The Input Method Protocol

X Consortium Standard

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X Version 11, Release 6.4

Version 1.0

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! "

$

%

#&' ()#*+,' - ,(.-/'/ + - *-#&(0# *+,,+1#2 () +12
3-1/ '4 ,' (, -5 6-'/ -1760/-18 90# 1(# 6-5-#'/ #(#&'
*+,,+1#-' () 5',7&+1#+9-6-#2)-#1')(, + +,#-706+,
0, (' +1/ 1(1-1),-18'5'1#% -1 1('.'1# &+66 #&' 4
7(1 (,#-05 9' 6-+96')(, +12 76+-5 /+5+8' (, (#&', 6-+9-6-
#2 *&'#&', -1 +1 +7#-(1 () 7(1#,+7# #(,# (, (#&',*- '
+,- -18),(5 (0# () (, -1 7(11'7#-(1 *-#& #&' ()#*+,' (,
#&' 0 ' (, (#&', /'+6-18 -1 #&' ()#*+,'%

': 4 7

$

; 4 7 %

4 * < # (8 %

$ $

%) ! 5

<

% # $:

%

Abstract

-5 -5 - 5 $

; :

-5 -5 $

$ % # $

$ %

Table of Contents

- %%% G
%%%%%%%%%%%%%%%%%%%

- 5 $ -5 $ - 5
-5 < 4??,@%
$ $
B $
$ % # - 5
$ 4??,C $ $
= : %

- 5
-5 -5 $ % #
#7 -
4 %

- $:
%

Background

#: % '
;
< < <
%

$ =
< : % #
= A < A A < A
< < %

#: % -
!
%
- D : $ $

= $ % #
%

- D 3 ,
$ 3 ! % $ 3 ! $
% -
% -

%

+ :
+ + : + %
5 -5 -5 $ $ $
-5 % 9 ; :
$
$
<%

Input Method Styles

4?? ; "

" # -5 $
: % #
< $ < %

" # $
%

$ " #
$: %

" #
%

7 $
-5 $ $ < = %

Architecture

Implementation Model

* 4 * $
B %

7 $ " + -5 $
$ % #
-5
-5 $ $
-5 $ %

6 " + -5
% # $ -5
-5 $ = %

5 : +
7 $ -5 % (
< < '
6 %

- 7 $ -5
-5 -5 $ %

Structure of IM

* -5 $
-5 $ %

-5 4(-5
% -5
4(-5
%

- -5 48 -5. %

: % 4 $ $
A- 7 : A -7 $ % + -7
4-5 47 -7 4/ -7 %

-7 -5 4-5
-5%

5 -5 $
: -7%

-7
-5 $ 4 -7) % 40 -7)
%

Event Handling Model

':) ' 9 <'
% # 9 <'
) ' -5 $: %

) ' 9 <' $
$ -5 $ %) % ?

BackEnd Method

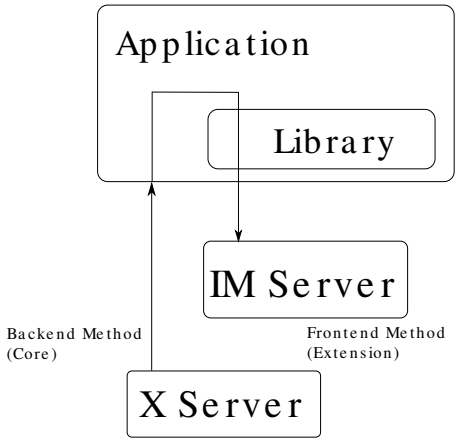
- 9 <' $ $ -5
-5 $ % '$
$; -5
-5 $ %

0 -5 3 3 , $
-5 $ = '$) 7
'$) 7 ; -5 $
) '$ %

FrontEnd Method

-) ' $ $ 4 $
-5 $ -5 % # $
$
-5 $ B <
< $ $ < %

& $) ' $; <
$ -5 $ $
< $ %)
9 <') '
$: % , + :X+
%



$

Event Flow Control

$ -5
 -5 $ / %

 '$) = $ -5 $
 %

/ '$) $ = $
 $ -5 $ %

) + 7-- 7
 + 7-- -5 $
< $ $ -5 $ % (< $
 7 -5 $ %

/ '$) = 4
 $ -5 $
 : $ % # -5 $
 XIM_REGISTER_TRIGGERKEYS $
 / '$) %

'$) 7 %

Default Preconnection Convention

-5 $ +#(5
 -5 $ XIM_SERVERS,
 E F% # +#(5
+#(5 -5 $ % -5 $ (-4
) 7 % # $ -5 $ $
 % # -5
 $ $ TRANSPORT,

% # -5 $ $
LOCALES,
: 4 (%

-5 $ +#(5
XIM_SERVERS -5 $ $
4 B im.

$ TRANSPORT
% # +
:X9 % +
4 7 %

) $ < 4 -5 $ 4
* $ -5 $ $
4 * % % 1 $ %

Protocol

#
= $
G 4 * H?I"

Basic Requests Packet Format

= :
-5 $ %

= < %

major-opcode: CARD8
minor-opcode: CARD8
length: CARD16

5+D(, (7(/' = : < <
% - 5+D(, (7(/' = 5-1(, (
7(/' J = % - 5-1(, (7(/'
F% (5+D(, (7(/' 5-1(, (7(/'
XIM_QUERY_EXTENSION % , K%L% > :
% # 6'18#& K
% - 6'18#& F%

Data Types

4 -5 $ "

BITMASK16
CARD16
BITMASK32
CARD32

PADDING FORMAT

Where N is some expression, and Pad(N) is the number of bytes needed to round

Pad(N) = (4 - (N mod 4)) mod 4

LPCE

1 A character from the4 X Portable Character Set in Latin Portable Character Encoding

STRING

2	n	length of string in bytes
n	LISTofLPCE	string
p		unused, p=Pad(2+n)

STR

1	n	length of name in bytes
n	STRING8	name

XIMATTR

2	CARD16	attribute ID (*1)
2	CARD16	type of the value (*2)
2	n	length of im-attribute
n	STRING8	im-attribute
p		unused, p = Pad(2+n)

The im-attribute argument specifies XIM values such as XNQueryInputStyle.

XICATTR

2	CARD16	attribute ID (*1)
2	CARD16	type of the value (*2)
2	n	length of ic-attribute
n	STRING8	ic-attribute
p		unused, p = Pad(2+n)

(*1) XIMATTR and XICATTR are used during the setup stage and XIMATTRIBUTE and XICATTRIBUTE are used after each attribute ID has been recognized by the IM Server and the IM library.

