The Input Method Protocol

X Consortium Standard

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!
" #

$ % &"(&") * $

+ , ,-

.

/

"

"01 2 "3451 6 5276818 94 6 : 36"02;" 34554<"= 2 4<=
>6<8 1* 51 25 6 ?618 6<$?;86<@ A;" <2" ?6 6"18 "2 "01
34554<"61 2 15$04<"4A6?6"= 6"<1 25 4 45"6$;?45
;5 2 1 4<8 <2<6< 56<@1 1<" 6< <2 171<" 04?? "01 *
$2< 25"6; A1 ?64A?1 25 4<= $?46 84 4@1 25 2"015 ?64A6?6
"= 301"015 6< 4< 4$"62< 2 $2<"54$" "25" 25 2"01536 1
456 6<@ 52 2;" 2 25 6< $2<<1$"62< 36"0 "01 2 "3451 25
"01 ; 1 25 2"015 814?6<@ 6< "01 2 "3451

1# * $

B * $

* 3 ! " 2 @

Abstract

" 6 6 +6 -
B #
6 6
" .

Table of Contents

6 (
(
A ! (
6)
4)
6)
6 F
1 0 F
1 $ H
8 $ H
O
A 5 C ! O
8 " O
1 < &&
$ 1 &E
1 $ &H
1 < &O
D # &N
6 7 &N
@ 6 7 &'
$ 6$ &'
8 6$ EK
6$ 7 EK
@ 6$ 7 E&
6$ E&
; 6$ E&
1 E&
B 6 E)
E)
5 6$ EF
$! EF
4 ! E'
5 (K
4 $ 1# (K
A " ? (&
$ < (E
8 6 " ((

Introduction

Scope

" B * 3 7 && 5 F +*&&5F-
4 6
B C
+ , B
,- 4 B *&&5F
B # *6 +* 6 -

3 6 +6 -
0
6 +6 - 6
+6 - ! *&&5F
"
G
" 6
*&&5H
C #

" 6
6 6 "
"$ .6
*

6 #

Background

"# 1
B
! ! !

C
! # "
C , ! , , ! ,
! !

"# 6

6 I #

C + - "

6 I > + - 5
> >
6
6

" + 4 - #
+ 4 - . +4 # 4 -
6 6
6 A B #

!

Input Method Styles

*&& B /

/ " 6
"
! !

/ "

/ "
#

/ "

$
6 ! C

Architecture

Implementation Model

3 * 3
G

$. / 4 6
"
6
6
6

? / 4 6
" 6
6 C

4
$. 6 2
! ! 1
?

6 $. 6
6 + - 6

Structure of IM

3 6
6

" 6 *2 6 +-
6
*2 6 +- +
-

6 6 *@ 6 7 +-

" + # - *
,6 $ # , +6$- 4 6$
*6 *$ 6$+- *8 6$+-

" 6$ 6 *6
6

6
6$

6$
6 * 6$ +- +*; 6$ +-
-

Event Handling Model

1# 1 A !1
" A !1
1 6 #

" 1 A !1
6 + &-

BackEnd Method

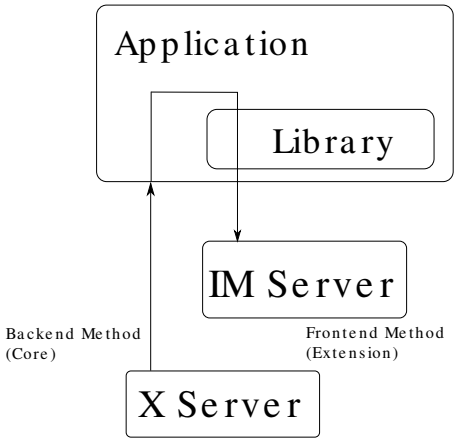
6 A !1 6
6 1
B 6
6

; 6 > > 5
6 + C 1 $ 1
$ - B 6 + 1 -

FrontEnd Method

6 1 *
6 6 "
+
6 G !
! !-

0 1 B !
6
!
A !1 1
+5
-



"

Event Flow Control

" 6
6 + 8 -

1 C 6

8 1 C
+ - 6

4 $66 $
4 $66 6
! 6 2 !
$ 6

" 8 1 C *
6
" 6
XIM_REGISTER_TRIGGERKEYS
8 1

" 1 $

Default Preconnection Convention

6 4"2
6 XIM_SERVERS,

J K " 4"2
4"2 6 6 2 6*
$ " 6
" 6
TRANSPORT,
+ - " 6
LOCALES,
*.2

" 6 4"2
XIM_SERVERS 6
* G im.

