

File created: 15-Aug-91 18:13:28 {DSK}<python>release>loops>2.0>library-src>LOOPSVCOPY.;2

changes to: (VARS LOOPSVCOPYCOMS)

previous date: 15-Aug-90 17:26:50 {DSK}<python>release>loops>2.0>library-src>LOOPSVCOPY.;1

Read Table: INTERLISP

Package: INTERLISP

Format: XCCS

;;
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(RPAQQ **LOOPSVCOPYCOMS**

((DECLARE%: DONTCOPY (PROP MAKEFILE-ENVIRONMENT LOOPSVCOPY))
(DECLARE%: DONTCOPY EVAL@COMPILE (FILES (LOADCOMP)
LOOPSSTRUC))

;;; Virtual Copy defn's

(CLASSES VirtualCopy VirtualCopyClass VirtualCopyMixin VirtualCopyContext)
(METHODS VirtualCopy.AddIV VirtualCopy.HasCV VirtualCopy.HasIV VirtualCopy.IVMissing VirtualCopy.InstOf
VirtualCopy.InstOf! VirtualCopy.InstallFileSource VirtualCopy.ListAttribute
VirtualCopy.ListAttribute! VirtualCopy.MethodNotFound VirtualCopy.OriginalID
VirtualCopy.SuperMethodNotFound VirtualCopy.Understands VirtualCopy.\Internal/MakeCopyObject
VirtualCopyClass.CVMissing VirtualCopyMixin.IVValueFromOriginal VirtualCopyMixin.IVValueMissing
VirtualCopyMixin.NewInstance VirtualCopyMixin.OriginalID VirtualCopyMixin.PrintOn
VirtualCopyMixin.VirtualCopy? VirtualCopyMixin.\Internal/MakeCopy
VirtualCopyMixin.\Internal/MakeCopyActiveValue VirtualCopyMixin.\Internal/MakeCopyList
VirtualCopyMixin.\Internal/MakeCopyObject)

;;; VirtualCopy fns

(FNS GetUltimateIVHere MakeVirtualCopy MakeVirtualMixin UltimateOriginal VirtualCopyOfCons))

(DECLARE%: DONTCOPY

(PUTPROPS **LOOPSVCOPY MAKEFILE-ENVIRONMENT** (:PACKAGE "IL" :READTABLE "INTERLISP" :BASE 10))
)

(DECLARE%: DONTCOPY EVAL@COMPILE

(FILESLOAD (LOADCOMP)
LOOPSSTRUC)
)

;;; Virtual Copy defn's

(DEFCLASSES VirtualCopy VirtualCopyClass VirtualCopyMixin VirtualCopyContext)

(DEFCLASS VirtualCopy (MetaClass VirtualCopyClass doc "VirtualCopy is a class that creates a sparse
representation for copies of object structures. It assumes that the class being
copied has a class variable named VirtualIVs Note. May want to extend this to say
ALL or DontCopy some" Edited%: (* sm%:"14-Feb-85 11:09"))

(Supers VirtualCopyMixin)
(InstanceVariables (| copyOf | NIL doc "Original object that this is a virtual copy of")
(| copyMap | NIL doc "Association list of objects and their copies to be substituted as structure
is built.")))

(DEFCLASS VirtualCopyClass (MetaClass MetaClass Edited%: (* sm%:"12-Feb-85 10:29"))
(Supers Class))

(DEFCLASS VirtualCopyMixin (MetaClass AbstractClass doc "VirtualCopyMixin is a class that creates a
representation for copies of object structures. It assumes that the class
being copied has a class variable named VirtualIVs It is mixed in with this
class, so that messages are handled locally, but values of instance variables
which are not set locally are found in the copy" Edited%:
(* sm%:"12-Jan-87 17:58"))

(Supers Tofu)
(InstanceVariables (| copyOf | NIL doc "Original object that this is a virtual copy of")
(| copyMap | NIL doc "Association list of objects and their copies to be substituted as structure
is built.")))