(*2) The value types are defined as follows:

MF		NO
	1 6	
M?		7+,/J
MG		7+,/?C
MO		7+,/OG
MK		#,-18J
M@	*	7+,/OG
M?F	4-5	G
		4-5
		G

			7+,/OG	4-5
M??	4,	G	-1#?C	4
		G	-1#?C	2
		G	7+,/?C	
		G	7+,/?C	
M?G	4	G	-1#?C	4
		G	-1#?C	2
M?O	4)	G		9
			#,-18J	9
				P GQ
M?@	4-5& 3 #	K		
				4-5#,-8 8',3'2 NK
			4-5#,-8 8',3'2	4-5& < #
			4-5&(#3'2 #+#'	& 3
M?L	4-5 7 $	4-5 #,7(1. #'4#		
M?J	4-5	4-5 ,"/-# #+#'		
M?R	4-5,	4-5,' '# #+#'		
M:L	1 6			

(*3) The IC value for the separator of NestedList is defined as follows,
#define XNSeparatorofNestedList "separatorofNestedList"
, which is registered in X Consortium and cannot be used for any other purpo

(*4) LISTofFOO
A Type name of the form LISTof FOO means a counted list of elements of
The size of the length field may vary (it is not necessarily the same
size as a FOO), and in some cases, it may be implicit.

```
XIMTRIGGERKEY
     4     CARD32       keysym
     4     CARD32       modifier
     4     CARD32       modifier mask

ENCODINGINFO
     2     n            length of encoding info
     n     STRING8      encoding info
     p                  unused, p=Pad(2+n)
```

```
     1     CARD8        extension major-opcode
     1     CARD8        extension minor-opcode
     2     n            length of extension name
     n     STRING8      extension name
     p                  unused, p = Pad(n)

XIMATTRIBUTE
     2     CARD16       attribute ID
     2     n            value length
     n                  value
     p                  unused, p = Pad(n)

XICATTRIBUTE
     2     CARD16       attribute ID
     2     n            value length
     n                  value
     p                  unused, p = Pad(n)



XIMSTRCONVTEXT
     2    CARD16                     XIMStringConversionFeedback
          #x0000001                  XIMStringConversionLeftEdge
          #x0000002                  XIMStringConversionRightEdge
          #x0000004                  XIMStringConversionTopEdge
          #x0000008                  XIMStringConversionBottomEdge
          #x0000010                  XIMStringConversionConvealed
          #x0000020                  XIMStringConversionWrapped
     2     n                         byte length of the retrieved string
     n     STRING8                   retrieved string
     p                               unused, p = Pad(n)
     2     m                         byte length of feedback array
     2                               unused
     m     LISTofXIMSTRCONVFEEDBACK  feedback array(*1)

(*1)   This field is reserved for future use.

XIMFEEDBACK
     4    CARD32       XIMFeedback
          #x000001     XIMReverse
          #x000002     XIMUnderline
          #x000004     XIMHighlight
          #x000008     XIMPrimary
          #x000010     XIMSecondary
          #x000020     XIMTertiary
          #x000040     XIMVisibleToForward
          #x000080     XIMVisibleToBackward
          #x000100     XIMVisibleCenter

XIMHOTKEYSTATE
     4    CARD32       XIMHotKeyState
          #x0000001    XIMHotKeyStateON
```

```
          #x0000002    XIMHotKeyStateOFF

XIMPREEDITSTATE
     4    CARD32       XIMPreeditState
          #x0000001    XIMPreeditEnable
          #x0000002    XIMPreeditDisable

XIMRESETSTATE
     4    CARD32       XIMResetState
          #x0000001    XIMInitialState
          #x0000002    XIMPreserveState
```

Error Notification

9 -5 $ -5 XIM_ERROR

%

+ = % -

=

%

XIM_ERROR (IM Server <--> IM library)

	2	CARD16	input-method-ID
	2	CARD16	input-context-ID
	2	BITMASK16	flag (*1)
		#0000	Both Input-Method-ID and Input-Context-ID are inva
		#0001	Input-Method-ID is valid
		#0002	Input-Context-ID is valid
	2	CARD16	Error Code
		#1	BadAlloc
		#2	BadStyle
		#3	BadClientWindow
		#4	BadFocusWindow
		#5	BadArea
		#6	BadSpotLocation
		#7	BadColormap
		#8	BadAtom
		#9	BadPixel
		#10	BadPixmap
		#11	BadName
		#12	BadCursor
		#13	BadProtocol
		#14	BadForeground
		#15	BadBackground
		#16	LocaleNotSupported
		#999	BadSomething (*2)
	2	n	byte length of error detail.
	2	CARD16	type of error detail (*3)
	n	STRING8	error detail (*4)
	p		unused, p = Pad(n)

(*1) Before an IM is created, both Input-Method-ID and

Input-Context-ID are invalid.
Before an IC is created, only Input-Method-ID is valid.
After that, both of Input-Method-ID and Input-Context-ID are valid.

(*2) Unspecific error, for example "language engine died"

(*3) This field is reserved for future use.

(*4) Vendor defined detail error message

Connection Establishment

XIM_CONNECT = $
$ %

XIM_CONNECT (IM library -> IM Server)

1		byte order
	#x42	MSB first
	#x6c	LSB first
1		unused
2	CARD16	client-major-protocol-version (*1)
2	CARD16	client-minor-protocol-version (*1)
2	CARD16	number of client-auth-protocol-names
n	LISTofSTRING	client-auth-protocol-names

(*1) Specify the version of IM Protocol that the client supports.

+ XIM_CONNECT %
# -5 $
% - %

XIM_AUTH_REQUIRED
%

XIM_AUTH_REQUIRED (IM library <--> IM Server)

1	CARD8	auth-protocol-index
3		unused
2	n	length of authentication data
2		unused
n	<varies> data	
p		unused, p = Pad(n)

: $
XIM_CONNECT XIM_AUTH_SETUP %+
= %

-5 XIM_AUTH_REPLY XIM_AUTH_REQUIRED
-5 $ %

XIM_AUTH_REPLY (IM library -> IM Server)

2	n	length of authentication data

```
     2                       unused
     2     n                 length of authentication data
     2                       unused
     n     <varies>      data
     p                       unused, p = Pad(n)
```

%

XIM_AUTH_NEXT = %

```
XIM_AUTH_NEXT (IM library <--> IM Server)
     2     n                 length of authentication data
     2                       unused
     n     <varies>      data
     p                       unused, p = Pad(n)
```

%

-5 $ XIM_AUTH_SETUP %

```
XIM_AUTH_SETUP (IM Server -> IM library)
     2     CARD16           number of client-auth-protocol-names
     2                      unused
     n     LISTofSTRING     server-auth-protocol-names
```

#
 %

XIM_AUTH_NG = $ %

4-5E+0#&E18 -5 S T -5 $

-5 $ XIM_CONNECT_REPLY XIM_CONNECT
XIM_AUTH_REQUIRED %

```
XIM_CONNECT_REPLY (IM Server -> IM library)
     2     CARD16     server-major-protocol-version (*1)
     2     CARD16     server-minor-protocol-version (*1)
```

(*1) Specify the version of IM Protocol that the IM Server supports. This document specifies major version one, minor version zero.

& -5 $ %

" 0 ; T

1 ; T

" XIM_CONNECT

- T

- T

" , $ XIM_AUTH_REQUIRED T

, $ S T T

" - XIM_AUTH_REPLY T

- XIM_AUTH_NEXT T

- XIM_AUTH_NG T $

" , $ XIM_CONNECT_REPLY T , $ XIM_AUTH_SETUP T

, $ XIM_AUTH_NEXT T

, $ XIM_AUTH_NG T $

, $ S T T

" XIM_AUTH_REQUIRED T

" XIM_AUTH_NG T $

-5 $

" 0 ; T

1 ; T

" , $ XIM_CONNECT

T , $ S T T

" - XIM_AUTH_REQUIRED T

- XIM_AUTH_SETUP T

- XIM_CONNECT_REPLY T

" , $ XIM_AUTH_REPLY T

, $ XIM_AUTH_NEXT T

, $ S T T

XIM_AUTH_REQUIRED T

- XIM_AUTH_SETUP T

- XIM_CONNECT_REPLY T

, $ XIM_AUTH_REQUIRED T

, $ S T T

- XIM_CONNECT_REPLY T

- XIM_AUTH_NG T $

- XIM_AUTH_NEXT T

XIM_AUTH_NG T $

XIM_DISCONNECT = $
$ %

4-5E/- 7(11'7# -5 T -5 $

XIM_DISCONNECT = % # -5
$ XIM_DISCONNECT_REPLY < XIM_ERROR < %

4-5E/- 7(11'7#E,' 62 -5 $ T -5

XIM_OPEN = -5
-5 $ %

XIM_OPEN (IM library -> IM Server)
n STR locale name
p unused, p = Pad(n)

