

# Multi-Word Compare-and-Swap on SBCL

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## (SB-)MCAS

- ▶ <http://www.discontinuity.info/~pkhuong/mcas/>
- ▶ Based on: “A Practical Multi-Word Compare-and-Swap Operation”, Harris, Fraser & Pratt (2002)
- ▶ “Atomic” CAS across an arbitrary set of locations
- ▶ (Long-term) Goal: build a toolkit for lock-free [at the user’s level] protocols

# Why lock-free?

- ▶ Safe
- ▶ Stable
- ▶ Hidden locks still ok?!

# Interface

READ /place/

SCAS /place/ /old/ /new/

WITH-MCAS (&key /initial-size/ /plan-name/) /body.../

CAS /place/ /old/ &optional /new/

RUN

Liveness guaranteed!

## And a DSL!

```
DO (/variables/*) (/value/*) /statement/*  
EVAL /variable/ /form/  
GET /variable/ /place/  
CAS /place/ /old/ &optional /new/  
GUARD /form/  
FAIL
```

*Easy to get livelocks*

## Chopping a circular double-linked list in two (almost)

```
(defun cut (from to)
  "Cut the sub-list between (and including) from and to."
  (declare (type 2list from to))
  (loop
    (multiple-value-bind (successp rest)
      (mcas:do (left right) (left)
        (mcas:get left (2list.left from))
        (mcas:cas (2list.left from)
                  left to)
        (mcas:get right (2list.right to))
        (mcas:cas (2list.right to)
                  right from)

        (mcas:cas (2list.right left) from right)
        (mcas:cas (2list.left right) to left))
      (when successp
        (return (values from rest))))))
```