This is the LysKOM Protocol A specification, edition 11.1. It specifies version 11 of the protocol. It was first distributed with version 2.1.2 of lyskomd.

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LysKOM Protocol A

This document specifies version 11 of LysKOM Protocol A. This is edition 11.1 of the specification. It was first distributed with version 2.1.2 of lyskomd.

The most up-to-date version of this document can always be found at http://www.lysator.liu.se/lyskom/protocol/.

LysKOM is a conferencing system\(^1\). Similar systems were QZ-KOM and PortaCOM\(^2\). The LysKOM system is copyrighted by Lysator Academic Computing Society and distributed under conditions of the GNU Public License. LysKOM and its documentation is provided “as is” without warranty of any kind.

Anything described here as “unspecified” is liable to change in future protocol versions.

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The LysKOM developers can be reached by email to lyskom@lysator.liu.se. If you find any errors in this document, please report them at http://bugzilla.lysator.liu.se/. Use ‘lyskomd’ as the product, and ‘documentation’ as component.

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\(^1\) Or in modern terms, enabling technology for Computer-Supported Cooperative Work (CSCW).

\(^2\) Also known as “PottaKOM” and “BortaKOM.”
1 Concepts used in LysKOM

This chapter introduces the concepts used in LysKOM, such as articles, conferences and sessions.

1.1 Articles

An article is represented as a value of the type \texttt{Text-Stat} and a string containing the article contents. An article will usually have one or more recipients and may be a comment or footnote to other articles. Each article is kept in the database until it is older than the \texttt{nice} value of each of its recipients and it is not marked by any user.

There is an array of \texttt{Misc-Info} included in the \texttt{Text-Stat}. This array contains information about recipients, senders, comments and footnotes.

Each article is identified by a number, the global\footnote{The number is not truly global; it is local to a specific LysKOM server.} article number (the \texttt{Text-No}). Global numbers are assigned in ascending order to new articles, and are never reused. If an article has recipients it will also have a local number for each recipient (the \texttt{Local-Text-No}). Local numbers are used in some data structures to provide more compact storage and to provide an ordering of articles for a particular recipient. Local numbers are assigned in ascending order and are never reused for a particular recipient, though different recipients will have articles with the same local numbers.

Occasionally it is necessary to map between local and global numbers. The server call \texttt{local-to-global} does this (see Section 4.104 [local-to-global], page 118).

1.2 Conferences

Conferences hold articles. They are represented in the protocol as a data type called \texttt{Conference}. Each conference has a \texttt{creator}, the person who created the conference, and a \texttt{supervisor}, a conference whose members can modify the conference. If the supervisor is a person, the members of that person's mailbox are supervisors, which in most cases is only that person. Persons are a special case: in addition to those who are supervisors for a certain person because of the \texttt{supervisor} field, the person is always a supervisor of himself. There is one exception to this special case: the person cannot use \texttt{set-supervisor} (see Section 4.19 [set-supervisor], page 59) to change who is his supervisor.

We have also introduced a type called \texttt{UConference} (pronounced micro-conf-stat) which holds a subset of the information contained in the full \texttt{Conference} type. Use the \texttt{UConference} type whenever possible since it places a much smaller load on the LysKOM server.

Each conference has a type, which is essentially a collection of boolean flags. Currently the flags \texttt{rd-prot}, \texttt{letterbox}, \texttt{secret}, \texttt{original}, \texttt{allow-anonymous} and \texttt{forbid-secret} are defined.

\texttt{rd-prot} The conference is protected from reading by non-members. Persons become members by having one of the existing members or supervisors add him or her to the conference. This restriction is enforced by the server.
original
Conferences of this type are intended for original articles only. Comments are to be redirected to the super-conf instead. This restriction is not enforced by the server; clients must implement this functionality. (See Section B.2.4 [Recipients of comments], page 171, for a summary of how a client should select the recipients of a comment.)

letterbox
Conferences of this type are connected to persons. Letters to a person are sent to the mailbox and the name of the mailbox is synchronized with the person name. It is currently not possible to explicitly set or clear this flag on a conference.

secret
Conferences of this type are secret. The server will not divulge any information about the existence of the conference to persons who are not members or supervisors of the conference. If a mailbox is made secret, that person cannot log in using the person name, but must specify a person number instead.

allow-anonymous
Conferences of this type accept anonymous articles. Other conferences will reject anonymous articles.

forbid-secret
Conferences of this type do not allow secret members. If a conference is changed to this type, preexisting secret members remain secret.

1.3 Persons and Sessions

Persons are represented in the protocol by values of the type Person. Associated with persons are statistics, a set of personal flags and a set of privileges (see Section 1.6 [Security], page 9). Persons are also associated with a conference that has the same number as the person and the letterbox bit set.

Connections to the server are represented as values of the type Static-Session-Info, Session-Info-Ident or Session-Info. Sessions have session number that are unique for each session in the lifetime of the server execution. A single user can have several sessions running at once. The session is not released until the network connection is closed; a user can log in and out repeatedly in a single session.

1.4 The Misc-Info List

The Misc-Info list contains tagged data. The fields are sent in groups pertaining to a particular type of information: information about recipient; carbon copy recipient; blank carbon copy recipient; comment to; footnote to; comment in and footnote in. The information groups may be sent in any order and there may be any number of groups. Within each group the elements are always sent in the order listed below.

1.4.1 Recipient

recpt
Starts a recipient group. It contains the conference number of a recipient of the article.
**loc-no**  Always present within a recipient group. It contains the local text number of the article in the conference specified by the preceding *recept* field.

**rec-time** If the recipient is a person, this element is added by the server when the recipient marks the article as read. It contains the time when the text was read.

**sent-by** Present when the recipient was added by a person other than the author (after the article was created.) It contains the person number of the person who added the recipient.

**sent-at** Present when the recipient was added after the article was created. It contains the time when the recipient was added.

### 1.4.2 Carbon Copy (CC) Recipient

The carbon-copy recipient group is identical to the recipient group above. The difference is how new comments to an article with a recipient or carbon-copy recipient are treated. A comment to an article is sent to all recipients, but not to carbon-copy recipients of the original article. This difference is enforced by the clients.

**cc-recpt** Starts a carbon-copy recipient group. It contains the conference number of a carbon-copy recipient of the article.

**loc-no** Always present in a CC recipient group. It contains the local text number of the article in the conference specified by the most recent *cc-recpt* field.

**rec-time** Present after the CC recipient has read the article. It contains the time when the article was read. Since only persons can read articles this will only be seen if the CC recipient is a person.

**sent-by** Present when a CC recipient was added by a person other than the author after the article had been created. It contains the person number of the person who added the CC recipient.

**sent-at** Present when a CC recipient was added after the article had been created. It is the time when the CC recipient was added.

### 1.4.3 Blank Carbon Copy (BCC) Recipient

The blank carbon-copy recipient group is identical to the carbon-copy recipient group above. The difference is the visibility of the information. A carbon-copy recipient group is visible to anyone that is allowed to fetch both the text status of the involved text and the conference status of the involved conference. (That is, as long as the conference isn’t secret everybody is allowed to see the carbon-copy recipient group.)

A BCC recipient group is basically only visible to members and supervisors of the recipient. Persons that have the right to become a member of the recipient can also see it, as can the author of the text (unless the recipient is secret to him). This is enforced by the server.

This type of group was introduced in protocol version 10. When old-style calls such as *get-text-stat-old* (see Section 4.27 [get-text-stat-old], page 66) are used this will
be converted to a CC recipient group by the server for the benefit of clients that don't understand this group. (This conversion will of course only be performed when the user is allowed to see the blank carbon copy.)

**bcc-recpt**  
Starts a blank carbon-copy recipient group. It contains the conference number of a blank carbon-copy recipient of the article.

**loc-no**  
Always present in a BCC recipient group. It contains the local text number of the article in the conference specified by the most recent bcc-recpt field.

**rec-time**  
Present after the BCC recipient has read the article. It contains the time when the article was read. Since only persons can read articles this will only be seen if the BCC recipient is a person.

**sent-by**  
Present when a BCC recipient was added by a person other than the author after the article had been created. It contains the person number of the person who added the BCC recipient.

**sent-at**  
Present when a BCC recipient was added after the article had been created. It is the time when the BCC recipient was added.

### 1.4.4 Comment To

**comm-to**  
Always present when the article is a comment to another article.

**sent-by**  
Present when the article was added as a comment by a person other than the author after the article had been created. It contains the person number of the person who added the article as a comment.

**sent-at**  
Present when the article was added as a comment after the article had been created. It contains the time when it was added as a comment.

### 1.4.5 Footnote To

**footn-to**  
Always present when the article is a footnote to another article.

**sent-at**  
Present when the article was added as a footnote after the article had been created. It contains the time when it was added as a footnote.

### 1.4.6 Comment in

**comm-in**  
Present when there are comments to this article. It contains the article number which is a comment to this article.

### 1.4.7 Footnote in

**footn-in**  
Present when there are footnotes to this article. It contains the article number which is a footnote to this article.
1.5 The Aux-Item List

The aux-item list is used as a generic extension mechanism in the LysKOM server and in protocol A.

1.5.1 About Aux-Items

Aux-items were introduced in protocol version 10 as a mechanism for extending the conference, text and server information structures without changing the protocol. (There is no need for aux-items on persons – just add an aux-item to the corresponding mailbox.)

The exact structure of an aux item is specified elsewhere (see Section 3.2 [Auxiliary Information], page 22). The important fields here are the aux-no, tag and data fields.

The aux-no field is used to identify an item. The aux-no together with a text or conference number uniquely identifies a particular aux item. Items are numbered from one and up within each item list. Once assigned, the aux-no for an item is never changed. New items are guaranteed to be assigned numbers that have never been used before within a particular list.

The tag field identifies the type of aux item. It is used by the server and by clients to figure out how to interpret the data field, and by the server to decide if the item needs special treatment.

The data field is a simple string. The meaning of the string is determined by the tag field, but since it is a string, clients that have no understanding of the contents can successfully parse the item anyway (in contrast to items in the misc-info list.)

1.5.2 Aux-Item Inheritance

An aux item that is placed on a text can be inherited. This means that if a comment or footnote to the text is created, an almost identical item will be created on the new text. The tag, creator, flags and data field will be inherited unchanged. The aux-no might be given a different value. A non-zero inherit-limit field will be decremented. The created-at timestamp will be set to the time when the new comment or footnote is created.

Inheritance only happens at text creation time. If a comment or footnote link is added later with add-comment (see Section 4.33 [add-comment], page 72) or add-footnote (see Section 4.38 [add-footnote], page 76), no items will be inherited. Also, if the link is removed (via sub-comment (see Section 4.34 [sub-comment], page 73) or sub-footnote (see Section 4.39 [sub-footnote], page 77)), the inherited items will still be in place.

Inheritance only happens when the inherit bit is set, and if inherit-limit is 0 or greater than 1. See Section 3.2 [Auxiliary Information], page 22, for more information.

Inheritance has no meaning for items placed on the server or on a conference.

It is possible for a predefined aux-item to behave in a way that isn’t consistent with the description in this section. The documentation for the specific aux-item should document any deviations.
1.5.3 Predefined Aux-Item Types

Predefined Aux-Item types are part of Protocol A, and clients should support all of them. As with other parts of the protocol, changes to these definitions will be made backwards-compatible, if possible.

Creation and deletion of items with a predefined type can cause arbitrarily complex and wondrous behavior in the server. Furthermore, the server may place constraints on the items with regard to content, flags, who can create them, to what objects they can be attached and so forth. The server may also silently enforce specific values for any field of an item, regardless of what the client requests.

All items with tags in the range 1-9999 and 30000 and up are considered predefined. If a client attempts to create an item with a tag in this range, but the server has no idea what that tag means, the server will return an error (illegal-aux-item).

Some items with tags in the range 10000-19999 are also predefined. They are items that initially were reserved for private use for a specific client, but where it was later discovered that the tag was generally useful. They should ideally have been assigned a number in the 1-9999 range from the beginning, but if they already have a widespread use they can be redefined to be predefined. Such redefinition will always be made in cooperation with the client writer.

See Chapter 7 [Aux-Item Types], page 145, for the complete list of predefined Aux-Item types.

1.5.4 Client-Specific Aux-Item Types

Client-specific items do not cause the server to perform any magic. All the flags (except the delete flag) are left untouched, the data is not validated in any way, and anyone can create any item. If you need more server support than this, your item should be on the predefined list.

All tags in the range 10000-19999 are reserved for clients. Blocks of 100 numbers at a time can be assigned to specific clients. A client should never create items with tags in a range assigned to another client or in an unassigned range. Assigned ranges will never change, except that specific aux-items may be redefined as predefined, as explained in Section 1.5.3 [Predefined Aux-Item Types], page 8.

Currently, the following ranges are assigned to clients:

- 10000-10099: The Elisp Client
- 10100-10199: komimportmail
- 10200-10299: Private test use (should never be used on a public server)

If you want a range of numbers, send e-mail to the LysKOM development group, or request it via Bugzilla.

1.5.5 Experimental Aux-Item Types

Experimental numbers are free for all. Use ’em any way you want. All numbers in the range 20000-29999 are for experimental use.
1.5.6 Defining New Aux-Item Types

If you want a new predefined item type, just document what it does, what the data format looks like and what the server is to do with the item and send this to the LysKOM development group. We'll assign a number to your item and put the documentation in this document.

If you’re not sure what you want the data to look like yet, make a note in your documentation that the data format might change. Once you have a data format you’re happy with, update the documentation so others may use your item.

If you need serious magic in the server (more than can be specified with the lyskomd configuration file), you’ll probably have to write the code yourself, or hope that the development group thinks your idea is so cool we do the job for you.

The idea is not to reject any type of item, unless there’s already an item type that does the job just as well. Adding item types should be a much less painful process than adding new calls.

1.6 Security

Security in LysKOM is based on two components. Each person has a set of privileges and each session has a security level. Rights in the system require both the sufficient privileges and a sufficient security level. The privileges currently available are wheel, admin, statistic, create-conf, create-pers and change-name. Security levels range from 0 to 255.

**wheel**  
*Normally not assigned*

- Level 0  
  Person may always log in, even when LysKOM is crowded.
- Level 6  
  Person may set Priv-Bits for all persons.
- Level 7  
  Person may set password for all persons.
- Level 8  
  Person acts as supervisor for everything.
- Level 10  
  Person can read all articles.

**admin**  
*Normally not assigned*

- Level 1  
  Shut down the server  
  Set motd-of-kom  
  Read last-login
- Level 2  
  Read status of secret conferences and persons  
  Read the protected parts of person and conference statuses  
  Read the entire text status, even when there are secret recipients
- Level 3  
  Change everybody’s names
- Level 4  
  Add/remove members  
  Add/remove recipients to articles
- Level 5  
  Set super-conference  
  Remove articles
Level 6    Set administrator

statistic

Normally not assigned

Level 2    Read the statistics portions of persons, even if protected

create-conf

Normally not assigned

Level 0    Create conferences

create-pers

Normally not assigned

Level 0    Create persons

change-name

Normally assigned

Level 0    Change names of conferences he is supervisor for

1.7 Membership and Reading

Persons’ memberships in conferences are represented in the protocol as arrays of Membership-typed values. This structure contains information about how and when the membership was created and which texts have been read in the conference.

There are two kinds of memberships. An active membership indicates that the person is actively participating in the conference, wants to know if there are unread texts and wants to receive messages sent to the conference. A passive membership is similar to no membership at all. The person is still a member but will not receive messages sent to the conference and will not be notified when there are new texts. From the user’s perspective, passive membership should be like no membership at all, but the server still remembers what the user has read in the conference while he or she was an active member. Since protocol version 10 a bit in the membership type field of the membership structure indicates the type of membership. Previously the server did not support passive memberships, but there was a convention that clients should treat the priority level zero as a passive membership.

The membership record indicates which texts have been read through the read-ranges field, which contains a list of ranges of local text numbers that has been read.

Finding out which articles a person has read in a particular conference requires a few calls. Normally, a client will retrieve a batch of perhaps 50 articles at a time. The outline of the process is as follows:

1. Fetch the membership to get the read-ranges.
2. Use local-to-global (see Section 4.104 [local-to-global], page 118) to translate a number of local numbers to global numbers.

---

2 The LysKOM server is normally configured so that anybody can create new conferences, even if they do not have this privilege.

3 The LysKOM server is normally configured so that anybody can create new persons, even if they do not have this privilege.
3. Remove the global numbers corresponding to local numbers contained in `read-texts` from the result.
4. Get and translate more texts as needed.

The process is complicated because of the translation between local and global text numbers. If the server does not implement the `local-to-global` call (see Section 4.104 [local-to-global], page 118), it is possible to use the less efficient but perfectly serviceable `get-map` call instead (see Section 4.35 [get-map], page 73).
2 Fundamentals of Protocol A

The data types in protocol A come in two flavors. The first (vanilla) are the simple data types from which the LysKOM (chocolate) data types are built. Simple data types include things like integers and strings while complex data types include things such as conferences and people.

2.1 Notation

This specification uses a BNF-like grammar to describe the protocol and its data elements.

Data fields have been given names that start with a lower-case letter.

Fundamental data types have names in all-caps (such as INT32 and ARRAY).

Derived data types have names that start with an upper-case letter. (If the type contains more than one word, all words start with an upper-case letter, like this: Text-Stat.) The operator ::= defines the name to its left.

Comments start with ! (exclamation mark) and alternatives are separated by a | (vertical bar). A ; (semicolon) terminates statements in the grammar. In some specifications there are literal strings. There is to be no whitespace before or after literal strings unless there is whitespace in the literal itself.

2.2 Simple Data Types

2.2.1 Integers

INT32, INT16, INT8 and BOOL are non-negative integers which must fit in 32, 16, 8 and 1 bits, respectively. They are transmitted to the server in ASCII-encoded decimal notation.

2.2.2 Floating point numbers

FLOAT are floating point numbers. They are represented as if printed via printf("%g", val); in C. See 7.19.6.1 The fprintf function in ISO/IEC 9899:1999 Programming languages - C for the details. See section “The %g conversion” in The GNU C Library Reference Manual, if you don’t have the C standard handy.

2.2.3 Strings

HOLLERITH denotes character strings of arbitrary length. They are transmitted as nHtext where text is the string and n is the number of characters in text in decimal notation. All byte values are allowed in the string itself, including nulls.

Long live FORTRAN!

The character set used in the strings is not yet specified by Protocol A. In the future, some Unicode encoding will probably be used, but it is not yet decided which one or how
the transition will be handled. Bug 99 is about the need for a Unicode roadmap; check that bug for the current state of the plans.

For now, which character set to use is a local policy of each server installation. There is not yet any way in the protocol to specify the character set that a certain server uses. Most clients currently assume that ISO 8859-1 (Latin-1) is used, and the default collate table of lyskomd also assumes ISO 8859-1. Conference names must currently use an 8-bit character set encoding where whitespace is defined as in ASCII, or conference matching won’t work. get-collate-table (see Section 4.86 [get-collate-table], page 105) contains some more information about character set issues.

2.2.4 Bit Strings

BITSTRING is a string of bits, commonly used for a set of boolean-valued flags. Bit strings are denoted as

\[
\text{BITSTRING ( name-1; name-2; name-3; } \ldots \text{ )}
\]

in this specification. They are transmitted as a sequence of ASCII ones and zeroes in the order the fields are listed.

For instance, given the specification

\[
\text{shape-of-world ::= BITSTRING (}
\text{is-flat;}
\text{is-round;}
\text{is-2d;}
\text{is-3d;}
\text{)}
\]

most peoples idea of shape-of-world would be sent as 0101 (round and three-dimensional.)

2.2.5 Enumerations

ENUMERATION is an integer constant. It is transmitted as an INT32, but only fixed values are permitted. Clients should be prepared to receive numbers outside the enumeration and either handle this gracefully as an error or use a reasonable default value in place of an invalid enumeration value.

An enumeration is specified as

\[
\text{ENUMERATION (}
\text{name-1=value-1;}
\text{name-2=value-2;}
\text{name-3=value-3;}
\text{)}
\]

This specification states that name-1 is represented by the integer value-1, name-2 is represented by value-2 and name-3 is represented by value-3.

An enumeration can also be inherited from a SELECTION data type:
Info-type ::= ENUMERATION-OF(Misc-Info)

This means that Info-type is an enumeration, that contains the same keys and values as the SELECTION Misc-Info.

For example, in the following specification, the constant guwal will be transmitted as the integer 2, ciokwe as the integer 3, and hopi as the integer 5.

language ::= ENUMERATION ( hakka = 1;
guwal = 2;
ciokwe = 3;
yoruba = 4;
hopi = 5; )

2.2.6 Arrays

ARRAY is a list of a fixed number of elements of a single type. The specification for an array is ARRAY type where type is the type of the array elements.

Arrays are transmitted as an \( n \{ \text{element element ...} \} \) where \( n \) is the number of elements and each \( \text{element} \) is an element of the array. A special case is when the array is empty, in which case the server transmits it as \( 0 \ast \). Note that the client must always transmit empty arrays as \( 0 \{ \} \).

In some calls the client can ask the server not to send the array contents, only its length. In these cases the array is transmitted as \( n \ast \) where \( n \) is the number of elements in the array.

2.2.7 Selection

SELECTION is tagged data. It consists of an INT32 selector followed by a tail of an arbitrary type and is specified as

SELECTION ( 
    n=name tail : type; 
    n=name tail : type; 
    ... 
 )

where each \( n \) is the selector value, \( name \) the selector name and \( tail \) the name of the selector tail and \( type \) its type. \( name \) and \( tail \) are often very similar, such as ‘sent-by’ and ‘sender’.

When transmitted, the selector is transmitted as an INT32 followed by the tail belonging to that selector. For instance, given the specification

\[
\text{description ::= SELECTION (}
\begin{align*}
1=\text{name} & \text{the_name : HOLLERITH;} \\
2=\text{age} & \text{years : INT32;}
\end{align*}
\]

two legal messages of the type \text{description} are ‘1 4HJohn’ and ‘2 18’.
2.2.8 RPC

RPC is a notation used to specify calls to the server. An RPC specification has the following form:

\[
\text{RPC (}
\text{call \ [n] ( request ) -> ( reply ) ;}
\text{call \ [n] ( request ) -> ( reply ) ;}
\text{)}
\]

where each call is the name of a call, \( n \) is the call number, request is a single data element sent as a request and reply is a single data element sent in reply from the server.

RPC calls are transmitted as \( n \ request \) where \( n \) and request have the same meaning as above. Note that in the client-server dialog a reference number must also be supplied with each request. This reference number is not part of the RPC itself, but is required for communications; see Section 2.4 [Client-Server Dialog], page 17.

2.2.9 Structure

Structures are collections of several data items. In the specification they are written as

\[
( \text{name : type ;}
\text{name : type ;}
\text{...}
\)
\]

where each name is the name of a data field and the corresponding type is its type.

Structures are transmitted as a sequence of their fields.

2.3 Connecting to the Server

The client-server dialog consists of two phases, establishing the connection and the LysKOM session itself.

A connection to the server is initiated by connecting to the appropriate network port\(^1\) and sending a single letter which is used to select a protocol version. This letter should always be ‘A’\(^2\).

The protocol version letter should be followed by connection information required by that protocol. In protocol A the connection information is a HOLLERITH string saying who the user connecting is followed by a linefeed character.

The format of the string should be ‘\text{username % hostname}’.

When the server has accepted the connection it replies with the string LysKOM on a single line.

---

1 The default port for a LysKOM server is 4894. That port was registered with IANA 2001-06-20.
2 In the early 1990s there was much discussion about the next generation LysKOM protocol, called “Protocol B”, and at one point in time it was believed that “Protocol B” would arrive at the same time as “Emacs 19”. “Emacs 19” arrived and was obsoleted by new versions. Meanwhile, it was discovered that “Protocol A” was more extensible than first believed. “Protocol A” will continue to evolve, but it is unlikely that it will ever be superseded by “Protocol B”.
Besides the string ‘LysKOM’, the server may respond with ‘%%LysKOM unsupported protocol.’ or ‘%% No connections left.’.

The ‘%%LysKOM unsupported protocol.’ reply is sent if the server does not understand the requested protocol, that is, if the first character is anything but an ‘A’. The connection will be closed by the server as soon as this string has been sent.

The ‘%% No connections left.’ reply is sent if the server is not accepting additional connections. This error is transient. The next connection attempt may succeed. Clients should wait a few seconds before attempting to make another connection after receiving this error. The connection will be closed by the server as soon as this string has been sent.

2.4 Client-Server Dialog

After connecting (see Section 2.3 [Connecting to the Server], page 16), calls to the server can be made. Most calls require the user to log in, but some calls can be made without a log-in. Calls to the server are made by sending a reference number followed by the call as specified. The call must be terminated with a linefeed character (ASCII 0x0A).

\[
\text{server-call ::= ( ref-no : INT32; request : Protocol-Request; )}
\]

The client may send several requests without waiting for the replies. However, the server will only buffer a limited amount of replies, so the client must check for pending replies from the server at least each time it sends requests to the server.

At some future point the server will reply with the result of the request or an error code preceded by an indicator and the reference number. The replies will be sent in the same order as the requests.\(^3\)

\[
\text{server-reply ::= ok-reply | error-reply | protocol-error;}
\]

\[
\text{ok-reply ::= ( "=", ref-no : INT32; reply-data; )}
\]

\[
\text{error-reply ::=}
\]

\(^3\) Client writers are encouraged to write the clients so that they are prepared for replies that are sent out-of-order. See Appendix E [Future changes], page 179, for speculations about how that may benefit the client in the future.
( "%%"
  ref-no : INT32;
  error-code : INT32;
  error-status : INT32;
)

protocol-error ::= "%% LysKOM protocol error."
  | "%%Insane token length."
  | "%%Insane array size."

Our notation is not flexible enough to specify the two-way nature of the communication. ref-no in the reply is always the same as ref-no in the corresponding request. reply-data depends on which request was made and is specified together with each request.

Note that there is no whitespace after the initial indicator in the reply.

Data elements sent from the client to the server are separated by one or more space characters (ASCII 32). An entire call is terminated by a linefeed character (ASCII 10).

Earlier versions of the protocol specified that data elements could be separated by any number of linefeed (ASCII 10), return (ASCII 13), tab (ASCII 9) or space (ASCII 32) characters. Servers should be forgiving and understand requests using the older conventions, but clients must conform to the current convention of separating data elements with spaces and terminating all requests with a linefeed character. The not-implemented error code will not be returned properly unless the client follows this requirement.

The server may return two different types of errors. Normal error-reply errors are replies to syntactically correct calls to the server, while protocol-error are replies to syntactically incorrect calls. See Section 2.5 [Protocol Error Messages], page 19, for more information about protocol-error.

If a call cannot complete successfully, LysKOM will respond with an error-reply. The meaning of error-code and error-status varies depending on the request; see Chapter 6 [Error Codes], page 139, and the documentation for each call, for a list of available error-code values and what they mean.

A client should be prepared for any error code in response to any call, no matter if the response makes any sense or not. The value returned in error-status was more or less undefined before protocol version 10. For protocol version 10 or newer, the meaning of error-status is defined in this document.

The meaning of error-status can be modified by any call. In particular the calls that deal with Misc-Info lists set error-status to the index of the misc item that caused the error (if the error was caused by a misc item.)

Client should handle the error messages listed with each call in a graceful manner. In addition, the following error types should always be handled gracefully: temporary-failure, internal-error, feature-disabled, not-implemented, obsolete-call, ldb-error, out-of-memory. Client should also be able to handle any error in any situation without choking completely since bugs might cause the wrong error message to be sent or new errors might be added later on.

The server may send asynchronous messages (see Chapter 5 [Asynchronous Messages], page 133) to the client at any time (but not in the middle of a reply). Two important
asynchronous messages are async-new-text (see Section 5.14 [async-new-text], page 136) and async-send-message (see Section 5.11 [async-send-message], page 135).

2.5 Protocol Error Messages

Protocol error messages are sent in reply to syntactically incorrect calls to the server. These should never appear in the client-server dialog. If they do, there is probably a bug in the client.

"%% LysKOM protocol error."
The client has sent a request that does not comply with protocol A. The server will attempt to recover from this error, but additional calls may be silently lost, and the server may send replies that the client does not expect, and in some cases recovery may not be possible. This error is also returned when the client sends an array that is longer than the maximum allowed by the server.

"%% Insane token length."
The client has sent a single token that is insanely long. Typically this means that the client has sent several kilobytes worth of digits, or something similar. This is never returned for long strings. The server will automatically disconnect a client who sends a token with an insane length.

"%% Insane array size."
The client has send an array with a negative length. The server is not easily fooled. The server will automatically disconnect a client who sends an array with an insane length.
3 LysKOM Data Types

In this section the data types specific to LysKOM are defined. Most of these will probably make very little sense until you know what calls there are. This section does not include the server calls or asynchronous messages, even though these are also data types.

Since the types defined here are all based on the simple types, the definitions are more concise in this section.

3.1 Common Types

The types defined in this section are fairly simple and used in many of the more complex data types.

3.1.1 Time

\[
\text{Time ::=}
\begin{align*}
\text{seconds} & : \text{INT32;} \\
\text{minutes} & : \text{INT32;} \\
\text{hours} & : \text{INT32;} \\
\text{day} & : \text{INT32;} \\
\text{month} & : \text{INT32;} \\
\text{year} & : \text{INT32;} \\
\text{day-of-week} & : \text{INT32;} \\
\text{day-of-year} & : \text{INT32;} \\
\text{is-dst} & : \text{BOOL;}
\end{align*}
\]

Time is used to specify times in several data structures. The fields seconds, minutes and hours give wall clock time. day is the day of month and month is the current month, starting with zero for January. year is the number of years since 1900. day-of-week is the current weekday, with zero used for Sunday. day-of-year is how many days of the year have passed starting with zero and is-dst is true when the time indicated is daylight savings time.

When the server receives a Time structure from a client it ignores the day-of-week and day-of-year fields.

All times are expressed in the time zone of the server, unless the set-connection-time-format request is used (see Section 4.121 [set-connection-time-format], page 131).

3.1.2 Conference Numbers

\[
\text{Conf-No ::=} \text{INT16;}
\]

This type denotes a conference number.
3.1.3 Text Numbers

Text-No ::= INT32;
Local-Text-No ::= INT32;
Text-List ::= ( first-local-no : Local-Text-No;
                  texts : ARRAY Text-No;
                  )

These three types are used to indicate articles in the LysKOM database. Text-No is a
global text number and Local-Text-No a local text number. Text-List is used when a
mapping from local to global numbers are required.

3.1.4 Person and Session Numbers

Pers-No ::= Conf-No;
Session-No ::= INT32;

Pers-No is used to indicate a person. Session-No is used in a few data structures
relating to information about active LysKOM sessions.

3.2 Auxiliary Information

Aux-No ::= INT32;

Aux-Item ::= ( aux-no : Aux-No;
              tag : INT32;
              creator : Pers-No;
              created-at : Time;
              flags : Aux-Item-Flags;
              inherit-limit : INT32;
              data : HOLLERITH;
              )

Aux-Item-Input ::= ( tag : INT32;
                     flags : Aux-Item-Flags;
                     inherit-limit : INT32;
                     data : HOLLERITH;
                     )
Aux-Item-Flags ::= BITSTRING
  ( deleted;
    inherit;
    secret;
    hide-creator;
    dont-garb;
    reserved2;
    reserved3;
    reserved4;
  )

Aux-Item-Input contains a subset of the fields of an Aux-Item. It is used when the client wants to send an Aux-Item to the server, and it only contains the elements that the client can affect. The fields in Aux-Item and Aux-Item-Input have the following meaning:

**aux-no**
The number of the item within the list where it is found. This number together with a conference or text number uniquely identifies a particular aux-item. (There is also a global list of Aux-Items for the server. That list is manipulated via the `modify-system-info` request (see Section 4.96 [modify-system-info], page 112), and when using that request the aux-no is enough to uniquely identify the aux-item.)

This field is not present in Aux-Item-Input. It is assigned by the server.

**tag**
The item tag. The tag determines what the data means. See Chapter 7 [Aux-Item Types], page 145.

**creator**
The person who created the item, or zero if the item was created anonymously or if the owner is being withheld.

This field is not present in Aux-Item-Input. It is assigned by the server.

**created-at**
The time when the item was created.

This field is not present in Aux-Item-Input. It is assigned by the server.

**flags**
The item flags (see below).

**inherit-limit**
Determines how many times (how deep) an item may be inherited. If zero, the item is inherited an unlimited number of times. If nonzero it is one more than the number of additional times the item may be inherited. Thus, 1 means that inheritance will be blocked and 2 means that the item will be inherited only to the next level.

**data**
The item data.

The flags that can be set on an aux-item have the following meaning:

**deleted**
The item has been deleted, and should not be used for anything.

**inherit**
The item will be inherited (if the inherit-limit field allows it.)

**secret**
The item will not be revealed to anyone but the item’s creator and supervisors of the creator.
hide-creator
The item creator will be withheld from everyone but the item’s creator and
supervisors of the creator.

dont-garb
The object the item is set on will not be garbage-collected.

3.3 Conference Types

Conf-Type ::= BITSTRING
   ( rd-prot;
     original;
     secret;
     letterbox;
   )

Extended-Conf-Type ::= BITSTRING
   ( rd-prot;
     original;
     secret;
     letterbox;
     allow-anonymous;
     forbid-secret;
     reserved2;
     reserved3;
   )

Any-Conf-Type ::= Conf-Type | Extended-Conf-Type;

These types are used to specify the type of a conference. Conf-Type is used in data
types and calls that were created before version 8.0 of the protocol and has been augmented
in Extended-Conf-Type. The type Any-Conf-Type is used when either is admissible.

