

File created: 18-Oct-93 15:27:40 {Pele:mv:envos}<LispCore>Sources>CLTL2>DEFSTRUCT-RUN-TIME.;2

previous date: 29-Aug-91 17:01:45 {Pele:mv:envos}<LispCore>Sources>CLTL2>DEFSTRUCT-RUN-TIME.;1

Read Table: XCL

Package: LISP

Format: XCCS

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```
(IL:RPAQQ IL:DEFSTRUCT-RUN-TIMECOMS
  ( (IL:COMS
    ;; Remembering parsed structures
    (IL:VARIABLES *PARSED-DEFSTRUCTS*)
    (IL:FUNCTIONS PARSED-STRUCTURE SET-PARSED-STRUCTURE)
    (IL:SETFS PARSED-STRUCTURE) )
    (IL:COMS
    ;; Declaring storage for structures
    (IL:FUNCTIONS SI::%STRUCTURE-DECLARE-DATATYPE)
    (IL:DECLARE\ : IL:DONTEVAL@LOAD IL:DOCOPY
      ;; This defines the root of the defstruct type hierarchy.
      (IL:P (IL:\ASSIGNDATATYPE1 'STRUCTURE-OBJECT NIL 0))))
    (IL:COMS
    ;; Support for self expansions etc
    (IL:VARIABLES *DEFSTRUCT-INFO-CACHE*)
    (IL:FUNCTIONS ESTABLISH-SETFS-AND-OPTIMIZERS ESTABLISH-PREDICATE)
    (IL:FUNCTIONS GET-PS-FROM-ACCESSOR GET-PS-FROM-PREDICATE GET-SLOT-DESCRIPTOR-FROM-PS)
    (IL:FUNCTIONS CACHE-SETF-INFO) )
    (IL:COMS
    ;; defstruct IO
    (IL:VARIABLES XCL:*PRINT-STRUCTURE*)
    (IL:FUNCTIONS PRINT-STRUCTURE-INSTANCE DEFAULT-STRUCTURE-PRINTER STRUCTURE-SLOT-NAMES)
    ;; For reading
    (IL:FUNCTIONS IL:CREATE-STRUCTURE STRUCTURE-CONSTRUCTOR))
    (IL:PROP (IL:FILETYPE IL:MAKEFILE-ENVIRONMENT)
      IL:DEFSTRUCT-RUN-TIME)
    (IL:DECLARE\ : IL:DONTEVAL@LOAD IL:DOEVAL@COMPILE IL:DONTCOPY IL:COMPILEVARS (IL:ADDVARS (IL:NLAMA)
      (IL:NLAML)
      (IL:LAMA) ) ) ) ) )
```

;; Remembering parsed structures

```
(DEFVAR *PARSED-DEFSTRUCTS* (IL:HASHARRAY 100)
  ;; All declared structures
  )
```

```
(DEFMACRO PARSED-STRUCTURE (NAME &OPTIONAL (NO-ERROR NIL))
```

;; Returns the parsed-structure corresponding to name

```
(COND
  (NO-ERROR `(IL:GETHASH ,NAME *PARSED-DEFSTRUCTS*))
  (T `(OR (IL:GETHASH ,NAME *PARSED-DEFSTRUCTS*)
    (ERROR "~s is not a defined structure" ,NAME))))
```

```
(DEFUN SET-PARSED-STRUCTURE (NAME PS &OPTIONAL (EXTRA NIL EXTRA-P))
```

;; SETF method for CL::PARSED-STRUCTURE. Extra arg is because CL::PARSED-STRUCTURE takes an optional, which we ignore here, but that
;; pushes the new value over one.

```
(WHEN EXTRA-P (SETQ PS EXTRA))
(IL:PUTHASH NAME PS *PARSED-DEFSTRUCTS*))
```

```
(DEFSETF PARSED-STRUCTURE SET-PARSED-STRUCTURE)
```

;; Declaring storage for structures

```
(DEFUN SI::%STRUCTURE-DECLARE-DATATYPE (NAME FIELD-SPECIFICATIONS FIELD-DESCRIPTORS WORD-LENGTH
  SUPERTYPE)
```

;;; analagous to declare-datatype, but does not prepend the supers descriptors. You must include all descs.

;;; N.B. descriptions and specs are for ALL slots, not just local-slots.

;; field-specifications is a list of the form '(pointer pointer (bits 3) (bits 5) word fixp). See p. 8.21 IRM

;; field-descriptors is the list returned from translate.datatype when given the above FIELD-SPECIFICATIONS. They are legal to pass to fetchfield.
 ;; word-length is the car of the result of translate.datatype.
 ;; supertype is the typename of the supertype.