" TRANSPORT
"
4 * $

! * 6 *
3 6
* 3 + < -

Protocol

"
C . .
E * 3 L&M/

Basic Requests Packet Format

" C #
6

" C !

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

" 4I25 2 $281 C # ! !
6 4I25 2 $281 C 6<25 2
$281 N C +6 6<25 2 $281
K - 2 4I25 2 $281 6<25 2 $281
XIM_QUERY_EXTENSION +5) O D #
-" ?1<@"0)
6 ?1<@"0 K

Data Types

" * 6 /

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:

PK +Q(-
< ?
P& $458N
PE $458&H
P($458(E
P) "56<@N

PF	3	$458(E		
P&K	*6	E		*6
Y	Y	E	Y	
Y	Y		$458(E	*6
P&&	*5	E	6<"&H	*
Y	Y	E	6<"&H	=
Y	Y	E	$458&H	
Y	Y	E	$458&H	
P&E	*	E	6<"&H	*
Y	Y	E	6<"&H	=
P&(	*	E		A
Y	Y		"56<@N	A
Y	Y		Y	R +ES -
P&F	*6 0 > "	)		*6 "56@ @15>1= +Q)-
Y	Y		*6 "56@ @15>1=	*6 0 ! "
Y	Y		*6 02">1= "4"1	0 >
P&O	*6 $	*6 "5$2<7 "1*"	Y	Y
P&N	*6	*6 51186" "4"1		
P&'	*6 5	*6 51 1" "4"1		
P#O	< ?			

(*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

A 6 6 XIM_ERROR

4 C 6
C

```
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 C

```
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.
```

4 XIM_CONNECT
" 6
+6 -

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 4
C

" 6 XIM_AUTH_REPLY XIM_AUTH_REQUIRED
6

```
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 C

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

"

" 6 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 C

*6 J4;"0J<@ +6 T U 6 -

" 6 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.

0 6

/ ; B U

< B U

/ XIM_CONNECT

6 U

6 U

/ 5 XIM_AUTH_REQUIRED U

5 T U U

/ 6 XIM_AUTH_REPLY U

6 XIM_AUTH_NEXT U

6 XIM_AUTH_NG U

/ 5 XIM_CONNECT_REPLY U 5 XIM_AUTH_SETUP U

5 XIM_AUTH_NEXT U

5 XIM_AUTH_NG U

5 T U U

/ XIM_AUTH_REQUIRED U

/ XIM_AUTH_NG U

6

/ ; B U

< B U

/ 5 XIM_CONNECT

U 5 T U U

/ 6 XIM_AUTH_REQUIRED U

6 XIM_AUTH_SETUP U

6 XIM_CONNECT_REPLY U

/ 5 XIM_AUTH_REPLY U

5 XIM_AUTH_NEXT U

5 T U U

XIM_AUTH_REQUIRED U

6 XIM_AUTH_SETUP U

6 XIM_CONNECT_REPLY U

5 XIM_AUTH_REQUIRED U

5 T U U

6 XIM_CONNECT_REPLY U

6 XIM_AUTH_NG U

6 XIM_AUTH_NEXT U

XIM_AUTH_NG U

XIM_DISCONNECT C

*6 J86 $2<<1$" +6 U 6 -

XIM_DISCONNECT C " 6
XIM_DISCONNECT_REPLY ! XIM_ERROR !

