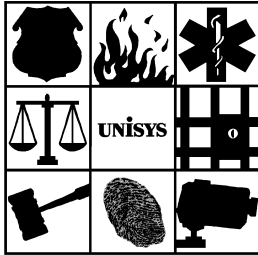


UNISYS



Law Enforcement Message Switch (LEMS)

Standard Binary Object Specification

Version: 1.1

Date: April 13, 1999

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Change Log

Version 1.1

- a) Added cover page.
- b) Corrected error in format of OBJECT LENGTH and DATA LENGTH in examples.

LEMS Standard Binary Object Specification

Introduction

The NCIC 2000 releases of both LEMS applications (5R1 on the 2200 and 2.0 for LEMS 2000) will include support for a Standard Binary Object. Unisys has developed and implemented this standard so that it can be used in the exchange of all binary objects (images, fingerprints and other not-text objects) between LEMS and its clients (workstations and metros). The object will provide a single structure for all binary inputs received from clients and all binary outputs sent to clients. Adopting it as a standard will provide the following benefits to states:

- a) All messages including AM and SEND will be able to include binary objects.
- b) Outputs sent to clients can be retransmitted even if they contain binary objects.
- c) Client software won't need to deal with the complexities or differences between how images exchanged with NCIC, NLETS and state databases.
- d) As new databases begin sending images, client interface software should not need to change.
- e) Any object, including word processor or spreadsheet files, can be exchanged using this standard.

Unisys has designed this object to be as simple as possible while providing the benefits listed above. We have discussed it with Datamaxx who endorses the approach and has agreed to support it in their workstation applications. It is suggested that states adopt this standard as their own, particularly for interfaces with workstations, metros, MDC controllers, CAD systems, etc. States may also want to consider it for use with in-state databases.

Format

The following table shows the structure of the standard binary object. Any number of such objects can be included in a message, subject to the overall format rules for the message type.

[START][OBJECT LENGTH][TYPE][DATA LENGTH][DATA][STOP]

Field	Length	Contents
START	4	"lobj" - 4 byte start pattern.
OBJECT LENGTH	4	Object length; 4 byte integer (not ASCII encoded decimal) in network byte order (same as NCIC); limited to 32K; includes entire length of the object from START to STOP, inclusive.
TYPE	4	Data type including: Standard types: such as "JPG", "BMP", "GIF", "DOC", "XLS", etc., using their standard file extension; blank-fill fourth character if necessary. Non-standard types: such as "IMG" (NCIC entry image), "FIM" (NCIC entry fingerprint), "IMR" (NCIC response image) or any non-standard type by agreement.
DATA LENGTH	4	Data length: 4 byte integer (not ASCII encoded decimal) in network byte order; limited to 32K-20.

DATA	Variable	Variable length data field containing the object.
STOP	4	"jbol" - 4 byte stop pattern.

- 1) The length fields are over-determined and provide additional integrity checks.
 - a) Since OBJECT LENGTH indicates the total length of the object from START to STOP, inclusive, it predicts where STOP should be found relative to START.
 - b) The following should be true: DATA LENGTH = OBJECT LENGTH - 20
- 2) TYPE denotes the type of object in terms of the associated file extension using standard conventions such as BMP, JPG, DOC, etc. and some non-standard extensions for NCIC images. See the *NCIC-2000 Message Book* for detailed specifications of NCIC image formats. NIST formatted RAP sheets will probably be added as a non-standard object type in the future.
 - a) **IMG** (non-fingerprint images sent to NCIC): includes image type (IMT), image size and image data. It is in the exact same format as will follow "IMG/" in an EIM transaction that includes a non-fingerprint image.
 - b) **FIM** (fingerprints sent to NCIC): includes "F", "M" and "V" indicators and associated byte counts, and image data. It is in the exact same format as will follow "FIM/" in an EIM transaction that includes a fingerprint image.
 - c) **IMR** (images received from NCIC): includes image type (IMT), upper top text (UTT), upper bottom text (UBT), lower top text (LTT), image size and image data. It is in the exact same format as will follow "IMR/" in a response from NCIC that includes a fingerprint image.