The bits have the following meaning (see Section 1.2 [Conferences], page 3, for more info.)

rd-prot If unset anyone can add themselves as members to the conference.

original If set, comments are not allowed in the conference.

secret If set the conference is secret. Its existence will only be revealed to members
and supervisors.

letterbox Set if the conference is a person’s mailbox.

allow-anonymous Set if anonymous articles are allowed in the conference.
forbid-secret
If set, secret members cannot be added to the conference.

reserved2
reserved3
Reserved for future use. The values of these bits should be never be modified or used by clients who do not know their meaning. When a new conference is created these should always be set to zero.

3.4 Conference Search Results

Conf-Z-Info ::= 
( name : HOLLERITH;
  type : Conf-Type;
  conf-no : Conf-No;
)

These types are used for the result of some calls that search for conferences based on their names.

3.5 Conference Status Types

Garb-Nice ::= INT32;

Conference-Old ::= 
( name : HOLLERITH;
  type : Conf-Type;
  creation-time : Time;
  last-written : Time;
  creator : Pers-No;
  presentation : Text-No;
  supervisor : Conf-No;
  permitted-submitters : Conf-No;
  super-conf : Conf-No;
  msg-of-day : Text-No;
  nice : Garb-Nice;
  no-of-members : INT16;
  first-local-no : Local-Text-No;
  no-of-texts : INT32;
)

Conference ::= 
( name : HOLLERITH;
  type : Extended-Conf-Type;
  creation-time : Time;
  last-written : Time;
creator : Pers-No;
presentation : Text-No;
supervisor : Conf-No;
permitted-submitters : Conf-No;
super-conf : Conf-No;
msg-of-day : Text-No;
nice : Garb-Nice;
keep-commented : Garb-Nice;
no-of-members : INT16;
first-local-no : Local-Text-No;
no-of-texts : INT32;
expire : Garb-Nice;
aux-items : ARRAY Aux-Item;
)

UConference ::= 
  ( name : HOLLERITH;
type : Extended-Conf-Type;
highest-local-no : Local-Text-No;
nice : Garb-Nice;
)

These three types are used to specify information about a conference. Garb-Nice is a quantity used to specify how long articles are kept in a conference before being removed. Conference is the full information about a conference and UConference is brief information about a conference.

The fields of Conference are

name The name of this conference.
type The type of the conference.
creation-time The date and time when the conference was created.
last-written The date when something was last written in the conference.
creator The person who created the conference.
presentation The article containing the conference presentation or zero if the conference has no presentation.
supervisor The conference\(^1\) who supervises this conference.

\(^1\) The supervisor may be a person, in which case the members of that person’s mailbox become supervisors.
permitted-submitters
The conference whose members\textsuperscript{2} may submit articles to the conference, or zero if anyone may do so.

super-conf
This field has two unrelated uses. If the original bit is set, clients should send comments to this conference (see Section B.2.4 [Recipients of comments], page 171). If the permitted-submitters field rejects a text\textsuperscript{3}, the server will silently send the text to the super-conf conference instead. This redirection mechanism is applied repeatedly until conference that accepts the text is found, or an implementation-defined limit is reached.

msg-of-day
The conference notice, if any.

nice
The number of days an article should be kept before being removed from the conference.

keep-commented
A text that has comments no older than this number of days will not be removed from the conference.

no-of-members
The number of members of this conference.

first-local-no
The local number of the oldest existing article in the conference.

no-of-texts
The number of articles in the conference.

expire
This field will be used to control when a conference expires. It is not used at the moment, and should be set to zero for future compatibility.

aux-items
The conference’s aux item list.

The fields of UConference are

name
The name of this conference.

type
The conference type. Note that this is an extended conference type, unlike the type field of Conference.

highest-local-no
The local number of the newest article in the conference.

nice
The number of days an article should be kept before being removed from the conference.

\textsuperscript{2} permitted-submitters can be a person, in which case all persons who are members of the associated mailbox are allowed to submit articles to the conference.

\textsuperscript{3} This is true if the text is created using create-text (see Section 4.87 [create-text], page 106), create-anonymous-text (see Section 4.88 [create-anonymous-text], page 107), create-anonymous-text-old (see Section 4.60 [create-anonymous-text-old], page 90) or create-text-old (see Section 4.29 [create-text-old], page 68). Future requests that create texts may have other semantics.
3.6 Archaic way to list conferences

The result of request number 12, lookup-name, cannot be expressed in the grammar used in this document. This is as close as it gets:

```
Conf-List-Archaic ::= ( conf-nos : ARRAY Conf-No; conf-types : ARRAY Conf-Type; )
```

The two arrays `conf-nos` and `conf-types` are always the same size. For some obscure reason the size of the second array is not actually transmitted. See also the example in Section 4.13 [lookup-name], page 55.

3.7 Mapping Local to Global Text Numbers

```
Text-Mapping ::= ( range-begin : Local-Text-No; range-end : Local-Text-No; more-texts-exists : BOOL; block : Local-To-Global-Block; )
```

```
Local-To-Global-Block ::= SELECTION ( 0=sparse sparse-block : ARRAY Text-Number-Pair; 1=dense dense-block : Text-List; )
```

```
Text-Number-Pair ::= ( local-number : Local-Text-No; global-number : Text-No; )
```

A Text-Mapping is used when the client needs to look up which global Text-No that corresponds to a Local-Text-No. The client uses local-to-global (see Section 4.104 [local-to-global], page 118) to ask for information about a few texts starting a a certain local text number, and the server returns the information in a Text-Mapping.

`range-begin`  
The first local text number that the Text-Mapping says anything about.

`range-end`  
The first local text number that the reply doesn’t say anything about. This Text-Mapping tells the client about all existing texts from `range-begin` to (but not including) `range-end`.

`more-texts-exists`  
This is true if there are more texts in the conference after this block. If a request such as local-to-global-reverse (see Section 4.122 [local-to-global-reverse],
page 131) which searches backwards, this will instead be true if there are more texts before this block.

**block**  The block can be sent in two formats. The server is free to choose which format to use as it pleases; clients must be prepared for any of them.

- The **sparse** format is useful when many local text number no longer exists. It starts with a 0 that indicates that the sparse format is used, and is followed by an array of **Text-Number-Pair**. The array will always be sorted so that **local-number** always increases.

- The **dense** format is good when most of the local text numbers exist. It starts with a 1 that indicates that the dense format is used, and is followed by a **Text-List**. The **Text-List** contains **first-local-no** and an array of **Text-No**. The local text number **first-local-no** corresponds to the **first-local-no** in the array, **first-local-no** + 1 corresponds to the second entry in the array, and so on. The array contains a zero to indicate that a certain local text number doesn’t exist.

### 3.8 Server Information

**Info ::=**

( version : INT32;
  conf-pres-conf : Conf-No;
  pers-pres-conf : Conf-No;
  motd-conf : Conf-No;
  kom-news-conf : Conf-No;
  motd-of-lyskom : Text-No;
  aux-item-list : ARRAY Aux-Item;
)

**Info-Old ::=**

( version : INT32;
  conf-pres-conf : Conf-No;
  pers-pres-conf : Conf-No;
  motd-conf : Conf-No;
  kom-news-conf : Conf-No;
  motd-of-lyskom : Text-No;
)

**Version-Info ::=**

( protocol-version : INT32;
  server-software : HOLLERITH;
  software-version : HOLLERITH;
)
These data types contain information about the LysKOM server. The fields of \texttt{Info} and \texttt{Info-Old} are:

- **version**: The server version encoded as a number $aabbcc$ where $aa$ is the major version number, $bb$ the minor number and $cc$ the secondary minor version. For instance, 10607 is version 1.6.7 of the server. If greater than 10699 the \texttt{get-version-info} (see Section 4.76 [get-version-info], page 99) should be used instead.

- **conf-pres-conf**: The conference that contains conference presentations.

- **pers-pres-conf**: The conference that contains person presentations.

- **motd-conf**: The conference that contains conference and person notices.

- **kom-news-conf**: The conference that contains news about LysKOM.

- **motd-of-lyskom**: The number of an article to display when LysKOM is entered or zero if there is none.

- **aux-item-list**: (Not present in \texttt{Info-Old}.) A list of aux-items that belong to the server.

The fields of \texttt{Version-Info} are:

- **protocol-version**: The version of protocol A the server is using. This may be used to ascertain which calls are available.

- **server-software**: Human-readable name of the server software.

- **software-version**: Human-readable name of the server software version.

The \texttt{Static-Server-Info} contains information about the state of the server when it started. It contains the following fields:

- **boot-time**: When did the server start?
save-time

When the server starts, it examines the database to see when it was saved. That information is available here.

db-status

The status of the database that the server found on startup. The value is implementation-defined. lyskomd reports clean (if the previous invocation of the server was shut down cleanly) or backup (which means that some information may have been lost in the last restart). Clients should be prepared to find other values here.

existing-texts

Number of texts that existed on startup. (To find out how many texts exists right now, you can use the get-stats call with what set to texts (see Section 4.113 [get-stats], page 126).)

highest-text-no

The highest text number that existed on startup. (To find the highest text number that exists right now, use the first-unused-text-no (see Section 4.116 [first-unused-text-no], page 128) and find-previous-text-no (see Section 4.62 [find-previous-text-no], page 92) calls.)

existing-confs

Number of conferences (including letterboxes) that existed on startup. (To find out how many conferences exists right now, you can use the get-stats call with what set to confs (see Section 4.113 [get-stats], page 126).)

existing-persons

Number of persons that existed on startup. (To find out how many persons exists right now, you can use the get-stats call with what set to persons (see Section 4.113 [get-stats], page 126).)

highest-conf-no

The highest conference number that existed on startup. (To find the highest conference number that exists right now, use the first-unused-conf-no (see Section 4.115 [first-unused-conf-no], page 127) and find-previous-conf-no (see Section 4.118 [find-previous-conf-no], page 128) calls.)

### 3.9 Person Status Types

Person ::= 

( username : HOLLERITH; 
privileges : Priv-Bits; 
flags : Personal-Flags; 
last-login : Time; 
user-area : Text-No; 
total-time-present : INT32; 
sessions : INT32; 
created-lines : INT32; 
created-bytes : INT32; 
)
read-texts : INT32;
no-of-text-fetches : INT32;
created-persons : INT16;
created-confs : INT16;
first-created-local-no : INT32;
no-of-created-texts : INT32;
no-of-marks : INT16;
no-of-confs : INT16;
)

Personal-Flags ::= BITSTRING
 ( unread-is-secret;
   flg2;
   flg3;
   flg4;
   flg5;
   flg6;
   flg7;
   flg8;
   )

Priv-Bits ::= BITSTRING
 ( wheel;
   admin;
   statistic;
   create-pers;
   create-conf;
   change-name;
   flg7;
   flg8;
   flg9;
   flg10;
   flg11;
   flg12;
   flg13;
   flg14;
   flg15;
   flg16;
   )

These types are used to specify information about persons. Person contains the information about a person, Personal-Flags contains flags set by the user and Priv-Bits contains the person’s privileges (see Section 1.6 [Security], page 9).

The fields of Person are
username    The name of the user.

privileges   The privileges of the person.

flags       Flags set by the user.

last-login  The time when the person last logged on or off.

user-area   The text number of the person’s user area or zero if the person has no user area.

total-time-present  The number of seconds the person has been using LysKOM.

sessions   The number of sessions the person has initiated.

created-lines   The number of lines of articles the person has written.

created-bytes    The number of characters the person has written.

read-texts   The number of articles the person has read.

no-of-text-fetches  The number of texts the person has retrieved from the server.

created-persons   The number of other persons this person has created.

created-confs This holds the number of conferences created by the person.

first-created-local-no The local number of the earliest existing article written by the person. The local number applies to a local-to-global mapping containing all articles written by the person.

no-of-created-texts This holds the number of articles written by the person, not counting the articles created before the earliest existing article written by the person. To get the true number of created articles, compute first-created-local-no + no-of-created-texts - 1.

no-of-marks The number of marked texts this person has.

no-of-confs The number of conferences the person is a member of.

The fields of Personal-Flags are
unread-is-secret
If this is set, only the person and his supervisors can see how many texts this
persons have read in a certain conference. The server will clear the read-ranges
field of Membership (and read-texts, last-time-read and last-text-read
fields of Membership-10 and Membership-Old) when other persons asks about
the information.

flg2
flg3
flg4
flg5
flg6
flg7
flg8 Reserved for the future. Set them to 0, and ignore the values they have.

3.10 Membership Information

Membership-Type ::= BITSTRING
  ( invitation;
  passive;
  secret;
  passive-message-invert;
  reserved2;
  reserved3;
  reserved4;
  reserved5;
  )

The Membership-Type type contains flags that modify a membership. It is passed as
part of both Member and Membership (and obsolete versions of those types). The flags are:

invitation
The member has been invited, but has not yet accepted membership. Clients
should set this flag when adding other users as members. The server may force
this flag to be set when adding another person as a member of a conference.

passive
The member is not actively participating in the conference. Passive mem-
bers do not receive messages (see Section 5.11 [async-send-message], page 135)
and should not be displayed as active members by clients. See also passive-
message-invert.

secret
The member does not wish to disclose the membership. Secret memberships and
members are cleared before being returned to a person who is not a supervisor
of the member or has sufficient privileges enabled.

passive-message-invert
If this bit is set, the passive bit is inverted when checking for messages (see
Section 5.11 [async-send-message], page 135) to this conference. In other words,
messages are blocked if one (but not both) of the bits passive and passive-
message-invert are set.
The remaining flags in the Membership-Type structure are reserved and should be set to false on all new memberships and retained on all existing memberships.

```
Member ::= ( member : Pers-No;
     added-by : Pers-No;
     added-at : Time;
     type : Membership-Type;
    )
```

The Member structure encodes information about a member in a conference. It is returned by the get-members call (see Section 4.102 [get-members], page 116). The fields of a Member structure are:

- **member**: The person who is a member of the conference.
- **added-by**: The person who created the membership. This field is zero only if the membership was created before protocol version 10 was introduced.
- **added-at**: The time when the membership was created. This field is meaningless if added-by is zero.
- **type**: Flags modifying the membership.

The contents of a Member structure can be cleared (all fields set to zero) if the person requesting the record has insufficient privileges to see the contents of the structure.

```
Read-Range ::= ( first-read : Local-Text-No;
                 last-read : Local-Text-No;
                )
```

```
Membership ::= ( position : INT32;
                 last-time-read : Time;
                 conference : Conf-No;
                 priority : INT8;
                 read-ranges : ARRAY Read-Range;
                 added-by : Pers-No;
                 added-at : Time;
                 type : Membership-Type;
                )
```

```
Membership-Old ::= ( last-time-read : Time;
                     conference : Conf-No;
                     priority : INT8;
                     last-text-read : Local-Text-No;
                     read-texts : ARRAY Local-Text-No;
                    )
```
Membership-10 ::= 
( position : INT32;
 last-time-read : Time;
 conference : Conf-No;
 priority : INT8;
 last-text-read : Local-Text-No;
 read-texts : ARRAY Local-Text-No;
 added-by : Pers-No;
 added-at : Time;
 type : Membership-Type;
)

The Membership structure encodes information about a person’s membership in a conference. It is returned by the query-read-texts (see Section 4.108 [query-read-texts], page 121) and get-membership calls (see Section 4.109 [get-membership], page 122).

The Membership-10 and Membership-Old types are obsolete variants of the same type, returned by older requests. Membership-Old contains less information. The encoding of the read texts in Membership-10 is very inefficient in the common case where you have read many texts after the first unread text.

position  The position of this membership in the membership list.

last-time-read  The time when the person last read anything from the conference. This will contain the start of the epoch if the unread-is-secret bit of the Personal-Flags is set and you don’t have enough privileges to get the info anyhow.

conference  The conference this membership data pertains to.

priority  The priority the person has assigned to the conference. The higher the number, the higher the priority. In the past, priority zero indicated a passive membership. This usage is now obsolete.

last-text-read  The local number of last text read in the conference. This will be set to 0 if unread-is-secret is set, unless you have access to the data anyhow. This field is not available in Membership, but you can easily derive the same information from read-ranges.

read-texts  Additional texts beyond last-text-read that have also been read. This will be empty if unread-is-secret is set, unless you have access to the data anyhow.

read-ranges  A list of ranges of all read texts. This will be empty if unread-is-secret is set, unless you have access to the data anyhow.

added-by  The person who created the membership. This field is zero if the membership was created before protocol version 10 was introduced.

added-at  The time when the membership was created. This field is meaningless if added-by is zero.
type Flags modifying the membership.

A membership record may be cleared by the server (all fields set to zero) if the person requesting the membership has insufficient privileges to see the contents membership, but has sufficient privileges to know about the person.

### 3.11 Article Marks

\[
\text{Mark} ::= \\
\begin{array}{l}
\text{(text-no : Text-No;}
\text{type : INT8;)}
\end{array}
\]

This data type hold information about a person’s marks on articles.

The fields of Mark are:

- **text-no**: The text number marked.
- **type**: The mark value.

Before version eight of protocol A, the meaning of the mark value was unspecified. Work is underway to specify the meaning of certain mark values.

### 3.12 Article Information

\[
\text{Misc-Info ::= SELECTION }\begin{array}{l}
0=\text{recpt recipient : Conf-No;}
1=\text{cc-recpt cc-recipient : Conf-No;}
2=\text{comm-to comment-to : Text-No;}
3=\text{comm-in commented-in : Text-No;}
4=\text{footn-to footnote-to : Text-No;}
5=\text{footn-in footnoted-in : Text-No;}
6=\text{loc-no local-no : Local-Text-No;}
7=\text{rec-time received-at : Time;}
8=\text{sent-by sender : Pers-No;}
9=\text{sent-at sent-at : Time;}
15=\text{bcc-recpt bcc-recipient : Conf-No;}
\end{array}
\]

\[
\text{Info-Type ::= ENUMERATION-OF(Misc-Info)}
\]

\[
\text{Text-Stat-Old ::= SELECTION }\begin{array}{l}
\text{(creation-time : Time;}
\text{author : Pers-No;}
\text{no-of-lines : INT32;}
\text{no-of-chars : INT32;)}
\end{array}
\]
These two structures contain information about a single article. **Text-Stat** contains core information about the article and **Misc-Info** contains miscellaneous information related to the article.

A **Text-Stat** consists of the following:

**creation-time**
- The time when the article was created.

**author**
- The author of the article.

**no-of-lines**
- The number of lines in the article.

**no-of-chars**
- The number of characters in the article.

**no-of-marks**
- The number of marks added to this article by persons.

**misc-info**
- The **Misc-Info** list for this article.

**aux-items**
- The list of aux items for this article.

**Misc-Info**, when sent to the client, is sent in a particular order (see Section 1.4 [The Misc-Info List], page 4). The variants **Misc-Info** are (briefly):

**recpt**
- Used to specify recipients of the article.

**cc-recpt**
- Specifies recipients who have received a copy of the article but who will not receive comments.

**comm-to**
- Specifies an article this article is a comment to.

**comm-in**
- Specifies an article in which there are comments to this article.

**footn-to**
- Specifies an article this article is a footnote to.
footn-in  Specifies an article to which this article is a footnote.
loc-no    Specifies the local text number of this article in the conference specified by
         recpt, cc-recpt or bcc-recpt.
rec-time  Specifies the time when this article was received by the conference specified by
         recpt, cc-recpt or bcc-recpt.
sent-by   Specifies who sent this article to the conference specified by recpt, cc-recpt
         or bcc-recpt.
sent-at   Specifies when the article was sent to the conference specified by recpt, cc-
         recpt or bcc-recpt.

bcc-recpt Specifies a blind carbon copy recipient. This item is only accepted by protocol
version 10 servers and is only sent in responses and messages introduced in
protocol version 10 or later.

3.13 Who Information

Who-Info-Old ::=  
               ( person : Pers-No;  
               working-conference : Conf-No;  
               what-am-i-doing : HOLLERITH;  
               )

Who-Info ::=  
               ( person : Pers-No;  
               working-conference : Conf-No;  
               session : Session-No;  
               what-am-i-doing : HOLLERITH;  
               username : HOLLERITH;  
               )

Who-Info-Ident ::=  
                    ( person : Pers-No;  
                    working-conference : Conf-No;  
                    session : Session-No;  
                    what-am-i-doing : HOLLERITH;  
                    username : HOLLERITH;  
                    hostname : HOLLERITH;  
                    ident-user : HOLLERITH;  
                    )

These structures are used to retrieve information on who is currently using LysKOM.
All the requests using these types are obsolete, but Who-Info is used by async-i-am-on
(see Section 5.5 [async-i-am-on], page 134).

The fields of Who-Info-Old are
person The person the information is about.

working-conference The conference the person is currently in.

what-am-i-doing A client-supplied string saying what the person is doing.

The fields of Who-Info are

person The person the information is about.

working-conference The conference the person is currently in.

session The person’s session number.

what-am-i-doing A client-supplied string saying what the person is doing.

username The name of the “real” user constructed from hostname and ident-user (see below) and information from the client.

The fields of Who-Info-Ident are

person The person the information is about.

working-conference The conference the person is currently in.

session The person’s session number.

what-am-i-doing A client-supplied string saying what the person is doing.

username The name of the “real” user constructed from hostname and ident-user.

hostname The host the connection originated at.

ident-user The user name according to the Ident daemon at the user’s machine or “unknown” if Ident was not used.

3.14 Session Information

Session-Info ::= 
( person : Pers-No;  
  working-conference : Conf-No;  
  session : Session-No;  
  what-am-i-doing : HOLLERITH;  
  username : HOLLERITH;  
  idle-time : INT32;  
  connection-time : Time;  
)
Session-Info-Ident ::= 

( person : Pers-No;
  working-conference : Conf-No;
  session : Session-No;
  what-am-i-doing : HOLLERITH;
  username : HOLLERITH;
  hostname : HOLLERITH;
  ident-user : HOLLERITH;
  idle-time : INT32;
  connection-time : Time;
)

Static-Session-Info ::= 

( username : HOLLERITH;
  hostname : HOLLERITH;
  ident-user : HOLLERITH;
  connection-time : Time;
)

Session-Flags ::= BITSTRING 

( invisible;
  user-active-used;
  user-absent;
  reserved3;
  reserved4;
  reserved5;
  reserved6;
  reserved7;
)

Dynamic-Session-Info ::= 

( session : Session-No;
  person : Pers-No;
  working-conference : Conf-No;
  idle-time : INT32;
  flags : Session-Flags;
  what-am-i-doing : HOLLERITH;
)

Scheduling-Info ::= 

( priority : INT16;
  weight : INT16;
These data types give information about a particular LysKOM session. The types Session-Info and Session-Info-Ident have been superseded by Static-Session-Info and Dynamic-Session-Info. The static session info represents information about a session that does not change during the lifetime of the session. Therefore static session infos can be aggressively cached by the client.

The fields of Session-Info are

- **person** The person using this session.
- **working-conference** The conference the session is currently in.
- **session** The number of this session.
- **what-am-i-doing** A client-supplied string saying what the person is currently doing.
- **username** The name of the “real” user (see Who-Info above.)
- **idle-time** The number of seconds since user-active was used by this session (see Section 4.83 [user-active], page 104), or since the session was created if user-active has not been used yet. See also user-active-used below.
- **connection-time** The time when the connection was initiated. This is not the same as the amount of time the person has been on.

The fields of Session-Info-Ident are

- **person** The person using this session.
- **working-conference** The conference the session is currently in.
- **session** The number of this session.
- **what-am-i-doing** A client-supplied string saying what the person is currently doing.
- **username** The name of the “real” user (see Who-Info-Ident above.)
- **hostname** The host the connection originated at.
- **ident-user** The user name according to the Ident daemon at the user’s machine or “unknown” if Ident was not used.
- **idle-time** The number of seconds since user-active was used by this session (see Section 4.83 [user-active], page 104), or since the session was created if user-active has not been used yet. See also user-active-used below.
- **connection-time** The time when the connection was initiated. This is not the same as the amount of time the person has been on.
The fields of Static-Session-Info are

**username**  The name of the “real” user (see Who-Info-Ident above.)

**hostname**  The host the connection originated at.

**ident-user**  The user name according to the Ident daemon at the user’s machine or “unknown” if Ident was not used.

**connection-time**  The time when the connection was initiated. This is not the same as the amount of time the person has been on.

The bits in Session-Flags are:

**invisible**  When true, the user requested an invisible session (see Section 4.63 [login], page 93). Sessions where no-one is logged in also have the invisible flag set.

**user-active-used**  When true, the user-active call (see Section 4.83 [user-active], page 104) has been issued by the session, which in turn means that idle-time fields of Dynamic-Session-Info, Session-Info and Session-Info-Ident are valid. When false, the idle-time fields contains the number of seconds since the session was created.

**user-absent**  This flag is currently not used.

The fields of a Dynamic-Session-Info are

**session**  The session number of the session.

**person**  The person currently logged on, or zero if the session has not yet logged on.

**working-conference**  The conference the session is currently in.

**idle-time**  The number of seconds since user-active was used by this session (see Section 4.83 [user-active], page 104), or since the session was created if user-active has not been used yet. See also user-active-used above.

**flags**  The dynamic session flags (see above.)

**what-am-i-doing**  What the client is doing. This string is set by the client.

The Scheduling-Info type determines how the resources are shared between different sessions⁴. See get-scheduling (see Section 4.119 [get-scheduling], page 129) and set-scheduling (see Section 4.120 [set-scheduling], page 129) for more information. It contains these fields:

---

⁴ RFC 2782 (DNS SRV) provided inspiration when the Scheduling-Info structure was defined.
priority  Clients with a numerically lower priority value will have priority over other clients. A client with priority set to 0 can totally starve clients with priority set to 1, 2 or anything higher.

weight  Within a priority class, the resources are shared in proportion to the weight value. If one client has a weight of 200 and another of 50, the first client will get roughly four times as much work done (assuming that the server is the limiting factor).

3.15 Statistics

Stats ::= ( average : FLOAT; 
ascent-rate : FLOAT; 
descent-rate : FLOAT; 
)

Stats-Description ::= ( what : ARRAY HOLLERITH; 
when : ARRAY INT32; 
)

The Stats structure returns information about a measured value.

average  The average is the average value for the measurement period. If the measurement period is 0, this is instead the current value.

ascent-rate  descent-rate

These fields indicate the activity for this value, measured in units per second. If the measured value is pending DNS requests, the ascent-rate would be the average number of issued requests per second, and the descent-rate would be the average number of received replies (or timeouts, errors, or other reasons why the request is no longer pending).

When calculating the ascent-rate, only events that cause the value to increase are considered. Likewise, the descent-rate only considers events that decrease the value.

Example: if the measurement period is 60 seconds, the value starts at 5, and it is increased by one 90 times and decreased by one 60 times during the measurement period, the value will of course be 35 when the period ends. The ascent rate will be 1.5 per second, and the descent rate 1.0 per second.

If the measurement period is 0, both ascent-rate and descent-rate are set to 0.

The Stats-Description structure returns information about what kind of statistical information that the server gathers. It contains these fields:

what  A list of all things that the server collect statistics about. Chapter 13 [Measured Properties], page 165, for a list of things that might be included in this list.
The statistics returned by `get-stats` (see Section 4.113 [get-stats], page 126) is a number of values collected during various periods of time. This array contains the periods, measured in seconds. The value 0 means that the current value is returned. The values are only returned in ascending order, so if 0 is included it will be the first value. Chapter 13 [Measured Properties], page 165, for more info.
4 Protocol Requests

This chapter documents all calls that can be made to the server. All calls are annotated with the protocol version in which they appeared and their current status.

The heading for each call looks something like this:

`create-person-old [5] (1) Obsolete (10)`

The heading consists of several parts:

The name: `create-person-old`
This is the name of the call. The name is not considered part of the protocol. It may change in future versions of this document. Since the name is never sent over the network it doesn’t matter that much.

The call number: `[5]`
The call number is what really matters, since it is sent over the network. It will never change.

Introduced: `(1)`
The protocol version when the call was first implemented. Some calls added more functionality in a later protocol version. The description for those calls describes such changes.

The status: `Obsolete`
The status of the call (see below).

Made obsolete: `(10)`
This figure is only present for some obsolete calls, and it states in which protocol version the call was obsoleted.

The status of a call can be any of:

`Experimental`
The call is experimental. No client should rely on the existence of this call. Experimental calls that are useful will usually become recommended in future versions.

`Recommended`
The call is a standard call. Clients are recommended to use these calls rather than experimental or obsolete ones. Servers are required to implement all recommended calls.

`Obsolete`
The call should no longer be used by clients. Servers should implement these, or they will be incompatible with old client versions. Please note: the documentation for the obsolete calls may be incomplete. Many of them perform compatibility magic to ensure that they never return anything that old clients don’t expect. This compatibility magic is often documented, but we may have forgotten to document it in some places.

A note about the examples: The examples consist of a number of calls and replies. Calls are set in a normal typewriter font. Replies are set in a slanted typewriter font. Extra newlines are sometimes inserted in the examples to avoid overly long lines.
4.1 login-old [0] (1) Obsolete (4)

    login-old [0] ( ( person : Pers-No; passwd : HOLLERITH ) ) -> ( );

Log in as a person. This call has been replaced by login (see Section 4.63 [login], page 93).

**Error codes**

undefined-person

    person is not an existing person.

login-disallowed

    Logins are not allowed and person does not have the wheel bit set.

invalid-password

    passwd is not the correct password for person. The error-status indicates
    the person number.

4.2 logout [1] (1) Recommended

    logout [1] ( )
    -> ( );

Log out from LysKOM.

This call does not disconnect the session; use disconnect for that (see Section 4.56 [disconnect], page 88).

After issuing a logout call the client can reconnect as the same or a different person
using the login call (see Section 4.63 [login], page 93).

For a client that needs to log in as several different users, issuing multiple logout and
login requests during one session is faster and places less load on the server than does
creating new sessions.

**Error codes**

This call never fails.

4.3 change-conference [2] (1) Recommended

    change-conference [2] ( conference : Conf-No )
    -> ( );

Change current conference of a session. This call used to be called pepsi (the name was
a very obscure and not very funny joke.)
**Error codes**

*login-first*

   The session is not logged in yet.

*undefined-conference*

   Conference `conference` does not exist or is secret.

*conference-zero*

   `conference` is zero.

*not-member*

   The user currently logged in is not a member of `conference`.

### 4.4 change-name [3] (1) Recommended

\[
\text{change-name [3] (conference : Conf-No; new-name : HOLLERITH )} \\
\rightarrow ( ) ;
\]

This call changes the name of a conference or a person. To change the name of a conference the session issuing the call must be logged in as a person who either has special privileges or is the supervisor of the conference.

**Error codes**

*login-first*

   The session is not logged in yet.

*undefined-conference*

   Conference `conference` does not exist or is secret.

*conference-zero*

   `conference` is zero.

*permission-denied*

   Permission denied. The `change-name` bit is not set or the user does not have enough access to `conference`.

*conference-exists*

   `new-name` is already occupied by another conference.

*string-too-long*

   `new-name` is too long for a valid conference name.

*bad-name*

   There are invalid characters in `new-name`.

### 4.5 change-what-i-am-doing [4] (1) Recommended

\[
\text{change-what-i-am-doing [4] (what-am-i-doing : HOLLERITH )} \\
\rightarrow ( ) ;
\]
This call tells the server what the logged-in user is doing. The string is usually displayed when a user requests that a client list who is using LysKOM. Clients are encouraged to use this call creatively.

**Error codes**

`string-too-long`

what-am-i-doing is too long.

### 4.6 create-person-old [5] (1) Obsolete (10)

```plaintext
create-person-old [5] (( name : HOLLERITH;
                 passwd : HOLLERITH ))
                 -> ( Pers-No );
```

This call requests that the server create a new person with the name and password given as arguments. To create a person the session may have to be logged in as a person with sufficient privileges, if the server is configured that way.

If the session was not logged in an automatic visible login to the new person will be performed.

The new person will be a member of exactly one conference: the associated mailbox. That membership will have priority 255 and (of course) position 0. All flags of the membership will be 0.

*Example:*

```
1 5 24HLysKOM Statistics Daemon 6Hsecret
   =1 6
```

This example creates a new person named “LysKOM statistics Daemon” with the password “secret”. The server has returned the person number six for the person.

**Error codes**

`login-first`

The session is not logged in and the server does not allow person creation before logging in.

`permission-denied`

The server does not allow everyone to create person and the person currently logged on does not have the create-pers bit set.

`conference-exists`

There is already a conference named `name`.

`invalid-password`

The string `passwd` is not a valid password.

`index-out-of-range`

Attempt to create a person failed because we reached the maximum number of conferences permitted. The `error-status` indicates the person number that should have been created if the limit hadn’t been reached.
4.7 get-person-stat-old [6] (1) Obsolete (1)

            mask : INT32 ))

-> ( Person );

This call returns information about a person. If the low bit of mask is not set, the empty string is returned instead of the username field. This call is obsolete and has been replaced by get-person-stat (see Section 4.50 [get-person-stat], page 84).

Error codes

login-first
This call can't be executed without logging in first.

undefined-person
Person person does not exist.

undefined-conference
Conference person does not exist or is secret.

conference-zero
person is zero.

4.8 set-priv-bits [7] (1) Recommended

            privileges : Priv-Bits )) -> ( );

This call sets the privileges of person to privileges. See Section 1.6 [Security], page 9. To successfully issue this call the session must be logged in as a person with sufficient privileges.

Example:

1 7 6 0010000000000000
=1

This example sets the privileges of person 6 to nothing but statistic. This particular set of privileges might be useful for a person used by a statistics-collecting daemon.