*6 J86 $2<<1$"J51 ?= +6 U 6 -

XIM_OPEN C 6
6

XIM_OPEN (IM library -> IM Server)

n	STR	locale name
p		unused, p = Pad(n)

XIM_OPEN C " 6
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 6 6$?6 " *6
4""5 ?6 " *6$4""5 " 6 6$ 68
! 6
6 ! 6 .6$
" 6
6 6 .6$
* " 6$ < ?
?6 " *6$4""5

XIM_CLOSE C 6
6

XIM_CLOSE (IM library -> IM Server)

```
     2     CARD16     input-method-ID
     2                unused

XIM_CLOSE         C   " 6
       XIM_CLOSE_REPLY  !         XIM_ERROR  !


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

Event Flow Control

```
4 6                  XIM_SET_EVENT_MASK        6
              6         6           G
           6     6          6
 !   *                      B     6



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          C   "     !
                                                XIM_SET_EVENT_MASK
6      # 68      B                    68
          !         C   "
6$G

;         8      1                  6
XIM_REGISTER_TRIGGERKEYS              6
XIM_OPEN_REPLY     2   6              6
     1


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          C   " 6
6       !     !

" 6         6                      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          C   " 6
                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     C
       3               !
$    1
```

```
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
```

```
" 6                              6     6
  #              &
     !           "
XIM_OPEN      *2  6 +- "
* $
```

```
XIM_ENCODING_NEGOTIATION           C    "  6
                           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     C     C     6  #
  6


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)

4  #         #       1  "
       XIM_OPEN       *2  6 +-

6    K    6     C     6        #

6      K    6     C         6


6             #     C
XIM_QUERY_EXTENSION        #      6
BadProtocol    6    6           C       !   4
I25 2 $281    6<25 2 $281                          BadProtocol

XIM_QUERY_EXTENSION         C   "  6
                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             #
    6         6     6                                XIM_QUERY_EXTENSION
     <;??   6               #
6     6         <;??   6          #
           6

4 B               #      "  6
  B                    #      "  6
      C                 6
```

Setting IM Values

```
XIM_SET_IM_VALUES   C              6


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 " *6 4"
"56A;"1                   4
         XIM_OPEN_REPLY
```

```
XIM_SET_IM_VALUES           C   " 6
                 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                68
         6
```

Getting IM Values

```
XIM_GET_IM_VALUES  C    C  6           6
```

```
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         C   " 6
                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
```

```
" 6        6                      XIM_GET_IM_VALUES_REPLY     "
```

```
             XIM_GET_IM_VALUES
```

Creating an IC

```
XIM_CREATE_IC     C        6$
```

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

