp (1 byte)<br>• L7RssiDown (1 byte) |

*Table 20 : RESPONSE_EXECINSTPING application message format*

If less than 3 responses are found, the L7PongX fields not used (L7Pong3 if 2 responses, L7Pong2 and L7Pong3 if 1 response, all if 0 responses) are initialised to zero by the device. If there are exactly 3 responses, the RESPONSE_EXECINSTPING message will give the Head-End system all the responses. If more than 3 responses are found, the Head-End system can read the next responses by carrying out a device memory read command (see 5.1).

In event of error in carrying out of the COMMAND_EXECINSTPING command by the device, the L7ErrorCode byte and the L7ErrorParam byte of the message are positioned at one of the following values according to the first error detected by the device:

| L7ErrorCode | Cause | L7ErrorParam |
|---|---|---|
| 1 to 255 | Reserved errors | Reserved |

*Table 21 : Encoding the error causes of the WRITEPARAMETERS command*

## 4.5 APP-DOWNLOAD application layer (optional)

The APP-DOWNLOAD application layer is used for the transmission of data blocks during software download. These data blocks have a fixed size defined by the LLC- DOWNLOAD layer (see WIZE – 01 LAN Protocol document, section 4.2), and free content. Structuring and use of the content of these blocks is the responsibility of the MANUFACTURER of the device in question, according to the conditions defined in chapter 4.2 of the WIZE-01 LAN Protocol document.

# 5 Appendix A: DATA LAN parameter dictionary

## 5.1 LAN parameters

The ID range $00 to $5F is reserved for LAN protocol management parameters. In this range, the following parameters must be supported by all the devices:

| Id | Parameter name | Description | Size (bytes) | Mode | L/R | Coding | Default value |
|---|---|---|---|---|---|---|---|
| 01 | **VERS_HW_TRX** | Hardware version number of the device (or transceiver for a remote module) | 2 | R | L/R | Byte 1 : Version,<br>Byte 2 : Revision | As per MANUFACTURER |
| 02 | **VERS_FW_TRX** | Software version number run by the device (or transceiver for a remote module) | 2 | R | L/R | Byte 1 : Version, Byte 2 : Revision | As per MANUFACTURER |
| 03 | **DATEHOUR_LAST_UPDATE** | Date/time of the last successful firmware download | 4 | R | L/R | EPOCH encoded on 32 bits and corresponding to the number of seconds since 1st January 2013 at 00:00:<br>MSBs first (big endian) | 00000000 |
| 04 | **L6APP** | Primary application of the device as defined by WIZE association used for information to the Head End System; see WIZE -01- LAN protocol §1.8 | 1 | R | L/R | set in factory as per Wize Alliance definition, ex:00h for Water Metering | 00h |
| 08 | **RF_UPLINK_CHANNEL** | Frequency channel to be used for all uplink message transmissions | 1 | R/W | L/R | See Regional Parameters document in the corresponding frequency band for parameter value. | See Regional Parameters document. |
| 09 | **RF_DOWNLINK_CHANNEL** | Frequency channel to be used for all message receptions (except firmware download) | 1 | R/W | L/R | See Regional Parameters document in the corresponding frequency band for parameter value. | See Regional Parameters document. |
| 0A | **RF_UPLINK_MOD** | Modulation to be used for all uplink message transmissions | 1 | R/W | L/R | See Regional Parameters document in the corresponding frequency band for parameter value. | See Regional Parameters document. |
| 0B | **RF_DOWNLINK_MOD** | Modulation to be used for all message receptions (except firmware download) | 1 | R/W | L/R | See Regional Parameters document in the corresponding frequency band for parameter value. | See Regional Parameters document. |
| 10 | **TX_POWER** | Transceiver nominal transmission power | 1 | R/W | L/R | See Regional Parameters document in the corresponding frequency band for parameter value. | See Regional Parameters document. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11 | **TX_DELAY_FULLPOWER** | Maximum time between two COMMAND messages before the device automatically returns to maximum transmission power | 2 | R/W | L/R | Number of days, from 1 to 65535 Value 0000:function disabled Byte 1: MSBs Byte 2: LSBs | 100 (three months and 10 days) |
| 12 | **TX_FREQ_OFFSET** | Absolute correction of transmission frequency | 2 | R/W | L/R | In Hertz, from -32768 (-32.768KHz) to +32767 (+32.767KHz). Signed number on 16 bits encoded in 2-complement : Byte 1: MSBs Byte 2: LSBs Note: the device can round off this value, provided that the accuracy requirements specified in chapter 5 are complied with). | Calibrated in factory |
| 18 | **EXCH_RX_DELAY** | Fixed wait time after transmission of a DATA message by the device and before opening the COMMAND message listening window | 1 | R/W | L/R | In seconds, from 1 (1s) to 255 (255s) | 5 (5s) |
| 19 | **EXCH_RX_LENGTH** | Duration of the COMMAND message listening window by the device | 1 | R/W | L/R | In multiples of 5 milliseconds, from 0 (reception disabled) to 255 (1.27s) | 8 (40ms) |
| 1A | **EXCH_RESPONSE_DELAY** | Time between reception of a COMMAND message by the device and transmission of the corresponding RESPONSE message | 1 | R/W | L/R | In seconds, from 0 (0s) to 255 | In seconds, from 0(0s) to EXCH_RESPONSE_DELAY_MIN |
| 1B | **EXCH_RESPONSE_DELAY_MIN** | Minimum value accepted for the EXCH_RESPONSE_DELAY parameter (defined by the device MANUFACTURER) | 1 | R | L/R | In seconds, from 0 (0s) to 255 (255s) | As per MANUFACTURER |
| 1C | **L7TRANSMIT_LENGTH_MAX** | Maximum length of application messages that can be sent by the device (fixed value defined by SUEZ) | 1 | R | L/R | In bytes, from 40 to 100 | As per MANUFACTURER Target value: 80 |
| 1D | **L7RECEIVE_LENGTH_MAX** | Maximum length of application messages that can be received by the device (Fixed value defined by SUEZ) | 1 | R | L/R | En bytes, de 50 à 100 | As per MANUFACTURER Taget value: 100 |
| 20 | **CLOCK_CURRENT_EPOC** | Current time of device | 4 | R/W | L/R | EPOCH encoded on 32 bits and corresponding to the number of seconds since 1st January 2013 at 00:00: MSB first (big endian) Programmed in factory | N/A |
| 21 | **CLOCK_OFFSET_CORRECTION** | Relative correction (time delta) to be applied to the device clock once only to correct its absolute drift | 2 | W | L/R | All values from -32768s to +32767s. Signed number on 16 bits encoded in complement on 2: Byte 1: MSBs Byte 2: LSBs This parameter is a virtual parameter: each writing corrects the current time in relative manner | 00h |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 22 | **CLOCK_DRIFT_CORRECTION** | Correction of device clock frequency | 2 | R/W | L/R | Number S of seconds to add to or subtract from the current time every D days:<br>Byte 1: Number of seconds S (signed integer from -128 to +127, complement on two)<br>Byte 2: Number of days D (from 1 to 255) | 00h, 01h |
| 28 | **CIPH_CURRENT_KEY** | Current key number | 1 | R/W | L/R | 00: No encryption (not accepted through APP-ADMIN request)<br>01 to CIPH_KEY_COUNT: Kenc key number enabled Other values: reserved | Value configured when manufacturing the devices: 01h |
| 29 | **CIPH_KEY_COUNT** | Number of encryption keys available in the device | 1 | R | L/R | unsigned int | 14 |
| 2A | **L6NETWID** | Value used by the device to initialize the L6NetwId field of any upstream messages | 1 | R | L/R | 00 to 255 | As per operator |
| 30 | **PING_RX_DELAY** | Fixed waiting time after transmission of an INSTPING message by the device and before opening the INSTPONG message listening window | 1 | R/W | L/R | In seconds, from 1 (1s) to PING_RX_DELAY_MIN | 10 (10s) or PING_RX_DELAY_MIN if this parameter is greater than 10 |
| 31 | **PING_RX_LENGTH** | Duration of the INSTPONG message listening window by the device | 1 | R/W | L/R | In seconds, from 1 (1s) to PING_RX_LENGTH_MAX | 3 |
| 32 | **PING_RX_DELAY_MIN** | Minimum value of the PING_RX_DELAY parameter | 1 | R | L/R | In seconds, from 1 (1s) to 255 (255s) | as per MANUFACTURER |
| 33 | **PING_RX_LENGTH_MAX** | Maximum value of the PING_RX_LENGTH parameter | 1 | R | L/R | In seconds, from 1 (1s) to 255 (255s) | as per MANUFACTURER |
| 34 | **PING_LAST_EPOCH** | Execution time of the last connectivity test (INSTPING/INSTPONG) | 4 | R | L/R | EPOCH | 00:00 |
| 35 | **PING_NBFOUND** | Number of different INSTPONG messages received in response to the last connectivity test | 1 | R | L/R | From 00 to FF | 0 |
| 36 | **PING_REPLY1** | Response 1 received for the last connectivity test (Bigest L7RssiDown) | 9 | R | L/R | Concatenation of the following fields:<br>L7ConcentId (6 bytes)<br>L7ModemId (1 byte)<br>L7RssiUpstream (1 byte)<br>L7RssiDownstream (1 byte) | 0 |
| 37 | **PING_REPLY2** | … | 9 | R | L/R | Idem Ping_reply1 | 0 |
| 38 | **PING_REPLY3** | … | 9 | R | L/R | Idem Ping_reply1 | 0 |
| 39 | **PING_REPLY4** | … | 9 | R | L/R | Idem Ping_reply1 | 0 |
| 3A | **PING_REPLY5** | … | 9 | R | L/R | Idem Ping_reply1 | 0 |
| 3B | **PING_REPLY6** | … | 9 | R | L/R | Idem Ping_reply1 | 0 |
| 3C | **PING_REPLY7** | … | 9 | R | L/R | Idem Ping_reply1 | 0 |
| 3D | **PING_REPLY8** | Response 8 received for the last connectivity test, (Weakest L7RssiDown) | 9 | R | L/R | Idem Ping_reply1 | 0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3E | **EXECPING_PERIOD E** | Periodic time of execping sending by the device, in months | 1 | R/ W | L/R | Unsigned int, 0 = deactivated | 6 |