Error codes

login-first
This call can't be executed without logging in first.

undefined-person
person is not a valid person.

permission-denied
The person currently logged in does not have the wheel bit set and privilege level set to 6 or higher.
4.9 set-passwd [8] (1) Recommended

set-passwd [8] (( person : Pers-No;
                     old-pwd : HOLLERITH;
                     new-pwd : HOLLERITH )) -> ( )

This call is used to set the password of person to new-pwd. Any person may set it’s own password. In addition persons with sufficient privileges may set other persons’ passwords. The password of the person currently logged in must match old-pwd.

Example:

1 8 5 6Hgazonk 7Ha9go8Hz
=1

This example sets the password of the LysKOM administrator to “a9go8Hz” provided that the old password was “gazonk”.

Error codes

login-first
This call cannot be executed without logging in.

undefined-person
person is not a valid person.

permission-denied
Attempt to change password of another person without being the supervisor of that person and without the wheel bit set and privilege level 7 or higher enabled.

invalid-password
old-pwd is invalid or new-pwd is invalid as a password.

4.10 query-read-texts-old [9] (1) Obsolete (10)

                            conference : Conf-No ))
-> ( Membership-Old );

This call is used to find the number of unread texts in a conference. The data it returns is actually a membership structure which specifies which texts have been read. It is up to the client to transform the data to a more usable form. person is the person being queried and conference is the conference in question.

Calling query-read-texts-old does not require the session to be logged in.
Example:

1 9 6 1
   =1 32 5 11 12 7 93 1 193 1 1 20 133 3 { 135 136 137 }

This example finds the read texts for user 6 in conference 1. The returned data indicates that the user last read conference 1 (the tenth number) on Monday July 12th, 1993 at 11:05:32 (the first nine numbers), that the person has assigned priority 20 to the conference (the eleventh number) and that all articles up to and including local number 133 plus articles 135, 136 and 137 have been read.

Error codes

undefined-person
    person does not exist, or no access to person.

undefined-conference
    Conference conference does not exist, or is secret.

conference-zero
    conference is zero.

not-member
    person is not a member of conference.

4.11 create-conf-old [10] (1) Obsolete (10)

create-conf-old [10] (( name : HOLLERITH;
                        type : Any-Conf-Type ))
   -> ( Conf-No );

This call is used to create new conferences. name is the name of the new conference and type is its type. If successful, the call returns the conference number of the newly created conference.

To use this call the session must have logged in as a user with privileges to create conferences (see Section 1.6 [Security], page 9).

Example:

1 50 8
%1 9 0
1 10 13HInlägg }t mig 00001000
   =1 8
1 50 8
   =1 13HInlägg }t mig 0000
43 9 17 14 5 96 5 165 1
43 9 17 14 5 96 5 165 1
5 0 5 0 5 0 77 0 1 0

This example creates a new conference named "Inlägg }t mig" which accepts all users as members and accepts anonymous articles. The server returns 7 as the new conference number.

1 This conference is a standard Lysator conference. It’s all Padrone’s fault.
Error codes

login-first
 login required before issuing this call.

permission-denied
 The server does not allow everyone to create a conference and user does not
 have the create-conf bit set.

conference-exists
 A conference named name already exists.

bad-name name contains invalid characters.

string-to-long
 name is too long to be used as a conference name.

secret-public
 The conference type type has the secret bit set, but the rd-prot bit is cleared.

index-out-of-range
 Attempt to create a conference failed because we reached the maximum number
 of conferences permitted. The error-status indicates the conference number
 that should have been created if the limit hadn’t been reached.


delete-conf [11] ( conf : Conf-No ) -> ( );

This call deletes the conference conf from the LysKOM database. Only privileged
users and the supervisors of a conference may delete it. If the conference is a mailbox the
 corresponding person will also be deleted.

Example:

1 50 7
=1 4HTest 1001
16 4 19 10 5 96 1 161 1
16 4 19 10 5 96 1 161 1
7 0 7 0 0 0 77 1 1 0
1 11 7
=1
1 50 7
%! 9 0

This example shows the successful deletion of conference number seven.

Error codes

login-first
 login required before issuing this call.

undefined-conference
 conf does not exist or is secret.
conference-zero
cnf is zero.

permission-denied
Not supervisor of cnf and not enough privileges enabled.

undefined-person
conf is a mailbox but does not exist as a person (the database is corrupt.)

4.13 lookup-name [12] (1) Obsolete (7)

lookup-name [12] ( name : HOLLERITH )
-> ( Conf-List-Archaic );

This call returns a list of conferences matching the string name. lookup-name has been superseded by lookup-z-name (see Section 4.77 [lookup-z-name], page 100).

Example:

1 12 3Had
=1 3 { 217 674 1582 } { 0000 1001 0000 }
2 12 3H:::
=2 0 * *
3 76 3Ha d 1 1
=3 3 { 31HÅlkohol- (och annan) drogdebatt 0000 217
13HAnna Degerman 1001 674
27HAnarchy discussion (import) 0000 1582 }
4 76 3H::: 1 1
=4 0 *

This example shows two attempts to look up a name. The first example looks up 'a d' and finds three matches (the middle, number 674, is a person). The second example looks up '::*:' which doesn’t match any conference (or person). Call number 3 and 4 issues the same lookup using the lookup-z-name call (see Section 4.77 [lookup-z-name], page 100). (The return value for call number 3 has been broken into three lines to fit on the page.)

Error codes

This call always succeeds.

4.14 get-conf-stat-older [13] (1) Obsolete (1)

mask : INT32 ))
-> ( Conference-Old );

This call retrieves the information associated with conference conf-no in the LysKOM server. This call should no longer be used; use get-conf-stat instead (see Section 4.92 [get-conf-stat], page 110).

The mask argument determines if the name is returned or not. If the lowest bit is 1 the name is returned, otherwise the empty string is returned instead of the name.
Error codes

undefined-conference
conf-no does not exist or is secret.

conference-zero
conf-no is zero.

4.15 add-member-old [14] (1) Obsolete (10)

\[
\text{add-member-old [14]} \left( \text{conf-no : Conf-No; pers-no : Pers-No; priority : INT8; where : INT16} \right) \rightarrow ( );
\]

Make the person pers-no a member of conference conf-no. The membership priority is set to priority and its position in the membership list is set to where.

This call can be used to change the priority and position of a conference in the person’s membership list if the person is already a member of the conference.

In protocol version 10, setting the priority to zero sets the passive bit in the membership. The actual priority is not changed.

Example:

```
1 46 119 0 10 0
=1 1 { 49 14 17 13 8 91 5 255 1 119 255 0 0 * } 1 14 1 119 250 0
=1
1 46 119 0 10 0
=1 2 { 52 30 14 11 5 96 2 162 1 1 250 0 0 * 49 14 17 13 8 91 5 255 1 119 255 0 0 * }
```

This example makes person 119 (me) a member of conference number 1. The priority is set to 250 and the conference is placed first in the membership list. The first and last calls of the example show the membership list for person 119 before and after the call.

Error codes

login-first
Login required before issuing this call.

undefined-conference
Conference conf-no does not exist or is secret.

conference-zero
conf-no is zero.

undefined-person
Person pers-no does not exist.
access-denied
Not enough permissions or privileges to add members to conference conf-no.

permission-denied
Person pers-no is already a member of conference conf-no, but the person logged on is not a supervisor and does not have enough privileges to change the priorities of person pers-no.

4.16 sub-member [15] (1) Recommended

sub-member [15] (( conf-no : Conf-No;
                pers-no : Pers-No ))
   -> ( );

Removes the person pers-no from the membership list of conference conf-no and remove the conference from the person’s list of memberships.

Example:

```
1 46 5 0 100 0
 =1 2 { 44 14 19 10 5 96 1 161 1 1 0 0 0 *
        49 14 17 13 8 91 5 255 1 5 255 0 0 * }
1 15 1 5
 =1
1 46 5 0 100 0
 =1 1 { 49 14 17 13 8 91 5 255 1 5 255 0 0 * }
```

This example shows how person 5 is removed from conference one. The calls to get-membership-old demonstrate the effects on the LysKOM database.

Error codes

login-first
Login required before issuing this call.

undefined-conference
Conference conf-no does not exist or is secret.

conference-zero
conf-no is zero.

undefined-person
Person pers-no does not exist.

not-member
Person pers-no is not a member of conference conf-no.

permission-denied
Not supervisor of conference conf-no or not supervisor of person pers-no and not enough privileges to issue the call anyway. error-status contains the conference number.
4.17 set-presentation [16] (1) Recommended

```
set-presentation [16] (( conf-no : Conf-No;
             text-no : Text-No ))
   -> ( );
```

This call sets the presentation text of the conference or person `conf-no` to the text `text-no`. To remove a presentation, use a `text-no` of zero. This call protects the new presentation from being deleted automatically and removes such protection from the old presentation. In lyskomd this is implemented by increasing the mark count on presentation texts.

**Example:**

```
1 50 6
=1 11HDavid Byers 1001
  26 15 11 9 5 96 0 160 1
  26 15 11 9 5 96 0 160 1
  5 0 5 0 5 0 77 1 1 0
1 16 6 1
=1
1 50 6
=1 11HDavid Byers 1001
  26 15 11 9 5 96 0 160 1
  26 15 11 9 5 96 0 160 1
  5 1 5 0 5 0 77 1 1 0
```

This example shows how the presentation of person 6 is being changed. To start with, the person had no presentation, as is shown by the `get-conf-stat-old` call (see Section 4.51 [get-conf-stat-old], page 85). Later, after `set-presentation` has been called, the presentation field has changed.

**Error codes**

- **login-first**
  Login required before issuing this call.

- **undefined-conference**
  Conference `conf-no` does not exist or is secret.

- **conference-zero**
  `conf-no` is zero.

- **permission-denied**
  Not enough permissions to change presentation of conference `conf-no`.

- **no-such-text**
  Text `text-no` does not exist or no read permission.

- **mark-limit**
  Adding a mark to text `text-no` would cause it to have too many marks.
4.18 set-etc-motd [17] (1) Recommended

\[
\text{set-etc-motd} \quad (( \text{conf-no} : \text{Conf-No}; \\
\text{text-no} : \text{Text-No} )) \\
\rightarrow ( ) ;
\]

This call sets the message of the day on the conference or person \text{conf-no} to the article \text{text-no} and removes the old message. To remove an old message without setting a new one, use a \text{text-no} of zero. This call protects the new message from automatic deletion and removes such protection from the old message just as \text{set-presentation} (see Section 4.17 [set-presentation], page 58).

Example:

\[
\begin{align*}
1 & 50 6 \\
=1 & 11HDavid Byers 1001 \\
& 26 15 11 9 5 96 0 160 1 \\
& 26 15 11 9 5 96 0 160 1 \\
& 5 0 5 0 5 0 77 1 1 0 \\
1 & 17 6 1 \\
=1 \\
1 & 50 6 \\
=1 & 11HDavid Byers 1001 \\
& 26 15 11 9 5 96 0 160 1 \\
& 26 15 11 9 5 96 0 160 1 \\
& 5 0 5 0 5 1 77 1 1 0 \\
\end{align*}
\]

This example shows how text number one is used as the message of the day for conference six (which happens to be a mailbox.) The \text{get-conf-stat-old} calls before and after demonstrate the change in the conference structure.

Error codes

login-first
Login required before issuing this call.

undefined-conference
Conference \text{conf-no} does not exist or is secret.

conference-zero
\text{conf-no} is zero.

permission-denied
Not enough permissions to set the MOTD of conference \text{conf-no}.

mark-limit
Adding a mark to text \text{text-no} would cause it to have too many marks.

4.19 set-supervisor [18] (1) Recommended

\[
\text{set-supervisor} \quad (( \text{conf-no} : \text{Conf-No}; \\
\text{admin} : \text{Conf-No} ))
\]
The `set-supervisor` call changes the supervisor of an existing conference. The result is that all members of the conference `admin` become supervisors of the conference `conf-no`. Typically, but not always, `admin` will be a mailbox.

**Example:**

```
1 50 4
=1 17HNyheter om LysKOM 0000
48 11 17 13 8 91 5 255 1
15 12 11 9 5 96 0 160 1
0 0 0 0 0 77 1 1 1
1 18 4 6
=1
1 50 4
=1 17HNyheter om LysKOM 0000
48 11 17 13 8 91 5 255 1
15 12 11 9 5 96 0 160 1
0 0 6 0 0 0 77 1 1 1
```

This example makes the members of conference six supervisors of conference four (which is usually the “News about LysKOM” conference). The change in the conference structure is evident from the `get-conf-stat-old` calls (see Section 4.51 [get-conf-stat-old], page 85) before and after the `set-supervisor` call. Note that the original supervisor was not set. In order to change the supervisor of such a conference, the session issuing the call must have administration privileges.

**Error codes**

- `login-first`
  Login required before issuing this call.

- `undefined-conference`
  Conference `conf-no` or conference `admin` does not exist or is secret.

- `conference-zero`
  `conf-no` is zero.

- `permission-denied`
  Not enough permissions or privileges to change the supervisor of conference `conf-no`.

### 4.20 set-permitted-submitters [19] (1) Recommended

```
set-permitted-submitters [19] (( conf-no : Conf-No;
perm-sub : Conf-No ))
```

This call grants the right to send articles to the conference `conf-no` to all members of the conference `perm-sub`. If `perm-sub` is 0, everybody can send articles to the conference. (This is the default setting of new conferences and persons.)
When a person tries to submit an article but does not have the right to do so, the server will send the article to the super-conference instead.

\textit{Example:}

\begin{verbatim}
1 50 4
=1 17HNyheter om LysKOM 0000
48 11 17 13 8 91 5 255 1
15 12 11 9 5 96 0 160 1
0 0 6 0 0 0 77 1 1 1
1 19 4 1
=1
1 50 4
=1 17HNyheter om LysKOM 0000
48 11 17 13 8 91 5 255 1
15 12 11 9 5 96 0 160 1
0 0 6 1 0 0 77 1 1 1
\end{verbatim}

This example shows how all members of conference one are given permission to send articles to conference four. From the beginning, only members of conference four were permitted to submit articles. The change is evident from the get-conf-stat-old calls (see Section 4.51 [get-conf-stat-old], page 85) before and after the set-permitted-submitters call.

\textbf{Error codes}

\textit{login-first}

Login required before issuing this call.

\textit{undefined-conference}

Conference \textit{conf-no} or conference \textit{perm-sub} does not exist or is secret.

\textit{conference-zero}

\textit{conf-no} is zero.

\textit{permission-denied}

Not enough permissions to change the permitted submitters of conference \textit{conf-no}.

\subsection{4.21 set-super-conf \textdagger [20] (1) Recommended}

\begin{verbatim}
super-conf : Conf-No ))
-> ( );
\end{verbatim}

Makes the conference \textit{super-conf} the super-conference of the conference \textit{conf-no}. See Section 3.5 [Conference Status Types], page 25, for more info on what this field is used for.
Example:

```
1 50 4
=1 17H Nyheter om LysKOM 0000
 48 11 17 13 8 91 5 255 1
 15 12 11 9 5 96 0 160 1
 0 0 6 0 0 0 77 1 1 1
2 20 4 8
=2
3 50 4
=3 17H Nyheter om LysKOM 0000
 48 11 17 13 8 91 5 255 1
 15 12 11 9 5 96 0 160 1
 0 0 6 0 8 0 77 1 1 1
```

This example demonstrates how the super-conference of conference 1 is set to conference 8. The calls to \texttt{get-conf-stat-old} (see Section 4.51 [get-conf-stat-old], page 85) demonstrate the change in the conference structure.

Error codes

\textbf{login-first}

Login required before issuing this call.

\textbf{undefined-conference}

Conference \texttt{conf-no} or conference \texttt{super-conf} does not exist or is secret.

\textbf{conference-zero}

\texttt{conf-no} is zero.

\textbf{permission-denied}

Not enough permissions to change super-conference of conference \texttt{conf-no}.

4.22 \textbf{set-conf-type [21] (1) Recommended}

```
set-conf-type [21] (( conf-no : Conf-No;
    type : Any-Conf-Type ))
    -> ( );
```

Sets the conference type of conference \texttt{conf-no} to \texttt{type}. Before protocol version 8, \texttt{type} could only be four bits. Starting with protocol version 8, either a four-bit \texttt{Conf-Type} or an eight-bit \texttt{Extended-Conf-Type} is allowed.
Example:

```
1 78 4
=1 17HNyhetem om LysKOM 00001000 1 77
1 21 4 00000000
=1
1 78 4
=1 17HNyhetem om LysKOM 00000000 1 77
```

This example shows a user removing the allow-anonymous bit from conference four.
The get-uconf-stat call (see Section 4.79 [get-uconf-stat], page 101) shows all eight bits
of the conference type before and after the set-conf-type call.

Error codes

login-first
Login required before issuing this call.

undefined-conference
Conference conf-no does not exist or is secret.

conference-zero
conf-no is zero.

secret-public
type has secret bit but not rd-prot.

permission-denied
Not enough permissions or privileges to change the conference type of conference
conf-no.

letterbox
Attempt to change the letterbox flag.

invalid-membership-type
Attempt to change to a conference type that is not compatible with one of more
members of the conference (for example, attempting to set forbid-secret on
a conference with a secret member.) error-status is the id of the first person
with an incompatible membership type.

4.23 set-garb-nice [22] (1) Recommended

```
set-garb-nice [22] (( conf-no : Conf-No;
                        nice : Garb-Nice ))
-> ( );
```

Sets the expiration time for articles in conference conf-no to nice days. An article that
is older than the maximum expiration time of each conference it is sent to may be deleted
by the LysKOM server unless it has marks.
Example:

1 78 4
=1 17HNYheter om LysKOM 00000000 1 77
1 22 4 7
=1
1 78 4
=1 17HNYheter om LysKOM 00000000 1 7

This example shows the expiration time of conference four being lowered from 77 to just seven days.

Error codes

login-first
Login required before issuing this call.

undefined-conference
Conference conf-no does not exist or is secret.

conference-zero
conf-no is zero.

permission-denied
Not enough permissions to change the expiration time for conference conf-no.

4.24 get-marks [23] (1) Recommended

get-marks [23] ( )
-> ( ARRAY Mark );

This call returns the list of marks the current user has set.

Example:

1 23
=1 3 { 13020 100 13043 95 12213 95 }

In this example, the current user has three marks, one on text 13020 with mark type 100, one on text 13042 with mark type 95 and one on text 12213 with mark type 95. The maximum number of marks may be arbitrarily limited in the LysKOM server.

Error codes

login-first
Login required before issuing this call.

4.25 mark-text-old [24] (1) Obsolete (4)

mark-text-old [24] (( text : Text-No;
mark-type : INT8 ))
-> ( );
This call has been replaced by \texttt{mark-text} (see Section 4.73 [mark-text], page 97) and \texttt{unmark-text} (see Section 4.74 [unmark-text], page 98) and should no longer be used. This call can only set \texttt{mark-type} to a value in the range 1 to 255 (inclusive). If \texttt{mark-type} is set to 0 the mark will be removed.

\textbf{Error codes}

\texttt{login-first}

Login required before issuing this call.

\texttt{no-such-text}

The text \texttt{text} does not exist.

\texttt{permission-denied}

No read permission on text \texttt{text}.

\texttt{undefined-person}

The person currently logged in does not exist (can’t happen error.)

\texttt{too-many-marks}

Marking the text would cause the person doing the marking to have too many marks, or cause the text to have too many marks.

\textbf{4.26 get-text [25] (1) Recommended}

\begin{verbatim}
get-text [25] (( text : Text-No;
start-char : INT32;
end-char : INT32 ))
\rightarrow ( HOLLERITH );
\end{verbatim}

Retrieve text number \texttt{text} from the LysKOM database, starting at position \texttt{start-char} and ending at position \texttt{end-char}. The first character in the text is numbered 0 and the last can be retrieved using \texttt{get-text-stat} (see Section 4.91 [get-text-stat], page 110). It is also permitted to request a character position beyond the actual end of the text, in which case as much text as is available will be returned.

\textit{Example:}

\begin{verbatim}
  1 25 100 0 32766
  □1 25HYawn⋆Nothing is happening
  25 100 5 32766
  □2 20HNothing is happening
  3 25 100 0 3
  □3 4HYawn
\end{verbatim}

In the example, \texttt{⋆} represents a linefeed.

In this example, text 100 is requested three times, first from position 0 to position 32766, then from position 5 to position 32766 and finally from position 0 to position 4. The first reply contains the entire text, the following two contain only the requested portion.
Error codes

no-such-text
The text text does not exits or no read permission. This error code will also be used when attempting to fetch texts without logging in first. (There are some texts that are readable without logging in: the motd-of-lyskom (see Section 4.42 [set-motd-of-lyskom], page 79), and texts with the world-readable aux item set on them.)

text-zero
Attempt to retrieve text number 0.

index-out-of-range
start-char is larger than the length of the text.

4.27 get-text-stat-old [26] (1) Obsolete (10)

get-text-stat-old [26] ( text-no : Text-No )
-> ( Text-Stat-Old );

Get information about text number text-no. The text-stat contains information about the size of the text, its recipients, comments, author and more.

For compatibility reasons this call will only return the misc-infos 0=recpt, 1=cc-recpt, 2=comm-to, 3=comm-in, 4=footn-to, 5=footn-in, 6=loc-no, 7=rec-time, 8=sent-by and 9=sent-at. Newer misc-infos will either be removed or converted to a similar one. Specifically, 15=bcc-recpt may (at the servers discretion) be converted to 1=cc-recpt or omitted entirely.

Example:

```
1 26 100
1=1 7 35 16 15 6 96 1 196 1 14 1 22 1
7 { 0 7 6 85 0 15 6 1
8 13 9 12 37 16 15 6 96 1 196 1
3 311 }
```

In this example, text number 100 was created by person 7 at approximately 4:35PM on July 15 1996. Its recipients are conferences 7 and 15, and it was sent to conference 15 by person 13 at 16:37 on the day it was created. The text has a single comment: text 311.

Error codes

no-such-text
The text text-no does not exist, or no read access. This error code will also be used when attempting to fetch texts without logging in first. (There are some texts that are readable without logging in: the motd-of-lyskom (see Section 4.42 [set-motd-of-lyskom], page 79), and texts with the world-readable aux item set on them.)

text-zero
Attempt to retrieve text number 0.
4.28 mark-as-read [27] (1) Recommended

\[\text{mark-as-read [27]} (( \text{conference} : \text{Conf-No}; \\
\qquad \text{text} : \text{ARRAY Local-Text-No })) \\
\qquad \rightarrow ( );\]

Marks text \text{text} in conference number \text{conference} as read for the current user. This call updates the membership record for the user.

\text{Example:}

\[
\begin{align*}
1 & 9 6 7 \\
=1 & 20 32 11 17 6 96 3 198 1 7 1 240 0 * \\
1 & 78 7 \\
=1 & 13HInlägg \text{ } t \text{ mig } 00001000 241 1 \\
1 & 27 7 1 \{ 241 \} \\
=1 & 1 9 6 7 \\
=1 & 20 32 11 17 6 96 3 198 1 7 1 241 0 *
\end{align*}
\]

This example shows person 6 marking local text number 241 in conference 7 as read. In the first \text{query-read-texts-old} call the person has read local text 240, but nothing higher. The \text{mark-as-read} call is reflected in the second \text{query-read-texts-old} call, where the user is seen to have read text 241 in conference 7.

To mark a global text number as read it is necessary to translate it into local text numbers by looking at the misc-info list in the \text{Text-Stat} and calling \text{mark-as-read} once for each recipient.

There is no need to call \text{mark-as-read} on deleted texts. The server will automatically mark them as read, sooner or later.

\text{Error codes}

\text{login-first}

Login required before issuing this call.

\text{undefined-conference}

The conference \text{conference} does not exist or is secret.

\text{conference-zero}

\text{conference} is zero.

\text{not-member}

The person logged on is not a member of conference \text{conference}.

\text{no-such-local-text}

One of the numbers in \text{text} is not a local text number in \text{conference}. The error argument indicates the index of the invalid number.

\text{local-text-zero}

One of the numbers in \text{text} is zero.
4.29 create-text-old [28] (1) Obsolete (10)

create-text-old [28] (( text : HOLLERITH;
    misc-info : ARRAY Misc-Info ))
-> ( Text-No );

Creates a new text with contents from text and recipients etc. defined by misc-info (see Section 1.4 [The Misc-Info List], page 4). In addition to the result, the server will send an asynchronous message to all members of any of the recipients of the new text. It is not defined whether this messages comes before or after the reply to the create-text message. Clients should be prepared for either situation.

The text up to the first linefeed is considered to be the subject line. The remaining text is the message body. Although messages with only a subject are valid, clients should avoid letting users create such messages.

The only Misc-Info items valid for this call are recept, cc-recpt, bcc-recpt (protocol version 10), comm-to and footn-to.

Example:

```
1 28 20HExample•Message body 3 { 0 5 1 112 2 33467 }
   :16 0 33502 13 16 15 16 6 97 3 196 1 119 1 20 0
     5 { 0 5 6 148 1 112 6 3438 2 33467 }
   =1 33502
```

In the example, • represents a linefeed.

In this example, person 119 creates a text containing a subject and a one-line body. The recipient of the text is conference five, conference 112 is a CC recipient and the text is a comment to text 33467. The server reply indicates that the new text has been given number 33502. Finally there is an asynchronous message sent to all members of recipient conferences. Note how the message was sent before the reply to the client. The misc-info list in this message has two additional fields, the local numbers of the text in each of its recipient conferences.

Error codes

- **login-first**
  - Login required before issuing this call.

- **string-too-long**
  - The string text is longer than the maximum length of a message.

- **temporary-failure**
  - The text could not be created at the moment.

- **no-such-text**
  - Attempt to comment or footnote a non-existent or secret text.

- **not-author**
  - Attempt to footnote a text authored by someone else.

- **footnote-limit**
  - Attempt to footnote a text with the maximum number of footnotes already set.
comment-limit
Attempt to comment a text with the maximum number of comments already set.

index-out-of-range
Attempt to create a text failed because we reached the maximum number of texts permitted. The error-status indicates the text number that should have been created if the limit hadn’t been reached.

access-denied
Attempt to send a text to a conference failed because no access to the conference or any super conference that will accept a text.

anonymous-rejected
Attempt to send an anonymous text to a conference that does not accept anonymous texts.

illegal-misc
Invalid misc-info list. A recipient is listed more than once or there is an unknown misc item in the misc-info list.

4.30 delete-text [29] (1) Recommended

delete-text [29] ( text : Text-No )
-> ( );

Deletes the text text from the LysKOM database, if the person issuing the command may do so.

Example:

1 29 33467
=1

This simple example shows the deletion of text number 33467.

Error codes

login-first
Login required before issuing this call.

no-such-text
The text text does not exist or no read access.

not-author
The person logged in is not the text author or supervisor of the text author.

4.31 add-recipient [30] (1) Recommended

add-recipient [30] (( text-no : Text-No;
conf-no : Conf-No;
recept-type : Info-Type ))
-> ( );

Adds conf-no as recipient to text text-no. If recept-type is 1, then a cc-recpt (see Section 1.4 [The Misc-Info List], page 4) is created; otherwise a recept is created.

Since protocol version 8 this call can also be used to change a cc-recpt into a recept and vice versa by simply adding a recipient that already exists.

Since protocol version 10 the recept-type parameter is a Misc-Info. Only infos recept, cc-recpt and bcc-recpt are accepted. In protocol version 9 and earlier this argument was a BOOL, that indicated if the recipient should be a cc-recpt (when true) or recept (when false).

**Example:**

```
1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1 0 *
1 30 1 5 0
=1
1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1
   3 { 0 5 6 1 9 34 34 17 17 6 97 4 197 1 }
1 30 1 5 1
=1
1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1
   3 { 1 5 6 1 9 34 34 17 17 6 97 4 197 1 }
```

This example show how conference 5 is added first as a recipient of text 1, then changed to a carbon-copy recipient. The misc-info list reflects these changes.

**Error codes**

**login-first**

Login required before issuing this call.

**undefined-conference**

The conference conf-no does not exist.

**conference-zero**

conf-no is zero.

**no-such-text**

The text text-no does not exist.

**already-recipient**

The conference conf-no is already a recipient of the same type as recept-type.

**illegal-info-type**

recept-type is not recept, cc-recpt or bcc-recpt.

**recipient-limit**

The text already has the maximum number of recipients.
permission-denied
Attempt to change recipient types of a recipient without being the supervisor of either the author, recipient, or sender of the recipient.

access-denied
Attempt to add a conference as recipient that the person logged on does not have permission to add texts to. The client may have to chase the super conf chain.

4.32 sub-recipient [31] (1) Recommended

\[
\text{sub-recipient [31]} (\text{text-no : Text-No; conf-no : Conf-No}) \rightarrow ( )
\]

Removes \text{conf-no} from the list of recipients of text \text{text-no}. Recipients may be removed by the author of the text or by the supervisor of the recipients of the text or by the supervisor of the author.

Example:

\[
1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1
3 \{ 1 5 6 1 9 34 34 17 17 6 97 4 197 1 \}
1 31 1 5
=1
1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1 0 *
1 31 1 5
\%
1 30 0
\]

In this example, conference 5 is removed from the recipient list of text number 5. When the call is repeated, the server simply returns an error since conference 5 is not a recipient of the text.

Error codes

login-first
Login required before issuing this call.

no-such-text
The text \text{text-no} does not exist or is secret.

not-recipient
The conference \text{conf-no} is not a recipient of text \text{text-no}.

undefined-conference
The conference \text{conf-no} does not exist or is secret.

conference-zero
\text{conf-no} is zero.
permission-denied
Not supervisor of text author or conference, and not sender of text to conf-no
and not enough privileges set and enabled.

4.33 add-comment [32] (1) Recommended

add-comment [32] (( text-no : Text-No;
comment-to : Text-No ))
-> ( );

Add a comment link between the text comment-to and the text text-no (text-no
becomes a comment to the text comment-to). This call is used to add comment links after
a text has been created. The normal procedure for creating comments is to add a comm-to
element to the text’s misc-info list when the text is created (see Section 1.4 [The Misc-Info
List], page 4).

Example:

1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1 0 *
1 26 2
=1 49 49 18 17 6 97 4 197 1 5 1 52 1 2 { 0 2 6 1 }
1 32 1
=1
1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1 1 { 3 2 }
1 26 2
=1 49 49 18 17 6 97 4 197 1 5 1 52 1
4 { 0 2 6 1 2 1 9 19 52 18 17 6 97 4 197 1 }

In this example, text number two is added as a comment to text number one. The
change is reflected in the Misc-Info List of the texts.

Error codes

login-first
Login required before issuing this call.

index-out-of-range
The texts text-no and comment-to are identical. The error-status is text-no.

no-such-text
The text text-no of comment-to are undefined.

comment-limit
The text comment-to already has the maximum number of comments.

already-comment
The text text-no is already a comment of comment-to.
already-footnote
The text text-no is already a footnote of comment-to, and a text cannot be both a comment and a footnote to the same text.

4.34 sub-comment [33] (1) Recommended

sub-comment [33] (( text-no : Text-No; comment-to : Text-No ))
-> ( );
This call removes the text text-no from comment-to’s list of comments.

Example:

```
1 26 1
="1 22 12 17 6 97 4 197 1 5 4 256 1 1 { 3 2 }
1 26 2
="1 49 49 18 17 6 97 4 197 1 5 1 52 1
  4 { 0 2 6 1 2 1 9 19 52 18 17 6 97 4 197 1 }
1 33 2 1
="1
1 26 1
="1 22 12 17 6 97 4 197 1 5 4 256 1 0 *
1 26 2
="1 49 49 18 17 6 97 4 197 1 5 1 52 1 2 { 0 2 6 1 }
```

In this example text 2 is a comment to text 1, as shown by the misc-info lists of the two texts. The sub-comment is called. The misc-info lists are changed to reflect the change.

Error codes

login-first
Login required before issuing this call.

no-such-text
One of the texts text-no or comment-to does not exist.

not-comment
The text text-no is not a comment to comment-to.

permission-denied
Not supervisor of author of text-no or not sender of the comment and not enough privileges set and enable to complete the call anyway.

4.35 get-map [34] (1) Obsolete (10)

get-map [34] (( conf-no : Conf-No; first-local-no : Local-Text-No; no-of-texts : INT32 ))
-> ( Text-List );
This call has been superseded by local-to-global (see Section 4.104 [local-to-global], page 118).

This call retrieves an array mapping local text numbers to global numbers. It is most often used to get a list of unread texts in a conference. Clients will usually use the query-read-texts (see Section 4.108 [query-read-texts], page 121) or get-membership (see Section 4.109 [get-membership], page 122) calls to find the last local number a user has read in a particular conference, then use the get-map call to retrieve the global numbers of all unread texts in the conference.

The conf-no parameter specifies which conference to get the map of. first-local-no is the local number of the first text returned by the call. no-of-texts is the maximum number of text the client wants.

The result is a list of global text numbers. The first element of the list is the global number of local number first-local-no, specified by the call; the second element is the global number of local number first-local-no plus one; and so forth. The list returned by the server is at most no-of-texts long, but may be shorter if the call specifies more texts that there are in the conference.

If first-local-no is higher than the highest local text number, the server will return an error.

If first-local-no is lower than the lowest number that still exists, the server will set first-local-no in the returned Text-List to the first text that still exists. The size of the returned array will be decreased by the same amount as first-local-no is increased. This may result in an empty array being returned. (This paragraph applies even when first-local-no is 0.)

If no texts at all exists in conf-no the resulting array will be empty, and first-local-no will be set to the number the next text to be created will receive.