(DEFCLASS VirtualCopyContext (MetaClass Class Edited%: (* SM "31-Jul-86 13:52")
doc "used to represent the copy context of a set of virtual copies. keeps
the shared copyMap of all the copies")

(Supers Object)
(InstanceVariables (copyMap NIL doc "list of dotted pairs of original.copy"))

(\BatchMethodDefs)

```
(METH VirtualCopy AddIV (varName newValue propName)
  "Adds an IV to instance. If it is not in regular set, puts it in assoc List on otherIVs"
  (category (VirtualCopy)))

(METH VirtualCopy HasCV (cvName propName)
  "Forwards to original"
  (category (VirtualCopy)))

(METH VirtualCopy HasIV (ivName propName)
  "New method template"
  (category (VirtualCopy)))

(METH VirtualCopy IVMissing (varName propName typeFlg newValue)
  "if an IV is missing then try the copyOf. Also if the IV is to be copied put back a virtual copy of the
  value"
  (category (VirtualCopy)))

(METH VirtualCopy InstOf (class)
  "Forward message"
  (category (VirtualCopy)))

(METH VirtualCopy InstOf! (class)
  "Forward message"
  (category (VirtualCopy)))

(METH VirtualCopy InstallFileSource (fileSource)
  "Fill the given instance based on expression fileSource read from file, and name it"
  (category (VirtualCopy)))

(METH VirtualCopy ListAttribute (type name)
  "Foward ListAttribute messages, with addition for IVs"
  (category (VirtualCopy)))

(METH VirtualCopy ListAttribute! (type name)
  "Foward ListAttribute! messages, with addition for IVs"
  (category (VirtualCopy)))

(METH VirtualCopy MethodNotFound (selector)
  "Find the method from the original object,"
  (category (Tofu)))

(METH VirtualCopy OriginalID NIL "An expression to identify the original for a virtual copy in PrintOn"
  (category (VirtualCopyMixin)))

(METH VirtualCopy SuperMethodNotFound (selector classOfSendingMethod)
  "Find the super method from the original object"
  (category (Tofu)))

(METH VirtualCopy Understands (selector)
  "Forward message"
  (category (VirtualCopy)))

(METH VirtualCopy \Internal/MakeCopyObject (valueToCopy)
  "copy the value from the original"
  (category (VirtualCopyMixin)))

(METH VirtualCopyClass CVMissing (object varName propName typeFlag newValue)
  "forwards it along to the thing its a copy of"
  (category (Class)))

(METH VirtualCopyMixin IVValueFromOriginal (varName propName typeFlg newValue)
  "get the value from the original (or inherit from its class)"
  (category (VirtualCopyMixin)))

(METH VirtualCopyMixin IVValueMissing (varName propName typeFlg newValue)
  "find the value in the original"
  (category (VirtualCopyMixin)))

(METH VirtualCopyMixin NewInstance (copyOf copyContextObj)
  "fills in the virtual copy and updates the copyMap"
  (category (VirtualCopyMixin)))

(METH VirtualCopyMixin OriginalID NIL "An expression to identify the original for a virtual copy in PrintOn"
  (category (VirtualCopyMixin)))

(METH VirtualCopyMixin PrintOn NIL "Object.PrintOn could be over-riden by some method of the copyOf so catch it
  here" (category (VirtualCopyMixin)))

(METH VirtualCopyMixin VirtualCopy? NIL "yes I am a virtual copy" (category (VirtualCopyMixin)))

(METH VirtualCopyMixin \Internal/MakeCopy (valueToCopy)
  "copy the value from the original"
  (category (VirtualCopyMixin)))

(METH VirtualCopyMixin \Internal/MakeCopyActiveValue (valueToCopy)
  "copy the activeValue from the original"
  (category (VirtualCopyMixin)))
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(METH VirtualCopyMixin \Internal/MakeCopyList (valueToCopy)
"copy the list from the original"
(category (VirtualCopyMixin)))

(METH VirtualCopyMixin \Internal/MakeCopyObject (valueToCopy)
"copy the value from the original"
(category (VirtualCopyMixin)))

[Method ((VirtualCopy AddIV)
self varName newValue propName) ;smL 9-Jun-86 19:16
"Adds an IV to instance. If it is not in regular set, puts it in assoc List on otherIVs"
(COND
[propName (WithIVPropDescr! self varName [LAMBDA (self varName propDescr)
(InstPutProp propDescr propName newValue)
(LAMBDA (self varName)
(_ self AddIV varName NotSetValue)
(InstPutProp (MakeIVPropDescr self varName)
propName newValue)
(T (WithIVValue self varName [LAMBDA (self varName oldValue loc)
(ChangeIVValue self varName loc newValue)
(LAMBDA (self varName)
(push (fetch otherIVs of self)
(CONS varName (create IVDescr
IVValue _ newValue)))
newValue]
(Method ((VirtualCopy HasCV)
self cvName propName) ;sm: 21-Feb-85 18:21
"forwards to original" ;assumes that VirtualCopy class does not have any CVs
(_ (UltimateOriginal self)
HasCV cvName propName))

(Method ((VirtualCopy HasIV)
self ivName propName) ;sm: 14-Feb-85 13:23
"New method template"
(OR (FMEMB ivName '( | copyOf | | copyMap |))
(_ (UltimateOriginal self)
HasIV ivName propName)))

(Method ((VirtualCopy IVMissing)
self varName propName typeFlg newValue) ;sm: 22-Feb-85 13:17
"if an IV is missing then try the copyOf. Also if the IV is to be copied put back a virtual copy of the
value"
(OR varName (ERROR "NIL is not an IVName"))
(SELECTQ typeFlg
((GetValueOnly GetValue)
(_ self IVValueMissing varName propName typeFlg newValue))
(PutValue (_ self AddIV varName NotSetValue)
(_ self IVValueMissing varName propName typeFlg newValue))
(PutValueOnly (_ self AddIV varName newValue propName))
(SHOULDNT "Error in IVMissing")))

(Method ((VirtualCopy InstOf)
self class) ;sm: 14-Feb-85 13:20
"Forward message"
(_ (UltimateOriginal self)
InstOf class))

(Method ((VirtualCopy InstOf!)
self class) ;sm: 14-Feb-85 13:21
"Forward message"
(_ (UltimateOriginal self)
InstOf! class))

(Method ((VirtualCopy InstallFileSource)
self fileSource) ;sm: 20-Feb-85 09:29
"Fill the given instance based on expression fileSource read from file, and name it"
(NameObject self (LISTP (CAR fileSource)
NIL))
(FillInst (CDR fileSource)
self)
self)

(Method ((VirtualCopy ListAttribute)
self type name) ;smL 11-Apr-86 15:13
"Forward ListAttribute messages, with addition for IVs"
(SELECTQ (U-CASE type)
(IVS (APPEND '( | copyOf | | copyMap |)
(_ (UltimateOriginal self)
ListAttribute type name)))
(_ (UltimateOriginal self)
ListAttribute type name)))

(Method ((VirtualCopy ListAttribute!)
self type name) ;smL 11-Apr-86 15:18
"Forward ListAttribute! messages, with addition for IVs"