XIM_OPEN = % # -5 $
XIM_OPEN_REPLY < XIM_ERROR < %

XIM_OPEN_REPLY (IM Server -> IM library)
2 CARD16 input-method-ID
2 n byte length of IM attributes supported
n LISTofXIMATTR IM attributes supported
2 m byte length of IC attributes supported
2 CARD16 unused
m LISTofXICATTR IC attributes supported

XIM_OPEN_REPLY -5 -7 6- # 4-
5+##, 6- # 4-7+##,% # -5 -7 -/
$ <% -
-5 < -5 -7
: % # -5 $ $
-5 -5 -7
4 % # -7 $ 1 6
6- # 4-7+##,%

XIM_CLOSE = -5
-5 $ %

XIM_CLOSE (IM library -> IM Server)
2 CARD16 input-method-ID

```
     2                unused

XIM_CLOSE         =  %# -5              $
       XIM_CLOSE_REPLY  <          XIM_ERROR  < %


XIM_CLOSE_REPLY (IM Server -> IM library)
     2     CARD16     input-method-ID
     2                unused
```

Event Flow Control

```
+ -5  $                 XIM_SET_EVENT_MASK        -5
  $              -5  $       -5           B
      $      -5  $ % -          -5  $
 <   4 $                        ;     -5
   %


XIM_SET_EVENT_MASK (IM Server -> IM library)
     2     CARD16        input-method-ID
     2     CARD16        input-context-ID
     4     EVENTMASK     forward-event-mask (*1)
     4     EVENTMASK     synchronous-event-mask (*2)

(*1)  Specify all the events to be forwarded to the IM Server by the IM library.
(*2)  Specify the events to be forwarded with synchronous flag on by the IM librar

XIM_SET_EVENT_MASK          =  %#  $   <   $
                                              XIM_SET_EVENT_MASK    %
-      : -/      ;         $           -/
       $    <          =  %#  $
-7B     $     $    $   %

0         /      '$     )             -5     $
XIM_REGISTER_TRIGGERKEYS                -5
XIM_OPEN_REPLY    % (   -5              -5  $
     '$  )     %


XIM_REGISTER_TRIGGERKEYS (IM Server -> IM library)

     2     CARD16                  input-method-ID
     2                             unused
     4     n                       byte length of on-keys
     n     LISTofXIMTRIGGERKEY     on-keys list
     4     m                       byte length of off-keys
     m     LISTofXIMTRIGGERKEY     off-keys list

XIM_REGISTER_TRIGGERKEYS          =  %# -5  $
-5       <     <            %

# -5         -5  $                    XIM_TRIGGER_NOTIFY       <
 $           <     <          %
```

```
XIM_TRIGGER_NOTIFY (IM library -> IM Server)
     2     CARD16           input-method-ID
     2     CARD16           input-context-ID
     4     CARD32           flag
           #0               on-keys list
           #1               off-keys list
     4     CARD32           index of keys list
     4     EVENTMASK        client-select-event-mask (*1)

(*1)  Specify the events currently selected by the IM library with XSelectInput.


XIM_TRIGGER_NOTIFY          =  % #  -5
  $              XIM_TRIGGER_NOTIFY_REPLY  <          XIM_ERROR  < %


XIM_TRIGGER_NOTIFY_REPLY (IM Server -> IM library)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
```

Encoding Negotiation

```
XIM_ENCODING_NEGOTIATION     =
      % *                 <
7    '   %


XIM_ENCODING_NEGOTIATION (IM library -> IM Server).sp 6p
     2     CARD16                 input-method-ID
     2     n                      byte length of encodings listed by name
     n     LISTofSTR              list of encodings supported in the IM library.
     p                            unused, p = Pad(n)
     2     m                      byte length of encodings listed by detailed data
     2                            unused
     m     LISTofENCODINGINFO     list of encordings supported in the IM library

# -5  $                          -5    % -
  :               ?
     <            % #
XIM_OPEN     $  4(  -5 % #
4 7     %

XIM_ENCODING_NEGOTIATION           =  % #  -5
        $                    XIM_ENCODING_NEGOTIATION_REPLY  <
XIM_ERROR  < %


XIM_ENCODING_NEGOTIATION_REPLY (IM Server -> IM library)
     2     CARD16     input-method-ID
     2     CARD16     category of the encoding determined.
           #0         name
           #1         detailed data
     2     INT16      index of the encoding determinated.
```

```
     2                unused
```

Query the supported extension protocol list

```
XIM_QUERY_EXTENSION     =    =    -5 :
  -5  $                 %


XIM_QUERY_EXTENSION (IM library -> IM Server)
     2     CARD16        input-method-ID
     2     n             byte length of extensions supported by the IM library
     n     LISTofSTR     extensions supported by the IM library
     p                   unused, p = Pad(n)

+ :         :     )  ' %#
        XIM_OPEN     $  4(  -5  %

-    F    -5     =     -5   $      :    %

-      F    -5     =          -5   $
          %

-              :     =          $     $
XIM_QUERY_EXTENSION          :      -5   $
BadProtocol    % -    -5   $          =        <   5+
D(, ( 7(/'   5-1(, ( 7(/'                                  BadProtocol   %

XIM_QUERY_EXTENSION          =  % #  -5
  $               XIM_QUERY_EXTENSION_REPLY  <          XIM_ERROR  < %


XIM_QUERY_EXTENSION_REPLY (IM Server -> IM library)
     2     CARD16      input-method-ID
     2     n           byte length of extensions supported by both the IM library
     n     LISTofEXT   list of extensions supported by both the IM library and the


XIM_QUERY_EXTENSION_REPLY              :
    -5         -5   $ % -                                    XIM_QUERY_EXTENSION
     1066    -5   $              :
-5   $ % -          1066    -5   $         :
             -5   $ %

+ ;              $    :      % #  -5
  ;                       :      % #  -5
       =                   -5   $ %
```

Setting IM Values

```
XIM_SET_IM_VALUES   =              -5%


XIM_SET_IM_VALUES (IM library -> IM Server)
     2     CARD16                  input-method-ID
     2     n                       byte length of im-attribute
```

```
     n     LISTofXIMATTRIBUTE     im-attributes

#                 XIM_SET_IM_VALUES            6- # 4-5+#
#,-90#'                  % +
         XIM_OPEN_REPLY              %

XIM_SET_IM_VALUES           =  % #  -5
  $              XIM_SET_IM_VALUES_REPLY  <          XIM_ERROR  <
        $                              XIM_ERROR         %


XIM_SET_IM_VALUES_REPLY (IM Server -> IM library)
     2     CARD16     input-method-ID
     2                unused

XIM_SET_IM_VALUES_REPLY                -/
         -5 %
```