Example:

```
1 34 119 10 5
  =1 10 5 { 0 0 466 478 391 }
2 34 119 16 5
  =2 16 3 { 481 0 491 }
3 34 119 19 5
  %3 16 0
4 34 120 1 5
  =4 4 2 { 480 485 }
5 34 120 1 2
  =5 4 0 *
```

This example shows five get-map calls. The first retrieves the mappings of local numbers 10 to 15; the second call returns local numbers 16 to 18. As this example shows the maps are not necessarily sorted in ascending order, since texts may be added after their creation, and the maps may contain zeroes anywhere. These represent texts that have been removed for some reason.

Since the first example returned two leading zeroes we can be certain that at least one text with a local text number lower than 10 still exists. Otherwise the result would have been truncated in the front as it is in examples 4 and 5.
The third exchange in the example shows what happens when first-local-no is too large.

The forth and fifth examples shows what happens when an attempt to retrieve a mapping from a conference where the first local text numbers have been deleted. In the example local text numbers 1, 2 and 3 no longer exist, and 4 corresponds to 480, and 5 to 485.

**Error codes**

**login-first**
Login required before issuing this call.

**undefined-conference**
Conference conf-no does not exist or is secret.

**conference-zero**
conf-no is zero.

**access-denied**
Conference conf-no is read protected.

**no-such-local-text**
first-local-no is higher than the highest local text number that ever has existed in this conference.

### 4.36 get-time [35] (1) Recommended

get-time [35] ( )
-> ( Time );

This call simply returns the local time according to the server.

*Example:*

```
    1 35
    =1 23 47 19 17 6 97 4 197 1
```

This example demonstrates the call. According to the server the time is 19:47:23, Thursday July 17, 1997. The result also shows that it is the 197th day of the year, and that daylight savings time is in effect.

**Error codes**

This call always succeeds

### 4.37 get-info-old [36] (1) Obsolete (10)

get-info-old [36] ( )
-> ( Info-Old );

This call returns the Info-Old structure for the server (see [Info-Old], page 29). Clients should call this in order to find out which conferences are used for presentations and such.
This call has been superseded by get-info (see Section 4.95 [get-info], page 112).
This call can be issued without logging in.

**Example:**

```
1 36
=1 10900 1 2 3 4 1
```

In this example, the server version is 1.9, the conference for presentation of new conferences is conference 1, the conference for presentation of new persons is conference 2, the conference for door messages is conference 3, the LysKOM news conference is conference 4 and the login message is text number 1.

**Error codes**

This call always succeeds.

### 4.38 add-footnote [37] (1) Recommended

```
add-footnote [37] (( text-no : Text-No; 
    footnote-to: Text-No ))
    -> ( );
```

Add a footnote link between the text `footnote-to` and the text `text-no` (`text-no` becomes a footnote to the text `footnote-to`). This call is used to add footnote links after a text has been created. Only the author of both texts is allowed to add the footnote link.

**Example:**

```
1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1 0 *
1 26 2
=1 49 49 18 17 6 97 4 197 1 5 1 52 1 2 { 0 2 6 1 }
1 37 2 1
=1
1 26 1
=1 2 22 12 17 6 97 4 197 1 5 4 256 1 1 { 5 2 }
1 26 2
=1 49 49 18 17 6 97 4 197 1 5 1 52 1
4 { 0 2 6 1 4 1 9 19 52 18 17 6 97 4 197 1 }
```

In this example, text number two is added as a footnote to text number one. The change is reflected in the Misc-Info List of the texts.

**Error codes**

- **login-first**
  
  Login required before issuing this call.

- **no-such-text**
  
  The text `text-no` or `footnote-to` does not exist or is secret.
index-out-of-range
The text-no and footnote-to arguments are equal, and the server does not support texts that are footnotes to themselves.

not-author
Not author of footnote-to.

footnote-limit
Text footnote-to already has the maximum number of footnotes.

already-footnote
Text text-no is already a footnote to footnote-to.

already-comment
Text text-no is already a comment to footnote-to, and a text cannot be both a comment and a footnote to the same text.

4.39 sub-footnote [38] (1) Recommended

```
sub-footnote [38] (( text-no : Text-No;
  footnote-to : Text-No ))
  -> ( );
```

This call removes the text text-no from footnote-to’s list of footnotes. Only the author of a footnote may remove it.

Example:

```
1 26 1
  =1 2 22 12 17 6 97 4 197 1 5 4 256 1 1 { 5 2 }
1 26 2
  =1 49 49 18 17 6 97 4 197 1 5 1 52 1
  4 { 0 2 6 1 4 1 9 19 52 18 17 6 97 4 197 1 }
1 38 2 1
  =1
1 26 1
  =1 2 22 12 17 6 97 4 197 1 5 4 256 1 0 *
1 26 2
  =1 49 49 18 17 6 97 4 197 1 5 1 52 1 2 { 0 2 6 1 }
```

In this example text 2 is a footnote to text 1, as shown by the misc-info lists of the two texts. The sub-footnote is called. The misc-info lists are changed to reflect the change.

Error codes

login-first
Login required before issuing this call.

no-such-text
The text text-no or footnote-to does not exist or is secret.

not-footnote
The text text-no is not a footnote to footnote-to.
permission-denied
Not supervisor of the author of text-no and not enough privileges set and enabled to complete call anyway.

4.40 who-is-on-old [39] (1) Obsolete (1)

who-is-on-old [39] ( )
  -> ( ARRAY Who-Info-Old );

This call is obsolete. Use get-static-session-info (see Section 4.85 [get-static-session-info], page 105) and who-is-on-dynamic (see Section 4.84 [who-is-on-dynamic], page 105) instead. If the server does not support these calls, use who-is-on (see Section 4.52 [who-is-on], page 86) instead.

The returned list contains all sessions where a person is logged in and the invisible flag of the session is unset.

Error codes

This call always succeeds.

4.41 set-unread [40] (1) Recommended

set-unread [40] (( conf-no : Conf-No;
                 no-of-unread : INT32 ))
  -> ( );

Only read the last no-of-unread in the conference conf-no. This call modifies the last-text-read of current person’s membership for the conference. This call is sometimes used to implement the “only read last N texts” command found in many clients. Due to possible race conditions², this call is usually better implemented using the set-last-read call (see Section 4.78 [set-last-read], page 101) which explicitly sets the last-text-read field of the membership.

Example:

1 9 5 6
=1 1 34 21 17 6 97 4 197 1 6 100 0 0 *
1 40 6 0
=1
1 9 5 6
=1 1 34 21 17 6 97 4 197 1 6 100 4 0 *

This example shows that person 5 last read text 0 in conference 6 (and since 0 is an illegal local text number, that implies that the person has not read anything in the conference.) After calling set-unread and asking to have zero unread texts in conference 6, this is reflected by the call to query-read-texts-old.

² Another client might create a new text immediately before the server processes this set-unread call, so you might end up setting last-text-read to something unexpected.
**Error codes**

*login-first*

Login required before issuing this call.

*undefined-conference*

The conference `conf-no` does not exist or is secret.

*not-member*

Not a member of conference `conf-no`.

### 4.42 set-motd-of-lyskom [41] (1) Recommended

```
set-motd-of-lyskom [41] ( text-no : Text-No )
-> ( )
```

This call sets the login message of LysKOM. It can only be executed by a privileged person, with the proper privileges enabled. A somewhat less convenient way of doing this is to use the `set-info` call (see Section 4.80 [set-info], page 102).

**Example:**

```
1 36
=1 10900 1 2 3 4 0
1 41 435
=1
1 36
=1 10900 1 2 3 4 435
```

This example shows how the login message of LysKOM is set using the set-motd-of-lyskom call. The results of the `get-info` calls demonstrate the effect.

**Error codes**

*login-first*

Login required before issuing this call.

*permission-denied*

Administrator bit not set or privilege level not enabled.

*no-such-text*

The text `text-no` does not exist.

*mark-limit*

The text `text-no` already has the maximum number of marks.

### 4.43 enable [42] (1) Recommended

```
enable [42] ( level : INT8 )
-> ( )
```

Sets the security level for the current session to `level`. See Section 1.6 [Security], page 9, for details about security levels. The only levels that make any sense right now are 0 and
This call may be issued by any person, but without the right privilege bits set, it has no effect.

*Example:*

```
1 41 1
%1 12 0
1 42 255
=1
1 41 1
=1
```

This example shows how `enable` makes a privileged call possible, in this case a call to `set-motd-of-lyskom` (see Section 4.42 [set-motd-of-lyskom], page 79).

**Error codes**

*login-first*

Login required before issuing this call.

### 4.44 sync-kom [43] (1) Recommended

```
 sync-kom [43] ( )
 -> ( );
```

This call instructs the LysKOM server to make sure the permanent copy of its database is current. Processing of requests is normally blocked until this call has completed, but the exact details depend on the server implementation. This call is privileged in most implementations.

*Example:*

```
1 42 255
=1
1 43
:0 7
:0 7
=1
```

This example shows how the `enable` call is used to enable all privileges (see Section 4.43 [enable], page 79), then the `sync-kom` call is used to save the database. The server responds with two asynchronous messages signaling that the database is being saved.

**Error codes**

*login-first*

Login required before issuing this call.

*permission-denied*

Administrator bit not set or privileges not enabled.
4.45 shutdown-kom [44] (1) Recommended

\[
\text{shutdown-kom [44] ( exit-val : INT8 )} \\
\text{\textarrow{\rightarrow} ( )};
\]

This call instructs the server to save all data and shut down. \textit{exit-val} is currently not used. This call is privileged.

\textit{Example:}

\begin{verbatim}
1 42 255
=1
1 44 0
=1
:2 13 5 3
\end{verbatim}

This example shows the shutdown of a server. The asynchronous message sent after the call returns is the result of a session being forced to log out.

\textbf{Error codes}

\begin{itemize}
  \item \textbf{login-first}  
    Login required before issuing this call.
  \item \textbf{permission-denied}  
    Administrator bit not set or privileges not enabled.
\end{itemize}

4.46 broadcast [45] (1) Obsolete (1)

\[
\text{broadcast [45] ( message : HOLLERITH )} \\
\text{\textarrow{\rightarrow} ( )};
\]

This call can been replaced by \textit{send-message} (see Section 4.54 [send-message], page 87). It is a privileged call.

\textbf{Error codes}

\begin{itemize}
  \item \textbf{login-first}  
    Login required before issuing this call.
  \item \textbf{string-too-long}  
    The string \textit{message} is too long.
  \item \textbf{feature-disabled}  
    Messages have been disabled.
\end{itemize}

4.47 get-membership-old [46] (1) Obsolete (10)

\[
\text{get-membership-old [46] (( person : Pers-No;} \\
  \text{first} : INT16; \\
\text{no-of-confs} : INT16;}
\]

want-read-texts : BOOL )
-> ( ARRAY Membership-Old );

This call retrieves the membership record for a list of conferences for a single person. person is the person whose memberships are to be retrieved. first is the first position in the membership list to retrieve, numbered from 0 and up. no-of-confs is the number of membership records to retrieve. If want-read-texts is ‘0’ the server will not send the contents of the read-texts array of the memberships. (The size will be transmitted, but a single asterisk (‘*’) will be sent instead of the array itself.)

The server will return a membership list that is shorter than no-of-confs if no-of-confs + first is larger than the number of conferences the person is a member of.

Servers that support protocol version 10 will return a priority of zero if the passive bit in the membership record has been set (either by a set-membership-type or by setting the priority of the conference to zero.)

Example:

1 46 5 0 3 1
=1 2 { 49 14 17 13 8 91 5 255 1 5 255 0 0 * 
   20 14 22 17 6 97 4 197 1 6 100 2 0 * }
1 46 5 0 1 1
=1 1 { 49 14 17 13 8 91 5 255 1 5 255 0 0 * }
1 46 5 1 4 1
=1 1 { 20 14 22 17 6 97 4 197 1 6 100 2 0 * }

In this example we retrieve the memberships of person 5. The first call asks for three memberships, starting with number 0. Since this person is only a member of two conferences, the list returned only contains two memberships. (An extra newline has been inserted in the result of the first call to make the result more readable.) The next two calls retrieve a single membership each, the first by asking for only one, and the second by asking for four memberships, starting with number 1.

Error codes

login-first
Login required before issuing this call.

undefined-person
The person person does not exist.

undefined-conference
The conference person does not exist or is secret.

index-out-of-range
first is higher than the index of the last conference in the person’s membership list.

bad-bool want-read-texts must be either ‘0’ or ‘1’.
4.48 get-created-texts [47] (1) Obsolete (10)

get-created-texts [47] (( person : Pers-No;
 first : Local-Text-No;
 no-of-texts : INT32 ))
-> ( Text-List );

This call is obsolete; instead you should use map-created-texts (see Section 4.105 [map-created-texts], page 119).

This call returns a list of the texts written by a person. person is the person whose created texts are to be retrieved. first is the first text to retrieve. no-of-texts is the number of texts to retrieve.

This call is essentially the same as get-map (see Section 4.35 [get-map], page 73), but instead of returning the texts sent to a single conference, it returns the texts written by a single person to any conference. The number of texts written by any one person is contained in the Person record for that person.

If first is lower than the first text written by person that still exists, it will be automatically increased to the first still existing text written by person. The get-created-texts will still attempt to return information about no-of-texts texts. (In this regard get-map and get-created-texts differ, since get-map will never ever return information about a later text than specified in the arguments to the call.\(^3\))

Example:

1 47 5 0 100
=1 1 8 { 1 2 3 4 5 6 7 8 }
2 47 5 4 2
=2 4 2 { 4 5 }
3 47 10 8 8
=3 12 8 { 309 312 324 327 329 339 0 387 }

In this example we have retrieved all texts written by person five. The first call asked for 100 texts, but only 8 were returned, which implies that person number 5 only created a total of 8 texts. We can also see that person 5 wrote all the first 8 texts in the conference system. The second call shows how a part of the map can be retrieved.

The third call asks for eight texts written by person 10, starting with the eighth number. Since the first eleven texts written by that person no longer exists the server instead returns information about eight texts staring from the twelfth text person 10 created. One of the eight texts has been deleted.

Error codes

login-first
Login required before issuing this call.

undefined-person
The person person does not exist or is secret.

---

\(^3\) This difference was not intentional, but it is now too late to change the semantics of either get-map or get-created-texts. Besides, they are both obsolete calls.
undefined-conference
The conference person does not exist or is secret.

no-such-local-text
first is higher than the local text number of the last created text.

4.49 get-members-old [48] (1) Obsolete (10)

get-members-old [48] (( conf : Conf-No;
first : INT16;
no-of-members : INT16 ))
-> ( ARRAY Pers-No );

This call returns a list of members of the conference conf. first is the first index in the membership to return, numbered from zero and up. no-of-members is the maximum number of members to return.

Example:

1 48 1 0 100
=1 4 { 7 8 9 10 }
1 48 6 0 100
=1 4 { 5 7 9 10 }
1 48 6 2 2
=1 2 { 9 10 }

In this example the client first requests the first 100 members in conference 1. The second request is for the first 100 members of conference 6. The last request is for members 2 and 3 in conference 6. As can be seen from the examples, the returned list is truncated if there are fewer members than requested.

4.50 get-person-stat [49] (1) Recommended

get-person-stat [49] ( pers-no : Pers-No )
-> ( Person );

This call returns the person pers-no. This call does not return all the information a client usually needs since the name is not included in the Person data structure. Use get-conf-stat (see Section 4.92 [get-conf-stat], page 110) on the same number to get additional information about the person.
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Example:

```
1 49 8
=1 44Hbyers@lager.lysator.liu.se 000001000000000000 00000000
44 21 19 18 6 97 5 198 1 0 2 3 0 0 0 0 0 0 1 0 0 2
1 50 8
=1 11HPaul Dekker 1001 8 6 19 18 6 97 5 198 1
8 6 19 18 6 97 5 198 1 8 0 8 0 0 0 77 1 1 0
```

This simple example shows how person number 8 is retrieved from the server. The second call shows the `get-conf-stat-old` call on the same ID number.

Error codes

undefined-person
The person `pers-no` does not exist.

undefined-conference
The conference `pers-no` does not exist or is secret.

4.51 `get-conf-stat-old [50]` (1) Obsolete (10)

```
get-conf-stat-old [50] ( conf-no : Conf-No )
-> ( Conference-Old );
```

This call retrieves the conference data structure for conference number `conf-no`.

Important note: This call does not return the extra flag bits that were introduced in protocol version 8. To get this information, use the `get-uconf-stat` call instead. However, clients should be able to handle `Conference-Old` structures with an arbitrary number of flag bits since we may decide to change the behavior of this call in the future.

Example:

```
1 50 1
=1 27HPresentation (av nya) möten 0000 48 11 17 13 8 91 5 255
1 18 34 21 17 6 97 4 197 1 0 0 0 0 0 77 0 1 1
1 50 8
=1 11HPaul Dekker 1001 8 6 19 18 6 97 5 198 1
8 6 19 18 6 97 5 198 1 8 0 8 0 0 0 77 1 1 0
```

This simple example retrieves conferences 1 and 8 from the server. Conference 1 is a regular conference, and conference 8 is a mailbox.

Error codes

undefined-conference
The conference `conf-no` does not exist or is secret.
4.52 who-is-on [51] (1) Obsolete (9)

who-is-on [51] ( )
-> ( ARRAY Who-Info );

This call is obsolete. Please use who-is-on-dynamic (see Section 4.84 [who-is-on-dynamic], page 105) and get-static-session-info calls instead (see Section 4.85 [get-static-session-info], page 105). Nonetheless, servers should support this call since many clients still use it.

This call should simply return a list of visible sessions (sessions where a person is logged in and the invisible flag is unset). The data structure is described elsewhere (see [Who-Info], page 39).

Error codes

This call always succeeds.

4.53 get-unread-confs [52] (1) Recommended

get-unread-confs [52] ( pers-no : Pers-No )
-> ( ARRAY Conf-No );

This call returns a list of conferences in which the person pers-no may have unread texts. This call will return a result for any valid pers-no. To retrieve information about secret persons, or to get information about unread texts in secret conference, the session must log on as a person with access to that information.

The result is guaranteed to include all conferences where pers-no has unread texts. It may also return some extra conferences. Passive memberships are never returned.

The returned conference numbers will be returned in the same order as they appear on the persons list of memberships.

Example:

1 52 7
=1 2 { 1 6 }
1 52 1
%1 10 0
1 52 1000
%1 10 0

This example shows how a session first retrieves the list of conferences in which person 7 has unread texts. The next request is for the unread conferences of person 1, but that happens to be a conference. The last request is for the unread conferences of person 1000, but that person didn’t exist in the test database.

Error codes

login-first

Login required before issuing this call.
undefined-person
Person pers-no does not exist or is secret.

4.54 send-message [53] (1) Recommended

send-message [53] (( recipient : Conf-No;
message : HOLLERITH ))
-> ( );

This call sends the message message to all members of recipient using async-send-message (see Section 5.11 [async-send-message], page 135). If recipient is 0, the message is sent to all sessions that are logged in.

The message is sent to all members of recipient that are currently logged in, and where the passive and passive-message-invert bits of the Membership-Type (see [Membership-Type], page 34) don’t prevent the message from being delivered.

Example:

1 53 4 14HThis is a test
=1
1 53 1 14HThis is a test
:3 12 1 8 14HThis is a test
=1
1 53 0 14HThis is a test
:3 12 0 8 14HThis is a test
=1
1 53 5 14HThis is a test
%1 16 0
1 53 3 14HThis is a test
%1 42 0

Error codes

login-first
Login required before issuing this call.

string-too-long
The string message is too long.

undefined-conference
Conference recipient does not exist or is secret.

feature-disabled
The message feature has been disabled in the server.

message-not-sent
The message was not sent for some other reason. Perhaps the recipient is not accepting messages or no member of the recipient was logged on.
4.55 get-session-info [54] (1) Obsolete (4)

get-session-info [54] ( session-no : Session-No )
-> ( Session-Info );

This call is obsolete. It has been replaced by get-session-info-ident (see Section 4.65 [get-session-info-ident], page 94), which in turn is also obsolete. See get-session-info-ident for more information.

Error codes

login-first
Login required before issuing this call.

undefined-session
The session session-no does not exist.

4.56 disconnect [55] (1) Recommended

disconnect [55] ( session-no : Session-No )
-> ( );

This call disconnects the session session-no from the LysKOM server. A session can always disconnect itself, even without logging in. If the session is logged in as user foo it can also disconnect any session logged in as a person for which foo is the supervisor.

Session number zero is always interpreted as the session making the call, so the easiest way to disconnect the current session is to disconnect session zero.

Example:

```
1 56
=1 7
1 55 7
=1
:2 13 8 7
```

Connection closed by foreign host.

In this example the client asks for its own session number, then disconnects itself (disconnection session 0 would have had the same effect.) The asynchronous message sent just before the session is disconnected is the logout message for the user that was logged on in the session. The “Connection closed by foreign host.” is not part of the server output. This message was generated by telnet.

Error codes

login-first
Login required before issuing this call if session-no is not the session issuing the call.

permission-denied
Attempt to disconnect another session and not supervisor of person logged in and not enough privileges set and enabled to complete the call anyway.
The session `session-no` does not exist.

### 4.57 who-am-i [56] (1) Recommended

```scheme
who-am-i [56] ( )
-> ( Session-No );
```

This call simply returns the session number of the session issuing the call.  

**Example:**

```
1 56
=1 7
```

In this example the session number of the session issuing the call is seven.

#### Error codes

This call always succeeds.

### 4.58 set-user-area [57] (2) Recommended

```scheme
set-user-area [57] (( pers-no : Pers-No;
user-area : Text-No ))
-> ( );
```

This call sets the user-area field for the person `pers-no` in the database to the text `user-area`. The user area is used to store client data for a particular person. See Chapter 10 [The User Area], page 157, for more details.  

**Example:**

```
1 49 7
=*1 25Hdavby@lage.lysator.liu.se 0000010000000000 00000000
 6 58 21 19 6 97 6 199 1 0 458 7 3 12 7 12 0 0 3 0 0 4
1 57 7 11
=*1
1 49 7
=*1 25Hdavby@lage.lysator.liu.se 0000010000000000 00000000
 6 58 21 19 6 97 6 199 1 11 458 7 71 2592 7 13 0 0 3 1 0 4
```

In this example the user area of person 7 is set to text number 11. The original user area was text numbers zero, which means that the person had no user area.

#### Error codes

- **login-first**
  - Login required before issuing this call.

- **undefined-person**
  - The person `pers-no` does not exist or is secret.
permission-denied
Not enough access to person pers-no to complete the call.

4.59 **get-last-text [58] (3)** Recommended

```
get-last-text [58] ( before : Time )
-> ( Text-No );
```

This call returns the number of the last text created before `before`. There is no guarantee that the text is readable by the person making the request, or that the text even exists.

This call assumes that all texts are written in chronological order, when the time is expressed in the local time zone of the server. That may not always be the case in real life. When daylight savings time reverts to standard time the same time span will occur twice. The clock of the server may also have been adjusted manually from time to time. This protocol specification does not mandate what the server should do in such cases.

If `set-connection-time-format` (see Section 4.121 `set-connection-time-format`, page 131) has been used with `use-utc` set to 1, the `before` time should be expressed in UTC. Daylight savings time will not be an issue in that case.

*Example:*

```
1 58 49 6 22 19 6 97 6 199 1
=1 11
1 58 49 6 22 18 6 97 6 199 1
=1 8
1 58 49 6 22 1 6 97 6 199 1
=1 0
```

In this example the text created most recently before 22:06 on July 19, 1997 was text number 11; the text created most recently before 22:06 on July 18 was text number 8; and the text created most recently before 22:06 on July 1st was text number 0, which means that there is no text that old in the database.

**Error codes**

*login-first*
Login required before issuing this call.

4.60 **create-anonymous-text-old [59] (3)** Obsolete (10)

```
create-anonymous-text-old [59] (( text : HOLLERITH; misc-info : ARRAY Misc-Info ))
-> ( Text-No );
```

Similar to `create-text-old` (see Section 4.29 `create-text-old`, page 68), but the text is created with the author field set to zero. Not even the server has a record of who created the text.

The original intended use for this call was for importing texts from other sources, such as WWW, FTP or Gopher, but some clients include explicit support for sending anonymous texts to a server.
It is only possible to send anonymous texts to a conference with the right flag bit set. The only Misc-Info items valid for this call in the misc-info array are recept, cc-recpt, bcc-recpt (introduced in protocol version 10), comm-to and footn-to.

Example:

Example

Message body 3 { 0 5 1 112 2 33467 }
:16 0 33502 13 16 15 16 6 97 3 196 1 0 1 20 0
5 { 0 5 6 146 1 112 6 3438 2 33467 }
=1 33502

In the example, • represents a linefeed.

In this example, person 119 creates a text containing a subject and a one-line body. The recipient of the text is conference five, conference 112 is a CC recipient and the text is a comment to text 33467. The server reply indicates that the new text has been given number 33502. Finally there is an asynchronous message sent to all members of recipient conferences. Note how the message was sent before the reply to the client. The misc-info list in this message has two additional fields, the local numbers of the text in each of its recipient conferences.

Error codes

login-first
Login required before issuing this call.

string-too-long
The string text is longer than the maximum length of a message.

temporary-failure
The text could not be created at the moment.

no-such-text
Attempt to comment or footnote a non-existent or secret text.

not-author
Attempt to footnote a text authored by someone else.

footnote-limit
Attempt to footnote a text with the maximum number of footnotes already set.

comment-limit
Attempt to comment a text with the maximum number of comments already set.

access-denied
Attempt to send a text to a conference failed because no access to the conference or any super conference that will accept a text.

anonymous-rejected
Attempt to send an anonymous text to a conference that does not accept anonymous texts.

illegal-misc
Invalid misc-info list. A recipient is listed more than once or there is an unknown misc item in the misc-info list.
4.61 find-next-text-no [60] (3) Recommended

\[
\text{find-next-text-no [60] ( start : Text-No )} \\
\text{-> ( Text-No );}
\]

This call returns the next readable text in the database created after text \textit{start}. \textit{start} does not have to be a valid or readable text number, as shown in the examples.

Example:

```
1 60 0  
=1 2  
1 60 2  
=1 4
```

This example shows how to retrieve the first readable text in the LysKOM database by calling \textit{find-next-text-no} with \textit{start} set to zero. In the example, the first text is number 2. The second example gets the text following number 2, which happens to be text number 4.

\textbf{Error codes}

\textit{login-first}

Login required before issuing this call.

\textit{no-such-text}

There is no text following text \textit{start}.

4.62 find-previous-text-no [61] (3) Recommended

\[
\text{find-previous-text-no [61] ( start : Text-No )} \\
\text{-> ( Text-No );}
\]

This call returns the first readable text in the database created most recently before \textit{start}. \textit{start} does not have to be a valid or readable text number, as shown in the examples.

Example:

```
1 61 134217727  
=1 11  
1 61 4  
=1 2
```

This example shows that the last readable text in the database is number 11 (unless by some odd coincidence all text from 11 to text number 134217727 have been deleted.) It also shows that the most recent text before number 4 is text number 2.

\textbf{Error codes}

\textit{login-first}

Login required before issuing this call.

\textit{no-such-text}

There is no text preceding text \textit{start}.  

4.63 login [62] (4) Recommended

```plaintext
login [62] (( person : Pers-No;
    passwd : HOLLERITH;
    invisible : BOOL ))
-> ( );
```

This call is used to log in. The session is logged in as person number `person` if `passwd` is the correct password for that person. If `invisible` is true, the session is invisible: it will not be returned by `who-is-on` (see Section 4.52 [who-is-on], page 86) and `who-is-on-ident` (see Section 4.64 [who-is-on-ident], page 94), and the dynamic session info (see [Dynamic-Session-Info], page 41) will have the invisible flag set.

Invisible sessions are primarily used by software agents that do not act on the behalf of real users.

**Example:**

```
1 62 7 6Hgazonk 1
=1
1 62 7 6Hgazonk 0
:2 9 7 1
1 62 7 6Hgazonk 0
:2 13 7 1
:2 9 7 1
=1
```

This example first shows a session log in as person seven with the invisible flag set. Because of this the asynchronous login message is not sent. The second call logs in as person seven again. This time a login message is sent, but not a logout message since the login was invisible. The third example shows a third login as person 7, but this time both the logout and login messages are sent.

**Error codes**

- **undefined-person**
  The person `person` does not exist.

- **login-disallowed**
  Logins have been disabled and person `person` does not have enough privileges to override.

- **invalid-password**
  The password `passwd` is not the password of `person` and the currently logged in person is not the supervisor of `person` and does not have enough privileges set and enabled to log in anyway.

- **conference-zero**
  Attempt to log in as person number 0.

- **bad-bool** `invisible` must be either ‘0’ or ‘1’.
4.64 who-is-on-ident [63] (4) Obsolete (9)

who-is-on-ident [63] ( )
-> ( ARRAY Who-Info-Ident );

This call is obsolete. It has been replaced by who-is-on-dynamic (see Section 4.84 [who-is-on-dynamic], page 105) and get-static-session-info (see Section 4.85 [get-static-session-info], page 105). It returns a list of all visible sessions.

Error codes

This call always succeeds.

4.65 get-session-info-ident [64] (4) Obsolete (9)

get-session-info-ident [64] ( session-no : Session-No )
-> ( Session-Info-Ident );

This call is obsolete. Use who-is-on-dynamic (see Section 4.84 [who-is-on-dynamic], page 105) combined with get-static-session-info (see Section 4.85 [get-static-session-info], page 105) instead.

Error codes

login-first
Login required before issuing this call.

undefined-session
The session session-no does not exist.

4.66 re-lookup-person [65] (5) Obsolete (7)

re-lookup-person [65] ( regexp : HOLLERITH )
-> ( ARRAY Pers-No );

This call is obsolete. It has been replaced by re-z-lookup (see Section 4.75 [re-z-lookup], page 99). It returns a list of persons matching the regular expression regexp. The regexp syntax used is that of the ed(1) Unix utility.

Error codes

regexp-error
Error compiling the regexp regexp. Perhaps the pattern is not a correct regexp.
4.67 re-lookup-conf [66] (5) Obsolete (7)

re-lookup-conf [66] ( regexp : HOLLERITH )
  -> ( ARRAY Conf-No );

This call is obsolete. It has been replaced by re-z-lookup (see Section 4.75 [re-z-lookup], page 99). It returns a list of conferences matching the regular expression regexp. The regexp syntax used is that of the ed(1) Unix utility.

Error codes

regexp-error
  Error compiling the regexp regexp. Perhaps the pattern is not a correct regexp.

4.68 lookup-person [67] (6) Obsolete (7)

lookup-person [67] ( name : HOLLERITH )
  -> ( ARRAY Pers-No );

This call is obsolete. It has been replaced by lookup-z-name (see Section 4.77 [lookup-z-name], page 100).

This call returns a list of persons with names matching the contracted name in name. See Chapter 8 [Name Expansion], page 153, for a description of the matching process.

Error codes

This call always succeeds.

4.69 lookup-conf [68] (6) Obsolete (7)

lookup-conf [68] ( name : HOLLERITH )
  -> ( ARRAY Conf-No );

This call is obsolete. It has been replaced by lookup-z-name (see Section 4.77 [lookup-z-name], page 100).

This call returns a list of conferences with names matching the contracted name in name. See Chapter 8 [Name Expansion], page 153, for a description of the matching process.

Error codes

This call always succeeds.

4.70 set-client-version [69] (6) Recommended

set-client-version [69] (( client-name : HOLLERITH;
                          client-version : HOLLERITH ))
  -> ( );
This call is used to tell the server which client and which version of that client is being used. The name of the client is passed in client-name and the version in client-version. The information sent in this call is made available to other sessions through the get-client-name (see Section 4.71 [get-client-name], page 96) and get-client-version calls (see Section 4.72 [get-client-version], page 97). This call should be used exactly once per session.

The following names are currently registered:

- elisp-client: The famous CPU hog.
- nilkom: C++ experiment
- tkom: C++ experiment
- getmail: Postmaster
- ttykom: The one and second tty client by Linus
- WinKOM: Windows client
- JySKom: JSK Web Client

*Example:*

```
1 56
=1 7
2 69 11Helisp-client 4H0.45
=2
3 70 7
=3 11Helisp-client
4 71 7
=4 4H0.45
```

In this example the who-am-i call is used to find the ID of the current session (see Section 4.57 [who-am-i], page 89). Next, set-client-version is used to set the name of the client to “elisp-client” and the version to “0.45”. The third call is to get-client-name, which returns the string just sent to the server (see Section 4.71 [get-client-name], page 96). Finally get-client-version (see Section 4.72 [get-client-version], page 97) is used to retrieve the client version of session number 7, which is, as expected, the string “0.45”.

**Error codes**

- string-too-long
  The string client-name or client-version is too long.

- client-is-crazy
  The client attempted to use this call more than once. The error-status is undefined.

### 4.71 get-client-name [70] (6) Recommended

```
get-client-name [70] ( session : Session-No )
-> ( HOLLERITH );
```

This call returns the name of the client that owns session number session. This client name string returned is the one set by the client using set-client-version (see Sec-
tion 4.70 [set-client-version], page 95). If set-client-version has not been issued in session number session, the empty string is returned.

See Section 4.70 [set-client-version], page 95, for an example of this call.

**Error codes**

**login-first**
Login required before issuing this call.

**undefined-session**
The session session does not exist.

### 4.72 get-client-version [71] (6) Recommended

get-client-version [71] ( session : Session-No )

-> ( HOLLERITH );

This call returns the version of the client that owns session number session. This client version string returned is the one set by the client using set-client-version (see Section 4.70 [set-client-version], page 95). If set-client-version has not been issued in session number session, the empty string is returned.

See Section 4.70 [set-client-version], page 95, for an example of this call.