```
"      #          6             +6$- +6
                      XIM_CREATE_IC    -            B
```

XIM_CREATE_IC C # 68 "
6 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 C 6$

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

XIM_DESTROY_IC C " 6
XIM_DESTROY_IC_REPLY
XIM_DESTROY_IC $! !
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 C 6$

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 " *6$4"
"56A;"1 4
XIM_OPEN_REPLY

XIM_SET_IC_VALUES C " 6
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 C C 6$ 6

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 ?6 " $458&H <
?

XIM_GET_IC_VALUES C
" 6
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 C 6$

XIM_SET_IC_FOCUS (IM library -> IM Server)

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

XIM_SET_IC_FOCUS C

Unsetting IC Focus

XIM_UNSET_IC_FOCUS C 6$

XIM_UNSET_IC_FOCUS (IM library -> IM Server)

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

XIM_UNSET_IC_FOCUS C

Filtering Events

1 A !1
*

* 1 XIM_FORWARD_EVENT "
6 C
XIM_SYNC_REPLY ! C

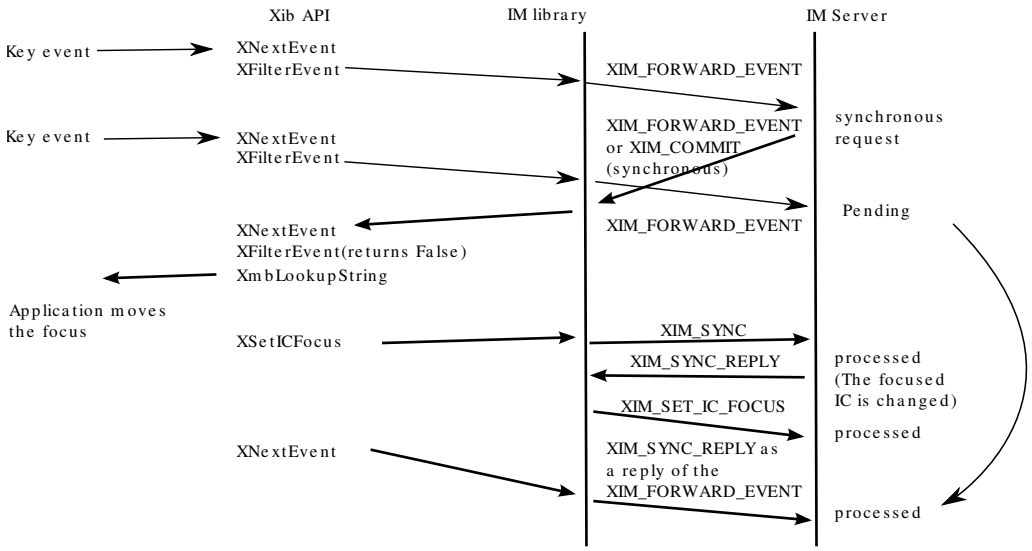
A !1

3 A !1
B !
XIM_SET_EVENT_MASK 2

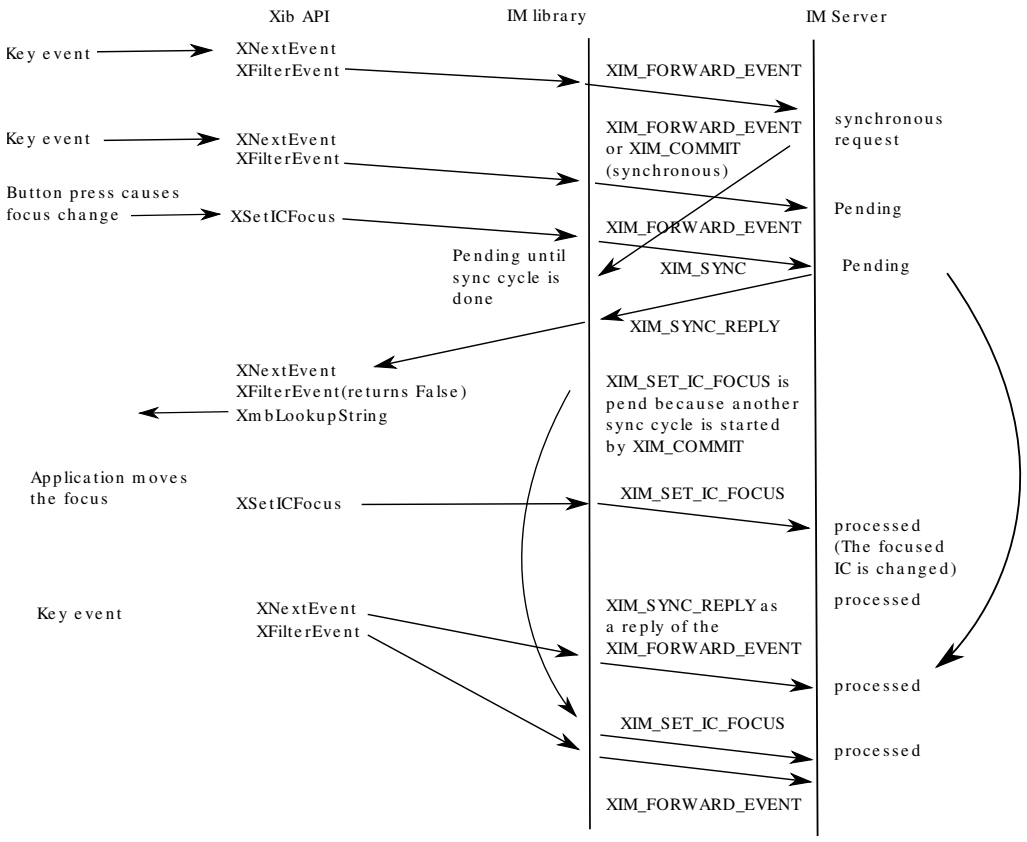
6 6
XIM_FORWARD_EVENT XIM_COMMIT C 4 6
6
XIM_FORWARD_EVENT 6
6 XIM_FORWARD_EVENT XIM_COMMIT
6 6 6
! C
6 C
6 6 ! XIM_FORWARD_EVENT
6 0 6

6 6 XIM_FORWARD_EVENT
6 C "
6 XIM_FORWARD_EVENT
XIM_SYNC_REPLY 6 XIM_FORWARD_EVENT XIM_COMMIT
6 A
B XIM_SYNC_REPLY

!



#
!
!



E

```
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).