Getting IM Values

```
XIM_GET_IM_VALUES   =    =   -5 $          -5   $
         %


XIM_GET_IM_VALUES (IM library -> IM Server)
     2     CARD16           input-method-ID
     2     n                byte length of im-attribute-id
     n     LISTofCARD16     im-attribute-id
     p                      unused, p=Pad(n)

XIM_GET_IM_VALUES         =  % #  -5
  $             XIM_GET_IM_VALUES_REPLY  <          XIM_ERROR  < %


XIM_GET_IM_VALUES_REPLY (IM Server -> IM library)
     2     CARD16                  input-method-ID
     2     n                       byte length of im-attributes returned
     n     LISTofXIMATTRIBUTE      im-attributes returned

#  -5   $      -5 $                    XIM_GET_IM_VALUES_REPLY    % #
                  $
               XIM_GET_IM_VALUES    %
```

Creating an IC

```
XIM_CREATE_IC     =         -7%


XIM_CREATE_IC (IM library -> IM Server)
     2     CARD16                  input-method-ID
     2     n                       byte length of ic-attributes
     n     LISTofXICATTRIBUTE      ic-attributes

#      :           -5  $           -7 % -
                        XIM_CREATE_IC    %             ;  %
```

```
XIM_CREATE_IC          =                : -/% #
-5                $                          XIM_CREATE_IC_REPLY  <
   XIM_ERROR  < %


XIM_CREATE_IC_REPLY (IM Server -> IM library)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
```

Destroying the IC

```
XIM_DESTROY_IC     =         -7%


XIM_DESTROY_IC (IM library -> IM Server)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID

XIM_DESTROY_IC                =  %  #  -5
                  $                   XIM_DESTROY_IC_REPLY
      XIM_DESTROY_IC               7   <   <
XIM_PREEDIT_DRAW    XIM_PREEDIT_DONE.


XIM_DESTROY_IC_REPLY (IM Server -> IM library)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
```

Setting IC Values

```
XIM_SET_IC_VALUES     =             -7%


XIM_SET_IC_VALUES (IM library -> IM Server)
     2     CARD16                 input-method-ID
     2     CARD16                 input-context-ID
     2     n                      byte length of ic-attributes
     2                            unused
     n     LISTofXICATTRIBUTE     ic-attributes

#                 XIM_SET_IC_VALUES             6- # 4-7+#
#,-90#'                 % +
         XIM_OPEN_REPLY              %

XIM_SET_IC_VALUES           =  % #  -5
  $               XIM_SET_IC_VALUES_REPLY    <          XIM_ERROR  <
         $                              XIM_ERROR         %


XIM_SET_IC_VALUES_REPLY (IM Server -> IM library)

     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
```

Getting IC Values

```
XIM_GET_IC_VALUES     =    =  -7$          -5  $
            %


XIM_GET_IC_VALUES (IM library -> IM Server)

     2     CARD16           input-method-ID
     2     CARD16           input-context-ID
     2     n                byte length of ic-attribute-id
     n     LISTofCARD16     ic-attribute-id
     p                      unused, p=Pad(2+n)
```

- 6- # 7+,/?C 1
6 %

```
XIM_GET_IC_VALUES          =
$              %# -5              $
   XIM_GET_IC_VALUES_REPLY  <          XIM_ERROR  < %


XIM_GET_IC_VALUES_REPLY (IM Server -> IM library)
     2     CARD16                 input-method-ID
     2     CARD16                 input-context-ID
     2     n                      byte length of ic-attribute
     2                            unused
     n     LISTofXICATTRIBUTE     ic-attribute
```

Setting IC Focus

```
XIM_SET_IC_FOCUS     =             -7%


XIM_SET_IC_FOCUS (IM library -> IM Server)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID

XIM_SET_IC_FOCUS          =  %
```

Unsetting IC Focus

```
XIM_UNSET_IC_FOCUS     =                -7%


XIM_UNSET_IC_FOCUS (IM library -> IM Server)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID

XIM_UNSET_IC_FOCUS          =  %
```

Filtering Events

```
'$             $     9 <'
   4 $             %
```

4 '$ XIM_FORWARD_EVENT % #
% - =
$ XIM_SYNC_REPLY < =
%

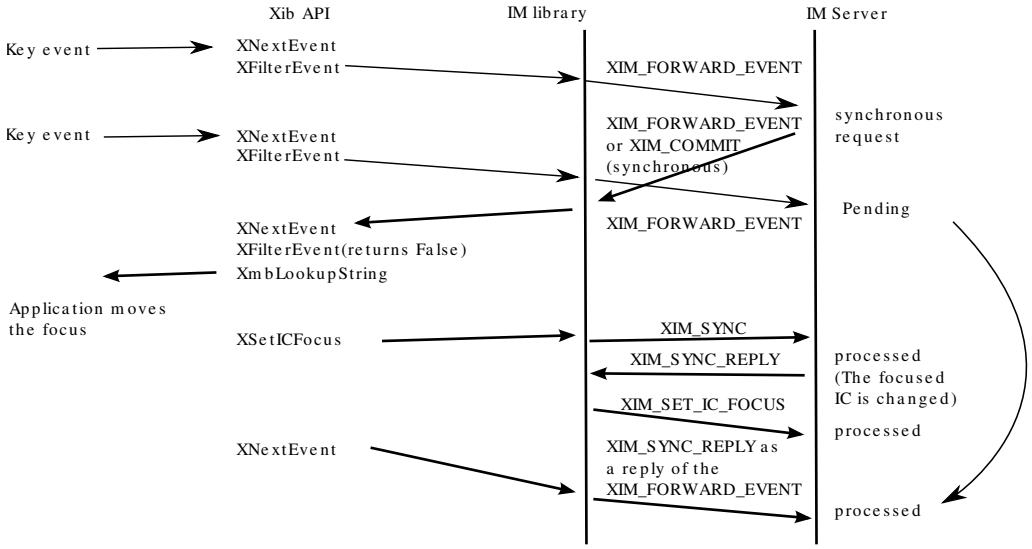
9 <'

* 9 <'
; $ <
XIM_SET_EVENT_MASK % (
%

- -5 $
XIM_FORWARD_EVENT XIM_COMMIT = % + -5
$ -5
XIM_FORWARD_EVENT -5
$ -5 $ XIM_FORWARD_EVENT XIM_COMMIT
-5 $ % - -5
< $ =
-5 = $ %
- -5 $ < XIM_FORWARD_EVENT
-5 $ % & $ -5 $
%