**Error codes**

**login-first**
Login required before issuing this call.

**undefined-session**
The session session does not exist.

### 4.73 mark-text [72] (4) Recommended

mark-text [72] (( text : Text-No;

mark-type : INT8 ))

-> ( );

This call associates the mark mark-type with the text text. The list of marks set by a person can be retrieved using the get-marks call (see Section 4.24 [get-marks], page 64).

Currently, servers do not associate any particular meaning to the different types of marks, but that may change in the future. Currently, servers should not delete texts that have marks, except by user request.
Example:

```
1 23
=1 0 *
2 72 110 230
=2
3 23
=3 1 { 110 230 }
```

This example shows how a person with no marks set sets mark 230 on text number 110. The calls to `get-marks` (see Section 4.24 [get-marks], page 64) show the effect of the call.

Error codes

- **login-first**
  Login required before issuing this call.

- **no-such-text**
  The text `text` does not exist or is secret.

- **permission-denied**
  No read access to text `text`.

- **undefined-person**
  The person currently logged in does not exist (can’t happen error.)

- **mark-limit**
  Already the maximum number of marks on text `text`.

4.74 unmark-text [73] (6) Recommended

```
unmark-text [73] ( text-no : Text-No )
-> ( );
```

This call removes any marks the logged-in person has set on the text `text-no`. 

Example:

```
1 23
=1 1 { 110 230 }
2 73 110
=2
3 23
=3 0 *
```

This example shows how a user with a mark set on text number 110 removes it using the unmark-text call.

Error codes

- **login-first**
  Login required before issuing this call.
undefined-person

The person currently logged in does not exist (can’t happen error.)

not-marked

The text text-no was not marked.

4.75 re-z-lookup [74] (7) Recommended

\[
\text{re-z-lookup [74]} (\langle \text{ regexp } : \text{ HOLLERITH}; \text{ want-persons } : \text{ BOOL}; \text{ want-confs } : \text{ BOOL } \rangle) \\
\rightarrow (\text{ ARRAY Conf-Z-Info });
\]

This call returns a list of those conferences and/or persons matching the regular expression `regexp`. If `want-confs` is true, then the result will include non-mailbox conferences. If `want-persons` is true, then the result will include mailbox conferences.

See also Section 4.77 [lookup-z-name], page 100, for an alternative way to look up names.

Refer to Chapter 8 [Name Expansion], page 153, for more details on how name lookup works.

Example:

1 74 2H.* 1 1
  =1 4 \{ 15HTest Conference 0000 10 11HDavid Byers 1001 6
         21HTrains (-) Discussion 0000 11 4HJohn 1001 9 \}
2 74 2H.* 0 1
  =2 2 \{ 15HTest Conference 0000 10
         21HTrains (-) Discussion 0000 11 \}
3 74 7H T.*[cC]
  =3 2 \{ 15HTest Conference 0000 10
         21HTrains (-) Discussion 0000 11 \}

This example shows three calls to `re-z-lookup`. The first call returns all conferences and persons in the entire database, in this case two conferences and two persons. The second example uses the same regular expression, but in this case, the call specifies that the result is only to contain conferences, so the two persons are not returned. The third example simply returns all names matching the pattern “T.*[cC]”.

Error codes

regexp-error

Error compiling the regexp `regexp`. Perhaps the pattern is not a correct regexp.

bad-bool `want-persons` and `want-confs` must be either ‘0’ or ‘1’.

4.76 get-version-info [75] (7) Recommended

\[
\text{get-version-info [75]} (\ ) \\
\rightarrow (\text{ Version-Info });
\]
This call returns information about the server version. The data returned by this call are primarily useful for presenting to the user. A client should not use this call to determine what the server’s capabilities are.

Example:

```
 1 75
#1 9 7Hlyskomd 5H1.9.0
```

This example lets us know that the server is lyskomd, version 1.9.0, which at the time of writing this is the only really usable server.

Error codes

This call always succeeds.

4.77 lookup-z-name [76] (7) Recommended

```
lookup-z-name [76] (( name : HOLLERITH;
               want-pers : BOOL;
               want-confns : BOOL ))
            -> ( ARRAY Conf-Z-Info );
```

This call looks up the name name in the server, and returns a list of all matching conferences and/or persons. If want-confns is true, then the result will include conferences that are not mailboxes. If want-pers is true, then the result will include conferences that are mailboxes.

See also Section 4.75 [re-z-lookup], page 99, for an alternative way to look up names.

Refer to Chapter 8 [Name Expansion], page 153, for details on the matching process.

Example:

```
1 76 0H 1 1
#1 4 { 15HTest Conference 0000 10 11HDavid Byers 1001 6
       21HTrains (-) Discussion 0000 11 4HJohn 1001 9 }
2 76 0H 0 1
#1 2 { 15HTest Conference 0000 10
       21HTrains (-) Discussion 0000 11 }
3 76 3HT C 1 1
#3 1 { 15HTest Conference 0000 10 }
```

This example shows three calls to lookup-z-name. The first call retrieves all conferences and persons in the server. The second request looks up the same name as the first, but this time the result is restricted to conferences. The final request requests all conferences and persons matching the pattern “T C”.

Error codes

bad-bool want-pers and want-confns must be either ‘0’ or ‘1’.
4.78 set-last-read [77] (8) Recommended

```
set-last-read [77] (( conference : Conf-No;
        last-read : Local-Text-No ))
        -> ( );
```

This call tells the server that the last local text number the person issuing the call has read in conference `conference` is `last-read`. This call is typically used when a user wants to have a specific number of unread texts in a particular conference.

Example:

```
1 9 7 6
=1 2 4 22 18 6 97 5 198 1 6 100 6 0 *
2 77 6 3
=2
3 9 7 6
=3 2 4 22 18 6 97 5 198 1 6 100 3 0 *
```

This example shows how person 7 originally had read everything up to and including local text number 6 in conference 6. After the call to `set-last-read`, the `query-read-texts-old` call reports that person 7 has read everything up to and including local text number 3.

Error codes

**login-first**

Login required before issuing this call.

**undefined-conference**

The conference `conference` does not exist or is secret.

**not-member**

Not a member of conference `conference`.

4.79 get-uconf-stat [78] (8) Recommended

```
get-uconf-stat [78] ( conference : Conf-No )
        -> ( UConference );
```

This call returns some information about conference `conference`. The information it returns is sufficient for most uses of conference information, and this call should be used instead of `get-conf-stat` wherever possible (see Section 4.92 [get-conf-stat], page 110). It uses less bandwidth and the lyskomd server always keeps all `UConference` objects in memory, so this call is significantly faster than `get-conf-stat`.

This is also currently the only way to get all the flag bits of the conference.
Example:

```
1 50 6
=1 8HTestconf 0000 1 34 21 17 6 97 4 197 1
   37 3 22 18 6 97 5 198 1 5 4 5 0 5 0 77 4 1 6
2 78 6
=2 8HTestconf 00001000 6 77
3 50 7
=3 11HDavid Byers 1111 13 4 19 18 6 97 5 198 1
   13 4 19 18 6 97 5 198 1 7 0 7 0 0 0 77 1 1 0
4 78 7
=4 11HDavid Byers 11111000 0 77
```

This example shows the difference between \texttt{get-conf-stat-old} (see Section 4.51 [get-conf-stat-old], page 85) and \texttt{get-uconf-stat}. In the first two examples conference 6 is retrieved, and in the second two, conference 7, which happens to be a person, is retrieved. Note the difference in length of the flag field.

Error codes

\texttt{undefined-conference}

The conference \texttt{conference} does not exist or is secret.

\texttt{conference-zero}

\texttt{conference} is zero.

4.80 set-info [79] (9) Recommended

```
set-info [79] ( info : Info-Old )
-> ( );
```

This call sets the server information retrieved by \texttt{get-info-old} (see Section 4.37 [get-info-old], page 75). The version number in the info structure is ignored (but must be present); all other fields are stored permanently in the LysKOM database. This is a privileged call.

Example:

```
1 79 10901 1 2 3 4 1080
=1
```

This example sets the conference presentation conference to one, the user presentation conference to two, the motd conference to three and the news conference to four. It also sets the login message to text 1080. It also attempts to set the version number to 1.9.1, but that number is silently ignored by the server.

Error codes

\texttt{login-first}

Login required before issuing this call.
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permission-denied
    Administrator bit not set or privileges not enabled.

undefined-conference
    One of the conferences in info does not exist.

no-such-text
    The MOTD text in info does not exist.

mark-limit
    The MOTD text in info already has the maximum number of marks.

text-zero
    This error message should never be returned, but lyskomd 1.9.0 erroneously returned this error message if the MOTD text in info was set to 0. That should mean that there should be no message of the day, and the current implementation of the server does accept MOTD to be 0.

4.81 accept-async [80] (9) Recommended

    accept-async [80] ( request-list : ARRAY INT32 )
    -> ( );

This call advises the server that the client wants to receive the asynchronous messages listed in request-list. The server must send these messages to the client when applicable, but may also send other types of messages if it so desires. The list of currently requested asynchronous messages may be retrieved using the query-async call (see Section 4.82 [query-async], page 104).

Don’t forget that message type 12 is personal, group and global text messages. Most users will not want these turned off.

Example:

    1 80 2 { 7 9 }
    =1

This example tells the server that the client wants to receive asynchronous messages when the database is being synched (message 7) and when someone logs in (message 9).

Error codes

If the client requests a message that the server does not send, the server will reply with an error message saying which message number it does not support. The call will succeed anyway. This mechanism is useful for clients that want new versions of some messages, but need to be compatible with older servers.

unknown-async
    At least one of the numbers in request-list is not the number of an async message the server knows about. The error-status indicates the first offending number.

Please note that a bug in lyskomd 1.9.0 prevented the server from sending this error message (frankly, we simply forgot about it.)
The request-list was too long. Servers should always accept a request-list that contains a lot more asynchronous messages than the server sends, so that it can deal with newer clients. This error message should only be returned if the client tries to trigger a buffer overrun.

4.82 query-async [81] (9) Recommended

query-async [81] ( )
  -> ( ARRAY INT32 );

This call queries the server for which asynchronous messages the client is receiving. Note that the client may not be able to turn off all messages returned in this list since the server may consider some messages to be mandatory. Also note that the client may still receive messages that are not listed in the result of this call. Even though those messages are turned off, the server may decide to send them under certain circumstances.

Example:

1 81
=1 7 { 0 5 7 9 11 12 13 }

In this example the client is receiving seven types of asynchronous messages: messages about new articles, changed names, database synching, new logins, rejected connections, personal messages and logouts. This particular set was the default for new connections to lyskomd 1.9 servers. See Chapter 5 [Asynchronous Messages], page 133, for the currently recommended list of asynchronous messages that servers should preselect.

Error codes

This call always succeeds.

4.83 user-active [82] (9) Recommended

user-active [82] ( )
  -> ( );

This call simply notifies the server that the user is active. The server uses the time of the last user-active call to calculate how long a user has been idle.

The client should send this to the server every time the user actively does something LysKOM-related, such as reads a texts, writes on a comment, gives a command, de-iconifies the LysKOM window, et c. However, the call should not be issued more than twice per minute, to avoid excessive network and server load.

Error codes

This call always succeeds.
4.84 who-is-on-dynamic [83] (9) Recommended

who-is-on-dynamic [83] (( want-visible : BOOL;
want-invisible : BOOL;
active-last : INT32 ))

-> ( ARRAY Dynamic-Session-Info );

This call returns a list of information about sessions. Only sessions with the desired
visibility and activeness are returned.

If want-visible is true then information about visible sessions is returned. If want-
invisible is true then information about invisible sessions is returned. If they are both
true sessions will be included in the answer regardless of their visibility status.

Sessions where no-one is logged in are considered invisible, and the invisible flag is set
in the corresponding Dynamic-Session-Info that is returned.

If active-last is zero then the result is a list of all sessions with the proper visibility.
If active-last is nonzero then only sessions that have issued an user-active call within
the last active-last seconds are included in the list.Sessions that have never issued an
user-active call are always included (if they have the proper visibility).

Error codes

bad-bool want-visible and want-invisible must be either ‘0’ or ‘1’.

4.85 get-static-session-info [84] (9) Recommended

generic-get-static-session-info [84] ( session-no : Session-No )

-> ( Static-Session-Info );

This call returns information about session number session-no. The returned informa-
tion cannot change until the session number is reused (and that cannot happen until the
server is shut down), so clients are encouraged to cache the information.

Error codes

login-first
  Login required before issuing this call.

undefined-session
  The session session-no does not exist.

4.86 get-collate-table [85] (10) Recommended

generic-get-collate-table [85] ( )

-> ( HOLLERITH );

This call returns the collate table being used by the server to match names. If index A and
index B in the string are the same character, characters A and B are considered equivalent.
An empty collate table indicates that the server considers all characters different.
Currently, the lyskomd server only deals with 8-bit characters. Clients should be prepared for collate tables of any length. Characters whose code are greater than the length of the collate table should be considered to be unique.

**Error codes**

This call always succeeds.

### 4.87 create-text [86] (10) Recommended

```
create-text [86] (( text : HOLLERITH;
misc-info : ARRAY Misc-Info;
aux-items : ARRAY Aux-Item-input ))
-> ( Text-No )
```

Creates a new text with contents from `text` and recipients etc. defined by `misc-info` (see Section 1.4 [The Misc-Info List], page 4). In addition to the result, the server will send an asynchronous message to all members of any of the recipients of the new text. It is not defined whether this messages comes before or after the reply to the create-text message. Clients should be prepared for either situation.

The text up to the first linefeed is considered to be the subject line. The remaining text is the message body. Although messages with only a subject are valid, clients should avoid letting users create such messages.

The items in `aux-items` are attached to the new text.

The only Misc-Info items valid for this call are `recpt`, `cc-recpt`, `bcc-recpt` (introduced in protocol version 10), `comm-to` and `footn-to`.

**Error codes**

`login-first`

Login required before issuing this call.

`string-too-long`

The string `text` is longer than the maximum length of a message.

`temporary-failure`

The text could not be created at the moment.

`no-such-text`

Attempt to comment or footnote a non-existent or secret text.

`not-author`

Attempt to footnote a text authored by someone else.

`footnote-limit`

Attempt to footnote a text with the maximum number of footnotes already set.

`comment-limit`

Attempt to comment a text with the maximum number of comments already set.
index-out-of-range

Attempt to create a text failed because we reached the maximum number of texts permitted. The error-status indicates the text number that should have been created if the limit hadn’t been reached.

access-denied

Attempt to send a text to a conference failed because no access to the conference or any super conference that will accept a text.

anonymous-rejected

Attempt to send an anonymous text to a conference that does not accept anonymous texts.

illegal-misc

Invalid misc-info list. A recipient is listed more than once or there is an unknown misc item in the misc-info list.

illegal-aux-item

One of the aux-items in aux-items is illegal. The tag might be out of range, the item not applicable to texts or whatever

aux-item-permission

One of the items looks valid but could not be created anyway.

long-array

Too many Misc-Info items or aux-items were specified.

4.88 create-anonymous-text [87] (10) Recommended

create-anonymous-text [87] (( text : HOLLERITH;
                      misc-info : ARRAY Misc-Info;
                      aux-items : ARRAY Aux-Item-Input ))
                      \rightarrow ( Text-No );

Similar to create-text (see Section 4.87 [create-text], page 106), but the text is created the author field set to zero. Not even the server has a record of who created the text.

The original intended use for this call was for importing texts from other sources, such as WWW, FTP or Gopher, but some clients include explicit support for sending anonymous texts to a server.

It is only possible to send anonymous texts to a conference with the right flag bit set.

The only Misc-Info items valid for this call in the misc-info array are recpt, cc-recpt, bcc-recpt (introduced in protocol version 10), comm-to and footn-to.

Error codes

login-first

Login required before issuing this call.

string-too-long

The string text is longer than the maximum length of a message.
temporary-failure
The text could not be created at the moment.

no-such-text
Attempt to comment or footnote a non-existent or secret text.

not-author
Attempt to footnote a text authored by someone else.

footnote-limit
Attempt to footnote a text with the maximum number of footnotes already set.

comment-limit
Attempt to comment a text with the maximum number of comments already set.

access-denied
Attempt to send a text to a conference failed because no access to the conference or any super conference that will accept a text.

anonymous-rejected
Attempt to send an anonymous text to a conference that does not accept anonymous texts.

illegal-misc
Invalid misc-info list. A recipient is listed more than once or there is an unknown misc item in the misc-info list.

illegal-aux-item
One of the aux-items in aux-items is illegal. The tag might be out of range, the item not applicable to texts or whatever

aux-item-permission
One of the items looks valid but could not be created anyway.

4.89 create-conf [88] (10) Recommended

create-conf [88] (( name : HOLLERITH;
           type : Any-Conf-Type;
           aux-items : ARRAY Aux-Item-Input ))
-> ( Conf-No );

This call is used to create new conferences. name is the name of the new conference and type is its type. If successful, the call returns the conference number of the newly created conference. The list aux-items contains the aux items to attach to the conference.

To use this call the session must have logged in as a user with privileges to create conferences (see Section 1.6 [Security], page 9).

Error codes

login-first
Login required before issuing this call.
permission-denied
The server does not allow everyone to create a conference and user does not have the create-conf bit set. May also be an attempt to create a conference with the letterbox bit set.

conference-exists
A conference named name already exists.

bad-name name contains invalid characters.

string-to-long
name is too long to be used as a conference name.

secret-public
The conference type has the secret bit set, but the rd-prot bit is cleared.

illegal-aux-item
One of the aux-items in aux-items is illegal. The tag might be out of range, the item not applicable to conferences or whatever

aux-item-permission
One of the items looks valid but could not be created anyway.

index-out-of-range
Attempt to create a conference failed because we reached the maximum number of conferences permitted. The error-status indicates the conference number that should have been created if the limit hadn’t been reached.

4.90 create-person [89] (10) Recommended

create-person [89] (( name : HOLLERITH;
passwd : HOLLERITH;
flags : Personal-Flags;
aux-items : ARRAY Aux-Item-Input ))
-> ( Pers-No );

This call requests that the server create a new person with the name and password given as arguments. To create a person the session must be logged in as a person with sufficient privileges. The list aux-items contains the aux items that are to be attached to the new person’s mailbox conference. The person flags are set to flags.

The new person will be a member of exactly one conference: the associated mailbox. That membership will have priority 255 and (of course) position 0. All flags of the membership will be 0.

Unlike call number 5, this call does not do an automatic login.

Error codes

login-first
The session is not logged in and the server does not allow person creation before logging in.
permission-denied
The server does not allow everyone to create person and the person currently
logged on does not have the create-pers bit set.

person-exists
There is already a person named name.

invalid-password
The string passwd is not a valid password.

illegal-aux-item
One of the aux-items in aux-items is illegal. The tag might be out of range,
the item not applicable to conferences or mailboxes or whatever.

aux-item-permission
One of the items looks valid but could not be created anyway.

index-out-of-range
Attempt to create a person failed because we reached the maximum number of
conferences permitted. The error-status indicates the person number that
should have been created if the limit hadn’t been reached.

4.91 get-text-stat [90] (10) Recommended

get-text-stat [90] ( text-no : Text-No )
-> ( Text-Stat );

Get information about text number text-no. The text-stat contains information about
the size of the text, its recipients, comments, author and more.

Error codes

no-such-text
The text text-no does not exist, or no read access. This error code will also be
used when attempting to fetch texts without logging in first. (There are some
texts that are readable without logging in: the motd-of-lyskom (see Section 4.42
[set-motd-of-lyskom], page 79), and texts with the world-readable aux item
set on them.)

text-zero
Attempt to retrieve text number 0.

4.92 get-conf-stat [91] (10) Recommended

get-conf-stat [91] ( conf-no : Conf-No )
-> ( Conference );

This call retrieves the conference data structure for conference number conf-no.
Error codes

undefined-conference
   The conference conf-no does not exist or is secret.

4.93 modify-text-info [92] (10) Recommended

   modify-text-info [92] (( text : Text-No;
         delete : ARRAY Aux-No;
         add : ARRAY Aux-Item-Input ))
   -> ( );

   This call deletes the aux-items listed in delete from the text text and then adds the ones listed in add to the text. Either list may be empty, and the call is guaranteed to either completely fail or completely succeed.

Error codes

login-first
   Login required before issuing this call.

no-such-text
   The text text does not exist or is secret.

aux-item-permission
   No permission to delete one or more of the items in delete, or not enough permissions to add one or more of the items in add.

illegal-aux-item
   One of the items in add is illegal for some reason.

4.94 modify-conf-info [93] (10) Recommended

   modify-conf-info [93] (( conf : Conf-No;
         delete : ARRAY Aux-No;
         add : ARRAY Aux-Item-Input ))
   -> ( );

   This call deleted the aux-items listed in delete from the conference conf and then adds the ones listed in add to the conference. Either list may be empty, and the call is guaranteed to either completely fail or completely succeed.

Error codes

login-first
   Login required before issuing this call.

undefined-conference
   The conference conf does not exist or is secret.
aux-item-permission
   No permission to delete one or more of the items in delete, or not enough
   permissions to add one or more of the items in add.

illegal-aux-item
   One of the items in add is illegal for some reason.

4.95 get-info [94] (10) Recommended

   get-info [94] ( )
   -> ( Info );

   This call returns the Info structure for the server (see [Info], page 29). Clients should
call this in order to find out which conferences are used for presentations and such.

   It can be issued without logging in.

Error codes

   This call always succeeds.

4.96 modify-system-info [95] (10) Recommended

   modify-system-info [95] (( items-to-delete : ARRAY Aux-No;
   items-to-add : ARRAY Aux-Item-Input ))
   -> ( );

   This call modifies the aux-item list of the server information (which can be retrieved
using get-info (see Section 4.95 [get-info], page 112). It only succeeds when issued by a
person with the admin bit set and privileges enabled.

   The items in items-to-delete are removed, and the items in items-to-add are added.
This call is atomic; either all deletions or additions succeeded, or none of them is made.

Error codes

login-first
   Login requires before issuing this call.

permission-denied
   Admin bit not set or privileges not enabled.

illegal-aux-item
   Attempt to create an invalid aux item.

aux-item-permission
   Attempt to delete an undeletable item or create an uncreateable item.
4.97 query-predefined-aux-items [96] (10) Recommended

query-predefined-aux-items [96] ( )
-> ( ARRAY INT32 );

Returns the list of aux-items that have specific definitions in the server. These items are the only items within the restricted tag ranges that can be created. The meanings of the various item types are defined in this document; see Chapter 7 [Aux-Item Types], page 145.

Error codes

This call always succeeds.

4.98 set-expire [97] (10) Experimental

set-expire [97] (( conf-no : Conf-No; expire : Garb-Nice ))
-> ( );

This call sets the expire field of the conference conf-no to expire. This call can only be issued by the conference’s supervisor or a privileged user.

Error codes

login-first
Login required before issuing this call.

undefined-conference
The conference conf-no does not exist or is secret.

permission-denied
Not supervisor of conference conf-no and not privileged enough to complete the call anyway.

4.99 query-read-texts-10 [98] (10) Obsolete (11)

query-read-texts-10 [98] (( person : Pers-No; conference : Conf-No ))
-> ( Membership-10 );

This call is obsolete. Use query-read-texts (see Section 4.108 [query-read-texts], page 121).

This call is used to find the number of unread texts in a conference. The data it returns is actually a membership structure which specifies which texts have been read. It is up to the client to transform the data to a more usable form. person is the person being queried and conference is the conference in question.

Calling query-read-texts-10 does not require the session to be logged in.
Example:

1 98 6 1
=1 4 32 5 11 12 7 93 1 193 1 1 20 133
3 { 135 136 137 } 5 43 8 3 12 7 93 1 193 1 01000000

This example finds the read texts for user 6 in conference 1. The returned data indicates that conference 1 is the fifth conference on the users' membership list ('4'; remember that the position starts its count at 0), user last read the conference on Monday July 12th, 1993 at 11:05:32 ('32 5 11 12 7 93 1 193 1'), that it is the membership in conference number 1 ('1'), that the person has assigned priority 20 to the conference ('20') and that all articles up to and including local number 133 ('133') plus articles 135, 136 and 137 ('3 { 135 136 137 }') have been read. The membership was added by person 5 ('5') at Monday July 12th, 1993 at 03:08:43 ('43 8 3 12 7 93 1 193 1') and it is passive ('01000000').

Error codes

undefined-person
person does not exist, or no access to person.

undefined-conference
Conference conference does not exist, or is secret.

conference-zero
conference is zero.

not-member
person is not a member of conference or insufficient privileges to find out if person is a member.

4.100 get-membership-10 [99] (10) Obsolete (11)

get-membership-10 [99] (( person : Pers-No;
first : INT16;
no-of-confs : INT16;
want-read-texts : BOOL ))

-> ( ARRAY Membership-10 );

This call is obsolete. Use get-membership (see Section 4.109 [get-membership], page 122).

This call retrieves the membership record for a list of conferences for a single person. person is the person whose memberships are to be retrieved. first is the first position in the membership list to retrieve, numbered from 0 and up. no-of-confs is the number of membership records to retrieve. If want-read-texts is '0', the server will not send the contents of the read-texts array of the memberships. (The size will be transmitted, but a single asterisk ('*') will be sent instead of the array itself.)

The server will return a membership list that is shorter than no-of-confs if no-of-confs + first is larger than the number of conferences the person is a member of. Elements of the member list that the person requesting the list does not have sufficient privileges to see may be cleared. Cleared elements simply have all fields set to zero.
Example:

1 99 5 0 3 1
  =1 2 { 0 49 14 17 13 8 91 5 255 1 5 255 0 0 * 5
      49 14 17 13 8 91 5 255 1 00000000
      1 20 14 22 17 6 97 4 197 1 6 100 2 0 * 5
      49 14 17 13 8 91 5 255 1 00000000 }
2 99 5 0 1 1
  =2 1 { 0 49 14 17 13 8 91 5 255 1 5 255 0 0 * 5
      49 14 17 13 8 91 5 255 1 00000000 }
3 99 5 1 4 1
  =3 1 { 1 20 14 22 17 6 97 4 197 1 6 100 2 0 * 5
      49 14 17 13 8 91 5 255 1 00000000 }

In this example we retrieve the memberships of person 5. The first call asks for three memberships, starting with number 0. Since this person is only a member of two conferences, the list returned only contains two memberships. The next two calls retrieve a single membership each. The first by asking for only one, and the second by asking for four memberships, starting with number 1.

Error codes

login-first
Login required before issuing this call.

undefined-person
The person person does not exist.

undefined-conference
The conference person does not exist or is secret.

index-out-of-range
first is higher than the index of the last conference in the person’s membership list.

bad-bool want-read-texts must be either ‘0’ or ‘1’.

4.101 add-member [100] (10) Recommended

add-member [100] (( conf-no : Conf-No;
pers-no : Pers-No;
priority : INT8;
where : INT16;
type : Membership-Type ))
  -> ( );

Make the person pers-no a member of conference conf-no. The membership priority is set to priority and its position in the membership list is set to where.

The membership flags are set to type. If the current user is adding a user he isn’t supervisor of, the invitation bit of type is automatically set by the server.
This call can be used to change the priority, position and flags of a conference in the person’s membership list if the person is already a member of the conference. The person doing this must either be a supervisor of the affected person, or have sufficient privileges enabled.

Example:

```
1 99 119 0 10 0
=1 1 { 49 14 17 13 8 91 5 255 1 119 255 0 0 * 119 0001111 }
1 100 1 119 250 0 1000000
=1
1 100 119 119 251 1 00000000
=1
1 99 119 0 10 0
=1 2 { 52 30 14 11 5 96 2 162 1 1 250 0 0 * 119 00000000
  49 14 17 13 8 91 5 251 1 119 255 0 0 * 1000000 }
```

This example makes person 119 (me) a member of conference number 1 and changes the priority and some flags of the preexisting membership in conference 119. The priority is set to 250 and the conference is placed first in the membership list. The first and last calls of the example show the membership list for person 119 before and after the calls.

### Error codes

- **login-first**
  Login required before issuing this call.

- **undefined-conference**
  Conference `conf-no` does not exist or is secret.

- **conference-zero**
  `conf-no` is zero.

- **undefined-person**
  Person `pers-no` does not exist.

- **access-denied**
  Not enough permissions or privileges to add members to `conf-no` or to change privileges, position or type of a preexisting membership.

- **permission-denied**
  Person `pers-no` is already a member of conference `conf-no`, but the person logged on is not a supervisor and does not have enough privileges to change the priorities of person `pers-no`.

### 4.102 get-members [101] (10) Recommended

```lisp
get-members [101] (( conf : Conf-No;
                        first : INT16;
                        no-of-members : INT16 ))
  -> ( ARRAY Member );
```
This call returns a list of members of the conference conf. first is the first index in the membership to return, numbered from zero and up. no-of-members is the maximum number of members to return.

Some of the elements of the result may be cleared if the person requesting the information does not have sufficient privileges to see the contents. Cleared elements simply have all fields set to zero.

Example:

```
1 101 1 0 100
=1 4 \{ 7 7 00000000 8 8 00000000 9 8 00000000 10 10 00000000 \}
1 101 6 0 100
=1 4 \{ 5 5 01000000 7 7 01000000 9 8 10000000 10 10 00000000 \}
1 101 6 2 2
=1 2 \{ 9 8 10000000 10 10 00000000 \}
```

In this example the client first requests the first 100 members in conference 1. The second request is for the first 100 members of conference 6. The last request is for members 2 and 3 in conference 6.

Error codes

undefined-conference
The conference conf does not exist or is secret.

index-out-of-range
first is higher than the number of members in conf.

4.103 set-membership-type [102] (10) Recommended

```
set-membership-type [102] (( pers : Pers-No;
                           conf : Conf-No;
                           type : Membership-Type ))
-> ( );
```

This call modifies the type of a membership. The person pers membership in conference conf is affected. The server may impose arbitrary restrictions on how the membership type may be changed. Typically it will only be possible to clear the invitation bit. It is possible that the server will not permit the secret bit to be set. Attempting to set a membership type that does not agree with the server’s restrictions will result in an error.

Error codes

login-first
Login required before issuing this call.

conference-zero
conf is zero.
undefined-conference
The conference **conf** does not exist or is secret or the person **pers** does not exist or is secret.

permission-denied
Insufficient permissions to change the membership of **pers**.

not-member
Person **pers** is not a member of conference **conf**.

invalid-membership-type
The requested membership type **type** was not compatible with restrictions set on the server or on the conference **conf**.

4.104 local-to-global [103] (10) Recommended

```
local-to-global [103] (( conf-no : Conf-No;
  first-local-no : Local-Text-No;
  no-of-existing-texts : INT32 ))
-> ( Text-Mapping );
```

This call retrieves information that makes it possible to convert **no-of-existing-texts** existing local text numbers starting at **first-local-no** to global text numbers, provided that there are that many local texts.

The **conf-no** parameter specifies which conference to look up local numbers in. **first-local-no** is the first number that the client is interested in. **no-of-existing-texts** is the maximum number of texts the client wants information about. Legal values for **no-of-existing-texts** are 1-255 (inclusive).

The server will return a sparse or dense Text-Mapping depending on the how many deleted texts there are after **first-local-no**.

The local-to-global-reverse (see Section 4.122 [local-to-global-reverse], page 131) request can be useful if you want to traverse the mapping from higher to lower numbers.

*Example:*

```
1 103 93 1 5
=1 1 7 1 1 1 6 { 1003 1005 1009 1029 0 1034 }
2 103 93 1 6
=2 1 63 1 0 6 {
  1 1003
  2 1005
  3 1009
  4 1029
  6 1034
  62 1302 }
3 103 93 50 10
=3 50 70 0 0 2 {
  62 1302
  69 1006 }
```
The above example shows three calls to \texttt{local-to-global}. (Extra newlines have been inserted in the result of the two final calls to make the result more readable.)

The first call requests information about the first five existing texts in conference 93. The result contains information about texts in the range 1-7 (including the lower limit, but not the upper), and there are more texts. The server uses the dense form of the \texttt{Text-Mapping}. As can be seen from the result, they have local text numbers 1, 2, 3, 4 and 6. The global text number corresponding to local text number 5 is sent as 0, indicating that it doesn’t exist.

In the second call, the client requests the same information, but one additional text. The result looks dramatically different, since the next existing text in this example has local text number 62. The result contains information about texts in the range 1-63 (including the lower limit, and excluding the upper), and there are more texts. The server of course uses the sparse form of the \texttt{Text-Mapping}.

The final call shows what happens when \texttt{first-local-no} doesn’t exist. The result contains information about texts in the range 50-70 (including the lower limit and excluding the upper); only local text number 62 and 69 actually exists in that range. 69 is the highest local text number.

(Note that local text number 69 corresponds to global text number 1006, which is lower than 1302. Situations like this often occurs when \texttt{add-recipient} is used.)

\textbf{Error codes}

\begin{description}
\item[login-first] Login required before issuing this call.
\item[long-array] \texttt{no-of-existing-texts} was larger than 255.
\item[conf-zero] \texttt{conf-no} was set to 0.
\item[local-text-zero] \texttt{first-local-no} was set to 0.
\item[undef-conf] The conference does not exist, or the client is not allowed to know that it exists.
\item[access-denied] The conference exists, but the client is not allowed to retrieve information about the texts in the conference.
\item[no-such-local-text] \texttt{first-local-no} is greater than the highest local text number that ever existed in the conference.
\end{description}

\textbf{4.105 \texttt{map-created-texts} [104] (10) Recommended}

\begin{verbatim}
map-created-texts [104] (( author : Pers-No;
                       first-local-no : Local-Text-No);
\end{verbatim}
Return text numbers for existing texts that the author has written.