```
(IF (NOT (AND (SYMBOLP NAME)
              (IL:SMALLPOSP WORD-LENGTH)))
    (ERROR "Illegal arguments: ~s ~s" NAME WORD-LENGTH))
(LET ((REFERENCE-COUNTED-POINTERS (MAPCAN #'(LAMBDA (DESCRIPTOR)
                                              (CASE (CADDR DESCRIPTOR)
                                                  ((IL:POINTER IL:FULLPOINTER) (LIST (CADR DESCRIPTOR)))
                                                  (FIELD-DESCRIPTORS)))
      (MULTIPLE-VALUE-BIND (TYPE-NUMBER REDECLARED?)
        (IL:\\ASSIGNDATATYPE1 NAME FIELD-DESCRIPTORS WORD-LENGTH FIELD-SPECIFICATIONS
          REFERENCE-COUNTED-POINTERS SUPERTYPE)
        ;; set the magic global to the allocated type number
        (IL:SETTOPVAL (IL:\\TYPEGLOBALVARIABLE NAME T)
          TYPE-NUMBER)
        (VALUES FIELD-DESCRIPTORS REDECLARED?))))
      (IL:DECLARE\\: IL:DONTEVAL@LOAD IL:DOCOPY
      (IL:\\ASSIGNDATATYPE1 'STRUCTURE-OBJECT NIL 0)
      )
```

;; Support for self expansions etc

```
(DEFVAR *DEFSTRUCT-INFO-CACHE* (IL:HASHARRAY 100)
      ;; Used to cache slots and predicates
      )
```

```
(DEFUN ESTABLISH-SETFS-AND-OPTIMIZERS (PS-NAME)
  ;; Caches shared self expanders and accessor optimizers where appropriate
  (LET* ((PS (PARSED-STRUCTURE PS-NAME))
        (INLINE (PS-INLINE PS)))
    (MAPC #'(LAMBDA (SLOT)
      ;; function-defining-form decides whether or not the accessors should be defun, definline, etc.
      (LET ((ACCESSOR (PSLOT-ACCESSOR SLOT)))
        (WHEN ACCESSOR
          (REMHASH ACCESSOR *DEFSTRUCT-INFO-CACHE*)
          (IF (NOT (PSLOT-READ-ONLY SLOT))
            ;; install the self method expander that is shared for all accessors
            (SET-SHARED-SETF-INVERSE ACCESSOR 'DEFSTRUCT-SHARED-SETF-EXPANDER))
          (COND
            ((EQ INLINE :ONLY)
              (SETF (MACRO-FUNCTION ACCESSOR)
                'DEFSTRUCT-SHARED-ACCESSOR-OPTIMIZER))
            ((MEMBER :ACCESSOR INLINE :TEST #'EQ)
              (SETF (GET ACCESSOR 'COMPILER:OPTIMIZER-LIST)
                (LIST 'DEFSTRUCT-SHARED-ACCESSOR-OPTIMIZER))))
          (T (REMPROP ACCESSOR 'COMPILER:OPTIMIZER-LIST))))))
    (PS-ALL-SLOTS PS))))
```

```
(DEFUN ESTABLISH-PREDICATE (PS-NAME)
  ;; Establishes a shared a shared optimizer for a defstruct predicate
  (LET* ((PS (PARSED-STRUCTURE PS-NAME))
        (PREDICATE (PS-PREDICATE PS)))
    (REMHASH PREDICATE *DEFSTRUCT-INFO-CACHE*)
    (IF (EQ (PS-INLINE PS) :ONLY)
      (SETF (MACRO-FUNCTION PREDICATE)
        'DEFSTRUCT-SHARED-PREDICATE-OPTIMIZER)
      (SETF (GET PREDICATE 'COMPILER:OPTIMIZER-LIST)
        (LIST 'DEFSTRUCT-SHARED-PREDICATE-OPTIMIZER)))))
```

```
(DEFUN GET-PS-FROM-ACCESSOR (ACCESSOR &OPTIONAL (NO-ERROR-P NIL))
  (OR (CATCH 'FIND-PS
      (MAPHASH #'(LAMBDA (KEY VALUE)
        (DOLIST (SLOT (PS-ALL-SLOTS VALUE)
          NIL)
          (IF (EQ ACCESSOR (PSLOT-ACCESSOR SLOT))
            (THROW 'FIND-PS VALUE))))
      *PARSED-DEFSTRUCTS*))
    (IF (NULL NO-ERROR-P)
      (ERROR "No such slot: ~s" ACCESSOR))))
```

