IOPMP Task Group Meeting

February 1, 2024

Video link

Agenda

- IOPMP compliance to RERI proposal
  - Channing@Nvidia
  - Alvin@Andes
- [Tentative] SiFive use cases that may not be able to fit in the IOPMP programming model.

IOPMP compliance to RERI

- The RAS Error Record Register Interface (RERI) specification
  - Specifies a standard mechanism for reporting errors
  - provide the facility to log the detected errors

- Link to RERI Specification: https://github.com/riscv-non-isa/riscv-ras-eri/tree/main

IOPMP compliance to RERI

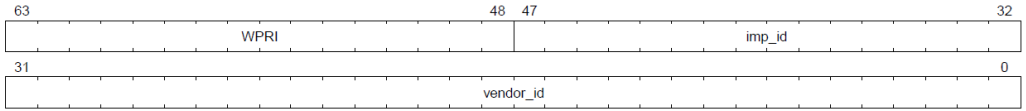
- Register Encoding Comparison

Registers in RERI Spec*	Registers in IOPMP Spec draft5
vendor_n_imp_id	NA* – IOPMP as an IP has its own impl_id register
bank_info	NA
valid_summary	NA
Custom	NA
control_i	ERRREACT – ie field to enable IOPMP error reporting
status_i	ERR_REQINFO – ip field to indicate pending error -- ttype field to indicate the errored transaction type
addr_info_i	ERR_REQADDR/H
info_i	ERR_REQINFO -- etype field to indicate the errored type -- sid to indicate the errored SID -- eid to indicate the error violated entry
suppl_info_i	ERR_USER(i) – user customized info.
timestamp_i	NA

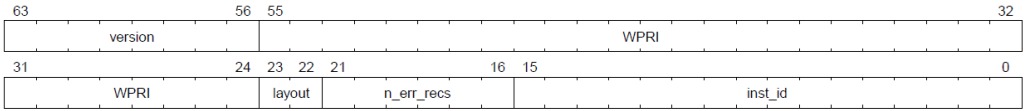
Note:
1. RERI Spec always uses 64-bit register
2. ‘NA’ in above table means no corresponding register or function in IOPMP spec draft5

IOPMP compliance to RERI

- RERI Error Bank Header Registers
  - vendor_n_imp_id – IOPMP already have the VERSION and IMPLMENTATION registers. *Need a placeholder here, and vendor_id/imp_id should be identical to the VERSION register?*



  - bank_info
    - n_err_recs: this field indicates the number of error records implemented by the error bank. *IOPMP spec draft v5 currently only logs the 1st error therefore does not support record number of errors: n_err_recs = 1?*

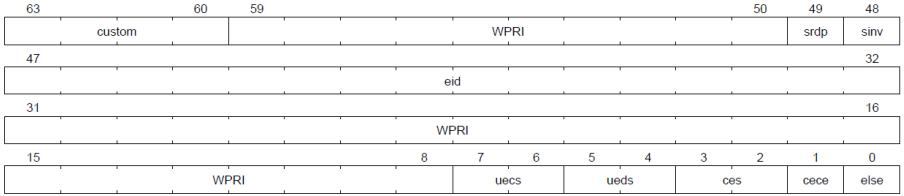


  - valid_summary
    - sv: enable a bitmapped summary on the error bank – *leave to user implementation define* valid_bitmap: bitmap of the pending errors

IOPMP compliance to RERI

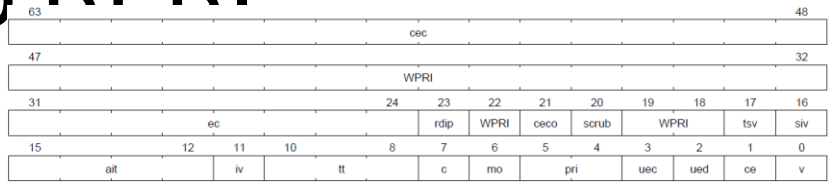
- control_i*
  - else -- The else field is WARL and may default to 1 or 0 at reset. When else is 1, the hardware unit logs and signals errors in the error record.
  - sinv -- The status-register-invalidate (sinv) bit, when written with a value of 1, causes the v (valid) field of the associated status_i register to be cleared if the rdip field in the status_i register is also 1.
  - srdp --?
  - cece/ces/ueds/uecs --?
  - eid -- The error-injection-delay (eid) is a WARL field used to control error record injection.

- Proposed IOPMP updates
  - ERRREACT.ie → control_0.else
  - ERR_REQINFO.ip → control_0.sinv



* red: IOPMP draft v5 has corresponding error record functions
black font: no corresponding functions in IOPMP draft v5

IOPMP compliance to RERI



- status_i
  - v -- The error record holds a valid error log if the valid (v) field is 1.
  - tt -- The transaction-type (tt) is a WARL field to report the type of transaction that detected the error
  - iv -- If the detected error reports additional information in the info_i register then information-valid (iv) field is set to 1.
  - ait -- The address-or-info-type (ait) is a WARL field that indicates the type of information reported in the addr_info_i register.
  - siv -- If the detected error reports additional supplemental information in the suppl_info_i register then supplemental-information-valid (siv) field is set to 1.
  - mo – indicate more than one error occurs
  - rdip -- ?
  - ce/ued/uec/c --?
- Proposed IOPMP updates
  - ERR_REQINFO. ip → status_0.v
  - ERR_REQINFO. ttype → status_0.tt

IOPMP compliance to RERI

- addr_info_i
  - The addr_info_i WARL register reports the address or other information associated with the detected error when status_i.ait is not 0.

- Proposed IOPMP updates
  - ERR_REQADDR/H → addr_info_0

IOPMP compliance to RERI

- info_i and suppl_info_i
  - The info_i WARL register provides additional information about the error when status_i.iv is 1.
  - The suppl_info_i WARL register provides additional information about the error when status_i.siv is 1.

- Proposed IOPMP updates
  - ERR_REQINFO.etype → info_0.etype
  - ERR_REQINFO.sid → info_0. sid
  - ERR_REQINFO.eid → info_0. eid
  - ERR_USER → suppl_info_0

Meeting minutes

- How should IOPMP be categorized to CE/UED/UEC?
  - Should it be categorized to one of the typical RAS error -- CE/UED/UED?
  - Or can there be a dedicated security error/functional error?
- vendor_n_imp_id
  - Should we enforce vendor_n_imp_id.vendor_id/imp_id should be identical to the value in IOPMP VERSION register
- status_0.iv/ait
  - should we enforce it to be set to 1 or leave it to user impl define?
- info_0
  - Define info_0 register encoding in next draft.