Just as each conference has a mapping from local text numbers to global text numbers, each person has a mapping from the N:th text written by him to the global text number. This function can be used to retrieve part of that mapping.

More information and examples may be found in Section 4.104 [local-to-global], page 118.

The map-created-texts-reverse (see Section 4.123 [map-created-texts-reverse], page 132) request can be useful if you want to traverse the mapping from higher to lower numbers.

Error codes

login-first
Login required before issuing this call.

long-array
no-of-existing-texts was larger than 255.

conf-zero
author was set to 0.

local-text-zero
first-local-no was set to 0.

undef-pers
The conference does not exist, or the client is not allowed to know that it exists.

no-such-local-text
first-local-no is greater than the highest local text number that ever existed in the conference.

access-denied
The conference exists, but the client is not allowed to retrieve information about the texts in the conference.

4.106 set-keep-commented [105] (10) Recommended

set-keep-commented [105] (( conf-no : Conf-No;
keep-commented : Garb-Nice ))

-> ( );

Sets the keep-commented field of the conference conf-no to keep-commented. This call can only be issued by a conference’s supervisor or a privileged user.

Error codes

login-first
Login required before issuing this call.
undefined-conference
The conference conf-no does not exist or is secret.

permission-denied
Not supervisor of conference conf-no and not privileged enough to complete the call anyway.

4.107 set-pers-flags [106] (10) Recommended

\[
\text{set-pers-flags} \ (\text{pers-no} \ : \ \text{Pers-No}; \\
\text{flags} \ : \ \text{Personal-Flags})
\]

-> ( )

Set the flags field of person pers-no to flags. This call can only be issued by the person supervisor or a privileged user.

Error codes

login-first
Login required before issuing this call.

conference-zero
The pers-no parameter is zero.

undefined-person
The person does not exist, or the session does not have permission to know about the person.

permission-denied
Person exists, but the session does not have permission to change the flags.

4.108 query-read-texts [107] (11) Recommended

\[
\text{query-read-texts} \ (\text{person} \ : \ \text{Pers-No}; \\
\text{conference} \ : \ \text{Conf-No}; \\
\text{want-read-ranges} \ : \ \text{BOOL}; \\
\text{max-ranges} \ : \ \text{INT32})
\]

-> ( Membership )

This call is used to find the number of unread texts in a conference. The data it returns is actually a membership structure which specifies which texts have been read. It is up to the client to transform the data to a more usable form. person is the person being queried and conference is the conference in question.

If want-read-ranges is ‘0’, the server will not send the contents of the read-ranges array of the memberships. (The size will be transmitted, but a single asterisk (‘*’) will be sent instead of the array itself.) The max-ranges argument is ignored in this case.

If want-read-ranges is ‘1’, the read-ranges array will be returned. If max-ranges is non-zero, the array will be truncated to max-ranges ranges. (It isn’t possible to determine if the array has been truncated, or if the array actually contained exactly that many ranges.) Setting max-ranges to ‘1’ gives you enough information to find out the first unread text.
When you call this request with `want-read-ranges` set to ‘1’, the ranges will expand to include any adjacent texts that are now deleted. This may not happen if `get-membership` (see Section 4.109 [get-membership], page 122) is used to retrieve the information.

Calling `query-read-texts` does not require the session to be logged in.

Example:

```
1 107 6 1 1 0
   =1 4 32 5 11 12 7 93 1 193 1 1 20
    2 { 1 133 135 137 } 5 43 8 3 12 7 93 1 193 1 01000000
```

This example finds the read texts for user 6 in conference 1. The returned data indicates that conference 1 is the fifth conference on the users’ membership list (‘4’; remember that the position starts its count at 0), user last read the conference on Monday July 12th, 1993 at 11:05:32 (‘32 5 11 12 7 93 1 193 1’), that it is the membership in conference number 1 (‘1’), that the person has assigned priority 20 to the conference (‘20’) and that all texts 1-133 and 135-137 have been read (‘2 { 1 133 135 137 }’). The membership was added by person 5 (‘5’) at Monday July 12th, 1993 at 03:08:43 (‘43 8 3 12 7 93 1 193 1’) and it is passive (‘01000000’).

**Error codes**

- **undefined-person**
  
  `person` does not exist, or no access to person.

- **undefined-conference**
  
  Conference `conference` does not exist, or is secret.

- **conference-zero**
  
  `conference` is zero.

- **not-member**
  
  `person` is not a member of `conference` or insufficient privileges to find out if `person` is a member.

- **bad-bool**
  
  `want-read-ranges` must be either ‘0’ or ‘1’.

**4.109 get-membership [108] (11) Recommended**

```
get-membership [108] (( person : Pers-No;
   first : INT16;
   no-of-confs : INT16;
   want-read-ranges : BOOL;
   max-ranges : INT32 ))
  -> ( ARRAY Membership );
```

This call retrieves the membership record for a list of conferences for a single person. `person` is the person whose memberships are to be retrieved. `first` is the first position in the membership list to retrieve, numbered from 0 and up. `no-of-confs` is the number of membership records to retrieve.
If `want-read-ranges` is ‘0’, the server will not send the contents of the `read-texts` array of the memberships. (The sizes will be transmitted, but a single asterisk (‘*’) will be sent instead of the array itself.) The `max-ranges` argument is ignored in this case.

If `want-read-ranges` is ‘1’, the `read-ranges` arrays of the memberships will be returned. If `max-ranges` is non-zero, each array will be truncated to `max-ranges` ranges. (It isn’t possible to determine if an array has been truncated, or if that array actually contained exactly that many ranges.) Unlike `query-read-texts` (see Section 4.108 [query-read-texts], page 121), the ranges may not expand to include deleted texts, so it isn’t certain that you get enough information to find the first unread text if you specify a non-zero `max-ranges` argument.

The server will return a membership list that is shorter than `no-of-confs` if `no-of-confs + first` is larger than the number of conferences the person is a member of. Elements of the member list that the person requesting the list does not have sufficient privileges to see may be cleared. Cleared elements simply have all fields set to zero.

**Example:**

```
1 108 5 0 3 1 0
*1 2 { 0 49 14 17 13 8 91 5 255 1 5 255 0 * 5
   49 14 17 13 8 91 5 255 1 00000000
   1 20 14 22 17 6 97 4 197 1 6 100 1 { 1 2 } 5
   49 14 17 13 8 91 5 255 1 00000000 }
2 108 5 0 1 1 0
*2 1 { 0 49 14 17 13 8 91 5 255 1 5 255 0 * 5
   49 14 17 13 8 91 5 255 1 00000000 }
3 108 5 1 4 1 0
*3 1 { 1 20 14 22 17 6 97 4 197 1 6 100 1 { 1 2 } 5
   49 14 17 13 8 91 5 255 1 00000000 }
```

In this example we retrieve the memberships of person 5. The first call asks for three memberships, starting with number 0. Since this person is only a member of two conferences, the list returned only contains two memberships. The next two calls retrieve a single membership each. The first by asking for only one, and the second by asking for four memberships, starting with number 1.

**Error codes**

- **login-first**
  Login required before issuing this call.

- **undefined-person**
  The person `person` does not exist.

- **undefined-conference**
  The conference `person` does not exist or is secret.

- **index-out-of-range**
  `first` is higher than the index of the last conference in the person’s membership list.

- **bad-bool** `want-read-ranges` must be either ‘0’ or ‘1’.
4.110 mark-as-unread [109] (11) Recommended

mark-as-unread [109] (( conference : Conf-No;
                 text       : Local-Text-No ))
                          -> ( );

Marks text text in conference number conference as not read for the current user. This call updates the membership record for the user. It can be used to undo the effect of mark-as-read (see Section 4.28 [mark-as-read], page 67).

Example:

1 9 6 7
=1 20 32 11 17 6 96 1 198 1 7 1 241 0 *
1 78 7
=1 13HIlnägg }t mig 00001000 241 1
1 27 7 241
=1
1 9 6 7
=1 20 32 11 17 6 96 1 198 1 7 1 240 0 *

This example shows person 6 marking local text number 241 in conference 7 as not read. In the first query-read-texts-old call the person has read local text 241, and nothing higher. The mark-as-read call is reflected in the second query-read-texts-old call, where the user is seen to have read text 240 in conference 7, but nothing higher.

To mark a global text number as not read it is necessary to translate it into local text numbers by looking at the misc-info list in the Text-Stat and calling mark-as-read once for each recipient.

Attempts to mark a deleted text as unread will appear to succeed, but might have no effect, since the server will automatically mark them as read, sooner or later.

Error codes

login-first
Login required before issuing this call.

undefined-conference
The conference conference does not exist or is secret.

conference-zero
conference is zero.

not-member
The person logged on is not a member of conference conference.

no-such-local-text
text is not, and has never been, a local text number in conference. The error argument contains the invalid number.

local-text-zero
text is zero.
4.111 set-read-ranges [110] (11) Recommended

    set-read-ranges [110] (( conference : Conf-No;
                       read-ranges : ARRAY Read-Range ))
    -> ( );

This call tells the server that the person issuing the call has read exactly those texts
specified by read-ranges in conference conference. This call is typically used to migrate
a membership from one person to another. It can also be used instead of set-unread
(see Section 4.41 [set-unread], page 78) or set-last-read (see Section 4.78 [set-last-read],
page 101).

The server may automatically extend the ranges with adjacent local text numbers that
are deleted.

Example:

    1 9 7 6
    =1 2 4 22 18 6 97 5 198 1 6 100 6 0 *
    2 110 6 3 { 1 20 23 25 28 }
    =2
    3 9 7 6
    =3 2 4 22 18 6 97 5 198 1 6 100 20 5 { 23 25 26 27 28 }

This example shows how person 7 originally had read everything up to and including
local text number 6 in conference 6. After the call to set-read-ranges, the query-read-
texts-old (see Section 4.10 [query-read-texts-old], page 52) call reports that person 7 has
read the local text numbers 1-20, 23 and 25-28.

Error codes

login-first
  Login required before issuing this call.

undefined-conference
  The conference conference does not exist or is secret.

conference-zero
  conference is zero.

not-member
  Not a member of conference conference.

local-text-zero
  read-ranges contains the number 0.

no-such-local-text
  read-ranges contains a local text number that never has existed.

long-array
  The read-ranges array is too long. error-status indicates the maximum
  range allowed.
invalid-range
The first-read field in one of the ranges in read-ranges is greater than last-read. The error-status indicates the interval (0 for the first interval, 1 for the second, and so on).

invalid-range-list
The first-read field in one of the ranges in read-ranges is not greater than the last-read field of the previous range. The error-status indicates the interval (0 for the first interval, 1 for the second, and so on).

4.112 get-stats-description [111] (11) Recommended

get-stats-description [111] ( )
-> ( Stats-Description );

Return a list of the supported statistical measurements. This request always succeeds, and always returns the same value for the duration of a session, so a client doesn’t need to use it more than once per session.

See [Stats-Description], page 44, for more info about the data type. See Chapter 13 [Measured Properties], page 165, for more info on what the returned values means.

Example:

1 111
=1 2 { 3HX-a 3HX-b } 4 { 0 60 300 900 }

Error codes

This call always succeeds.

4.113 get-stats [112] (11) Recommended

get-stats [112] ( what : HOLLERITH )
-> ( ARRAY Stats );

Return a list of the statistical measurements of what. The number of elements in the result corresponds to the when field of the Stats-Description returned by get-stats-description (see Section 4.112 [get-stats-description], page 126).

See Chapter 13 [Measured Properties], page 165, for more info on the what argument. See also [Stats-Description], page 44.
Example:

\[
\begin{align*}
1 & 112 \text{ clients} \\
\text{=1 4 \{ 20 0 0 19.80 1.2 1.1 18.33 1.2 1.1 16.11 1.2 1.2e-02 \}}
\end{align*}
\]

Assuming that the when field of get-stats-description contains the time periods 0, 60, 300 and 900, the above result indicates that there is currently 20 connected clients. The past averages for 1, 5 and 15 minutes are 19.8, 18.33 and 16.11 connected clients.

You can use this call even if you are not logged in.

Error codes

feature-disabled
The measurement that was requested has been disabled.

undefined-measurement
The server doesn’t measure the value requested by what.

access-denied
The client isn’t allowed to retrieve the requested value. The client might be granted the privilege by logging in as a privileged user, using the enable (see Section 4.43 [enable], page 79) request, by a receiving a privilege bit, or in an implementation-defined way.

4.114 get-boottime-info [113] (11) Recommended

get-boottime-info [113] ( )
-> ( Static-Server-Info );

Return status information that was current when the server started. This include the time of the last restart. Clients are encouraged to cache the return value of this request, as it will never change while a client is connected.

Error codes

This call always succeeds

4.115 first-unused-conf-no [114] (11) Recommended

first-unused-conf-no [114] ( )
-> ( Conf-No );

Return first conference number that is not yet used.

Error codes

This call always succeeds
4.116 first-unused-text-no [115] (11) Recommended

first-unused-text-no [115] ( )
-> ( Text-No );

Return first text number that is not yet used.

Error codes

This call always succeeds

4.117 find-next-conf-no [116] (11) Recommended

find-next-conf-no [116] ( start : Conf-No )
-> ( Conf-No );

This call returns the next conference that you are allowed to see in the database created after conference start. start does not have to be a valid or readable conference number, as shown in the examples.

Example:

```
1 116 0
=1 2
1 116 2
=1 4
```

This example shows how to retrieve the first readable conference in the LysKOM database by calling find-next-conf-no with start set to zero. In the example, the first conference is number 2. The second example gets the conference following number 2, which happens to be conference number 4.

Error codes

login-first
Login required before issuing this call.

undefined-conference
There is no conference following conf start.

4.118 find-previous-conf-no [117] (11) Recommended

find-previous-conf-no [117] ( start : Conf-No )
-> ( Conf-No );

This call returns the last accessible conference in the database created before start. start does not have to be a valid or readable conference number, as shown in the examples.
Example:

\[
\begin{align*}
1 & \text{ 114} \\
   & \text{=1 12345} \\
2 & \text{ 117 12345} \\
   & \text{=2 12330} \\
1 & \text{ 117 12330} \\
   & \text{=1 12329}
\end{align*}
\]

This example uses first-unused-conf-no (see Section 4.115 [first-unused-conf-no], page 127) to find the largest number that can meaningfully be sent to find-previous-conf-no. It then uses the request twice to find that the two conferences with highest conference numbers that are accessible to the user logged in is 12329 and 12330.

Error codes

login-first
Login required before issuing this call.

undefined-conference
There is no conf preceding conf start.

4.119 get-scheduling [118] (11) Experimental

\[
\text{get-scheduling [118] ( session-no : Session-No )} \\
\rightarrow ( \text{Scheduling-Info} )
\]

Get the current scheduling information for a session. You can use 0 as session-no to get information about the current session.

set-scheduling (see Section 4.120 [set-scheduling], page 129) contains an example.

Error codes

The first error code in the list below that is applicable will be returned.

login-first
Login required before issuing this call, unless session-no is 0 or the number of the current session.

undefined-session
That session does not exist.

4.120 set-scheduling [119] (11) Experimental

\[
\text{set-scheduling [119] (( session-no : Session-No;}} \\
\text{priority : INT16;}} \\
\text{weight : INT16 ))} \\
\rightarrow ( )
\]
This call sets the scheduling priority and weight of the connection. [Scheduling-Info], page 41, for more information. You can use 0 as session-no to set the info for the current session.

Example:

```
1 118 0
=1 1 1000
2 119 0 0 1000
%2 58 1
3 119 0 1 2500
%2 59 1500
3 119 0 1 1500
=3
```

This example uses get-scheduling (see Section 4.119 [get-scheduling], page 129) to find out the current scheduling setting (priority 1 and weight 1000). The client then attempts to get a better priority (0), but is informed that priority 1 is the best priority available to this user (or before logging in). At request 3 the client attempts to increase the weight to 2500, but is informed that 1500 is the best weight available. It finally sets the weight to 1500. This will result in a 50% speedup compared to the default setting.

The set-scheduling request makes it possible to implement a quite complex scheduling machinery in the server. Please note, however, that a server that only implements priority 0 and weight 1 (and thus treats all sessions equally) is fully compliant with this specification. The number of priorities and weights that are available is implementation-defined. They can vary depending on the privileges of the user that is logged in, and may be affected by the enable (see Section 4.43 [enable], page 79) call.

**Error codes**

The first error code in the list below that is applicable will be returned.

**weight-zero**
You must specify a non-zero weight.

**login-first**
Login required before issuing this call, unless session-no is 0 or the number of the current session.

**undefined-session**
That session does not exist.

**access-denied**
You don’t have enough privileges to modify the priority of the specified session. You can only modify your own session and sessions logged in as a person you are supervisor of.

**index-out-of-range**
The priority argument is numerically too large. error-status indicates the numerically largest priority that the server supports.
priority-denied
You don’t have enough privileges to lower your priority. error-status indicates the lowest priority that you have access to.

weight-denied
You don’t have enough privileges to set the specified weight at the specified priority. error-status indicates the highest weight you have access to at the specified priority. The limit may differ at different priorities.

4.121 set-connection-time-format [120] (11) Recommended

```
set-connection-time-format [120] ( use-utc : BOOL )
-> ( )
```

This call specifies how Time values are sent over the protocol. By default, they are sent in the local time zone of the server. If use-utc is 1, they will instead be sent using UTC.

This affects both times sent from the server to the client, and from the client to the server.

Please note that there is a race condition. The time contained in any asynchronous message received after sending a set-connection-time-format request and before getting the reply may have been sent using either the old or the new setting. You should not trust them.

Error codes

bad-bool use-utc must be either ‘0’ or ‘1’.

4.122 local-to-global-reverse [121] (11) Recommended

```
local-to-global-reverse [121] (( conf-no : Conf-No;
local-no-ceiling : Local-Text-No;
no-of-existing-texts : INT32 ))
-> ( Text-Mapping )
```

This call retrieves information that makes it possible to convert no-of-existing-texts existing local text numbers smaller than local-no-ceiling to global text numbers, provided that there are that many local texts smaller than local-no-ceiling.

In other words, this request is just link local-to-global (see Section 4.104 [local-to-global], page 118), but it searches backwards in the mapping.

The conf-no parameter specifies which conference to look up local numbers in. local-no-ceiling is the first number that the client is not interested in. no-of-existing-texts is the maximum number of texts the client wants information about. Legal values for no-of-existing-texts are 1-255 (inclusive).

The server will return a sparse or dense Text-Mapping depending on the how many deleted texts there are before local-no-ceiling.

As a special case, if local-no-ceiling is 0, information will be returned about the no-of-existing-texts highest-numbered texts.
Error codes

login-first
Login required before issuing this call.

long-array
no-of-existing-texts was larger than 255.

conf-zero
conf-no was set to 0.

undef-conf
The conference does not exist, or the client is not allowed to know that it exists.

access-denied
The conference exists, but the client is not allowed to retrieve information about the texts in the conference.

4.123 map-created-texts-reverse [122] (11) Recommended

map-created-texts-reverse [122] (( author : Pers-No;
local-no-ceiling : Local-Text-No;
no-of-existing-texts : INT32 ))

-> ( Text-Mapping );

Return text numbers for existing texts that author has written. This is just like map-created-texts (see Section 4.105 [map-created-texts], page 119), but searches in the other direction. (Compare with local-to-global-reverse (see Section 4.122 [local-to-global-reverse], page 131).)

As a special case, if local-no-ceiling is 0, information will be returned about the last no-of-existing-texts texts.

Error codes

login-first
Login required before issuing this call.

long-array
no-of-existing-texts was larger than 255.

conf-zero
author was set to 0.

undef-pers
The conference does not exist, or the client is not allowed to know that it exists.

access-denied
The conference exists, but the client is not allowed to retrieve information about the texts in the conference.
Asynchronous Messages

Asynchronous messages are information messages sent from the server to the client. Most of them are used to inform the client about changes to the database (such as when a new text is created), so that the clients don’t have to poll the server for new information. Some have other uses.

The messages with status "O" are included here for historical purposes only. Servers are not required to handle them, and are encouraged to reject them if a client uses it as an argument to accept-async (see Section 4.81 [accept-async], page 103).

Clients can select which messages to receive by issuing an accept-async call (see Section 4.81 [accept-async], page 103). They can find out which messages are being sent by issuing the query-async call (see Section 4.82 [query-async], page 104). Note that the server can send other messages as well. For example, a broadcast message from a person with admin bits set may get through even if the client has not requested broadcast messages.

When a connection is opened some messages are selected by default. Clients should use the accept-async call to select which messages they want. Servers are encouraged to preselect the async-new-text-old, async-new-name, async-sync-db, async-leave-conf, async-login, async-rejected-connection, async-send-message and async-logout messages. These correspond to the useful messages that were sent prior to the introduction of accept-async (see Section 4.81 [accept-async], page 103).

An asynchronous message is sent as a colon immediately followed by the number of message parameters, the message number and the message parameters. For example, message number 5 could be sent as

:3 5 119 11HDavid Byers 13HDavid C Byers

The parameters of each message are listed in the same format as server calls.

5.1 async-new-text-old [0] (1) Obsolete (10)

async-new-text-old [0] (( text-no : Text-No; text-stat : Text-Stat-Old ));

This message is sent when a text is created. The text number of the text is sent in text-no and the text stat in text-stat. This message is sent to all logged-in members of any recipient of the text, any text it is a comment of, and any text it is a footnote of.

In protocol version 10 this call has been superseded by Section 5.14 [async-new-text], page 136.

5.2 async-i-am-off [1] (1) Obsolete (1)

async-i-am-off [1] ( person : Pers-No );

This message was sent when person logged off. It has been replaced by async-logoff (see Section 5.12 [async-logoff], page 136), since this asynchronous message could not differentiate between sessions if the same person was logged in more than once.
5.3 async-i-am-on-obsolete [2] (1) Obsolete (1)

conference : Conf-No;
what-am-i-doing : HOLLERITH ));

This message was sent when person changed his what-i-am-doing string to what-am-i-doing or his working conference to conference.

It has been replaced by call number 6, async-i-am-on (see Section 5.5 [async-i-am-on], page 134), since this asynchronous message could not differentiate between sessions if the same person was logged in more than once.

5.4 async-new-name [5] (1) Recommended

async-new-name [5] (( conf-no : Conf-No;
old-name : HOLLERITH;
new-name : HOLLERITH ));

This message is sent when a person or conference changes names. The conference whose name is being changed is sent in conf-no, the old name in old-name and the new name in new-name.

5.5 async-i-am-on [6] (1) Recommended

async-i-am-on [6] ( info : Who-Info );

This message is sent when a session’s working conference, what-i-am-doing string (see Section 4.5 [change-what-i-am-doing], page 49) or username changes. The new information is sent in info.

5.6 async-sync-db [7] (1) Recommended

async-sync-db [7] ( );

This message is sent once just before the server blocks to save its database and once just after it blocks. There is no good way to tell the difference between the two cases.

5.7 async-leave-conf [8] (1) Recommended

async-leave-conf [8] ( conf-no : Conf-No );

This message is sent to a user when the user’s membership in the working conference is removed for any reason. The conference the user is being removed from is sent in conf-no.

Earlier versions of the LysKOM Protocol A specifications stated that this message was only sent if the membership was "revoked forcefully". The exact meaning of that phrasing was never specified. The lyskomd implementation has probably always followed the current version of the specification, which means that this message is sent whatever the reason for the removal is.

Possible reasons include:
The session issued a sub-member call (see Section 4.16 [sub-member], page 57).
Some other session issued a sub-member call (see Section 4.16 [sub-member], page 57).
The conference was deleted.

This message is not sent if a membership is transformed from an active to a passive membership.

5.8 async-login [9] (1) Recommended

async-login [9] (( pers-no : Pers-No;
     session-no : Session-No ));

This message is sent when someone logs in. The identity of the person logging in is sent in pers-no, and the session number in session-no.

5.9 async-broadcast [10] (1) Obsolete (1)

async-broadcast [10] (( sender : Pers-No;
     message : HOLLERITH ));

This message has been superseded by async-send-message which is more flexible (see Section 5.11 [async-send-message], page 135). It used to be sent when the administrator (sender) broadcasted a string (message) to all LysKOM users, but is no longer used.

5.10 async-rejected-connection [11] (1) Recommended

async-rejected-connection [11] ( );

This message is sent when someone fails to log in because the maximum number of allowed connections has been reached. Some clients may take this as a signal to log out. Administrators should take it as a signal to allow more connections.

5.11 async-send-message [12] (1) Recommended

async-send-message [12] (( recipient : Conf-No;
     sender : Pers-No;
     message : HOLLERITH ));

This message is sent when someone (the sender) sends a message string (the message). The recipient of the message is sent in recipient. If it is zero, then the message was sent to all connections. If it is a conference, then the message is being sent to all logged-in members of that conference. If it is a mailbox then the message is personal and is only sent to members of the mailbox conference.

The passive and passive-message-invert bits of the membership influence if this message is sent. See [Membership-Type], page 34.
5.12 async-logout [13] (1) Recommended

session-no : Session-No ));

This message is sent when someone logs out. pers-no is the person logging out and session-no is the session in which the person is logging out. This message might also be sent when a session disconnects, even if there is nobody logged on in the session.

5.13 async-deleted-text [14] (10) Recommended

async-deleted-text [14] (( text-no : Text-No;
text-stat : Text-Stat ));

This message is sent when a text is deleted and the currently logged-in person is a member of one of the recipients, or a recipient of any text that is linked to this text via a comment or footnote link. The text number being deleted is sent in text-no and the text stat in text-stat.

5.14 async-new-text [15] (10) Recommended

async-new-text [15] (( text-no : Text-No;
text-stat : Text-Stat ));

This message indicates that a new text has been created. The text has number text-no, and the text stat is text-stat. The message is sent to all logged-in members of any recipient of the text, any text it is a comment of, and any text it is a footnote of.

5.15 async-new-recipient [16] (10) Recommended

async-new-recipient [16] (( text-no : Text-No;
conf-no : Conf-No;
type : Info-Type ));

This message indicates that a new recipient has been added to text text-no. The recipient added is conf-no and the type of recipient is indicated by type. This message is sent to all recipients of the text (of any text that is linked to this text via a comment or footnote link) that are permitted to know about the new recipient.

5.16 async-sub-recipient [17] (10) Recommended

async-sub-recipient [17] (( text-no : Text-No;
conf-no : Conf-No;
type : Info-Type ));

This message indicates that a recipient has been removed from text text-no. The recipient removed is conf-no and the type of recipient is indicated by type. This message is sent to everybody that were recipients of the text (or any text that is linked to this text via a comment or footnote link) and that were permitted to know about the recipient.
5.17 async-new-membership [18] (10) Recommended

async-new-membership [18] (( pers-no : Pers-No;
conf-no : Conf-No ));

This message indicates that the membership for pers-no in conference conf-no has been added. This message is currently sent only to pers-no, but that may change in the future.

See also Section 5.7 [async-leave-conf], page 134.

5.18 async-new-user-area [19] (11) Recommended

async-new-user-area [19] (( pers-no : Pers-No;
old-user-area : Text-No;
new-user-area : Text-No ));

This message indicates that the user-area of pers-no has changed from old-user-area to new-user-area. This message is sent to all supervisors of pers-no (which of course includes pers-no himself).

5.19 async-new-presentation [20] (11) Recommended

async-new-presentation [20] (( conf-no : Conf-No;
old-presentation : Text-No;
new-presentation : Text-No ));

This message indicates that the presentation of conf-no has changed from old-presentation to new-presentation. This message is sent to everybody who is allowed to see conf-no. If the conference had no presentation, old-presentation will be 0. Likewise, if the presentation of the conference was removed, new-presentation will be 0.

5.20 async-new-motd [21] (11) Recommended

async-new-motd [21] (( conf-no : Conf-No;
old-motd : Text-No;
new-motd : Text-No ));

This message indicates that the msg-of-day of conf-no has changed from old-motd to new-motd. This message is sent to everybody who is allowed to see conf-no. If the conference had no message-of-the-day, old-motd will be 0. Likewise, if the motd of the conference was removed, new-motd will be 0.

5.21 async-text-aux-changed [22] (11) Recommended

async-text-aux-changed [22] (( text-no : Text-No;
deleted : ARRAY Aux-Item;
added : ARRAY Aux-Item ));
This message indicates that the aux-items of text text-no have been changed. (This message is not sent when the text is created or deleted.) deleted is a list of the deleted items, and added is a list of the added items. At least one of the arrays will be non-empty.

Please note that all items in deleted will have the deleted bit of the flags field set.
6 Error Codes

Normal errors are sent in reply to syntactically correct calls to the server. The client should accept any error code in response to any call, even if the error code in question is not listed in the description of the call, and even if the error code in question is not defined in the protocol specification yet.

This table lists the currently defined error codes together with a short explanation. The explanation given below is the default semantics for the error code. It can be updated by the descriptions found for a specific call.

See Section 2.4 [Client-Server Dialog], page 17, for more information about error responses, including the syntax of the error response.

no-error (0)
No error has occurred. error-status is undefined. This should never happen, but it might.

not-implemented (2)
The call has not been implemented yet. error-status is undefined.

obsolete-call (3)
The call is obsolete and no longer implemented. error-status is undefined.

invalid-password (4)
Attempt to set a password containing illegal characters, or to use an incorrect password.

string-too-long (5)
A string was too long (see descriptions of each call.) error-status indicates the maximum string length.

login-first (6)
Login is required before issuing the call. error-status is undefined.

login-disallowed (7)
The system is in single-user mode. You need to be privileged to log in despite this. error-status is undefined.

conference-zero (8)
Attempt to use conference number 0. error-status is undefined.

undefined-conference (9)
Attempt to access a non-existent or secret conference. error-status contains the conference number in question.

undefined-person (10)
Attempt to access a non-existent or secret person. error-status contains the person number in question.

access-denied (11)
No read/write access to something. This might be returned in response to an attempt to create a text, when the recipient conference and its super conferences are read-only, or when attempting to add a member to a conference without enough permission to do so. error-status indicates the object to which we didn’t have enough permissions to.
permission-denied (12)
Not enough permissions to do something. The exact meaning of this response depends on the call. error-status indicated the object for which permission was lacking, or zero.

not-member (13)
The call requires the caller to be a member of some conference that the caller is not a member of. error-status indicates the conference in question.

no-such-text (14)
Attempt to access a text that either does not exist or is secret in some way. error-status indicates the text number in question.

text-zero (15)
Attempt to use text number 0. error-status is undefined.

no-such-local-text (16)
Attempt to access a text using a local text number that does not represent an existing text. error-status indicates the offending number.

local-text-zero (17)
Attempt to use local text number zero. error-status is undefined.

bad-name (18)
Attempt to use a name that’s too long, too short or contains invalid characters. error-status is undefined.

index-out-of-range (19)
Attempt to use a number that’s out of range. The range and meaning of the numbers depends on the call issued. error-status is undefined unless stated otherwise in the call documentation.

conference-exists (20)
Attempt to create a conference or person with a name that’s already occupied. error-status is undefined.

person-exists (21)
Attempt to create a person with a name that’s already occupied. error-status is undefined. This error code is probably not used, but you never know for sure.

secret-public (22)
Attempt to give a conference a type with secret bit set and the rd-prot bit unset. This is an error since such a conference type is inconsistent. error-status is undefined.

letterbox (23)
Attempt to change the letterbox flag of a conference. error-status indicates the conference number.

ldb-error (24)
Database is corrupted. error-status is an internal code.

illegal-misc (25)
Attempt to create an illegal misc item. error-status contains the index of the illegal item.
illegal-info-type (26)
   Attempt to use a Misc-Info type (or Info-Type value) that the server knows
   nothing about. error-status is the type.

already-recipient (27)
   Attempt to add a recipient that is already a recipient of the same type. error-
   status contains the recipient that already is.

already-comment (28)
   Attempt to add a comment to a text twice over. error-status contains the
   text number of the text that already is a comment.

already-footnote (29)
   Attempt to add a footnote to a text twice over. error-status contains the
   text number of the text that already is a footnote.

not-recipient (30)
   Attempt to remove a recipient that isn’t really a recipient. error-status
   contains the conference number in question.

not-comment (31)
   Attempt to remove a comment link that does not exist. error-status contains
   the text number that isn’t a comment.

not-footnote (32)
   Attempt to remove a footnote link that does not exist. error-status contains
   the text number that isn’t a footnote.

recipient-limit (33)
   Attempt to add a recipient to a text that already has the maximum number
   of recipients. error-status is the text that has the maximum number of
   recipients.

comment-limit (34)
   Attempt to add a comment to a text that already has the maximum number of
   comments. error-status is the text with the maximum number of comments.

footnote-limit (35)
   Attempt to add a footnote to a text that already has the maximum number of
   footnote. error-status is the text with the maximum number of footnotes.

mark-limit (36)
   Attempt to add a mark to a text that already has the maximum number of
   marks. error-status is the text with the maximum number of marks.

not-author (37)
   Attempt to manipulate a text in a way that required the user to be the author of
   the text, when not in fact the author. error-status contains the text number
   in question.

no-connect (38)
   Currently unused.

out-of-memory (39)
   The server ran out of memory.
server-is-crazy (40)
Currently unused.

client-is-crazy (41)
The client used an illegal call sequence, such as calling set-client-version more than once.

undefined-session (42)
Attempt to access a session that does not exist. error-status contains the offending session number.

regexp-error (43)
Error using a regexp. The regexp may be invalid or the server unable to compile it for other reasons. error-status is undefined.

not-marked (44)
Attempt to manipulate a text in a way that requires the text to be marked, when in fact it is not marked. error-status indicates the text in question.

temporary-failure (45)
Temporary failure. Try again later. error-status is undefined.

long-array (46)
An array sent to the server was too long. error-status is undefined.

anonymous-rejected (47)
Attempt to send an anonymous text to a conference that does not accept anonymous texts. error-status is undefined.

illegal-aux-item (48)
Attempt to create an invalid aux-item. Probably the tag or data are invalid. error-status contains the index in the aux-item list where the invalid item appears.

aux-item-permission (49)
Attempt to manipulate an aux-item without enough permissions. This response is sent when attempting to delete an item set by someone else or an item that can’t be deleted, and when attempting to create an item without permissions to do so. error-status contains the index at which the item appears in the aux-item list sent to the server.

unknown-async (50)
Sent in response to a request for an asynchronous message the server does not send. The call succeeds, but this is sent as a warning to the client. error-status contains the message type the server did not understand.

internal-error (51)
The server has encountered a possibly recoverable internal error. error-status is undefined.

feature-disabled (52)
Attempt to use a feature that has been explicitly disabled in the server. error-status is undefined.
message-not-sent (53)
Attempt to send an asynchronous message failed for some reason. Perhaps the recipient is not accepting messages at the moment or there are no viable members in the recipient of the message. error-status is undefined.

invalid-membership-type (54)
A requested membership type was not compatible with restrictions set on the server or on a specific conference. error-status is undefined unless specifically mentioned in the documentation for a specific call.

invalid-range (55)
The lower limit of a supplied range is greater than the upper limit. error-status is undefined.

invalid-range-list (56)
The lower limit of a supplied range is not greater than the upper limit of the previous range in the list. error-status is undefined.

undefined-measurement (57)
A request for a measurement that the server doesn’t make has been made. error-status is undefined.

priority-denied (58)
You don’t have enough privileges to lower your priority. error-status indicates the lowest priority that you have access to.

weight-denied (59)
You don’t have enough privileges to set the specified weight.

weight-zero (60)
The scheduling weight must be non-zero. error-status is undefined.

bad-bool (61)
An argument of type BOOL was given a value that is neither ‘0’ nor ‘1’. error-status is undefined.
7 Aux-Item Types

Some of the aux-items below (mostly the ones that begin with "mx-") are used by mail importers.