```
(DEFUN DEFAULT-STRUCTURE-PRINTER (STRUC STREAM &OPTIONAL (PRINT-LEVEL 0))
  (IF (NOT XCL:*PRINT-STRUCTURE*)
    (IL:\\PRINT-USING-ADDRESS STRUC STREAM 0)
    (LET ((*PRINT-LEVEL* (AND *PRINT-LEVEL* (1- *PRINT-LEVEL*))))
      (IF (OR (AND *PRINT-LEVEL* (<= *PRINT-LEVEL* PRINT-LEVEL))
        (AND *PRINT-LENGTH* (<= *PRINT-LENGTH* 0)))
        (IL:\\ELIDE.PRINT.ELEMENT STREAM)
        (LET ((LENGTHSOFAR (IF *PRINT-LENGTH* 0))
          (TYPE (IL:TYPE-NAME STRUC)))
          (IL:\\OUTCHAR STREAM (IL:|fetch| (READTABLEP IL:HASHMACROCHAR) IL:|of| *READTABLE*))
          (WRITE-STRING "S(" STREAM)
          (IF (AND LENGTHSOFAR (> (INCF LENGTHSOFAR)
            *PRINT-LENGTH*))
            (IL:\\ELIDE.PRINT.TAIL STREAM T)
            (PROGN (IF *PRINT-ESCAPE*
              (PRIN1 TYPE STREAM)
              (PRINC TYPE STREAM))
              (DO ((FIELD (STRUCTURE-SLOT-NAMES TYPE)
                (CDR FIELD))
                (DESCRIPTOR (IL:GETDESCRIPTORS TYPE)
                (CDR DESCRIPTOR)))
                ((NULL FIELD))
                (WHEN (EQ (CAR FIELD)
                  'SI:--STRUCTURE-DUMMY-SLOT--))
```

```

                (GO SKIP))
                (IL:\\OUTCHAR STREAM (IL:CONSTANT (CHAR-CODE #\Space)))
                (IF (AND LENGTHSOFAR (> (INCF LENGTHSOFAR)
                                           *PRINT-LENGTH*))
                    (PROGN (IL:\\ELIDE.PRINT.TAIL STREAM T)
                          (RETURN NIL))
                    (PROGN (PRINC (CAR FIELD)
                                STREAM)
                          (IF (AND LENGTHSOFAR (> (INCF LENGTHSOFAR)
                                           *PRINT-LENGTH*))
                              (PROGN (IL:\\ELIDE.PRINT.TAIL STREAM T)
                                    (RETURN NIL))
                              (PROGN (IL:\\OUTCHAR STREAM (IL:CONSTANT (CHAR-CODE #\Space)))
                                    (IL:\\PRINDATUM (IL:FETCHFIELD (CAR DESCRIPTOR)
                                                                STRUC)
                                                                STREAM
                                                                (1+ PRINT-LEVEL))))))
                    SKIP)))
                (WRITE-STRING ")" STREAM)))
        T)))

(DEFUN STRUCTURE-SLOT-NAMES (STRUCTURE-NAME &OPTIONAL (DONT-COPY NIL))
  (LET* ((PS (PARSED-STRUCTURE STRUCTURE-NAME))
         NAMES)
    (SETQ NAMES (PS-ALL-SLOT-NAMES PS))
    (IF DONT-COPY
        NAMES
        (COPY-LIST NAMES))))

;; For reading

(DEFUN IL:CREATE-STRUCTURE (STRUCTURE-FORM)
  (APPLY (STRUCTURE-CONSTRUCTOR (CAR STRUCTURE-FORM))
        (XCL:WITH-COLLECTION (DO ((TAIL (CDR STRUCTURE-FORM)
                                         (CDDR TAIL)))
                                ((NULL TAIL))
                                (XCL:COLLECT (IL:MAKE-KEYWORD (CAR TAIL)))
                                (XCL:COLLECT (CADR TAIL))))))

(DEFUN STRUCTURE-CONSTRUCTOR (STRUCTURE-NAME)
  (OR (GET STRUCTURE-NAME 'IL:STRUCTURE-CONSTRUCTOR)
      (LET* ((PS (PARSED-STRUCTURE STRUCTURE-NAME))
             (CONSTRUCTOR (PS-STANDARD-CONSTRUCTOR PS)))
        (OR CONSTRUCTOR (ERROR "~S is a structure with no standard constructor." (PS-NAME PS))))))

(IL:PUTPROPS IL:DEFSTRUCT-RUN-TIME IL:FILETYPE COMPILE-FILE)

(IL:PUTPROPS IL:DEFSTRUCT-RUN-TIME IL:MAKEFILE-ENVIRONMENT (:READTABLE "XCL" :PACKAGE "LISP"))

(IL:DECLARE\ : IL:DONTEVAL@LOAD IL:DOEVAL@COMPILE IL:DONTCOPY IL:COMPILERVERS

(IL:ADDTOVAR IL:NLAMA )

(IL:ADDTOVAR IL:NLAML )

(IL:ADDTOVAR IL:LAMA )
)

(IL:PUTPROPS IL:DEFSTRUCT-RUN-TIME IL:COPYRIGHT ("Venue & Xerox Corporation" 1986 1987 1988 1990 1991 1993))

```

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