*171<" * +#1 - 4
#1 G C < &H *1 G #
&H +6<"&H-

XIM_FORWARD_EVENT 6
6 6 2
6 6
6 " 6
XIM_FORWARD_EVENT

6 , C , , C ! ,
!

Synchronizing with the IM Server

XIM_SYNC C B 6 6

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

" B 6 6
" XIM_SYNC *6 C
" # 68 6$
6 6 B

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

" XIM_FORWARD_EVENT, XIM_COMMIT
*6 C
XIM_SYNC_REPLY

Sending a committed string

3 6 6
> 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
```

6 *? ! > /

```
     2                unused
     4     KEYSYM     KeySym
```

6 *? ! $

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

6 *? ! A

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

" 6                      XIM_COMMIT
```

Reset IC

```
XIM_RESET_IC     C            6$    6


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

XIM_RESET_IC         C   " 6
        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               # 68
      6$
```

Callbacks

```
6 *6      *6    4    *6    4     *6 @    $   !
       *6    $   !  . *6    $   !
     !

4     ! C           6       6
          C              6        6

3   6              ! C             C
          6       6
    C
```

Negotiating geometry

```
"  6                 XIM_GEOMETRY
*6     *6    4    *6    4


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

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

" 3 6$

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
6


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

```
" 6               XIM_PREEDIT_START          *6
$   !


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

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

"                    "
         !       6


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               # 68
         6$G  "
*6      $   !

" 6               XIM_PREEDIT_DRAW         *6    8  $
 !


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

"     ,   , , J   ,    , J    ,              *6
   8  $   !    3     ,     ,
 #     *6    8  $   !     <;?? 3    ,     !,
              #    !     *6    8  $   !
<;?? 3              ,       ,
              !          !

" 6               XIM_PREEDIT_CARET           $  $   !


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

1               *6    $  $   !
 !


XIM_PREEDIT_CARET_REPLY (IM library -> IM Server)

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

"                    !

" 6               XIM_PREEDIT_DONE          *6    8  $
 !


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            *6      <   $   !
```

Status Callbacks

```
" 6               XIM_STATUS_START          *6      $
 !
```

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

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

" 6 XIM_STATUS_DRAW *6 8 $
!

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

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

6 *6"#"

```
     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
```

6 *6 A "