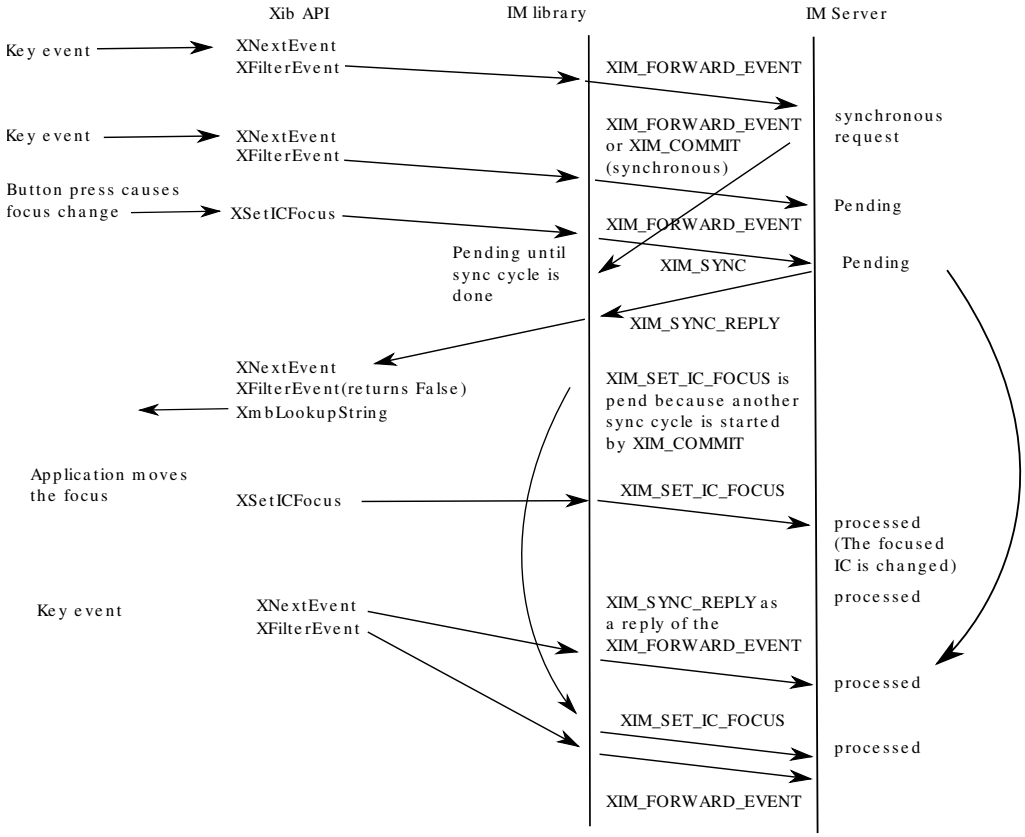
- -5 XIM_FORWARD_EVENT
-5 $ = % #
-5 $ XIM_FORWARD_EVENT
XIM_SYNC_REPLY % - XIM_FORWARD_EVENT XIM_COMMIT
-5 $ % 9
; XIM_SYNC_REPLY %

)
< $ %



)

) :
$ < $ $
< $ $ %



) G

```
XIM_FORWARD_EVENT (IM library <--> IM Server)
     2      CARD16          input-method-ID
     2      CARD16          input-context-ID
     2      BITMASK16       flag
            #0001           synchronous
            #0002           request filtering (*1)
            #0004           request lookupstring (*2)
     2      CARD16          serial number
            XEVENT          X event
```

(*1) Indicate the receiver should filter events and possible preedit may be invok

(*2) Indicate the receiver should only do lookup string. The IM Server is expecte
to just do a conversion of the key event to the best candidate. This bit may
affect the state of the preedit state (e.g. compose of dead key sequences).

4'.'1# 4 $:'$ % + $
:'$ B = 1 ?C 4'$ B : %
?C -1#?C %

XIM_FORWARD_EVENT $ -5
-5 $ -5 $ % (
$ -5 $ -5
$ -5 % # -5 $
$ XIM_FORWARD_EVENT

% - A = $ A A = < A
< $ %

Synchronizing with the IM Server

XIM_SYNC = ; -5 -5 $ %

```
XIM_SYNC (IM library <--> IM Server)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
```

; -5 -5 $
% # $ XIM_SYNC 4-5 =
% # : -/ -7
-5 -5 $; %

```
XIM_SYNC_REPLY (IM Server <--> IM library)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
```

$ XIM_FORWARD_EVENT, XIM_COMMIT
4-5 =
XIM_SYNC_REPLY $ %

Sending a committed string

* -5 $ -5 $
3 XIM_COMMIT %

```
XIM_COMMIT (IM Server -> IM library)

     2     CARD16          input-method-ID
     2     CARD16          input-context-ID
     2     BITMASK16       flag
           #0001           synchronous
           #0002           XLookupChars
           #0004           XLookupKeySym
           #0006           XLookupBoth = XLookupChars | XLookupKeySym
```

- 46 < 3 "

```
     2                unused
     4     KEYSYM     KeySym
```

- 46 < 7

```
     2     m              byte length of committed string
     m     LISTofBYTE     committed string
     p                    unused, p = Pad(m)
```

- 46 < 9

```
     2                    unused
     4     KEYSYM         KeySym
     2     n              byte length of committed string
     n     LISTofBYTE     committed string
     p                    unused, p = Pad(2+n)

# -5  $      $             XIM_COMMIT
        %
```

Reset IC

```
XIM_RESET_IC     =            -7    -5  $ %


XIM_RESET_IC (IM library -> IM Server)
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID

XIM_RESET_IC         =  % # -5             $
        XIM_RESET_IC_REPLY  <          XIM_ERROR  < %


XIM_RESET_IC_REPLY (IM Server -> IM library)

     2     CARD16          input-method-ID
     2     CARD16          input-context-ID
     2     n               byte length of preedit string
     n     LISTofBYTE      preedit string
     p                     unused, p = Pad(2+n)

XIM_RESET_IC_REPLY               : -/
      -7 %
```

Callbacks

```
- 4-5     4-5    +    4-5    +     4-58    7    <
       4-5    7    <    4-5    7    <
     <       %

+     <  =           -5   $     -5
          =     $          -5        -5   $ %

*    -5  $           <  =             =
  $         -5       -5   $
$    =   %
```

Negotiating geometry

```
#  -5   $              XIM_GEOMETRY
4-5     4-5    +    4-5    +    %


XIM_GEOMETRY (IM Server -> IM library)
```

```
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
```

) * $ $ -7%

Converting a string

```
XIM_STR_CONVERSION (IM Server -> IM library)

     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
     2     CARD16     XIMStringConversionPosition
     2                unused
     4     CARD32     XIMCaretDirection
           #0         XIMForwardChar
           #1         XIMBackwardChar
           #2         XIMForwardWord
           #3         XIMBackwardWord
           #4         XIMCaretUp
           #5         XIMCaretDown
           #6         XIMNextLine
           #7         XIMCPreviousLine
           #8         XIMLineStart
           #9         XIMLineEnd
           #10        XIMAbsolutePosition
           #11        XIMDontChange
     2     CARD16     factor
     2     CARD16     XIMStringConversionOperation
           #0001      XIMStringConversionSubstitution
           #0002      XIMStringConversionRetrieval
     2     INT16      byte length to multiply the XIMStringConversionType

XIM_STR_CONVERSION                  $
-5  $ %


XIM_STR_CONVERSION_REPLY (IM library -> IM Server)

     2     CARD16             input-method-ID
     2     CARD16             input-context-ID
     4     CARD32             XIMStringConversionFeedback
           XIMSTRCONVTEXT     XIMStringConversionText

XIM_STR_CONVERSION_REPLY                $
   <       %
```

Preedit Callbacks

```
# -5  $            XIM_PREEDIT_START          4-5
7   <    %


XIM_PREEDIT_START (IM Server -> IM library)
```

```
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID

#                    %#
$         <       -5  $ %
```

XIM_PREEDIT_START_REPLY (IM library -> IM Server)

```
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
     4     INT32     return value
```

XIM_PREEDIT_START_REPLY : -/
-7B %# $ $
4-5 7 <%

-5 $ XIM_PREEDIT_DRAW 4-5 / 7
< %

XIM_PREEDIT_DRAW (IM Server -> IM library)

```
     2     CARD16                input-method-ID
     2     CARD16                input-context-ID
     4     INT32                 caret
     4     INT32                 chg_first
     4     INT32                 chg_length
     4     BITMASK32             status
           #x0000001             no string
           #x0000002             no feedback
     2     n                     length of preedit string
     n     STRING8               preedit string
     p                           unused, p = Pad(2+n)
     2     m                     byte length of feedback array
     2                           unused
     m     LISTofXIMFEEDBACK     feedback array
```