`content-type [1] (text)`
Specifies the content type of a text. Data is a valid MIME type or one of the special LysKOM types (see Chapter 9 [LysKOM Content Types], page 155).
This item may only be set by the author of a text. The inherit, secret and hide-owner bits are cleared. Only one content-type item can be created per creator.

`fast-reply [2] (text)`
Data is a string that constitutes a brief comment to the text. This comment should be displayed immediately after the text body.
An item of this type will never be inherited, can always be deleted, is never anonymous and is never secret.

`cross-reference [3] (text, conference, letterbox)`
Data is a cross-reference to something else. The contents consist of a letter, a number, and optionally a space and a descriptive text. The letter must be one of T, C or P. T specifies that the cross-reference points to a text; C that it points to a conference; and P that it points to a person. The number is the id of the target of the cross reference. The descriptive text is simply that, a text that describes the cross-reference. For example, "T15 Check this out!" is a cross reference to text 15 with a description that reads "Check this out!", and "T17" is a cross reference without a description.
The inherit bit is automatically cleared and the item can always be deleted.

`no-comments [4] (text)`
When this item is set, the author requests that nobody comments the text. This is advisory only; it is still possible to write comments, but clients should advise the user that this is contrary to the author’s wishes. Data should be empty.
This item may only be set by the author. The secret, hide-creator and inherit bits are automatically cleared.

`personal-comment [5] (text)`
When this item is set, the author requests only personal comments. This is advisory only; it is still possible to create regular comments, but clients should advise the user that the author prefers a personal comment. Data should be empty.
This item may only be set by the author. The secret, hide-creator and inherit bits are automatically cleared.

`request-confirmation [6] (text)`
The author requests that everyone who reads the text confirms having done so by creating read-confirmation items on the text. Clients should ask users if
they wish to confirm having read the text when it is displayed. Data should be empty.
The hide-creator, secret and inherit bits are automatically cleared.

`read-confirm [7] (text)`
This item can be taken as confirmation that the item creator has read the text to which the item is attached. Clients should never ever create this item without an explicit confirmation from the user that the text has indeed been read.
The hide-creator, secret and inherit bits are automatically cleared. Once created an item of this type cannot be deleted.

`redirect [8] (conference, letterbox)`
This item indicates that texts should not be sent to the conference, but be directed to some other target instead. Clients should notify users that attempt to send texts to the conference of the redirect and offer to send the text to the target of the redirect instead. A typical use of this item would be a user that does not read LysKOM very often and would like to advise other users to send e-mail instead.

Data is PROTOCOL:ADDRESS where PROTOCOL is either "E-mail" or "LysKOM", and ADDRESS is either an e-mail address or a LysKOM conference number. Hopefully we'll be able to replace this with a forwarding mechanism later.

This item can only be set by the conference supervisor or in the case of a mailbox, the person attached to the mailbox. The hide-creator and secret bits are cleared automatically. Only one redirect can be specified.

`x-face [9] (conference, letterbox, server)`
Data is the face of the person in compface format. Cool, innit?

This item can only be set by the conference supervisor or in the case of a mailbox, the person attached to the mailbox. The hide-creator and secret bits are cleared automatically.

`alternate-name [10] (text, conference, letterbox)`
Data is a string that the client may use as an alternate to the name of a conference or the subject of a text. Note that the server does not match against this name when performing name lookups. Clients should only display alternate names created by the user currently logged on.
The inherit flag is automatically cleared.

Data is a PGP signature of the text. The signature should be the equivalent of what `pgp -sba` in PGP 2.6.2 generates.
The secret, hide-creator and inherit bits are automatically cleared. Signatures cannot be deleted once they have been created.

`pgp-public-key [12] (letterbox)`
Data is the public key of the person. It is desirable that the public key contains a userid of the format "LysKOM <pn@server>+", where n is the number of the
person in the LysKOM server specified in server. This rule is currently not enforced.

This item can only be set by the person himself. The hide-creator, secret and inherit bits are automatically cleared.

'e-mail-address [13] (conference, letterbox, server)'
Data is an RFC 822-style email address. When set on a mailbox, it should be the email address of the person. If the person has multiple email addresses he may set several e-mail-address aux-items.

The meaning of this aux-item when set on a conference that isn’t a mailbox is vague. For a conference that is used as to import a mailing list this should be the email address of the list. For other conferences we haven’t really defined a sensible use.

When this aux-item is set on the server it should contain the email address of the administrator (or administrators.)

This aux-item can only be set by the supervisor of a conference or the server administrator. The creator cannot be hidden.

'faq-text [14] (conference, letterbox, server)'
Data is a decimal text number, which is a FAQ for the conference, letterbox or server. Creating an item of this type automatically causes creation of a faq-for-conf item.

This item can only be set by the supervisor or server administrator. The hide-creator, secret, and inherit bits are automatically cleared.

'creating-software [15] (text)'
Data is the name and version number of the client that created the text. This aux-item can only be set by the author of the text. Once set, it cannot be removed or changed. A typical value would be 'elisp-client 0.47.3'. Setting the creating-software aux-item is optional.

The data should be the client name, a space, and the client version used in the set-client-version (see Section 4.70 [set-client-version], page 95) call. The server may enforce this restriction.

'mx-author [16] (text)'
Data is a string containing the name of the author of an imported e-mail, extracted from the From header. This aux-item may be missing, if the mail address in the From header consists of just the addr-spec (see the next aux-item).

Clients should display this instead of the actual author of the text (which will be an importer ID) even if an mx-from aux-item is not present.

Sample contents: Joe Q. Public which may come from a From header containing "Joe Q. Public" <john.q.public@example.com>.

'mx-from [17] (text)'
Data is the proper e-mail address (called addr-spec in the mail standards) extracted from the From header of an imported e-mail.
Clients should display this address together with the **mx-author**, preferably inside angles. If **mx-author** is not present, this address should be shown anyway. It can also be used by clients to construct an address for personal (e-mail) replies to an imported message.

Sample contents: **john.q.public@example.com** which may come from a From header containing **john.q.public@example.com** or something like "Joe Q. Public" <john.q.public@example.com>.

`mx-reply-to [18] (text)`
Data is the proper e-mail address (called **addr-spec** in the mail standards) extracted from the **Reply-To** header of an imported e-mail. Clients should use this for constructing replies to imported messages.

`mx-to [19] (text)`
Data is a single e-mail address from an email **To** header. Multiple **mx-to** items may be present when multiple recipients are specified in the header. Clients should display these items along with the normal LysKOM recipient headers.

Sample contents: Both **john.q.public@example.com** and "Joe Q. Public" <john.q.public@example.com> are valid.

`mx-cc [20] (text)`
Same as **mx-to**, but applies to the **CC** header rather than the To header.

`mx-date [21] (text)`
Data is the date and time from the **Date** header of an imported email. Its format is "YYYY-MM-DD hh:mm:ss TZ". YYYY is the year the message was sent, MM is the month, DD is the day, hh is the hour, mm is the minute and ss is the second. This date and time are given in the timezone where the message was sent. TZ is the timezone the date is valid for. It must be of the form "+hhmm" or "-hhmm", where hh is the number of hours offset from UTC and mm is the number of minutes offset. Symbolic timezones are not permitted. The timezone specification is recommended but optional, since it is not always available.

Clients should display this information as the date and time a text was written, since the imported text will have been created at a later time. The date and time when the message was imported would then be displayed elsewhere or not at all.

`mx-message-id [22] (text)`
Data is the **Message-ID** header of an imported e-mail, with whitespace and comments removed. The Message-ID should contain the surrounding angles.

`mx-in-reply-to [23] (text)`
Data is a string containing one item of the same form as the mx-message-id item described above. This is the Message-ID of another mail the current text is a comment to.

Hopefully, this information comes from the **In-Reply-To** header of the imported e-mail, but it could also have been picked from the end of the **References** header line.
If the text really comments more than one other text directly, it is allowed to attach more than one \texttt{mx-in-reply-to} items to it.

\texttt{mx-misc [24] (text)}

Data is a string that contains all of the headers of an imported email, including \texttt{Subject}, and including those that are redundantly stored in other aux-items. The headers are concatenated with "\text{n}". In other words, this item contains all headers of an imported e-mail as they appear in the message. Clients are encouraged to provide a command to display this information.

\texttt{mx-allow-filter [25] (conference, letterbox)}

This aux-item has been declared obsolete. It was intended to supply the importer with information on how to filter incoming messages based on regular expressions matching header lines.

\texttt{mx-reject-forward [26] (conference, letterbox)}

This aux-item has been declared obsolete. It was intended to supplement mx-allow-filter by telling where rejected mails should be sent.

\texttt{notify-comments [27] (letterbox)}

Data is a decimal text number that the user is interested in. Clients should monitor this text for unread comments and present these to the user in some convenient manner. This is typically used by users that want to read comments to some text of theirs as soon as they arrive, rather than in the normal reading order.

This item can only be set by the owner of the letterbox. No flags are forced or cleared.

\texttt{faq-for-conf [28] (text)}

Data is a decimal number specifying the conference a certain text is a FAQ for. The special number zero denotes that the text is a FAQ for the entire system. Items of this kind can only be created by the LysKOM server itself. Texts with this item are protected from garbage collection.

\texttt{recommended-conf [29] (server)}

Data is a decimal number specifying a conference that new members should automatically be added to, optionally followed by a space and a recommended priority, optionally followed by a space and a membership type. In the future, additional data may be defined; clients should be prepared to accept and ignore a space and any trailing data that may follow the membership type. A few examples might clarify what the data may look like:

\begin{verbatim}
1 Conference number 1.
2 32 Conference number 2, with priority 32.
3 250 11100000 Conference number 3, with priority 250. The membership should be secret, passive and have the invitation bit set.
4 253 01000000 garbage Conference number 4, with priority 253. The membership should be passive. The client should ignore the trailing garbage; it is reserved
\end{verbatim}
for future extensions. Note that clients are not allowed to create aux-items of this format, but they should be prepared to handle them correctly.

This is a recommendation only; it is up to the client that creates a new person to also add him to the conferences that are specified via recommended-conf.

`allowed-content-type [30] (conference, letterbox, server)`

Data is a non-negative decimal priority number, followed by a space, followed by a LysKOM content type glob pattern. Clients should send texts to a conference only if the content-type matches any of the allowed-content-type glob patterns of that conference.

If the conference doesn't have any allowed-content-type, the allowed-content-type items of the server should be used. If the server also has no allowed-content-type aux-items, it should be interpreted as if a single allowed-content-type aux-item with the value '1 text/plain' exists.

If there are allowed-content-type aux-items with different priority numbers, it is a hint to the client about which content-type is most desirable. Content-types that matches a lower priority number are preferred.

As an example, consider a conference with the following four allowed-content-type aux-items:

1 text/plain
2 text/x-kom-basic
2 text/enriched
3 text/*

These aux-items taken together means that 'text/plain' is preferred, that 'text/x-kom-basic' and 'text/enriched' can be used if there is a reason why 'text/plain' is inadequate, and that any text type (such as 'text/html') is acceptable. Other content types, such as 'x-kom/user-area', should not be used.

The server does not currently enforce the above restriction on the content type of new texts. This mechanism is currently a hint to the client (or to the author of a new text). This may change in the future, if experience shows that it is desirable to have the server enforce the content type.

`canonical-name [31] (server)`

This should be set to the official domain name of the server, optionally followed by a colon and the port number. The port number should only be used if a non-standard port is used. Examples: 'kom.lysator.liu.se:8300', 'kom.lysator.liu.se'. The intent is that the canonical-name should be globally unique among all LysKOM servers. Only a single aux-item of this type can be set on the server. This aux-item can be used by clients that wish to do certain things only when connected to a specific server.

`mx-list-name [32] (conference)`

This item should only be used if the main purpose of the conference is to import a single external mailing list. The data should be the email address that is used to post to the list, such as 'bug-lyskom@lysator.liu.se'.
Chapter 7: Aux-Item Types

'send-comments-to [33] (letterbox)'

Normally, when a comment is created, the LysKOM client adds the author of the commented text to the recipient list if he isn’t a member of any of the recipients of the comment. By setting this aux-item on the letterbox, a person can request different treatment.

Data is a decimal integer (a conference number) optionally followed by a space character and a decimal number (a recipient type). In the future, additional data may be defined; clients must be prepared to accept and ignore a space and any trailing data that may follow the recipient type. Clients must be prepared to accept items of this type that contain only the conference number.

Comments should be sent to the specified conference number instead of to the author. The value ‘0’ is special and means that the comment should not be sent to any special conference, even though that means that the author of the commented text will never see the comment. (The value ‘0’ is useful for mail importers and other similar robots.)

The recipient type is the type of recipient to add. If the recipient type is missing, clients should either assume recipient type zero (recpt) or ask the user. Legal recipient types are ‘0’ for recpt, ‘1’ for cc-recpt and ‘15’ for bcc-recpt (these are the values used in Info-Type). Additional recipient types may be added in the future. Clients should treat unknown or invalid recipient types as if they were missing (i.e. treat them as zero or ask the user).

See Section B.2.4 [Recipients of comments], page 171, for more information about how the client should select the conferences that a comment should be sent to.

This aux-item can only be set by the supervisor of the person.

'world-readable [34] (text)'

Texts that has this aux-item set on them can be read by everybody. It is not even necessary to log in.

Only the author of the text can set this item. The data must be the empty string. The hide-creator, secret, dont-garb and inherit bits are automatically cleared.

'mx-refuse-import [35] (conference, letterbox)'

This item tells the importer under what circumstances mail should be imported to the conference or letterbox. If no aux-item of this type is present, there are no limitations on import to this conference or letterbox.

If the data is the string all, the importer will never add this conference or letterbox as a recipient.

If the data is the string spam, the importer will not add this conference or letterbox as a recipient if the mail is considered to be spam according to some importer specific criteria (such as the presence of SpamAssassin flags).

If the data is the string html, the importer will not add this conference or letterbox as a recipient if the mail is considered to be in HTML format.

In the future, other alternatives in addition to the above may be defined for this aux-item. An importer should silently ignore unrecognized ones. If more
than one aux-item of this type is present, they will be combined in the most restrictive way, i.e. the recipient will not be added if any of the aux-items forbids import.

Clients are encouraged to provide commands to manage aux-items of this type for conferences and letterboxes.

`mx-mime-belongs-to [10100] (text)`
Data is a decimal text number that this text is an attachment to. Most likely, the current text is also a comment (or perhaps a footnote) to the text mentioned in the aux-item. A client can use this aux-item to alter the display format of the text (stating that this is an attachment, not a normal comment).

`mx-mime-part-in [10101] (text)`
Data is a decimal text number of a text that is an attachment to the current one. In other words: this is the converse of mx-mime-belongs-to. A client can use this aux-item to know which comments to mark as attachments; the remaining comments are assumed to be normal.

`mx-mime-misc [10102] (text)`
Data is a string that contains all of the MIME headers for the current text. It is set by the importer. The fields are concatenated with "\n".
Clients are encouraged to provide a command to display this.

`mx-envelope-sender [10103] (text)`
Data is the envelope sender of an imported text. The mail server is supposed to pass this information to the importer, for inclusion here.

`mx-mime-file-name [10104] (text)`
Data is the file name of an attachment. Most likely, the importer gets this information from a name parameter on a Content-Type MIME header line. Clients are encouraged to use this file name as the default file name when the user chooses to save the text.

See also Appendix D [Some Client-specific Aux-Item Types], page 177, for information about some non-standardized aux-item types.
8 Name Expansion

Names in LysKOM can be expanded according to two rules, regexp matching or KOM conventions.

8.1 Regexp Matching

This type of expansion, used by the `re-z-lookup` call and its predecessors (see Section 4.75 [re-z-lookup], page 99) simply matches `ed(1)` style regular expressions to names in the database to find the list of matching names. The matching is case sensitive.

8.2 KOM Conventions

This type of matching is a little more complicated. Patterns consist of words and parenthesized expressions, and contain implicit wildcards. The `lyskomd` program implements an approximation of these conventions. Since `lyskomd` is the trendsetter, these semantics are good enough.

The rules are simple. Any parenthesized expressions are removed from the pattern and the names being checked for matches. Then the words of the pattern are examined from beginning to end, and if every pattern word matches the prefix of the corresponding word in the name, the name matches the pattern.

For example “L D” matches “LysKOM (client, server and protocol) Discussion (and) Ideas”, but not “LysKOM Protocol Discussion”.

The matching is case insensitive. Character case is converted according to a collate table in the server. The collate table can be retrieved from the server with the `get-collate-table` call (see Section 4.86 [get-collate-table], page 105).

The current collate table simply maps ISO 8859-1 uppercase and lowercase letters to equivalents, and also considered braces and suchlike equivalent according to swascii rules.
9 LysKOM Content Types

LysKOM defines a few special content types for texts. They are all described in this chapter. In addition to these, clients must support ‘text/plain’, should support ‘text/enriched’ and are encouraged to support ‘text/html’.

Lines are separated by a single linefeed (ASCII 10) character. The linefeed character is used as a line separator, not as a line terminator. In other words, there should be no linefeed after the last line.

9.1 Reformattable Text

This type of content corresponds to the mime type ‘text/x-kom-basic’. It is raw text that can be reformatted by the client without ill effects, but that can be legibly displayed on a text terminal without formatting.

- Lines must be no longer than 70 characters.
- Each line, except the last, is terminated by a single linefeed character.
- Two linefeed characters in succession signal the end of the paragraph.
- There must be no whitespace or linefeeds after the last character.
- The end of the last line also signals the end of the paragraph.

The following rules apply when reformatting:

- The indentation of the first line of a paragraph is to be applied to all lines in the paragraph.
- If the first line of a paragraph matches ">+ *" then the string that matched that regexp is to be prefixed to all lines of the paragraph.

This content type was previously erroneously called ‘x-kom/basic’, but as far as we know no client ever created texts that were labeled with that name. Please use the new name ‘text/x-kom-basic’ instead.

Historical note: version 0.46.1 and earlier of the elisp client created texts labeled with ‘x-kom/text’. Clients may treat that content type as ‘text/x-kom-basic’ for improved interoperability.

9.2 The User Area

This content type indicates that the article contains a user area. See Chapter 10 [The User Area], page 157.
10 The User Area

The user area is a regular text that is used to store client-specific information in the server. Most clients use this to store settings a user has made that are specific to a particular server. There are also provisions to store settings that are shared between clients.

The user-area is divided into several sub-blocks. The common block is shared by all clients, and its formats and contents are dictated by this protocol specification. Clients may also create one or more other blocks.

In normal texts, everything up to the first linefeed is considered to be the subject line. The user area is an exception: it does not contain any subject line.

Each block is encoded as a HOLLERITH string. A table of contents is also encoded as a HOLLERITH string and added first in the user area. There must be at least one space between each string, and there might be spaces at the beginning and/or end of the user-area. Thus, a user-area made up of three blocks will contain four HOLLERITH-encoded strings, each separated by at least one space, and maybe with extra spaces at the beginning or end of the text.

The table of contents consists of one HOLLERITH-encoded string for each block in the user-area. Each string contains the name of the corresponding block. There is at least one space between each string, and there may be spaces before the first string and after the last string. Clients must never create two or more blocks with the same name.

This format ensures that clients can copy or read past other clients’ blocks without knowing their structure.

Example:

13H7Hblock-a 1Hb 4Hasdf 5H hjkl

In the above example, there are two blocks: block-a and b. block-a contains four bytes, asdf, while b contains five bytes: hjkl (note the leading space). Below are a few other ways to encode the same user-area:

14H 7Hblock-a 1Hb 4Hasdf 5H hjkl
16H 7Hblock-a 1Hb 4Hasdf 5H hjkl
13H1Hb 7Hblock-a 5H hjkl 4Hasdf

The first two examples embed extra (redundant) spaces, and the last swaps the order of the two blocks.

The following block names have been defined:

common The common block shared by all clients. The format of the common block is described below.
elisp The block created by the Emacs lisp client. The format is completely undocumented, but you’ll need a lisp reader to parse it.
WWW-kom The block created by the web gateway WWW-kom. It has the same syntax as the common block, but the keys and values are not documented.
rkom Used by Anders Magnusson <<ragge@hudd.luth.se>>.

If you’re writing a client that uses the user-area, please let us know what you name your client’s block.
10.1 The Common Block

This defines the structure of the common block. The common block contains a list of variable settings. Each variable setting consists of a name, some whitespace, and a value. Settings are separated by a linefeed character. The values can be of several different types (such as integers, strings, booleans, lists of stuff) but they are all encoded as HOLLERITHs. The reason for this is to simplify for clients that need to ignore the value, and so it is possible to add new value types without confusing old clients.

The grammar below defines the syntax of the common block.

```
common-block  :  settings
settings      :  settings setting
               |  /* empty */
setting       :  variable ' ' value '
variable      :  [A-Za-z-_0-9]+  
value         :  HOLLERITH
```

The values contain structure within the HOLLERITH. The following grammar defines the data types that are currently used. Clients must be prepared to ignore values that have other data types.

```
boolean       :  1 | 0  
integer       :  -?[0-9]+  
string-list   :  string-list ' ' HOLLERITH
               |  HOLLERITH
```

Currently the following variables are used, but more may be added, and clients must cope with variables they know nothing of in the common block. (Doing so is easy, as all values are encoded as HOLLERITHs.)

`created-texts-are-read`
   True if the user wants texts s/he creates to be marked as read automatically.
   boolean.

`dashed-lines`
   True if the user wants dashed lines around the text body when it’s displayed.
   boolean.

`presence-messages`
   True if the user wants messages about people logging in and logging out of LysKOM.
   boolean.

`print-number-of-unread-on-entrance`
   True if the user wants to see the number of unread texts when entering a conference.
   boolean.

`read-depth-first`
   True if the user wants to read text in depth-first order.
   boolean.

`reading-puts-comments-in-pointers-last`
   True if the user wants the client to display comment links after the text body.
   boolean.
**confirm-multiple-recipients**
True if the user wants the client to ask for confirmation before sending a text to many conferences. **boolean**.

**default-mark**
The default mark to set on marked texts. **integer**.

**language**
Preferred languages, in priority order. **string-list**.
This contains a list of ISO 639 language codes. ISO 639-2 should be used for languages that have a 2-character language code. For other languages, ISO 639-1 should be used. 
http://lcweb.loc.gov/standards/iso639-2/langcodes.html contains a list of the current language codes.
The client should configure its user interface to use the first language in the list that it supports. Example: a client that supports English and Swedish would use:

- Swedish if the list is ‘2Hfr 2Hsv 2Hen’
- English if the list is ‘2Hen 2Hsv 2Hfr’
- either if the list is ‘2Hes 2Hfr’
11 Membership visibility

The details of the security model isn’t properly documented. Much information can be extracted from various parts of the protocol specification, but there is no complete overview. In time, this chapter may become such an overview. For now, it only defines when a membership is visible.

The various requests that return information about a membership can be grouped into three categories:

- **Category 1**: given a conference, list (some of) the members.
  - `get-members` (see Section 4.102 [get-members], page 116)
  - `get-members-old` (see Section 4.49 [get-members-old], page 84)
  
  These requests fail if the conference is secret and you don’t have access to it, even if a membership should be visible to you according to the rules below.

- **Category 2**: given a person, list (some of) the conferences that the person is a member of.
  - `get-membership` (see Section 4.109 [get-membership], page 122)
  - `get-membership-10` (see Section 4.100 [get-membership-10], page 114)
  - `get-membership-old` (see Section 4.47 [get-membership-old], page 81)
  - `get-unread-confs` (see Section 4.53 [get-unread-confs], page 86)

  These requests fail if the person is secret and you don’t have access to it, even if a membership should be visible to you according to the rules below.

- **Category 3**: given a person and a conference, return the membership.
  - `query-read-texts` (see Section 4.108 [query-read-texts], page 121)
  - `query-read-texts-10` (see Section 4.99 [query-read-texts-10], page 113)
  - `query-read-texts-old` (see Section 4.10 [query-read-texts-old], page 52)

  These requests follows the rules below exactly.

The rules for membership visibility are given below. In the explanation, the variables $C$, $P$ and $V$ are used like this:

- a conference $C$
- a person $P$ who is a member of the conference $C$
- a viewer $V$ who wants to find out about $P$’s membership in $C$

The following flags also influences how much $V$ can see:

- the `unread-is-secret` flag of $P$
- the `secret` flag of $P$’s membership in $C$

The following rules determines if a membership is visible to $V$. The first rule that matches is used.

- If $V$ is supervisor of $P$, then the membership is visible. Both the `unread-is-secret` and `secret` flags are ignored.
- If $V$ is supervisor of $C$, then the membership is visible. The `secret` flag is ignored. The `unread-is-secret` flag is honored.
• If $V$ is allowed to see both $P$ and $C$, and if \texttt{secret} is unset, then the membership is visible. The \texttt{unread-is-secret} flag is honored.
• Otherwise, $V$ is not allowed to see the membership.
12 Automatic text removal (the garb)

Old texts are automatically removed by a process known as the garb. By default, the garb will remove all texts when it looks at them. There are several things that can save a text from removal:

- if the server is configured to never remove any texts.
- if text is marked. See mark-text (see Section 4.73 [mark-text], page 97).
- if the text is presentation of a conference. See set-presentation (see Section 4.17 [set-presentation], page 58).
- if the text is message of the day for a conference. See set-etc-motd (see Section 4.18 [set-etc-motd], page 59).
- if the text is message of the day for the system. See set-motd-of-lyskom (see Section 4.42 [set-motd-of-lyskom], page 79).
- if the text is message of the user area of a person. See set-user-area (see Section 4.58 [set-user-area], page 89).
- if the text is less than 24 hours old.
- if the text has an aux-item with the dont-garb bit set. See See [Aux-Item-Flags], page 22.
- if the text is less than nice days old, for any of the recipients. nice is part of the Conference status. set-garb-nice (see Section 4.23 [set-garb-nice], page 63). All recipient types, recept, cc-recept and bcc-recept, counts. If the text was added to the conference after its creation, the check is made against the addition time instead of the creation time. See set-garb-nice (see Section 4.23 [set-garb-nice], page 63).
- if the text was added as a comment or footnote to a text within the last 24 hours. See add-comment (see Section 4.33 [add-comment], page 72) and add-footnote (see Section 4.38 [add-footnote], page 76).
- for each comment and footnote to the text, the time when it became a comment or a footnote of the text is considered. If it is less than 24 hours, the text is saved. If it is less than the keep-commented field of any of the recipients of the text and the comment/footnote, it is saved. All recipient types, recept, cc-recept and bcc-recept, counts. See set-keep-commented (see Section 4.106 [set-keep-commented], page 120).

Other texts will be removed. It is an implementation detail of the server exactly when texts will be removed.
13 Measured Properties

The server measures a number of properties, and can return information about them to a client via the `get-stats` request (see Section 4.113 [get-stats], page 126). A server implementation may include experimental properties, whose name should begin with ‘X-’. All other properties should be defined in this chapter.

Some of the properties that are suggested here might prove to be too hard to measure efficiently, or might prove to expose too much information. In that case, a server may select to not implement them. Clients must be prepared to receive a `feature-disabled` or `undefined-measurement` error if they call `get-stats` with a value that wasn’t received from `get-stats-description` (see Section 4.112 [get-stats-description], page 126).

For each measured value, both the levels and the ascent and descent rates are returned. See [Stats], page 44, for more information.

Ascent and descent rates are always normalized to a number of events per 100 seconds.

**run-queue-length**
- The number of clients that the server is currently refusing to serve since its time for the server to process other clients for a while.

**pending-dns**
- The number of pending DNS requests.

**pending-ident**
- The number of pending IDENT requests.

**clients**
- The number of connected clients.

**reqs**
- The number of Protocol A requests that is being processed. In the current implementation, this will always be a number between 0 and 1, but that might change in the future.

**texts**
- The number of existing texts.

**confs**
- The number of existing conferences (including letterboxes).

**persons**
- The number of existing persons.

**send-queue-bytes**
- The number of bytes waiting in the send queue.

**recv-queue-bytes**
- The number of bytes waiting in the receive queue.
Appendix A  Extracted grammars (informative)

The file ‘Protocol-A.texi’ is the authoritative standard for protocol A. However, it has a two problems:

- The Texinfo markup makes it hard for a program to extract information—and once a program is written, we might change the Texinfo markup, so that the program has to be updated.
- We often rename requests and data types, in order to have good names for the most recommended functions and types. However, a program that uses a data type might fail if that type suddenly is altered.

To overcome these problems, and better server client writers that want to generate the protocol-level code automatically from the specification, a few variants of the grammar is available as separate files. In some of these files, the names have been changed to stable names that will not change as the protocol evolves. Currently, these three grammars exists:

‘protocol-a-full.txt’
The full Protocol A specification, with stable names.

‘protocol-a-recommended.txt’
The recommended requests and asynchronous messages, and all types they need, with stable names.

‘protocol-a-current.txt’
The recommended requests and asynchronous messages, with the names used in this specification.

The files are generated by ‘doc/checkargs.py’ in the lyskom-server distribution. Adding more output formats is fairly easy. Let us know, preferably via Bugzilla, if a new output format would be useful for you. It is the intention that the format of the above-mentioned files will not change. The file format should be self-explanatory once you have read the protocol specification. It does contain some comments that should be useful.

The stable names are generated by this process:

- Don’t modify builtin types such as INT32.
- Remove the suffixes ‘-old’, ‘-older’ and ‘-Old’, unless that would introduce an ambiguity.
- Unless the name already has a version suffix, add one.

All files mentioned above are reachable via http://www.lysator.liu.se/lyskom/protocol/.
Appendix B  Writing Clients (informative)

This appendix is not really part of the protocol specification, but it contains some information that may be useful for client writers.

B.1 Common Commands

Most clients will implement certain commands. This main purpose of this section is to get client writers started on some of these commands, and to answer some questions that seem to come up over and over again.

B.1.1 What do I have unread

Each person has a membership list containing the conferences the person is a member of. Each element is an object of type Membership. Among other things it contains the number of the conference, the priority of the membership, when the person most recently marked a text as read in the conference, and which texts the person has read.

The list of read texts consists of two parts: a local text number called last-text-read and a list of local text numbers called read-texts. The person has marked all texts up to and including last-text-read as read, and also the texts listed in read-texts. All other texts in the conference are unread. Clients can use either the query-read-texts or get-membership calls to get membership data.

The standard procedure for finding out which texts are unread is the following:

1. Call get-unread-confs for the person. This returns a list of conferences in which the person may have unread texts. This call may return conferences that do not contain any unread texts, but it will never forget to return a conference that does contain an unread text.

2. Call query-read-texts for each conference returned in the previous step. This will return the membership data for all the conferences that may contain unread texts.

3. Call get-uconf-stat for each conference returned in the first step. The conference status will be needed shortly. Repeat the following steps for each conference.

4. Compare the highest existing local number in the conference (from the conference status) with the last-text-read field for the corresponding membership. If the highest existing local text is higher than last-text-read, the conference may contain unread texts.

5. Get part of the local to global map from the conference starting at last-text-read and ending at the highest existing local number. Every local number in the map that is not read according to the membership data and that has a mapping to a global number is an unread text. You might say that you remove the read texts from the map to get the unread texts.

Take care not to call get-map or get-membership too much since they tend to be expensive operations. Use get-unread-confs and query-read-texts to minimize the work. Another point to remember is that the server will send asynchronous messages with information about new texts. Clients need to listen to these messages.
B.2 Client Conventions

There are certain conventions that most clients follow, and that users expect. These are not part of the protocol and are subject to change. In particular those conventions that address deficiencies in the protocol will go away when the protocol is updated to correct these deficiencies.