```
     4     PIXMAP     pixmap data
```

" , , *6 8 $!

" 6 XIM_STATUS_DONE *6 8 $
!

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

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

Acknowledgements

" #
6" * $ &N ! 4

3 ! ! 4 ! !
! + -

6 0 $ "! = 0
! 6 0 6 ! ! > > ! ? 0 !
0 ! !5 A !!
0 " ! "! ! 3! ! 3!
< ! " ! = > = I =

References

! " #$ % & 5 3

*' (( ) * + 5 3*

A. Common Extensions

1# ! + XIM_EXT_SET_EVENT_MASK-
*$ "
! # !

+&- 1# V

XIM_EXT_SET_EVENT_MASK ! 6

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

" 6 XIM_SYNC_REPLY 6 " C

+E- 1#

" C

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
*6 J 1"J6$J74?;1      6                    *6
```

```
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 C

B. Transport List

" 6

" 4"2 XIM_SERVERS
C ?2$4?1
"54< 25"

"{*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>*

3 T U !

6 G T U 6

" # 6 /

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

T U + # -
+ &N (K K E&E- " T ′ U 6
# /

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

DECnet Names

" # 81$ /

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

T ″ U + 57<28-
81$ +)) OK- " T ′, U
81$ # /

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

X Names

" # * /

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

6

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

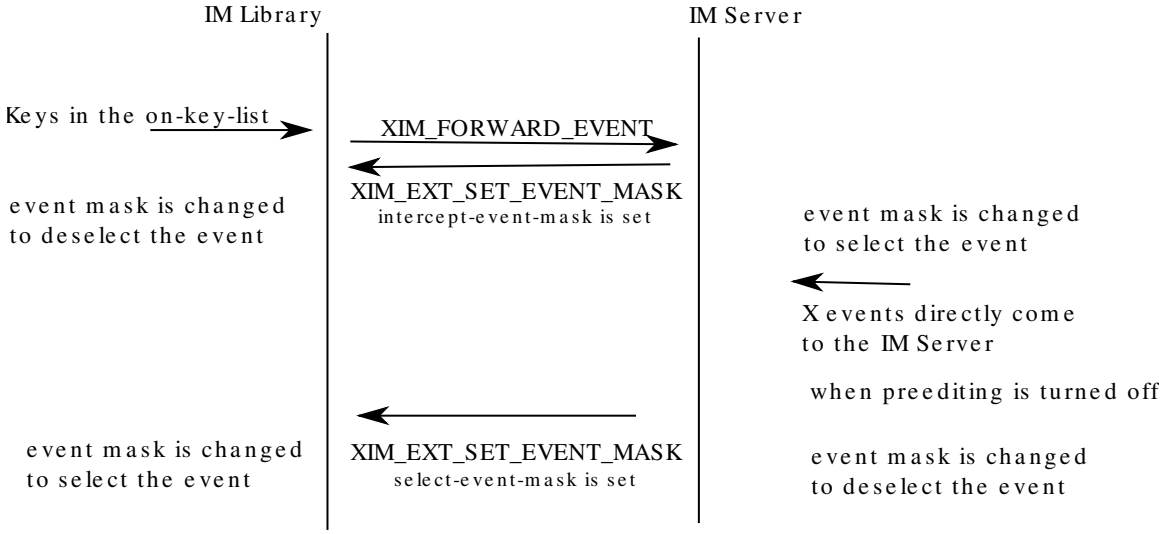
+&- 1

1 B

6 1 6 C 6
1 # " C
XIM_QUERY_EXTENSION " 6 XIM_EXT_SET_EVENT_MASK
! !
! XIM_QUERY_EXTENSION_REPLY

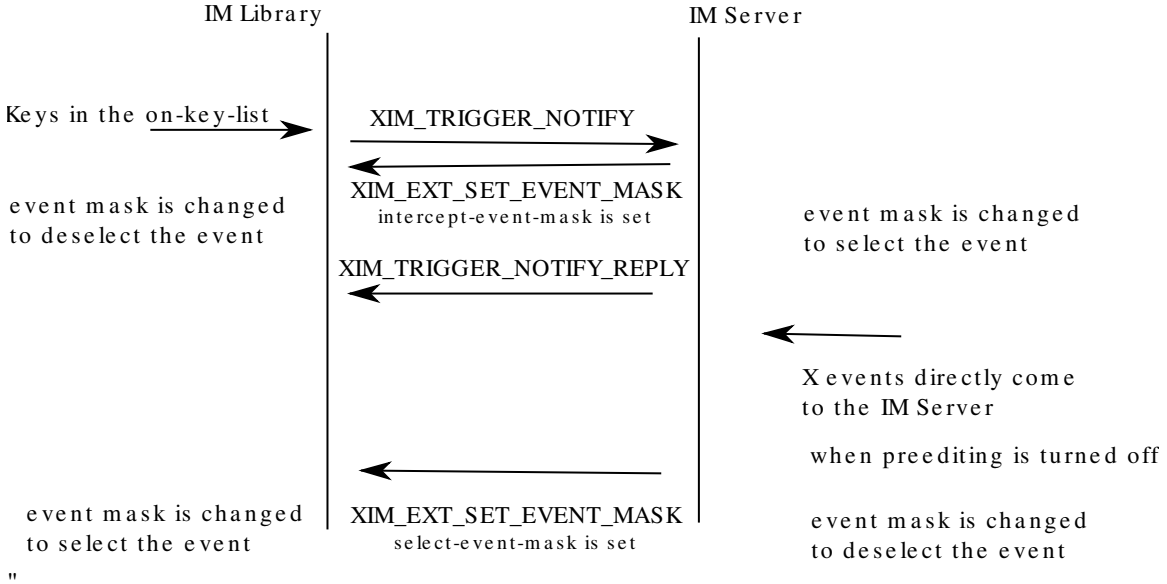
1
6 B XIM_EXT_SET_EVENT_MASK

2 ! !
" C
/



"

" # 6
C



"

" *6
! ! "

!

! C

/

T ! U, ,T ! U, ,

C ! 6

* C

! !

4 1 !

! " 6

! !

XIM_REGISTER_TRIGGERKEYS 6 A 6

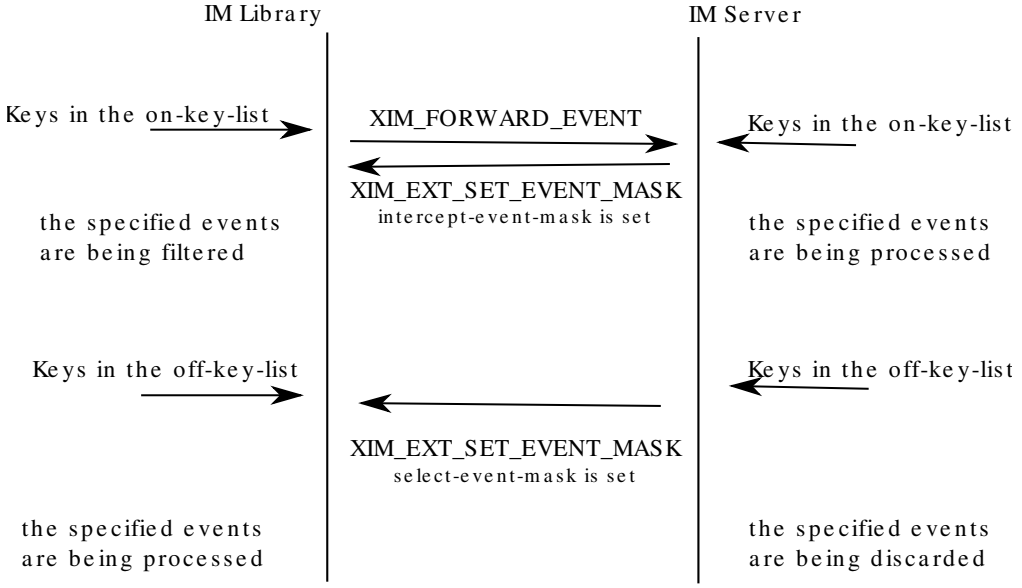
6 G

6 "

! "

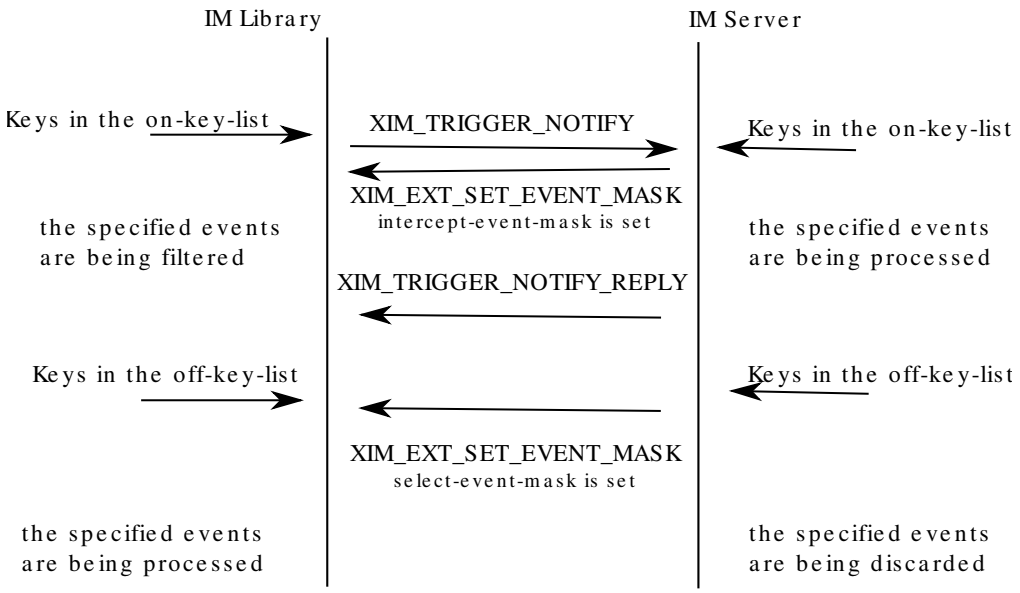
C /

TT; UU



"

TT; UU



"

"

6 1 C B *
$ 3 4 !
@ > *G
4 * B
B 6 6

+E- " ?

" * *6
" !
1
/

" *6
6

"

!

" 6 6

" !
* "$ .6 81$ "514 "
* 5 ,# ,
! "

4 * " *6
* *6 6
* 6 # *6

$ 3 6
* , ,
6 ,6
,
$
6 4$
G *6 J 15715
6
5 ," 6 , *6 J 15715

3 3

	$
J	* 3
A J	* 3
8 Q	"
3	6 3 68
4 J	*6 4 + ,J*6 J*$2<<1$", -
	(E
LKM	68
L&M	+Q&-
LEM	+Q&-

6 + 6
- 6 $ G

3 3 !

	$
J	* 3
A J	* 3
8 Q	"
3	68
4 J	*6 4 + ,J*6 J*$2<<1$", -
	(E
LKM	6 68
L&M	+Q&-
LEM	+Q&-
L(M	B $ +QE-

+Q&- .

" . .
/

3 " 3 # $ #
%

%		#
$		3
K	K	$ W $
	&	$ W $
	E	$ W $ W $
&	K	<
E	K	$ W <
	&	$ W $ W <