A A A E A A E A 4-5
/ 7 < % * A A
: 4-5 / 7 < 1066% * A <A
: < 4-5 / 7 <
1066% * $ A A
< < %

-5 $ XIM_PREEDIT_CARET 7 7 <
%

XIM_PREEDIT_CARET (IM Server -> IM library)

```
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
     4     INT32      position
     4     CARD32     direction
           #0         XIMForwardChar
```

```
            #1          XIMBackwardChar
            #2          XIMForwardWord
            #3          XIMBackwardWord
            #4          XIMCaretUp
            #5          XIMCaretDown
            #6          XIMNextLine
            #7          XIMCPreviousLine
            #8          XIMLineStart
            #9          XIMLineEnd
            #10         XIMAbsolutePosition
            #11         XIMDontChange
      4     CARD32      style
            #0          XIMInvisible
            #1          XIMCPrimary
            #2          XIMSecondary
```

```
'              4-5   7  7   <   %
  <                          %
```

```
XIM_PREEDIT_CARET_REPLY (IM library -> IM Server)

      2     CARD16      input-method-ID
      2     CARD16      input-context-ID
      4     CARD32      position
```

```
#        $            <              %
```

```
# -5  $            XIM_PREEDIT_DONE          4-5   / 7
  <    %
```

```
XIM_PREEDIT_DONE (IM Server -> IM library)

      2     CARD16      input-method-ID
      2     CARD16      input-context-ID
```

Preedit state notify

```
XIM_PREEDITSTATE (IM Server -> IM Library)
      2     CARD16         input-method-ID
      2     CARD16         input-context-ID
      4     BITMASK32      XIMPreeditState
            #x0000000      XIMPreeditUnknown
            #x0000001      XIMPreeditEnable
            #x0000002      XIMPreeditDisable
```

```
XIM_PREEDITSTATE           4-5      1   7   <
  %
```

Status Callbacks

```
# -5  $            XIM_STATUS_START          4-5     7
  <    %
```

XIM_STATUS_START (IM Server -> IM library)

2	CARD16	input-method-ID
2	CARD16	input-context-ID

-5 $ XIM_STATUS_DRAW 4-5 / 7
< %

XIM_STATUS_DRAW (IM Server -> IM library)

2	CARD16	input-method-ID
2	CARD16	input-context-ID
4	CARD32	type
	#0	XIMTextType
	#1	XIMBitmapType

- 4-5#:# %

4	BITMASK32	status
	#x0000001	no string
	#x0000002	no feedback
2	n	length of status string
n	STRING8	status string
p		unused, p = Pad(2+n)
2	m	byte length of feedback array
2		unused
m	LISTofXIMFEEDBACK	feedback array

- 4-59 # %

4	PIXMAP	pixmap data

A A 4-5 / 7 < %

-5 $ XIM_STATUS_DONE 4-5 / 7
< %

XIM_STATUS_DONE (IM Server -> IM library)

2	CARD16	input-method-ID
2	CARD16	input-context-ID

Acknowledgements

$:
5-# 4 7 ?J < % +

%

* < < % + < <
<

-5 & 7 #<)! 2 &
5< - & - < 5 < 3 ! 3) < 6 & <
5 & < 5) <,! 9 5 < < !
& #! 5 < #< 5 < *< 5 < *<
1 < # < 2 3 2 D 2 %

References

! " #$ % & %, *% %

' (( ) * + %, *% %

A. Common Extensions

': < % % XIM_EXT_SET_EVENT_MASK
: 47 %#
< : < %

? ': $ U

XIM_EXT_SET_EVENT_MASK $ < -5
%

XIM_EXT_SET_EVENT_MASK (IM Server -> IM library)

```
     2     CARD16        input-method-ID
     2     CARD16        input-context-ID
     4     EVENTMASK     filter-event-mask (*1)
     4     EVENTMASK     intercept-event-mask (*2)
     4     EVENTMASK     select-event-mask (*3)
     4     EVENTMASK     forward-event-mask (*4)
     4     EVENTMASK     synchronous-event-mask (*5)

     (*1) Specify the events to be neglected by the IM library via XFilterEvent.
     (*2) Specify the events to be deselected by the IM library with XSelectInput.
     (*3) Specify the events to be selected by the IM library with XSelectInput.
     (*4) Specify all the events to be forwarded to the IM Server by the IM librar
     (*5) Specify the events to be forwarded with synchronous flag on by the IM li
```

-5 XIM_SYNC_REPLY -5 $ % # =
$ %

G ': $ %

= $ %

XIM_EXT_FORWARD_KEYEVENT XIM_FORWARD_EVENT
%

XIM_EXT_FORWARD_KEYEVENT (IM Server <--> IM library)

```
     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
```

```
     2     BITMASK16     flag
          #0001     synchronous
     2     CARD16      sequence number
     1     BYTE      xEvent.u.u.type
     1     BYTE      keycode
     2     CARD16      state
     4     CARD32      time
     4     CARD32      window

XIM_EXT_MOVE
```

4-5E '#E-7E.+60' % - $ 4-5
%

```
XIM_EXT_MOVE (IM library -> IM Server)

     2     CARD16     input-method-ID
     2     CARD16     input-context-ID
     2     INT16     X
     2     INT16     Y

XIM_EXT_MOVE            = %
```

B. Transport List

-5 $

+#(5 XIM_SERVERS
= $ 6(7+6'
#,+1 (,#%

"{*category*=[*value*,...]}..."

%

```
server;: IM Server name (used for XIM_SERVERS)
locale;: XPG4 locale name (LOCALES)
transport;: transport-specific name (TRANSPORT)
```

"

```
TCP/IP Names
```

: "

<local name> ::= "local/"*<hostname>*":"*<pathname>*

* S T < %

-5 $ B S T -5 $

: - "

<*TCP name*> ::= "tcp/"<*hostname*>":"<*ipportnumber*>

S T : % % %
?J%OF%F%G?G % # S ' T -5 $
%) : "

tcp/expo.lcs.mit.edu:8012
tcp/18.30.0.212:7890

DECnet Names

: /'7 "

<*DECnet name*> ::= "decnet/"<*nodename*>"::IMSERVER$"<*objname*>

S " T ,.1(/
/'7 KK%LF % # S ', T
$ /'7 ! %) : "

DECNET/SRVNOD::IMSERVER$DEFAULT
decnet/44.70::IMSERVER$other

X Names

: 4 "

<*X name*> ::= "X/"

