RISC-V Vector Instruction Categories

- Configuration-Setting Instructions (vconfig):
    - vsetvli
    - vsetvl

- Vector Loads and Stores (vmem):
    - Vector Unit-Stride Instructions (vmem_vusi)
        - vle<eew>.v
        - vse<eew>.v
    - Vector Strided Instructions (vmem_vsi)
        - vlse<eew>.v
        - vsse<eew>.v
    - Vector Indexed Instructions (vmem_vii)
        - vlxei<eew>.v
        - vsxei<eew>.v
        - vsuxei<eew>.v
    - Unit-Stride Fault-Only-First Loads (vmem_usffl)
        - vle<eew>ff.v
    - **Vector Load/Store Segment Instructions *(Zvlsseg)**
        - vlseg<nf>e<eew>.v
        - vsseg<nf>e<eew>.v
        - vlseg<nf>e<eew>ff.v
        - vlsseg<nf>e<eew>.v
        - vssseg<nf>e<eew>.v
        - vlxseg<nf>ei<eew>.v
        - vsxseg<nf>ei<eew>.v
    - Vector Load/Store Whole Register Instructions (vmem_vls_wri)
        - vl<nf>r.v
        - vs<nf>r.v

- Vector AMO Operations (vamo):
    - vamoswapei.v
    - vamoaddei.v
    - vamoxorei.v
    - vamoandei.v
    - vamoorei.v
    - vamominei.v
    - vamomaxei.v
    - vamominuei.v
    - vamomaxuei.v

- Vector Integer Arithmetic Instructions (vinteger):
    - Vector Single-Width Integer Add/Subtract (vswi_add_sub)

        - vadd.vv
        - vadd.vx
        - vadd.vi
        - vsub.vv
        - vsub.vx
        - vrsub.vx
        - vrsub.vi
    - Vector Widening Integer Add/Subtract (vwi_add_sub)
        - vwaddu.vv
        - vwaddu.vx
        - vwsubu.vv
        - vwsubu.vx
        - vwadd.vv
        - vwadd.vx
        - vwsub.vv
        - vwsub.vx
        - vwaddu.wv
        - vwaddu.wx
        - vwsubu.wv
        - vwsubu.wx
        - vwadd.wv
        - vwadd.wx
        - vwsub.wv
        - vwsub.wx
    - Vector Integer Extension (vie)
        - vzext.vf2
        - vsext.vf2
        - vzext.vf4
        - vsext.vf4
        - vzext.vf8
        - vsext.vf8
    - Vector Integer Add-with-Carry/Subtract-with-Borrow (vi_adc_subb)
        - vadc.vvm
        - vadc.vxm
        - vadc.vim
        - vmadc.vvm
        - vmadc.vxm
        - vmadc.vim
        - vmadc.vv
        - vmadc.vx
        - vmadc.vi
        - vsbc.vvm
        - vsbc.vxm
        - vmsbc.vvm
        - vmsbc.vxm
        - vmsbc.vv

        - vmsbc.vx
    - Vector Bitwise Logical (vbl)
        - vand.vv
        - vand.vx
        - vand.vi
        - vor.vv
        - vor.vx
        - vor.vi
        - vxor.vv
        - vxor.vx
        - vxor.vi
    - Vector Single-Width Bit Shift (vsw_bshft)
        - vsll.vv
        - vsll.vx
        - vsll.vi
        - vsrl.vv
        - vsrl.vx
        - vsrl.vi
        - vsra.vv
        - vsra.vx
        - vsra.vi
    - Vector Narrowing Integer Right Shift (vni_rgt_shft)
        - vnsrl.wv
        - vnsrl.wx
        - vnsrl.wi
        - vnsra.wv
        - vnsra.wx
        - vnsra.wi
    - Vector Integer Comparison (vic)
        - vmseq.vv
        - vmseq.vx
        - vmseq.vi
        - vmsne.vv
        - vmsne.vx
        - vmsne.vi
        - vmsltu.vv
        - vmsltu.vx
        - vmslt.vv
        - vmslt.vx
        - vmsleu.vv
        - vmsleu.vx
        - vmsleu.vi
        - vmsle.vv
        - vmsle.vx
        - vmsle.vi
        - vmsgtu.vx