```

```
(SELECTQ (U-CASE type)
  (IVS (APPEND '(| copyOf | | copyMap |)
    (_ (UltimateOriginal self)
      ListAttribute! type name)))
  (_ (UltimateOriginal self)
    ListAttribute! type name)))

(Method ((VirtualCopy MethodNotFound)
  self selector) ; sm: 14-Feb-85 13:33
  "Find the method from the original object,"
  (FetchMethodOrHelp (UltimateOriginal self)
    selector))

(Method ((VirtualCopy OriginalID)
  self) ; sm: 17-Jun-85 15:47
  "An expression to identify the original for a virtual copy in PrintOn"
  (CONS (ClassName (@ | copyOf |))
    (_Super)))

(Method ((VirtualCopy SuperMethodNotFound)
  self selector classOfSendingMethod) ; sm: 12-Feb-85 15:11
  "Find the super method from the original object"
  (FindSuperMethod (UltimateOriginal self)
    selector classOfSendingMethod))

(Method ((VirtualCopy Understands)
  self selector) ; sm: 14-Feb-85 13:23
  "Forward message"
  (_ (UltimateOriginal self)
    Understands selector))

(Method ((VirtualCopy \Internal/MakeCopyObject)
  self valueToCopy) ; smL 11-Apr-86 15:47
  "copy the value from the original"
  (MakeVirtualCopy valueToCopy (@ | copyMap |)))

(Method ((VirtualCopyClass CVMissing)
  self object varName propName typeFlag newValue) ; smL 29-Sep-86 17:27
  "forwards it along to the thing its a copy of"
  (SELECTQ typeFlag
    ((PutClassValueOnly PutClassValue)
      (APPLY* typeFlag (UltimateOriginal object)
        varName newValue propName))
    (APPLY* typeFlag (UltimateOriginal object)
      varName propName)))

(Method ((VirtualCopyMixin IVValueFromOriginal)
  self varName propName typeFlg newValue) ; smL 29-Sep-86 17:53
  "get the value from the original (or inherit from its class)"
  (SELECTQ typeFlg
    ((GetValue GetValueOnly)
      [COND
        ((FMEMB varName '(| copyOf | | copyMap |))
          NIL)
        ([AND (_ (@ | copyOf |)
          HasCV
          'VirtualIVs)
          (LET [(virtual (GetClassValue (@ | copyOf |)
            'VirtualIVs]
              (OR (EQ virtual 'ALL)
                (FMEMB varName virtual]
                  (* for virtual ivs ALWAYS copy the value accessible from the
                  original)
                (_ self AddIV varName (_ self \Internal/MakeCopy (GetValueOnly (@ | copyOf |)
                  varName propName)
                    propName)
                (APPLY* typeFlg self varName propName))
          (* for all other ivs)
          (T (LET ((otherHere (GetValueOnly (@ | copyOf |)
            varName propName)))
              (SELECTQ typeFlg
                (GetValueOnly otherHere)
                (ExtractRealValue self varName otherHere propName))
            (* PutValueOnly never gets here)
            (PutValue
              [COND
                ((FMEMB varName '(| copyOf | | copyMap |))
                  (PutValueOnly self varName newValue propName))
                (T (LET ((otherHere (GetValueOnly (@ | copyOf |)
                  varName propName)))
                    (* Prepare for active values)
                    (COND
                      ((type? annotatedValue otherHere)
                        (* Move active value into Virtual copy)
                        (PutValueOnly self varName (_ self \Internal/MakeCopy otherHere)
                          propName)
                        (PutValue self varName newValue propName)))
                    ))
              ))
            ))
          ))
      ))
  ))