- $ $ $ $ %

C. Protocol Number

Major Protocol number

XIM_CONNECT	#001
XIM_CONNECT_REPLY	#002
XIM_DISCONNECT	#003
XIM_DISCONNECT_REPLY	#004
XIM_AUTH_REQUIRED	#010
XIM_AUTH_REPLY	#011
XIM_AUTH_NEXT	#012
XIM_AUTH_SETUP	#013
XIM_AUTH_NG	#014
XIM_ERROR	#020
XIM_OPEN	#030
XIM_OPEN_REPLY	#031
XIM_CLOSE	#032

```
XIM_CLOSE_REPLY                          #033
XIM_REGISTER_TRIGGERKEYS                 #034
XIM_TRIGGER_NOTIFY                       #035
XIM_TRIGGER_NOTIFY_REPLY                 #036
XIM_SET_EVENT_MASK                       #037
XIM_ENCODING_NEGOTIATION                 #038
XIM_ENCODING_NEGOTIATION_REPLY           #039
XIM_QUERY_EXTENSION                      #040
XIM_QUERY_EXTENSION_REPLY                #041
XIM_SET_IM_VALUES                        #042
XIM_SET_IM_VALUES_REPLY                  #043
XIM_GET_IM_VALUES                        #044
XIM_GET_IM_VALUES_REPLY                  #045

XIM_CREATE_IC                            #050
XIM_CREATE_IC_REPLY                      #051
XIM_DESTROY_IC                           #052
XIM_DESTROY_IC_REPLY                     #053
XIM_SET_IC_VALUES                        #054
XIM_SET_IC_VALUES_REPLY                  #055
XIM_GET_IC_VALUES                        #056
XIM_GET_IC_VALUES_REPLY                  #057
XIM_SET_IC_FOCUS                         #058
XIM_UNSET_IC_FOCUS                       #059
XIM_FORWARD_EVENT                        #060
XIM_SYNC                                 #061
XIM_SYNC_REPLY                           #062
XIM_COMMIT                               #063
XIM_RESET_IC                             #064
XIM_RESET_IC_REPLY                       #065

XIM_GEOMETRY                             #070
XIM_STR_CONVERSION                       #071
XIM_STR_CONVERSION_REPLY                 #072
XIM_PREEDIT_START                        #073
XIM_PREEDIT_START_REPLY                  #074
XIM_PREEDIT_DRAW                         #075
XIM_PREEDIT_CARET                        #076
XIM_PREEDIT_CARET_REPLY                  #077
XIM_PREEDIT_DONE                         #078
XIM_STATUS_START                         #079
XIM_STATUS_DRAW                          #080
XIM_STATUS_DONE                          #081
XIM_PREEDITSTATE                         #082
```

(*) The IM Server's extension protocol number should be more than #128.

D. Implementation Tips

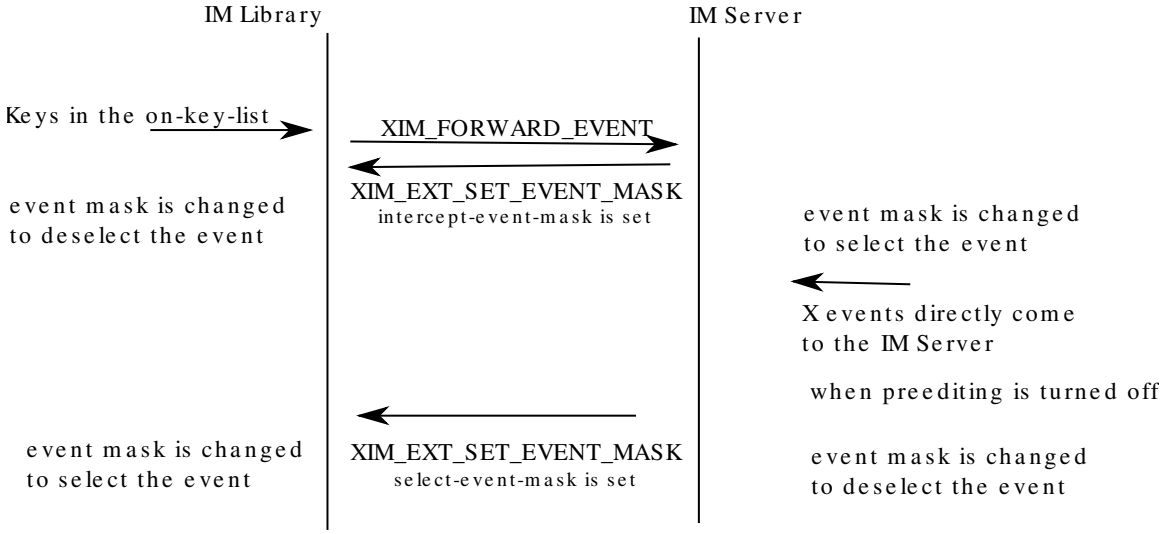
?) ' 5

) ' ;
  $ %

-) ' -5 = -5 $
) ' : $ % # =
XIM_QUERY_EXTENSION %# -5 $ XIM_EXT_SET_EVENT_MASK
$ < $ < $
<$ XIM_QUERY_EXTENSION_REPLY %

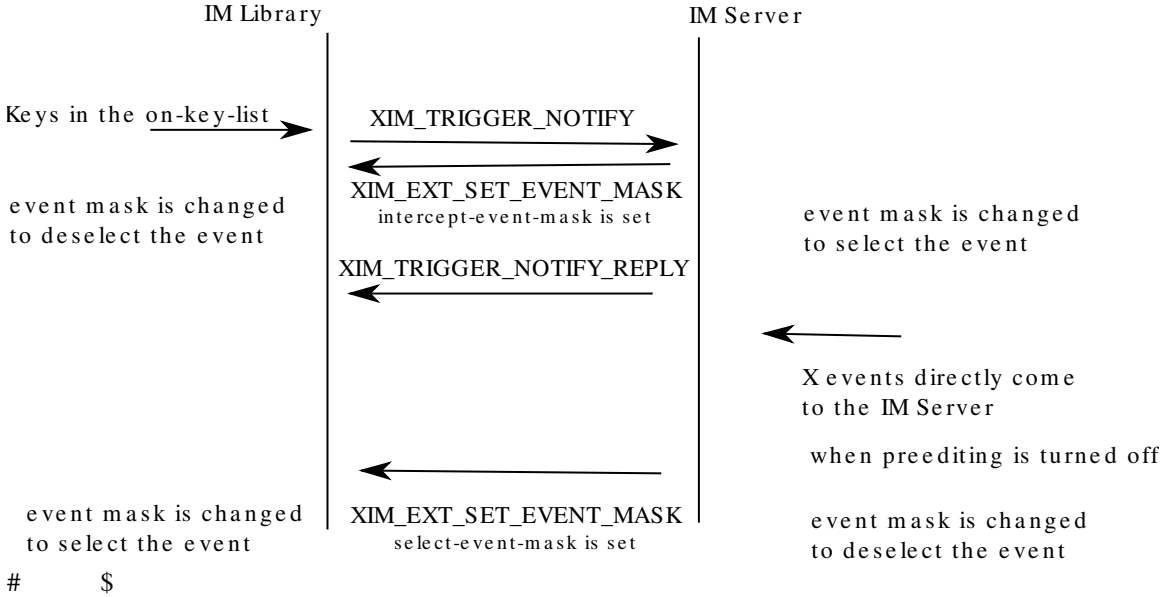
) '
-5 $; XIM_EXT_SET_EVENT_MASK %

(< $ <
% # = $
"



$

: -5 $
$ = %



$

4-5
$ < $ < % #

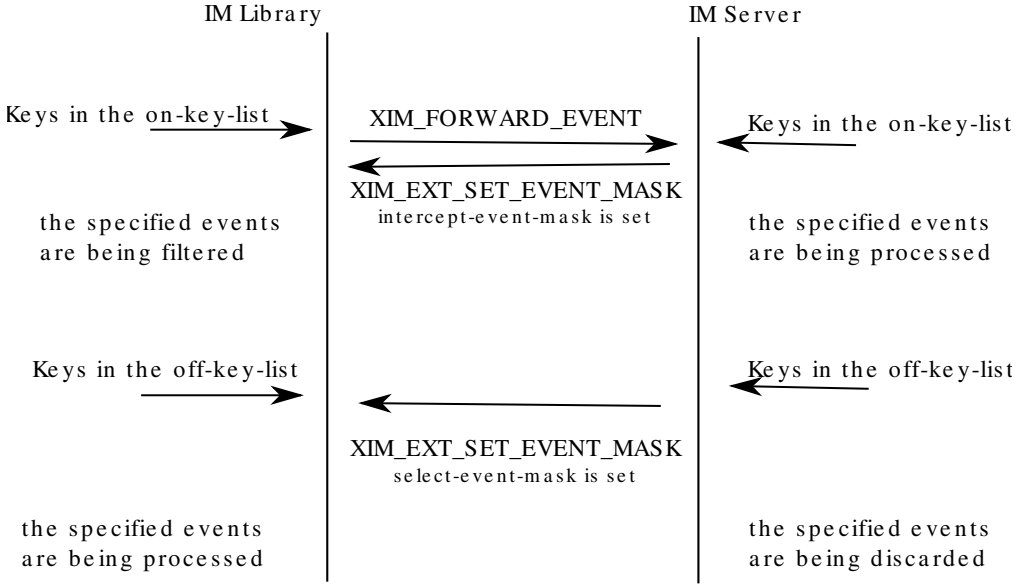
$ < $
< =
"

