

Declaring WARL on the ISA string

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UDB parameters of the S extension

```
ASID_WIDTH: { type: integer; minimum: 0; maximum: 16 }
S_MODE_ENDIANNNESS: { type:string; enum: [little, big, dynamic] }
SXLEN: { type: integer; enum: [32, 64, 3264] }
REPORT_VA_IN_MTVAL_ON_LOAD_PAGE_FAULT: { type: boolean } [lot of other REPORT_VA_...]
STVAL_WIDTH { type: integer; maximum: 0xffffffffffffffff }
SCOUNTENABLE_EN: { type: array; items: { type: boolean }; maxItems: 32; minItems: 32 }
STVEC_MODE_DIRECT, STVEC_MODE_VECTORED, SATP_MODE_BARE, TRAP_ON_ECALL_FROM_S,
TRAP_ON_SFENCE_VMA_WHEN_SATP_MODE_IS_READ_ONLY, MSTATUS_[VF]S_WRITABLE:
                                                                    { type: boolean }
MSTATUS_[VF]S_LEGAL_VALUES: { type: array; items: { type: integer; enum: [0,1,2,3] }}
MSTATUS_TVM_IMPLEMENTED, HSTATEEN_ENVCFG_TYPE:
                                                                    { type: string; enum: [rw, read-only-0, read-only-1] }
```

Detecting implementation

- Testing for an exception upon execution
- Playing with inputs
 - satp.MODE, senvcfg.PMM, satp.ASID, hgeie, ...
- Benchmarking behavior
 - Misaligned accesses
- Hard-code mvendorid+marchid+mimpid+...
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Make

Linux

Linux+KVM

OpenSBI

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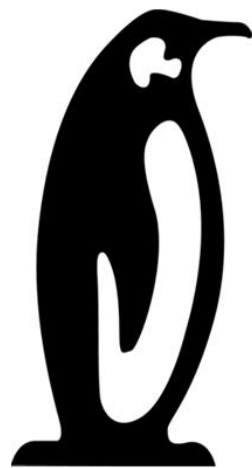
Possible solutions

- Ignore
- ISA string extensions (“`asidlen1b`”, “`asidlen2b`”, ..., “`asidlen16b`”)
- Key-value pairs (`asidlen: 9`)
- Typed extension objects (`S.asidlen = 9 : [0; RV32 ? 9 : 16]`)
- SBI ecalls
 - Key-value (cpuid/hwprobe style)
 - Structure (UDB/DT style)
- WARL-specific (Generic CSR description)

Generic CSR description

```
satp {  
  compatible = "riscv,csr-encoding";  
  address = <0x180>;  
  width = <64>;  
  fields {  
    ppn { bits = <0 43>; legal-ranges = <0 0xffffffff>; };  
    asid { bits = <44 59>; legal-ranges = <0 0xfff>; };  
    mode { bits = <60 63>; legal-ranges = <0 0 8 9>; }; }; };
```

- Doesn't need RVI involvement for naming
- Encroaching on UDB territory
- Can be ISA-stringed: "satpbits44to59legal0to0xfffstop"



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