Processing

As part of the standard application LEMS, will scan inputs from clients for the presence of binary objects. If found, they will be reformatted per the requirements of the destinations. In the NCIC-2000 releases, this will include reformatting to NCIC-2000 standards. Future releases will provide conversions for NLETS. States will need to handle reformatting binary objects within applications that drive state interfaces which do not use the standard object. The NCIC-2000 releases will also reformat binary objects received from NCIC-2000 (image and fingerprints) into the standard object.

Client applications will be responsible for preparing inputs and processing outputs that contain standard binary objects.

When messages containing binary objects are to be sent to clients unable to receive them, the binary object will be replaced with the text string "****BINARY OBJECT REMOVED****".

Examples

The following examples illustrate how binary objects present in messages received from various sources will be reformatted. In the examples, values formatted as "0xNNNNNNNN" represent 4 byte integers in hexadecimal format and "s" denotes a blank space.

Example 1:

An enter image (EIM) transaction as received from a client, containing an NCIC IMG image formatted as a standard binary object. The IMG field contains a 5K byte JPG mugshot.

```
EIM.VA1234567.NIC/W123456789.IMT/M.DOI/19990401.IMG/1obj0x000013A2IM
Gs0x0000138EM05000<JPG mugshot>jbol
```

The EIM transaction as it will be sent to NCIC with headers added and the binary object reformatted to NCIC standards.

```
1B01123456789012345.EIM.VA1234567.NIC/W123456789.IMT/M.DOI/19990401.
IMG/M05000<JPG mugshot>
```

Example 2:

A response from NCIC containing a 5K byte JPG mugshot in NCIC IMR format.

```
1L01123456789012345
VA1234567

MKE/WANTED PERSON
...
IMR/M<UTT><UBT><LTT>05000<JPG mugshot>.
```

The response from NCIC as it will be sent to the client with the IMR reformatted into a standard binary object. Note that the format of delivery headers will vary among states.

```
<LEMS delivery header>
1L01123456789012345
VA1234567

MKE/WANTED PERSON
...
IMR/lobj0x0000142FIMRs0x0000141BM<UTT><UBT><LTT>05000<JPG
mugshot>jbol.
```

The response from NCIC as it will be sent to clients that don't accept messages containing binary objects with the objects removed.

```
<LEMS delivery header>
1L01123456789012345
VA1234567

MKE/WANTED PERSON
...
IMR/***BINARY OBJECT REMOVED***.
```

Example 3:

A free-format message received from a workstation containing a 4.5K byte JPG photo and 10K byte BMP drawing, both as standard binary objects.

```
SEND LDI1 LDI2,
BE ON LOOKOUT FOR SUSPECT ...
PER ATTACHED PHOTO lobj0x000011A8JPGs0x00001194<JPG photo>jbol
OTHER IMAGE SHOWS POSSIBLE SMT ON LEFT SHOULDER
lobj0x00002724BMPs0x00002710<BMP drawing>jbol
```

The message as it will be sent to LDI1 (who does accept messages containing binary objects) with the JPG photo and BMP drawing still formatted as standard binary objects.

```
<LEMS delivery header>
SEND LDI1 LDI2,
BE ON LOOKOUT FOR SUSPECT ...
PHOTO ATTACHED lobj0x000011A8JPGs0x00001194<JPG photo>jbol
OTHER IMAGE SHOWS POSSIBLE SMT ON LEFT SHOULDER
lobj0x00002724BMPs0x00002710<BMP drawing>jbol
```

The message as it will be sent to LDI2 (who doesn't accept messages containing binary objects) with the JPG photo and BMP drawing replaced by text noting the removal of binary objects.

```
<LEMS delivery header>
SEND LDI1 LDI2,
BE ON LOOKOUT FOR SUSPECT ...
PHOTO ATTACHED ***BINARY OBJECT REMOVED***
OTHER IMAGE SHOWS POSSIBLE SMT ON LEFT SHOULDER ***BINARY OBJECT
REMOVED***
```