S < TA AS < TA A

= < -5 $
4 =
< < %

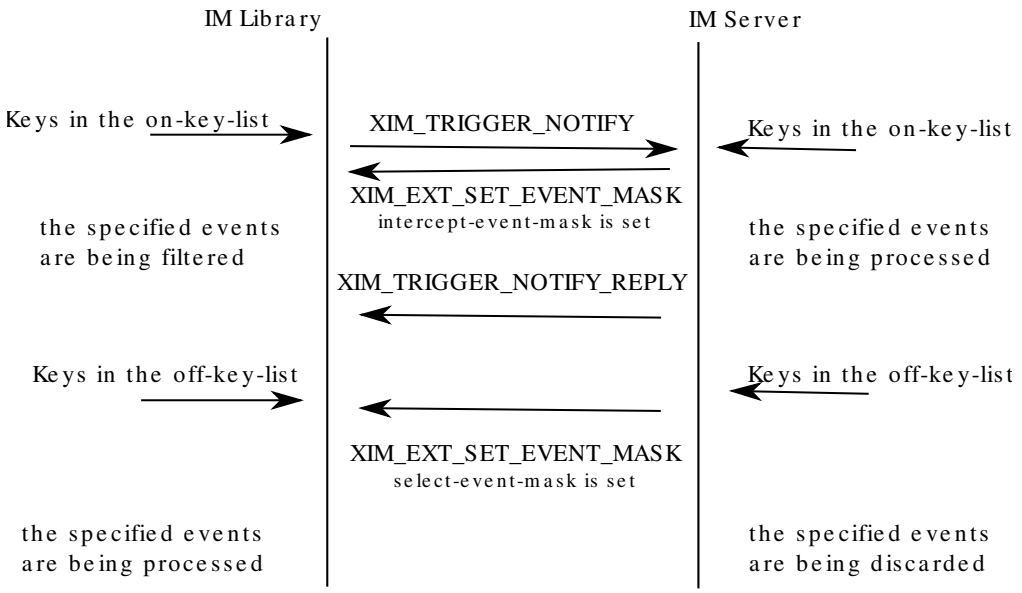
+) ' $ <
<% # -5
$ < <
XIM_REGISTER_TRIGGERKEYS % - 9 -5 $
-5 $ B $
$ -5 $ % #
: < $ % #
= "

SS0 $ TT



$

SS0 $ TT



$

$
$
$ %

-) ' = ; 4
7 * + $ <
8 3 4B $
% + 4 ;
; -5 -5 $ %

G # 6

4 4-5
% # <
% '
"

$ 4-5
-5 $ %

#
$
< %

-5 $ % -
$ %

< $
4 #7 - /'7 #,'+5% #
4 %, A: A
< # %

+ 4 # 4-5
4 4-5 -5 $
4 -5 $: 4-5

7 5 $ * %-
4 A A
-5 $ A-5
A%

7

- %+7 5
$ B 4-5E ',.',
-5 $ %

, A# - 5 A 4-5E ',.', %

3 3

	7 5
E	4 *
9 E $	4 *
/ N	#
*	-5 * -/
+ E	4- + AE4-5E47(11'7#A)
	OG
% HFI	-/
% H?I	! $ N?
% HGI	! $ N?

- -5 $
-5 $ 7 5 $ B
%

3 3 !

	7 5
E	4 *
9 E $	4 *
/ N	#
*	-/
+ E	4- + AE4-5E47(11'7#A)
	OG
% HFI	-5 -/
% H?I	$! $ N?
% HGI	$ $ N?
% HOI	$; 7 5 NG

N? ! $

! $
"

3 "3 # $ #
%

%		#
$		
F	F	75 V 75
	?	75 V 75
	G	75 V 75 V 75
?	F	1
G	F	75 V 1
	?	75 V 75 V 1

```
only-CM            :    data is sent via a ClientMessage
multi-CM           :    data is sent via multiple ClientMessages
Property-with-CM   :    data is written in Property, and its Atom
                         is send via ClientMessage
PropertyNotify     :    data is written in Property, and its Atom
                         is send via PropertyNotify
```

! $ "

W# F ! $ -5 $ % #
/ O%
! $ $ %

W# -5 $! $ % #
-5 $ %

W- ! $ $ F%

NG $; 7 5

- $ 75 $;
7 5 % # ; $
75 75 ; $
%

#

$ 7 5 * 4 *
%

) 7 -5 $

7 5

- $ 7 5 $ "

3 & 3 ' ( )

	7 5
E	4 *
9 E $	4 *
/ N	#
*	-5 -/
+ E	4- + AE4-5E5(,'/+#+A)
	J
% HGFI	/+#+ " GF

3 * 3 ' (!)

	7 5
E	4 *
9 E $	4 *
/ N	#
*	-5 -/
+ E	4- + AE4-5E ,(#(7(6A)
	J
% HGFI	/+#+ " 5+4 GF N?

N? - GF $ F%

- $ * %
$
%

W# 47
+ -5 $ $ 7 5
$ %

W# 47
+ -5 $ $ 1
$ %

47 "

3 + 3 , - % ! '

.

/ N	#
*	-5 -/
+	+ N?

.

+	4+E #,-18
	J
	5 +
E N	/+#+
	/+#+

+#(5 XInternAtom%

AE 444A

5 + -5
$ % % P # %

- + $ 7 5 $ 7 5
"

3 /3 ' .
% % !

	7 5
E	4 *
9 E $	4 *
/ N	#
*	-5 -/
+ E	4- + AE4-5E ,(#(7(6A)
	OG
% HFI	+
% H?I	+

) -5 $ 7

7 5

7 5 "

3 0 3 ' ( )

	7 5
E	4 *
9 E $	4 *
/ N	#
*	-/
+ E	4- + AE4-5E5(,'/+#+A)
	J

% HGFI	/+#+ " GF

3 1 3 ' (!)

	7 5
E	4 *
9 E $	4 *
/ N	#
*	-/
+ E	4- + AE4-5E ,(#(7(6A)
	J
% HGFI	/+#+ " 5+4 GF N?

N? - ; GF $
F%

- $ * %
$
%

W# 47 -5
+ $ 7 5 $ %

W# 47 -5
+ $ 1 $ %

47 "

3 2 3 , - % ! '

.

/ N	#
*	-/
+	+ N?
+	4+E #,-18
	J
	5 +
E N	/+#+
	/+#+

N? # +#(5
XInternAtom%

-5 $ 5 +
% % P # %

- + $ 7 5 $ 7 5
"

3 3 ' .
% % !

	7 5
E	4 *
9 E $	4 *
/ N	#
*	-/
+ E	4- + AE4-5E ,(#(7(6A)
	OG
% HFI	+#(5
% H?I	+#(5

7 7

- -5 $
%%