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Pseu

MLS (indexed)

Multiply-subtract from accumulator (indexed)

Multiply all integer elements within each 128-bit segment of the first source vector by the specified element in the corresponding second source vector segment. The products are then destructively subtracted from the corresponding elements of the addend and destination vector.

The elements within the second source vector are specified using an immediate index which selects the same element position within each 128-bit vector segment. The index range is from 0 to one less than the number of elements per 128-bit segment, encoded in 1 to 3 bits depending on the size of the element. This instruction is unpredicated.

It has encodings from 3 classes: 16-bit, 32-bit and 64-bit

16-bit

```
31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 0 1 0 0 0 1 0 0 0 i3h 1 i3l Zm 0 0 0 0 1 1 Zn Zda
```

```
MLS < Zda > .H, < Zn > .H, < Zm > .H[< imm >]
```

```
if !HaveSVE2() && !HaveSME() then UNDEFINED;
constant integer esize = 16;
integer index = UInt(i3h:i3l);
integer n = UInt(Zn);
integer m = UInt(Zm);
integer da = UInt(Zda);
```

32-bit

```
3130292827262524 23 22 212019181716151413121110 9 8 7 6 5 4 3 2 1 0

0 1 0 0 0 1 0 0 1 0 0 1 i2 Zm 0 0 0 0 1 1 Zn Zda

size<1>size<0> S
```

```
MLS < Zda > . S, < Zn > . S, < Zm > . S[< imm >]
```

```
if !HaveSVE2() && !HaveSME() then UNDEFINED;
constant integer esize = 32;
integer index = UInt(i2);
integer n = UInt(Zn);
integer m = UInt(Zm);
integer da = UInt(Zda);
```

64-bit

3130292827262524	23	22	2120	19181716	1514131	2111	098765	4 3 2 1 0
0 1 0 0 0 1 0 0	1	1	1 i1	Zm	0 0 0 0	1 :	_ Zn	Zda
. 1 . 0							•	

MLS <Zda>.D, <Zn>.D, <Zm>.D[<imm>] if !HaveSVE2() && !HaveSME() then UNDEFINED; constant integer esize = 64; integer index = UInt(i1); integer n = UInt(Zn); integer m = UInt(Zm);

Assembler Symbols

integer da = <u>UInt</u>(Zda);

<Zda> Is the name of the third source and destination scalable vector register, encoded in the "Zda" field.

<Zn> Is the name of the first source scalable vector register, encoded in the "Zn" field.

<Zm> For the 16-bit and 32-bit variant: is the name of the second source scalable vector register Z0-Z7, encoded in the "Zm" field.

For the 64-bit variant: is the name of the second source scalable vector register Z0-Z15, encoded in the "Zm" field.

<imm> For the 16-bit variant: is the element index, in the range 0
to 7, encoded in the "i3h:i3l" fields.

For the 32-bit variant: is the element index, in the range 0 to 3, encoded in the "i2" field.

For the 64-bit variant: is the element index, in the range 0 to 1, encoded in the "i1" field.

Operation

```
CheckSVEEnabled();
constant integer VL = CurrentVL;
constant integer PL = VL DIV 8;
constant integer elements = VL DIV esize;
constant integer eltspersegment = 128 DIV esize;
bits (VL) operand1 = \mathbb{Z}[n, VL];
bits(VL) operand2 = \mathbb{Z}[m, VL];
bits(VL) result = \mathbb{Z}[da, VL];
for e = 0 to elements-1
    integer segmentbase = e - (e MOD eltspersegment);
    integer s = segmentbase + index;
    integer element1 = UInt(Elem[operand1, e, esize]);
    integer element2 = UInt(Elem[operand2, s, esize]);
    bits(esize) product = (element1 * element2) < esize-1:0>;
    Elem[result, e, esize] = Elem[result, e, esize] - product;
Z[da, VL] = result;
```

Operational information

If FEAT_SVE2 is implemented or FEAT_SME is implemented, then if PSTATE.DIT is 1:

- The execution time of this instruction is independent of:
 - The values of the data supplied in any of its registers.
 - The values of the NZCV flags.
- The response of this instruction to asynchronous exceptions does not vary based on:
 - The values of the data supplied in any of its registers.
 - The values of the NZCV flags.

This instruction might be immediately preceded in program order by a MOVPRFX instruction. The MOVPRFX instruction must conform to all of the following requirements, otherwise the behavior of the MOVPRFX and this instruction is unpredictable:

- The MOVPRFX instruction must be unpredicated.
- The MOVPRFX instruction must specify the same destination register as this instruction.
- The destination register must not refer to architectural register state referenced by any other source operand register of this instruction.

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