        - vmsgtu.vi
        - vmsgt.vx
        - vmsgt.vi
        - *vmsgeu.vx
        - *vmsge.vx
    - Vector Integer Min/Max (vi_min_max)
        - vminu.vv
        - vminu.vx
        - vmin.vv
        - vmin.vx
        - vmaxu.vv
        - vmaxu.vx
        - vmax.vv
        - vmax.vx
    - Vector Single-Width Integer Multiply (vswi_mul)
        - vmul.vv
        - vmul.vx
        - vmulh.vv
        - vmulh.vx
        - vmulhu.vv
        - vmulhu.vx
        - vmulhsu.vv
        - vmulhsu.vx
    - Vector Integer Divide (vi_div)
        - vdivu.vv
        - vdivu.vx
        - vdiv.vv
        - vdiv.vx
        - vremu.vv
        - vremu.vx
        - vrem.vv
        - vrem.vx
    - Vector Widening Integer Multiply (vwi_mul)
        - vwmul.vv
        - vwmul.vx
        - vwmulu.vv
        - vwmulu.vx
        - vwmulsu.vv
        - vwmulsu.vx
    - Vector Single-Width Integer Multiply-Add (vswi_mul_add)
        - vmacc.vv
        - vmacc.vx
        - vnmsac.vv
        - vnmsac.vx
        - vmadd.vv
        - vmadd.vx

        - vnmsub.vv
        - vnmsub.vx
    - Vector Widening Integer Multiply-Add (vwi_mul_add)
        - vwmaccu.vv
        - vwmaccu.vx
        - vwmacc.vv
        - vwmacc.vx
        - vwmaccsu.vv
        - vwmaccsu.vx
        - vwmaccus.vx
    - **Vector Quad-Widening Integer Multiply-Add *(Zvqmac)**
        - vqmaccu.vv
        - vqmaccu.vx
        - vqmacc.vv
        - vqmacc.vx
        - vqmaccsu.vv
        - vqmaccsu.vx
        - vqmaccus.vx
    - Vector Integer Merge (vi_merge)
        - vmerge.vvm
        - vmerge.vxm
        - vmerge.vim
    - Vector Integer Move (vi_mov)
        - vmv.v.v
        - vmv.v.x
        - vmv.v.i

- Vector Fixed-Point Arithmetic Instructions (vfixed):
    - Vector Single-Width Saturating Add/Subtract (vsw_satu_add_sub)
        - vsaddu.vv
        - vsaddu.vx
        - vsaddu.vi
        - vsadd.vv
        - vsadd.vx
        - vsadd.vi
        - vssubu.vv
        - vssubu.vx
        - vssub.vv
        - vssub.vx
    - Vector Single-Width Averaging Add/Subtract (vsw_avg_add_sub)
        - vaaddu.vv
        - vaaddu.vx
        - vaadd.vv
        - vaadd.vx
        - vasubu.vv
        - vasubu.vx

        - vasub.vv
        - vasub.vx
    - Vector Single-Width Fractional Multiply with Rounding and Saturation (vsw_frac_mul_rs)
        - vsmul.vv
        - vsmul.vx
    - Vector Single-Width Scaling Shift (vsw_scal_shft)
        - vssrl.vv
        - vssrl.vx
        - vssrl.vi
        - vssra.vv
        - vssra.vx
        - vssra.vi
    - Vector Narrowing Fixed-Point Clip (vn_fp_clip)
        - vnclipu.wv
        - vnclipu.wx
        - vnclipu.wi
        - vnclip.wv
        - vnclip.wx
        - vnclip.wi

- Vector Floating-Point Instructions (vfloat):
    - Vector Single-Width Floating-Point Add/Subtract (vsw_fp_add_sub)
        - vfadd.vv
        - vfadd.vf
        - vfsub.vv
        - vfsub.vf
        - vfrsub.vf
    - Vector Widening Floating-Point Add/Subtract (vw_fp_add_sub)
        - vfwadd.vv
        - vfwadd.vf
        - vfwsub.vv
        - vfwsub.vf
        - vfwadd.wv
        - vfwadd.wf
        - vfwsub.wv
        - vfwsub.wf
    - Vector Single-Width Floating-Point Multiply/Divide (vsw_fp_mul_div)
        - vfmul.vv
        - vfmul.vf
        - vfdiv.vv
        - vfdiv.vf
        - vfrdiv.vf
    - Vector Widening Floating-Point Multiply (vw_fp_mul)
        - vfwmul.vv
        - vfwmul.vf

- Vector Single-Width Floating-Point Fused Multiply-Add (vsw_fp_fuse_mul_add)
  - vfmacc.vv
  - vfmacc.vf
  - vfnmacc.vv
  - vfnmacc.vf
  - vfmsac.vv
  - vfmsac.vf
  - vfnmsac.vv
  - vfnmsac.vf
  - vfmadd.vv
  - vfmadd.vf
  - vfnmadd.vv
  - vfnmadd.vf
  - vfmsub.vv
  - vfmsub.vf
  - vfnmsub.vv
  - vfnmsub.vf
- Vector Widening Floating-Point Fused Multiply-Add (vw_fp_fuse_mul_add)
  - vfwmacc.vv
  - vfwmacc.vf
  - vfwnmacc.vv
  - vfwnmacc.vf
  - vfwmsac.vv
  - vfwmsac.vf
  - vfwnmsac.vv
  - vfwnmsac.vf
- Vector Floating-Point Square-Root (v_fp_sqrt)
  - vfsqrt.v
- Vector Floating-Point MIN/MAX (v_fp_mix_max)
  - vfmin.vv
  - vfmin.vf
  - vfmax.vv
  - vfmax.vf
- Vector Floating-Point Sign-Injection (v_fp_sign_inject)
  - vfsgnj.vv
  - vfsgnj.vf
  - vfsgnjn.vv
  - vfsgnjn.vf
  - vfsgnjx.vv
  - vfsgnjx.vf
- Vector Floating-Point Compare (v_fp_comp)
  - vmfeq.vv
  - vmfeq.vf
  - vmfne.vv
  - vmfne.vf