*Table 22 : LAN parameters*

Other parameters related to Business layers are described in corresponding documents.

# 6 Informative Appendix B: L6App table as available to publishing date of this document

Updated table available near Wize Alliance, please send an email to contact@wize-alliance.com, with the subject “New L6App ID request”

| L6App ID | Application Layer | Description | specifications |
|---|---|---|---|
| $00 | APP-WTR | Remote reading of water meters | See.. |
| $01 | APP-GAS | Remote reading of gas meters (alternativement $11) | See WIZE - 04 APP_METER-GAS Application Layers - v1.1 |
| *$02* | | *Generic frame (si confirmé)* | |
| *$03* | | *Shut-off valve (si confirmé)* | |
| $04 to $1F | | Reserved for Metering applications prefered | |
| $20 to $8F | | Reserved for future Use, available from the Wize Alliance that manages their allocation | |
| $90 | | M-Bus Full frame | |
| $91 | | M-Bus Compact frame | |
| $92 | | M-Bus Format frame | |
| $A0 to $BF | | Manufacturer specific frames (maps M-Bus CI-fields) | |
| $C0 to $FB | | Reserved for future Use, available from the Wize Alliance that manages their allocation | |
| $FC | APP-INSTALL | Identifies Installation Layer; this code is optional as Installation Layer is also notified in C-FIELD (see Wize – 01 LAN Protocol document, see §2.1 Format of LLC- Exchange frames) | See WIZE – 03 Common Application Layer |
| $FD | APP-ADMIN | Identifies device administration Layer; this code is optional as Administraive Layer is also notified in C-FIELD (see Wize – 01 LAN Protocol document, see §2.1 Format of LLC- Exchange frames) | See WIZE – 03 Common Application Layer |
| $FE | APP-OPEN | Can be used freely for experimental devices or proprietary application-level protocols. | |
| $FF | APP-EXT | Reserved for future use as an extension value if multiple bytes are needed | |

*Table 23:L6App table*

END OF DOCUMENT