```
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
```

" . /

X " K . 6 "
" 8 ("
.

X " 6 . "
6

X 6 . K

+QE- B $

6 $ B
$ " B
$ + $ - B

#

" $ 3 * 3

$ 6

$

6 $ /

3 & 3 ' ( )

	$
J	* 3
A J	* 3
8 Q	"
3	6 68
4 J	*6 4 + ,J*6 J 25184"4, -
	N
LEKM	+ . 84"4 / EK -

3 * 3 ' (!)

	$
J	* 3
A J	* 3
8 Q	"
3	6 68
4 J	*6 4 + ,J*6 J 52"2$2?, -
	N
LEKM	+ . 84"4 / 4* EK - +Q&-

+Q&- 6 EK K

6 3
"

X " *$
4 6 $

X " *$
4 6 <

" *$ /

3 + 3 , - % ! '

.	
8 Q	"
3	6 68
4	. 4 +Q&-
4	*4J "56<@
	N
	4
J Q	. 84"4
	84"4

" . 4"2 XInternAtom

,J ***,

" 4 6
+ R " -

6 4 $ $
/

3 / 3 ' .
% % !

	$
J	* 3
A J	* 3
8 Q	"
3	6 68
4 J	*6 4 + ,J*6 J 52"2$2?, -
	(E
LKM	. 4
L&M	. 4

6 $

$

" $ /

3 0 3 ' ( )

	$
J	* 3
A J	* 3
8 Q	"
3	68
4 J	*6 4 + ,J*6 J 25184"4, -
	N
LEKM	+ . 84"4 / EK -

3 1 3 ' (!)

	$
J	* 3
A J	* 3
8 Q	"
3	68
4 J	*6 4 + ,J*6 J 52"2$2?, -
	N
LEKM	+ . 84"4 / 4* EK - +Q&-

+Q&- 6 B EK
K

6 3
"

X " *$ 6
4 $

X " *$ 6
4 <

" *$ /

3 23 , - % ! '

.	
8 Q	"
3	68
4	. 4 +Q&-
4	*4J "56<@
	N
	4
J Q	. 84"4
	84"4

+Q&- " . 4"2
XInternAtom

" 6 4
+ R " -

6 4 $ $
/

3 3 ' .
% % !

	$
J	* 3
A J	* 3
8 Q	"
3	68
4 J	*6 4 + ,J*6 J 52"2$2?, -
	(E
LKM	. 4"2
L&M	. 4"2

$ $

6 6