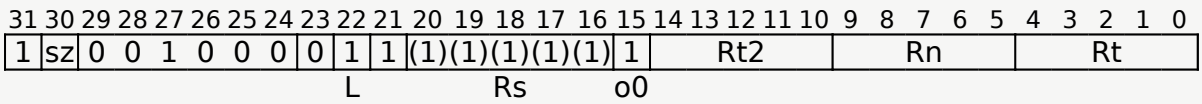
LDAXP

Load-Acquire Exclusive Pair of Registers derives an address from a base register value, loads two 32-bit words or two 64-bit doublewords from memory, and writes them to two registers. For information on single-copy atomicity and alignment requirements, see *Requirements for single-copy atomicity* and *Alignment of data accesses*. The PE marks the physical address being accessed as an exclusive access. This exclusive access mark is checked by Store Exclusive instructions. See *Synchronization and semaphores*. The instruction also has memory ordering semantics, as described in *Load-Acquire, Store-Release*. For information about memory accesses, see *Load/Store addressing modes*.



32-bit (sz == 0)

```
LDAXP <Wt1>, <Wt2>, [<Xn|SP>{,#0}]
```

64-bit (sz == 1)

```
LDAXP <Xt1>, <Xt2>, [<Xn|SP>{,#0}]
```

```
integer n = UInt(Rn);
integer t = UInt(Rt);
integer t2 = UInt(Rt2);

constant integer elsize = 32 << UInt(sz);
constant integer datasize = elsize * 2;
boolean tagchecked = n != 31;

boolean rt_unknown = FALSE;
if t == t2 then
    Constraint c = ConstrainUnpredictable(Unpredictable_LDPOVERLAP);
    assert c IN {Constraint_UNKNOWN, Constraint_UNDEF, Constraint_NOP};
    case c of
        when Constraint_UNKNOWN rt_unknown = TRUE;    // result is UNKN
        when Constraint_UNDEF   UNDEFINED;
        when Constraint_NOP     EndOfInstruction();
```

For information about the constrained unpredictable behavior of this instruction, see *Architectural Constraints on UNPREDICTABLE behaviors*, and particularly *LDAXP*.

Assembler Symbols

<Wt1>	Is the 32-bit name of the first general-purpose register to be transferred, encoded in the "Rt" field.

<Wt2>	Is the 32-bit name of the second general-purpose register to be transferred, encoded in the "Rt2" field.
<Xt1>	Is the 64-bit name of the first general-purpose register to be transferred, encoded in the "Rt" field.
<Xt2>	Is the 64-bit name of the second general-purpose register to be transferred, encoded in the "Rt2" field.
<Xn|SP>	Is the 64-bit name of the general-purpose base register or stack pointer, encoded in the "Rn" field.

Operation

```
bits(64) address;
bits(datasize) data;
constant integer dbytes = datasize DIV 8;

AccessDescriptor accdesc = CreateAccDescExLDST(MemOp_LOAD, TRUE, tagche

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

// Tell the Exclusives monitors to record a sequence of one or more ato
// memory reads from virtual address range [address, address+dbytes-1].
// The Exclusives monitor will only be set if all the reads are from th
// same dbytes-aligned physical address, to allow for the possibility o
// an atomicity break if the translation is changed between reads.
AArch64.SetExclusiveMonitors(address, dbytes);

if rt_unknown then
    // ConstrainedUNPREDICTABLE case
    X[t, datasize] = bits(datasize) UNKNOWN;    // In this case t = t2
elsif elsize == 32 then
    // 32-bit load exclusive pair (atomic)
    data = Mem[address, dbytes, accdesc];
    if BigEndian(accdesc.acctype) then
        X[t, datasize-elsize] = data<datasize-1:elsize>;
        X[t2, elsize] = data<elsize-1:0>;
    else
        X[t, elsize] = data<elsize-1:0>;
        X[t2, datasize-elsize] = data<datasize-1:elsize>;
else // elsize == 64
    // 64-bit load exclusive pair (not atomic), but must be 128-bit ali
    if !IsAligned(address, dbytes) then
        AArch64.Abort(address, AlignmentFault(accdesc));

    X[t, 64] = Mem[address, 8, accdesc];
    X[t2, 64] = Mem[address+8, 8, accdesc];
```

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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