B.2.1 Text formatting

Traditionally the only clients for LysKOM were text-based and only displayed texts exactly as they were stored in the server. Although there are a number of clients now that can wrap lines automatically, texts should still be stored in preformatted style, suitable for display in a monospaced font.

If the client accepts texts from the user and then reformats them, such as a client with an editor with a variable-width font, it should ensure that it follows the following simple rules:

- Lines should be no longer than 72 characters.
- Lines are terminated with a single linefeed character.
- Paragraphs are separated by two linefeeds in succession.
- There are no empty lines at the end of the text.

Clients that include editors but do not alter the text before sending it to the server should attempt to ensure that texts confirm to the above conventions.

The same conventions apply to messages sent with the send-message call (see Section 4.54 [send-message], page 87).

B.2.2 Content type specification

This convention is understood by all popular clients. If the first line is one of a few predefined strings, then this string specifies the type of text. Currently only the strings “html:” and “enriched:” are supported, specifying ‘text/html’ and ‘text/enriched’ respectively.

Starting with protocol version 10, this ugly workaround is obsolete. Use aux-items to specify content type instead.

B.2.3 Client-side name expansion

When a client needs to prompt the user for a conference (or person), it could offer the user several ways of specifying the conference:

- By conference number
- By name, using the lookup-z-name call (see Section 4.77 [lookup-z-name], page 100).
- By name, using the re-z-lookup call (see Section 4.75 [re-z-lookup], page 99).
- By name, transforming the string to a case insensitive regular expression, and then using the re-z-lookup call.
It is beyond the scope of this document to specify how the client interacts with the user. The client should offer the user all the methods of specifying a conference listed above. At the very least, the two first methods should be supported.

B.2.4 Recipients of comments

When a user writes a comment, the user should have full control over which conferences and/or letterboxes the comment is sent to. By default, the recipient list should be all \texttt{recpt} recipients. \texttt{cc-recpt} and \texttt{bcc-recpt} recipients should not be included.

Conferences in the recipient list that have the \texttt{original} bit set, and a non-zero \texttt{super-conf}, should be replaced by the \texttt{super-conf}.

If the author of the commented text isn’t a member of any of the new recipients, the client should check if the author has a \texttt{send-comments-to} aux item. If it is ‘0’, nothing should be done. Otherwise, \texttt{send-comments-to} should be a valid conference number, and that conference should be added as a \texttt{recpt} recipient. If there is no \texttt{send-comments-to} aux-item, the user should be prompted to add the author of the commented text as a \texttt{recpt} or \texttt{cc-recpt} recipient.

If the author of the new comment is not a member of any of the recipients, the client should check if the author has a \texttt{send-comments-to} aux item. If it is ‘0’ nothing should be done. Otherwise, \texttt{send-comments-to} should be a valid conference number, and the user should be prompted to add that conference as a \texttt{recpt} or \texttt{cc-recpt} recipient. If there is no \texttt{send-comments-to}, or \texttt{send-comments-to} is invalid, the user should be prompted to add his letterbox as a \texttt{recpt} or \texttt{cc-recpt} recipient.

If a recipient is present more than once, all duplicates should be removed.

B.2.5 Order of misc-info groups

The ordering of the groups of \texttt{Misc-Info} items are not defined by this protocol. However, when creating a new text, clients are recommended to use this order:

- any \texttt{footn-to} items
- any \texttt{comm-to} items
- any \texttt{recpt} items
- any \texttt{cc-recpt} items
- any \texttt{bcc-recpt} items

This is the order that the elisp-client normally uses, and users have come to expect that order.
Appendix C Importing and Exporting E-Mail (informative)

E-mail import has been implemented using various programs since the first LysKOM server became operational. Protocol version 10 introduces a lot of aux-items, a large part of which are intended for use by mail importers to enhance the functionality. As of this moment, there is one mail importer (komimportmail) that is designed to take full advantage of all the new aux-items.

E-mail export has never been used seriously. The first person to design and implement an exporter gets to rewrite this appendix based on his or her experiences.

C.1 Importing e-mail

The main job of the mail importer is to figure out where to deliver mail, how to handle MIME coding and/or structure and how to deal with threading. During this, it creates one or more texts and a lot of aux-items.

C.1.1 Recipients

Although a mail message contains To and CC headers, they are not really useful when importing as it is the envelope recipients, not the header recipients, that should be used. To understand this, consider a mail where the To header contains a personal mail address. The mail is received using a tool like procmail and forwarded to the LysKOM importer. The envelope address will be correct, but the To header will still contain the personal address.

The komimportmail importer uses addresses like “number@server”, where number is the number of the recipient and server is the mail domain reserved for the LysKOM importer. For backwards compatibility with earlier importers, it is allowed to prepend a “p” before the number. Instead of the number, komimportmail can accept a name, as long as the name can be resolved to exactly one conference or letterbox. Before looking up the name, any underscore or period is translated into a space.

Care should be taken when a mail is received more than once. This can happen if a mail is addressed to more than one address. For example, assume that a mail is sent to john.q.public@example.com and sven.svensson@example.se. Two different mail servers handle the two recipients, but both eventually decide to forward the mail to the LysKOM importer (but for different conferences). The LysKOM importer will receive the mail twice, with different envelope recipients.

A solution is to keep a database containing a mapping from Message-ID to LysKOM text number for imported messages. If a message is seen more than once, the message is not imported. Instead, recipients are added to the existing text.

On the other hand, that will introduce a security hole, where a person who knows the Message-ID of an interesting imported mail can add himself or some open conference as a recipient. Perhaps the importer should check for matching contents before adding recipients.

The importer needs to be careful not to deliver messages to conferences that do not allow messages, even though the server might not complain.
For mail delivery to work for any conference, the importer has to use a privileged person, or it will be unable to deliver mail to secret conferences. A potential problem is that this leaks secret information from the server. For the time being, the komimportmail importer avoids this problem by using an unprivileged person and requiring the members of secret conferences to invite the importer if they want e-mail import to work.

C.1.2 Threading

The importer should do its best to thread messages. When the importer sees a new message it needs to look at the In-Reply-To header to see what the message is a reply to. If the In-Reply-To header does not exist, or if it exists but does not contain a valid Message-ID, the last valid Message-ID of a References header may be used instead.

If the Message-ID of a previously imported e-mail is found, the new text should be made a comment of the replied-to text.

If the Message-ID is of the form defined below (see [Message-ID], page 175), and it refers to a text exported from this server, the new text should be made a comment of the replied-to text.

This means that the importer will probably have to maintain its own database of imported texts that maps the message ID to the text number in the LysKOM database. There is no other way to find the text number for a particular imported text. Fortunately, this is exactly the same database we need to solve the multiple reception problem described above.

It has been noted that messages on some mailing lists arrive in peculiar order, with replies before the original messages. Perhaps this is due to moderation. A smart importer should be prepared to handle this, by adding a comment link when the original message eventually arrives.

One possible solution is to add a new kind of entry to the Message-ID database, mapping a Message-ID to a list of text numbers that should become comments to the message when it is imported.

C.1.3 MIME issues

An importer should try to handle e-mail messages containing MIME appendices as smart as possible. As the current LysKOM model lacks hierarchical structuring inside articles, appendices should probably be imported as comments or footnotes to the main message.

One would think that it is easy to convert the hierarchical MIME structure to a corresponding LysKOM comment tree. However, this would require creating empty interior nodes to attach some comments to.

Therefore, the komimportmail importer currently uses a rather naive algorithm: All leaf parts are found. The first one gets to be the main text, and the rest are included as comments to it.

Appendices encoded with Base64 or Quoted-Printable should be decoded.

When creating aux-items like mx-author, text coded using the method in RFC 2047 should be decoded.
C.2 Exporting e-mail

As of this writing, an experimental e-mail exporter exists, but it is a fairly recent creation. The author of this document knows very little about how it works, so this section contains very little information.

C.2.1 Message-ID

A standard for Message-ID creation has been established. The general format is:

```
text-no.port.exporter.randomness@server
```

The different parts are explained below:

- **text-no** The text number of the text that was exported.
- **port** The canonical-name aux item defines a unique name for the LysKOM system that the text was exported from. The server and port fields are set from it. If no port is specified in the canonical-name, the port part is set to the empty string.
- **server** The name of the software that exported the text.
- **randomness** A string that ensures that the Message-ID is unique even if the same text is exported several times. This could contain a random string, a sequence number, or something else that makes the Message-ID unique.
Appendix D  Some Client-specific Aux-Item Types (informative)

This appendix contains some contributed information from client writers about some of the aux-item types that they use. This information may be updated at any time by the client writers. How much the client writer cares about backward compatibility when they make changes to these aux-item types may be beyond the control of the authors of the Protocol A specification.

If any of the aux-item types defined here becomes widely used by different clients, they should probably be standardized and moved to the Chapter 7 [Aux-Item Types], page 145 chapter.

‘elisp-client-read-faq [10000] (letterbox)’
This item indicates FAQs that the user has read. Data is a decimal number indicating the conference for which a FAQ has been read, followed by a space character and a second decimal number indicating the text number of the FAQ. In the future, additional data may be defined; clients should be prepared to accept and ignore a space and any trailing data that may follow the second number.

Note that aux-items of this type should always be secret since they may contain information about texts of conferences that are not publicly visible.

A few examples might clarify what the data may look like:

459 11215 FAQ in text 11215 for conference 459 has been read.
459 11215 garbage FAQ in text 11215 has been read. Clients must ignore the trailing garbage. Note that clients are not allowed to create aux-items of this format, but they should be prepared to handle them correctly.

This aux-item is specific to the elisp client. Other clients are not required to use or understand this item type.

‘elisp-client-rejected-recommendation [10001] (letterbox)’
This item indicates a rejected membership recommendation. Data is a decimal number indicating the conference for which the recommendation was rejected. In the future, additional data may be defined; clients should be prepared to accept and ignore a space and any trailing data that may follow the second number.

Note that aux-items of this type should always be secret since future extensions may contain sensitive data.

A few examples might clarify what the data may look like:

459 A recommendation for conference 459 has been rejected.
459 garbage A recommendation for conference 459 has been rejected. Clients must ignore the trailing garbage. Note that clients are not allowed to create aux-items of this format, but they should be prepared to handle them correctly.
This aux-item is specific to the elisp client. Other clients are not required to use or understand this item type.
Appendix E  Future changes (speculative)

While useful and stable, this protocol is far from perfect. Here is a short list of things the current developers would like to change in future versions of the protocol. The list is not sorted.

All changes will be made in a backwards compatible way. Clients will still be able to use the old requests.

- Cryptography! LysKOM is sometimes used for sensitive information. It is unacceptable that everything is sent in the clear. Should we use TLS? This area needs further study. (This is bug 133.)
- The information contained in the Misc-Info array should be integrated into the Text-Stat. There should be one array of recipients, one of texts that comments this text, and so on. This would make the Misc-Info type obsolete. (This is bug 134.)
- The aux-items can be very large. It was a mistake to include them in the Text-Stat. They should probably be separated from the Text-Stat; retrieving the Text-Stat should only indicate which aux-items that exists. (This is bug 135.)
- The super conference is used for two purposes: to indicate where followups of original conferences should be sent, and to indicate where articles created by persons that are not permitted submitters should be sent. Occasionally one wants to send followups to one conference and unauthorized original articles to another conference. One way to fix this is to remove the original bit and introduce a followups-to field in the Conference. Doing this in a backwards-compatible way requires some thought... (This is bug 136.)
- The security system is too complex, yet unable to do many useful things, and should be rethought. (This is bug 137.)
- If the client issues several request without waiting for a reply, the replies will nevertheless always arrive in the same order as the requests were sent in. If a threaded version of the LysKOM server is ever made, it could possibly process two requests from the same client at the same time, and the answers could be returned in any order. However, the current clients are probably not written so that they can handle such reordering.
  
  In the future, a new call might be added, so that a client can give the server explicit permission to reorder the replies. The client would then have to rely on the ref-no to match each reply to the corresponding call. (This is bug 138.)

For more information about potential future changes, see Bugzilla @ Lysator. The above list is in no way complete.
Appendix F  Protocol Version History (informative)

F.1 Protocol version 11 (first implemented in lyskomd 2.1.0)

New Server Calls
These new calls have status Recommended.
- 107=query-read-texts
- 108=get-membership
- 109=mark-as-unread
- 110=set-read-ranges
- 111=get-stats-description
- 112=get-stats
- 113=get-boottime-info
- 114=first-unused-conf-no
- 115=first-unused-text-no
- 116=find-next-conf-no
- 117=find-previous-conf-no
- 118=get-scheduling
- 119=set-scheduling

These new calls have status Experimental.
- 120=set-connection-time-format
- 121=local-to-global-reverse
- 122=map-created-texts-reverse

Status change
The following calls have change status from Experimental to Recommended.
- 105=set-keep-commented

The following calls have changed status from Recommended or Experimental to Obsolete.
- 98=query-read-texts-10
- 99=get-membership-10

New and Modified Types
- Read-Range
- Membership
- Membership-Type
- Stats
- Stats-Description
- Static-Server-Info
- FLOAT
New Asynchronous Messages

- 19=async-new-user-area
- 20=async-new-presentation
- 21=async-new-motd
- 22=async-text-aux-changed

New aux-items

See Appendix G [Document Edition History], page 189, as new aux-items are added between protocol versions.

New error codes

See Appendix G [Document Edition History], page 189.

Notes

- The reserved1 bit of Membership-Type has been renamed to passive-message-invert. See Section 3.10 [Membership Information], page 34. This affects async-send-message (see Section 5.11 [async-send-message], page 135) and send-message (see Section 4.54 [send-message], page 87).
- The following requests can no longer be used until you have logged in: get-last-text (see Section 4.59 [get-last-text], page 90), find-next-text-no (see Section 4.61 [find-next-text-no], page 92) and find-previous-text-no (see Section 4.62 [find-previous-text-no], page 92).
- You can now modify the type of a recipient with the add-recipient (see Section 4.31 [add-recipient], page 69) call if you are the supervisor of either the author, recipient or sender. The check used to be more restrictive.
- The following asynchronous messages are also sent to recipients of texts linked to the relevant text via comment or footnote links: async-new-text-old (see Section 5.1 [async-new-text-old], page 133), async-deleted-text (see Section 5.13 [async-deleted-text], page 136), async-new-text (see Section 5.14 [async-new-text], page 136), async-new-recipient (see Section 5.15 [async-new-recipient], page 136) and async-sub-recipient (see Section 5.16 [async-sub-recipient], page 136).
- All requests that take a BOOL argument now return the error bad-bool if the argument is anything but ‘0’ or ‘1’.

F.2 Protocol version 10 (first implemented in lyskomd 2.0.0)

Error codes

The error codes are now documented. Several error codes were changed to more sane values while documenting the new behavior.

New Server Calls

These new calls have status Recommended.

- 85=get-collate-table
- 86=create-text
• 87 = create-anonymous-text
• 88 = create-conf
• 89 = create-person
• 90 = get-text-stat
• 91 = get-conf-stat
• 92 = modify-text-info
• 93 = modify-conf-info
• 94 = get-info
• 95 = modify-system-info
• 96 = query-predefined-aux-items
• 98 = query-read-texts
• 99 = get-membership
• 100 = add-member
• 101 = get-members
• 102 = set-membership-type
• 103 = local-to-global
• 104 = map-created-texts
• 106 = set-pers-flags

These new calls have status Experimental.

• 97 = set-expire
• 105 = set-keep-commented

Name changes

<table>
<thead>
<tr>
<th>Old name</th>
<th>New name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 = create-person</td>
<td>5 = create-person-old</td>
</tr>
<tr>
<td>9 = query-read-texts</td>
<td>9 = query-read-texts-old</td>
</tr>
<tr>
<td>10 = create-conf</td>
<td>10 = create-conf-old</td>
</tr>
<tr>
<td>13 = get-conf-stat-old</td>
<td>13 = get-conf-stat-older</td>
</tr>
<tr>
<td>14 = add-member</td>
<td>14 = add-member-old</td>
</tr>
<tr>
<td>26 = get-text-stat</td>
<td>26 = get-text-stat-old</td>
</tr>
<tr>
<td>28 = create-text</td>
<td>28 = create-text-old</td>
</tr>
<tr>
<td>36 = get-info</td>
<td>36 = get-info-old</td>
</tr>
<tr>
<td>46 = get-membership</td>
<td>46 = get-membership-old</td>
</tr>
<tr>
<td>48 = get-members</td>
<td>48 = get-members-old</td>
</tr>
<tr>
<td>50 = get-conf-stat</td>
<td>50 = get-conf-stat-old</td>
</tr>
<tr>
<td>59 = create-anonymous-text</td>
<td>59 = create-anonymous-text-old</td>
</tr>
</tbody>
</table>

Status change

The following calls have change status from Experimental to Recommended.

• 58 = get-last-text
• 77 = set-last-read
• 78 = get-uconf-stat
The following calls have changed status from Recommended or Experimental to Obsolete.

- 5=create-person-old
- 9=query-read-texts-old
- 10=create-conf-old
- 14=add-member-old
- 26=get-text-stat-old
- 28=create-text-old
- 36=get-info-old
- 46=get-membership-old
- 47=get-created-texts
- 48=get-members-old
- 50=get-conf-stat-old
- 59=create-anonymous-text-old

New and Modified Structures

- Aux-Item
- Aux-Item-Input
- Conference
- Info
- Member
- Membership
- Membership-Type
- Misc-Info
- Text-Stat

Renamed Asynchronous Messages

A ‘async-’ prefix has been added to the name of all asynchronous messages. In addition, 0=new-text has been renamed to 0=async-new-text-old, and it is now considered obsolete. Clients should use 80=accept-async to listen to 15=async-new-text instead.

New Asynchronous Messages

- 14=async-deleted-text
- 15=async-new-text
- 16=async-new-recipient
- 17=async-sub-recipient
- 18=async-new-membership

Notes

- Since protocol version 9 setting a priority of zero for a conference was supposed to indicate passive membership in a conference. It was largely up to the client to implement this. True passive memberships have been introduced in this protocol version through the Membership-type extension to
the Membership type. In order to maintain compatibility with clients that interpret priority 0 as passive membership, the old calls `add-member-old` (see Section 4.15 [add-member-old], page 56) and `get-membership-old` (see Section 4.47 [get-membership-old], page 81) perform magic, translating between priorities and membership types. The magic is documented with each call.

F.3 Protocol version 9 (first implemented in lyskomd 1.9.0)

New functionality
- The server shall now reply with error `not-implemented` when a client attempts to use an unimplemented call. This feature requires that the client uses linefeed as call terminator.

Added Commands
- 79=set-info: Can change server information.
- 80=accept-async: Can select asynchronous messages to receive.
- 81=query-async: Can query which messages are being send.
- 82=user-active
- 83=who-is-on-dynamic
- 84=get-static-session-info

Changed names
- `change-conference` was previously called `pepsi`. The name was changed, but not the functionality.

Status change
- 63=`who-is-on-ident` is now considered obsolete.
- 64=`get-session-info-ident` is now considered obsolete.

F.4 Protocol version 8 (first implemented in lyskomd 1.8.0)

Added Functionality
- 30=add-recipient: Can change `recpt` to `cc-recpt` and vice versa.
- 21=set-conf-type: Accepts `Conf-Type` and `Extended-Conf-Type`.
- 10=create-conf: Accepts `Conf-Type` and `Extended-Conf-Type`.

New Commands
- 77=set-last-read
- 78=get-uconf-stat

F.5 Protocol version 7 (first implemented in lyskomd 1.7.0)

Added Functionality
- 53=send-message: Recipient can be a conference or a person.
New Commands

- 74=re-z-lookup
- 75=get-version-info
- 76=lookup-z-name

Other

- The asynchronous message 1=i-am-off has been removed

F.6 Protocol Version 6 (first implemented in lyskomd 1.4.0)

New Calls

- 67=lookup-person
- 68=lookup-conf
- 69=set-client-version
- 70=get-client-name
- 71=get-client-version
- 72=mark-text
- 73=unmark-text

F.7 Protocol Version 5 (first implemented in lyskomd 1.3.0)

New Calls

- 65=re-lookup-person
- 66=re-lookup-conf

F.8 Protocol Version 4 (first implemented in lyskomd 1.1.1)

New Calls

- 62=login
- 63=who-is-on-ident
- 64=get-session-info-ident

F.9 Protocol Version 3 (first implemented in lyskomd 1.1.0)

New Calls

- 61=find-previous-text-no
- 60=find-next-text-no
- 59=create-anonymous-text
- 58=get-last-text
F.10 Protocol Version 2 (first implemented in lyskomd 0.30.0)

New Calls
  • 57=set-user-area

F.11 Protocol Version 1 (first implemented in lyskomd 0.29.2)

New Calls  All calls from 0–56.
Appendix G  Document Edition History (informative)

11.1: 2003-08-30

*Modified aux-item:* mx-refuse-import [35] now supports the value html. See Chapter 7 [Aux-Item Types], page 145.

*Previously undocumented stuff:* See Chapter 12 [Garb], page 163, for information about how the garb works.

*New appendix:* See Appendix A [Extracted grammar], page 167, for information about machine-readable grammars extracted from this specification.

*Typographic improvements:* The section heading of all asynchronous messages now contains the async number.

*Fixed errors:* In the info manual, the status codes in the menus of request and asynchronous messages were set to ‘r’ instead of ‘0’ for who-is-on-ident, get-session-info-ident and async-new-text-old. Several section headings for obsolete requests was missing information about when the request became obsolete.

Distributed with lyskomd 2.1.2.

11.0: 2003-08-24

*New aux-items:* mx-refuse-import [35]. See Chapter 7 [Aux-Item Types], page 145.

*New types:* Read-Range and Membership (the old Membership was renamed to Membership-10). See Section 3.10 [Membership Information], page 34.

Stats and Stats-Description. See Section 3.15 [Statistics], page 44.

Static-Server-Info. See Section 3.8 [Server Information], page 29.

FLOAT. See Section 2.2 [Simple Data Types], page 13.

*Status change:* The query-read-texts-10 (see Section 4.99 [query-read-texts-10], page 113) and get-membership-10 (see Section 4.100 [get-membership-10], page 114) requests are now obsolete. The set-keep-commented (see Section 4.106 [set-keep-commented], page 120) request is now recommended.

*New calls:*

- query-read-texts (see Section 4.108 [query-read-texts], page 121)
- get-membership (see Section 4.109 [get-membership], page 122)
- mark-as-unread (see Section 4.110 [mark-as-unread], page 124)
- set-read-ranges (see Section 4.111 [set-read-ranges], page 125)
- get-stats-description (see Section 4.112 [get-stats-description], page 126)
- get-stats (see Section 4.113 [get-stats], page 126)
- get-boottime-info (see Section 4.114 [get-boottime-info], page 127)
- first-unused-conf-no (see Section 4.115 [first-unused-conf-no], page 127)
- first-unused-text-no (see Section 4.116 [first-unused-text-no], page 128)
- find-next-conf-no (see Section 4.117 [find-next-conf-no], page 128)
• find-previous-conf-no (see Section 4.118 [find-previous-conf-no], page 128)
• get-scheduling (see Section 4.119 [get-scheduling], page 129)
• set-scheduling (see Section 4.120 [set-scheduling], page 129)
• set-connection-time-format (see Section 4.121 [set-connection-time-format], page 131)
• local-to-global-reverse (see Section 4.122 [local-to-global-reverse], page 131)
• map-created-texts-reverse (see Section 4.123 [map-created-texts-reverse], page 132)

New error codes: invalid-range, invalid-range-list, priority-denied, weight-denied, weight-zero, undefined-measurement and bad-bool.

New async messages:
• async-new-user-area (see Section 5.18 [async-new-user-area], page 137)
• async-new-presentation (see Section 5.19 [async-new-presentation], page 137)
• async-new-motd (see Section 5.20 [async-new-motd], page 137)
• async-text-aux-changed (see Section 5.21 [async-text-aux-changed], page 137)

Protocol change: Renamed the reserved1 bit of Membership-Type to passive-message-invert. See Section 3.10 [Membership Information], page 34. This affects async-send-message (see Section 5.11 [async-send-message], page 135) and send-message (see Section 4.54 [send-message], page 87).
The following requests can no longer be used until you have logged in: get-last-text (see Section 4.59 [get-last-text], page 90), find-next-text-no (see Section 4.61 [find-next-text-no], page 92) and find-previous-text-no (see Section 4.62 [find-previous-text-no], page 92).
You can now modify the type of a recipient with the add-recipient (see Section 4.31 [add-recipient], page 69) call if you are the supervisor of either the author, recipient or sender. The check used to be more restrictive.
Aux-item tags 10200-10299 are now reserved for private test use. See Section 1.5.4 [Client-Specific Aux-Item Types], page 8.
The following asynchronous messages are also sent to recipients of texts linked to the relevant text via comment or footnote links: async-new-text-old (see Section 5.1 [async-new-text-old], page 133), async-deleted-text (see Section 5.13 [async-deleted-text], page 136), async-new-text (see Section 5.14 [async-new-text], page 136), async-new-recipient (see Section 5.15 [async-new-recipient], page 136) and async-sub-recipient (see Section 5.16 [async-sub-recipient], page 136).
Two requests can now return more error codes than they used to:
add-comment (see Section 4.33 [add-comment], page 72)
already-comment and already-footnote.
add-footnote (see Section 4.38 [add-footnote], page 76)

already-comment.

The field later-texts-exists in Text-Mapping has been renamed to more-texts-exists, as this name is more meaningful for the new requests local-to-global-reverse (see Section 4.122 [local-to-global-reverse], page 131) and map-created-texts-reverse (see Section 4.123 [map-created-texts-reverse], page 132).

Fixed errors: The description of the error index-out-of-range was wrong for add-footnote (see Section 4.38 [add-footnote], page 76), missing for create-person-old (see Section 4.6 [create-person-old], page 50), create-person (see Section 4.90 [create-person], page 109), create-conf-old (see Section 4.11 [create-conf-old], page 53), create-conf (see Section 4.89 [create-conf], page 108) and create-text-old (see Section 4.29 [create-text-old], page 68), and incomplete for create-text (see Section 4.87 [create-text], page 106).

async-leave-conf (see Section 5.7 [async-leave-conf], page 134) is not sent when the person is deleted, so don’t say that it is.

Distributed with lyskomd 2.1.0.

10.7: 2002-11-03

Fixed errors: The description of common block of the user area was just plain wrong. See Chapter 10 [The User Area], page 157, for the updated specification.

The documentation for no-of-created-texts in the Person structure was wrong. See [Person], page 31.

The documentation for the privilege bits create-conf and create-pers stated that they are by default on. In fact, they are by default ignored, but off. See Section 1.6 [Security], page 9.

The example for re-z-lookup (see Section 4.75 [re-z-lookup], page 99) was wrong.

An example for lookup-z-name (see Section 4.77 [lookup-z-name], page 100) was wrong.

Protocol change: Added a new "language" value to the common block of the user area. See Chapter 10 [The User Area], page 157.

New aux-items: world-readable [34]. See Chapter 7 [Aux-Item Types], page 145.

elisp-client-read-faq [10000] and elisp-client-rejected-recommendation [10001]. See Appendix D [Some Client-specific Aux-Item Types], page 177.

Modified aux-item: send-comments-to [33] may now also contain an optional recipient type. See Chapter 7 [Aux-Item Types], page 145.

Previously undocumented stuff: The rules for when a membership is visible are now documented. See Chapter 11 [Membership visibility], page 161.

Documented the unread-is-secret flag of Person. See [Personal-Flags], page 32.

The documentation for get-person-stat-old was improved (see Section 4.7 [get-person-stat-old], page 51).
The Message-ID of exported texts is now documented. See [Message-ID], page 175.

A client should offer to add the author as a recipient of a text he is creating if he isn’t a member of any of the recipients. See Section B.2.4 [Recipients of comments], page 171.

There should be no linefeed after the last line of a text. See Chapter 9 [LysKOM Content Types], page 155. See Section 9.1 [Reformattable Text (text/x-kom-basic)], page 155.

Added a recommendation for how groups of Misc-Info items should be sorted. See Section B.2.5 [Order of misc-info groups], page 171.

Editorial changes: Several spelling errors, typos, et c were fixed.

Distributed with lyskomd 2.0.7.

10.6: 2002-03-29

Fixed errors: The format of the user area was plain wrong. The examples for query-read-texts-10 and get-membership-10 were wrong. The idle-time field is only affected by the user-active request, not by all activity (see Section 3.14 [Session Information], page 40).

Protocol change: Expanded the documentation of super-conf. See Section 3.5 [Conference Status Types], page 25. Simplified the rules for super-conf; a setting of 0 no longer means anything. A new section contains a summary of how a client should decide where to send a comment, and it contains the new rules. Section B.2.4 [Recipients of comments], page 171. Most clients already implemented the new rules; the old rules were overly complex.

New aux-item: send-comments-to [33].

Modified aux-item: FAQ-text [14] may now be set on a letterbox.

Previously undocumented stuff: Expanded the documentation of permitted-submitters. See Section 4.20 [set-permitted-submitters], page 60.

Clarify that a person is a supervisor of himself, except for the set-supervisor call; see Section 1.2 [Conferences], page 3.

Document the change-name privilege bit; see Section 1.6 [Security], page 9.

Document that last-login is also updated on logout; see Section 3.9 [Person Status Types], page 31.

Clarify that the address part of redirect [8] is a conference number.

Compatibility info: Mention that the elisp client used to enter texts as ‘x-kom/text’ instead of ‘text/x-kom-basic’.

Administrativia: Updated “Future changes” (see Appendix E [Future changes], page 179), and mention that we now use Bugzilla to keep track of bugs and feature requests.

Editorial changes: Added some of Texinfo markup and cross references. Several spelling errors, typos, et c were fixed.

Distributed with lyskomd 2.0.6.
10.5: 2001-09-30
A new section (see Section B.2.3 [Client-side name expansion], page 170) in the informative Client Conventions appendix was written. Distributed with lyskomd 2.0.5.

10.4: 2001-05-24
*Fixed errors:* Fixed the description of the old-pwd argument to set-passwd (see Section 4.9 [set-passwd], page 52). The content-type 'x-kom/basic' was renamed to 'text/x-kom-basic'.

*Previously undocumented stuff:* Documented several previously undocumented aspects of the protocol: the hello string used during connection establishment, the items-to-delete and items-to-add arguments of modify-system-info, the type argument of add-member (including the fact that the invitation membership flag is automatically set in some circumstances), that a client can issue many requests at once (and that the replies are sent back in order).

*New stuff:* Registered the "rkom" user-area block.

*New aux-items:* The following predefined aux-items were added: canonical-name [31], mx-list-name [32] mx-mime-belongs-to [10100], mx-mime-part-in [10101], mx-mime-misc [10102], mx-envelope-sender [10103] and mx-mime-file-name [10104]. Those aux-items with a number higher than 10000 were previously documented in this document, but they now have the status of predefined aux-items.

*Editorial changes:* Lots of editorial changes needed to publish an online version on the web at [http://www.lysator.liu.se/lyskom/protocol/](http://www.lysator.liu.se/lyskom/protocol/). Many minor syntax errors corrected, and much missing Texinfo markup added. The document now makes heavy use of Texinfo macros. Due to bugs in the current version of 'texinfo.tex' this file cannot currently be typeset using \TeX\X. (All bugs are reported to the Texinfo maintainers.)

get-membership-old, get-membership-10 and login used to take an argument of type BITSTRING(a-single-field). The type has now been changed to BOOL instead, to simplify the description. The encoding of the protocol is unchanged.

The indices are now joined into a single index. More terms have been added to it. Many sections of text were moved around to make it easier to find information. Some non-normative information was moved to appendices. Removed a few non-normative empty sections.

This edition was published on the web; no lyskomd release was imminent when the edition was finished. Future editions will also be published on the web; most of them will likely be published at the same time as a lyskomd release is made. They will continue to be included in the lyskomd releases.

10.3: 2000-09-09
Several aux-items can be set on letterboxes and not only conferences. A few can now be set on the server. The allowed-content-type and recommended-conf aux-items were added. The mx-allow-filter and mx-reject-forward aux-items are marked obsolete. Text regarding mail import was improved, based
on actual experience in writing an email importer. Reserved a range of aux-
items for komimportmail. Several minor corrections and clarifications made.
Distributed with lyskomd 2.0.4.

10.2: 1999-07-23
Some typos and other minor errors were fixed. Distributed with lyskomd 2.0.2.

10.1: 1999-07-12
Call sub-comment was incorrectly marked obsolete. This has been corrected.
Regexps are case sensitive. The Info-Type enumeration was introduced in the
description of the protocol. (Previous versions of the protocol had broken defi-
nitions of add-recipient, async-new-recipient and async-sub-recipient.)
Distributed with lyskomd 2.0.1.

10.0: 1999-06-27
The specification was translated to English and converted to Texinfo by David
incorrectly marked the sub-comment call as obsolete, and stated that regexp
lookup was case insensitive. Both statements were wrong, and has since been
fixed.

9.0: 1996-08-04

8.0: 1995-11-10
Protocol version 8. Distributed with lyskomd 1.8.0.

7.1: 1995-01-08.
Protocol and document revision history were added by Per Cederqvist. Outline
mode was used to make the document more manageable. This version was
distributed with lyskomd 1.7.1.

7.0: 1994-12-31.
The first specification with a version number. All calls that had been added
since 1991-06-25 were documented. Pell and Per Cederqvist did the deed. This
version was distributed with lyskomd 1.7.0.

Linus Tolke wrote comments for some calls that were without comments.

1992-07-06.
Linus Tolke converted the document to ISO 8859-1.

1991-08-12.
Per Cederqvist started using version control for documentation.

Lars Aronsson documented the protocol that was in use at the time.
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