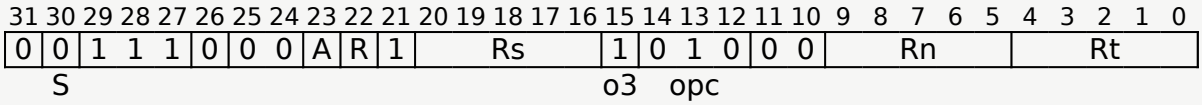
RCWSWP, RCWSWPA, RCWSWPL, RCWSWPAL

Read Check Write Swap doubleword in memory atomically loads a 64-bit doubleword from a memory location, and conditionally stores the value held in a register back to the same memory location. Storing back to memory is conditional on RCW Checks. The value initially loaded from memory is returned in the destination register. This instruction updates the condition flags based on the result of the update of memory.

- RCWSWPA and RCWSWPAL load from memory with acquire semantics.
- RCWSWPL and RCWSWPAL store to memory with release semantics.
- RCWSWP has neither acquire nor release semantics.

Integer
(FEAT_THE)



RCWSWP (A == 0 && R == 0)

```
RCWSWP <Xs>, <Xt>, [<Xn|SP>]
```

RCWSWPA (A == 1 && R == 0)

```
RCWSWPA <Xs>, <Xt>, [<Xn|SP>]
```

RCWSWPAL (A == 1 && R == 1)

```
RCWSWPAL <Xs>, <Xt>, [<Xn|SP>]
```

RCWSWPL (A == 0 && R == 1)

```
RCWSWPL <Xs>, <Xt>, [<Xn|SP>]
```

```
if !IsFeatureImplemented(FEAT_THE) then UNDEFINED;
integer t = UInt(Rt);
integer n = UInt(Rn);
integer s = UInt(Rs);

boolean acquire = A == '1' && Rt != '11111';
boolean release = R == '1';
boolean tagchecked = n != 31;
```

Assembler Symbols

<Xs>	Is the 64-bit name of the general-purpose register to be stored, encoded in the "Rs" field.
<Xt>	Is the 64-bit name of the general-purpose register to be loaded, encoded in the "Rt" field.
<Xn|SP>	Is the 64-bit name of the general-purpose base register or stack pointer, encoded in the "Rn" field.

Operation

```
if IsD128Enabled(PSTATE.EL) then UNDEFINED;
bits(64) address;
bits(64) newdata = X[s, 64];
bits(64) readdata;
bits(4) nzcv;

AccessDescriptor accdesc = CreateAccDescRCW(MemAtomicOp_SWP, FALSE, acq

if n == 31 then
    CheckSPAlignment();
    address = SP[];
else
    address = X[n, 64];

bits(64) compdata = bits(64) UNKNOWN;    // Irrelevant when not executi
(nzcv, readdata) = MemAtomicRCW(address, compdata, newdata, accdesc);

PSTATE.<N,Z,C,V> = nzcv;
X[t, 64] = readdata;    // Return the old value when t!=31
```

Operational information

If PSTATE.DIT is 1, the timing of this instruction is insensitive to the value of the data being loaded or stored.

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