```

```

(T (PutValueOnly self varName newValue propName))
(SHOULDNT "Error in Put or GetValue"))))

(Method ((VirtualCopyMixin IVValueMissing)
  self varName propName typeFlg newValue) ; sml 29-Sep-86 14:52
"find the value in the original"
(if (ASSOC varName (fetch otherIVs of self))
  then (_Super)
  else (_ self IVValueFromOriginal varName propName typeFlg newValue)))

(Method ((VirtualCopyMixin NewInstance)
  self copyOf copyContextObj) ; SM 31-Jul-86 15:48
"fills in the virtual copy and updates the copyMap"
(PutValueOnly self '| copyOf | copyOf)
[COND
  (copyContextObj (* copied in context, just add to the copy map)
    (NCONC1 (@ copyContextObj copyMap)
      (CONS copyOf self)))
  (T (* create a new context)
    (SETQ copyContextObj (_ ($ VirtualCopyContext)
      New))
    (_@
      copyContextObj copyMap (LIST (CONS copyOf self)
        (PutValueOnly self '| copyMap | copyContextObj)
        self)))

(Method ((VirtualCopyMixin OriginalID)
  self) ; sml 23-May-86 09:36
"An expression to identify the original for a virtual copy in PrintOn"
(OR (GetObjectName (@ | copyOf |))
  (fetch OBJUID of (@ | copyOf |))
  (EntityAddress (@ | copyOf |)))

(Method ((VirtualCopyMixin PrintOn)
  self) ; sml 23-May-86 09:36
"Object.PrintOn could be over-riden by some method of the copyOf so catch it here"
(LIST (CONCAT LoopsReadMacroChar ".")
  '$&
  (ClassName self)
  (OR (fetch OBJUID of self)
    (EntityAddress self))
  (_ self OriginalID)))

(Method ((VirtualCopyMixin VirtualCopy?)
  self) ; sm: 14-Feb-85 11:12
"yes I am a virtual copy" self)

(Method ((VirtualCopyMixin \Internal/MakeCopy)
  self valueToCopy) ; sml 11-Apr-86 15:50
"copy the value from the original"
(SELECTQ (TYPENAME valueToCopy)
  (instance (_ self \Internal/MakeCopyObject valueToCopy))
  (LISTP (_ self \Internal/MakeCopyList valueToCopy))
  (annotatedValue
    (_ self \Internal/MakeCopyActiveValue valueToCopy))
  valueToCopy))

(Method ((VirtualCopyMixin \Internal/MakeCopyActiveValue)
  self valueToCopy) ; sml 11-Apr-86 15:50
"copy the activeValue from the original"
(LET* ((oldAV (fetch annotatedValue of valueToCopy))
  (newAV (_ (_ oldAV Class)
    New)))
  [for iv in (_ oldAV ListAttribute! 'IVS) do (PutValueOnly newAV iv (_ self \Internal/MakeCopy
    (GetIVHere oldAV iv)
    (create annotatedValue
      annotatedValue _ newAV)))]

(Method ((VirtualCopyMixin \Internal/MakeCopyList)
  self valueToCopy) ; sml 11-Apr-86 15:50
"copy the list from the original"
(LET [(first (_ self \Internal/MakeCopy (CAR valueToCopy)))
  (rest (_ self \Internal/MakeCopy (CDR valueToCopy))]
  (COND
    ((AND (EQ first (CAR valueToCopy))
      (EQ rest (CDR valueToCopy)))
      valueToCopy)
    (T (CONS first rest)))

(Method ((VirtualCopyMixin \Internal/MakeCopyObject)
  self valueToCopy) ; sml 11-Apr-86 15:47
"copy the value from the original"
(MakeVirtualMixin valueToCopy (@ | copyMap |)))

(\UnbatchMethodDefs)