        - vmflt.vv
        - vmflt.vf
        - vmfle.vv
        - vmfle.vf
        - vmfgt.vf
        - vmfge.vf
    - Vector Floating-Point Classify (v_fp_classify)
        - vfclass.v
    - Vector Floating-Point Merge (v_fp_merge)
        - vfmerge.vfm
    - Vector Floating-Point Move (v_fp_mv)
        - vfmv.v.f
    - Vector Single-Width Floating-Point/Integer Type-Convert (vsw_fp_itc)
        - vfcvt.xu.f.v
        - vfcvt.x.f.v
        - vfcvt.rtz.xu.f.v
        - vfcvt.rtz.x.f.v
        - vfcvt.f.xu.v
        - vfcvt.f.x.v
    - Vector Widening Floating-Point/Integer Type-Convert (vw_fp_itc)
        - vfwcvt.xu.f.v
        - vfwcvt.x.f.v
        - vfwcvt.rtz.xu.f.v
        - vfwcvt.rtz.x.f.v
        - vfwcvt.f.xu.v
        - vfwcvt.f.x.v
        - vfwcvt.f.f.v
    - Vector Narrowing Floating-Point/Integer Type-Convert (vn_fp_itc)
        - vfncvt.xu.f.w
        - vfncvt.x.f.w
        - vfncvt.rtz.xu.f.w
        - vfncvt.rtz.x.f.w
        - vfncvt.f.xu.w
        - vfncvt.f.x.w
        - vfncvt.f.f.w
        - vfncvt.rod.f.f.w

- Vector Reduction Operations (vreduce):
    - Vector Single-Width Integer Reduction (vsw_int_red)
        - vredsum.vs
        - vredmaxu.vs
        - vredmax.vs
        - vredminu.vs
        - vredmin.vs
        - vredand.vs
        - vredor.vs

        - vredxor.vs
    - Vector Widening Integer Reduction (vw_int_red)
        - vwredsumu.vs
        - vwredsum.vs
    - Vector Single-Width Floating-Point Reduction (vsw_fp_red)
        - vfredosum.vs
        - vfredsum.vs
        - vfredmax.vs
        - vfredmin.vs
    - Vector Widening Floating-Point Reduction (vw_fp_red)
        - vfwredosum.vs
        - vfwredsum.vs

- Vector Mask Instructions (vmask):
    - Vector Mask-Register Logical (v_mask_reg_log)
        - vmand.mm
        - vmnand.mm
        - vmandnot.mm
        - vmxor.mm
        - vmor.mm
        - vmnor.mm
        - vmornot.mm
        - vmxnor.mm
        - *vmmv.m
        - *vmclr.m
        - *vmset.m
        - *vmnot.m
    - Vector Mask Population Count (v_mask_pop_count)
        - vpopc.m
    - Find-First-Set Mask Bit (ff_set_mb)
        - vfirst.m
    - Set-Before-First Mask Bit (sbf_mb)
        - vmsbf.m
    - Set-Including-First Mask Bit (sif_mb)
        - vmsif.m
    - Set-Only-First Mask Bit (sof_mb)
        - vmsof.m
    - Vector Iota (v_iota)
        - viota.m
    - Vector Element Index (v_elem_ind)
        - vid.v

- Vector Permutation Instructions (vpermute):
    - Vector Integer Scalar Move (v_int_scal_mv)
        - vmv.x.s
        - vmv.s.x

    - Vector Floating-Point Scalar Move (v_fp_scal_mv)
        - vfmv.f.s
        - vfmv.s.f
    - Vector Slide (v_slide)
        - vslideup.vx
        - vslideup.vi
        - vslidedown.vx
        - vslidedown.vi
        - vslide1up.vx
        - vfslide1up.vf
        - vslide1down.vx
        - vfslide1down.vf
    - Vector Register Gather (v_reg_gather)
        - vrgather.vv
        - vrgather.vx
        - vrgather.vi
    - Vector Compress (v_comp)
        - vcompress.vm
    - Vector Whole Register Move (v_whole_reg_mv)
        - vmv<nr>r.v

- Divided Element Extension *(Zvediv) (vediv):
    - Vector Integer Dot-Product (v_int_dt_prod)
        - vdotu.vv
        - vdot.vv
    - Vector Floating-Point Dot-Product (v_fp_dt_prod)
        - vfdot.vv