```

;;; VirtualCopy fns

(DEFINEQ

(GetUltimateIVHere

[LAMBDA (self varName prop)

(* sm%: "22-Feb-85 09:46")

(* returns the local IV up the original chain starting with self)

```
(LET ((here (GetIVHere self varName prop)))
  (COND
    ((NotSetValue here)
     (COND
       ((_ self VirtualCopy?)
        (GetUltimateIVHere (@ | copyOf |)
                             varName prop))
       (T here)))
    (T here]))
```

(MakeVirtualCopy

[LAMBDA (x copyContextObj)

(* SM "31-Jul-86 14:17")

(* copies any objects inside of x)

```
(COND
  ((Object? x)
   (OR [AND copyContextObj (CDR (ASSOC x (@ copyContextObj copyMap]
                                         (_ ($ VirtualCopy)
                                             New x copyContextObj))
```

(MakeVirtualMixin

[LAMBDA (x copyContextObj)

(* SM "31-Jul-86 14:18")

(* copies any objects inside of x)

```
(COND
  ((Object? x)
   (OR [AND copyContextObj (CDR (ASSOC x (@ copyContextObj copyMap]
                                         (_ [$! (LIST 'VirtualCopyMixin (ClassName (UltimateOriginal x]
                                                                                   New x copyContextObj))
```

(UltimateOriginal

[LAMBDA (self)

(* sm%: "14-Feb-85 12:06")

(* finds the thing which self is ultimately copying)

```
(COND
  [(_ self VirtualCopy?)
   (COND
     ((NULL (@ | copyOf |))
      (ERROR self "No original for VirtualCopy"))
     (T (UltimateOriginal (@ | copyOf |)
                            (T self]))
```

(VirtualCopyOfCons

[LAMBDA (list copyMap)

(* mjs%: " 8-Nov-84 16:01")

(* copies any objects inside of list)

```
(LET ((first (MakeVirtualCopy (CAR list)
                               copyMap))
      (rest (MakeVirtualCopy (CDR list)
                              copyMap)))
  (COND
    ((AND (EQ first (CAR list))
          (EQ rest (CDR list)))
     list)
    (T (CONS first rest]))
```

(PUTPROPS **LOOPSVCOPY COPYRIGHT** ("Venue & Xerox Corporation" 1986 1987 1988 1990 1991))

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PROPERTY INDEX

LOOPSVCOPY1
