Meeting minutes are in the speaker notes for the relevant slide


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Agenda

- Disclosures
- Summit:
  - Lively discussion
  - Event trace: some discussion around benefits and value. No conclusion
  - Instrumentation trace: strong interest is moving this forward (see next slide)
- HTI fast track status
  - Action is with me to get repo set up
- E-Trace maintenance
  - All but one update made and pull requests issued. Changes in review/awaiting approval
- AOB

PD Paul Donahue (Ventana) (Me)
IR Iain Robertson (Siemens)
BA Bruce Ableidinger (MIPS)
RC Robert Chyla (MIPS)
BS Beeman Strong (Rivos)
 Carsten Gosvig - SiFive
JG Jay Gamoneda (NXP)
MS Michael Schleinkofer (Lauterbach)
S(Shivarama (NXP)

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Instrumentation trace: We should move the group forward. However, we need to come to an agreement in this online meeting where all interested parties are present (unlike the in-person meeting at the Summit).

Multiple proposals: Siemens instrumentation trace, SiFive, Jay's proposal, ARM. Jay will have slides for next meeting to show what NXP did on their PowerPC cores. Before getting into the details, we need to agree on a charter which lists the requirements. Jay will write a draft charter and Robert will help refine it. They volunteer to lead the group.

Lots of things can be added to trace. For Event Trace, we need to have a reasonably compelling justification for why it should be standardized. It could just be a standard for N-Trace and the E-Trace standardization could happen later, if ever. But the protocol-neutral pieces should be standardized in a way that's protocol-neutral.

Instrumentation trace involves instrumenting the code. It's very flexible and you can emulate a printf. Event trace is a subset of instrumentation trace that doesn't involve instrumenting the code (and it's less flexible).

Michael doesn't have much insight into how Lauterbach's customers use instrumentation trace or event trace. Siemens has more customer traction on instrumentation trace than event trace. Post-processing software needs to be available to make sense of the data. ARM has event trace so there is support in other architectures.

We need to be able to clearly outline the value proposition before presenting to the HC. This will form the first paragraph of the charter.

Discussion about whether both N-Trace and E-Trace packet formats need to be done at the same time. Consensus that we don't need to wait for both to be supported in order to support either. Only supporting N-Trace (or only E-Trace) in this TG allows forward progress. If common architecture-level decisions are made, the E-Trace (or N-Trace) packet formats can come in later as a possible fast track.

Debug spec status update: Sail milestone has been reached. ACT testing milestone has probably been reached. They want to move the Sdtrig chapter into the priv spec and work on that has not begun.

Instrumentation Trace

- Concept: program is instrumented with instructions that produce trace
  - Could be via CSR or memory mapped
- Siemens calls this "Static Instrumentation" and has offered this for ~10 years
  - Write to memory mapped 'mailbox' generates a trace packet
  - Each mailbox is 16 bytes, with mailboxes grouped into "channels" of 32 mailboxes. Bits 8:5 of the address determine the actions taken when the mailbox is written to:
    - 5: include a timestamp if set
    - 6: include the write data if set
    - 7: Set 'marker' bit in trace packet if set
    - 8: Blocking (i.e. bus subordinate will backpressure when trace bandwidth unavailable) if set
    - 9: Send cross-triggering event to other monitoring components if set
  - Configuration for
    - Including (or not) bus transaction ID
    - Filtering on transaction ID (e.g. discard writes outside a range of IDs)
    - Enabling each channel (up to 2k channels currently)

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Instrumentation Trace

- Trace packet contains
  - Channel number,
  - 'marker'
  - 'cross trigger' indication
  - 'flag' bit indicating presence of data/ID
  - id_present bit indicating whether data field includes ID from bus
  - # bytes of data
  - transaction ID (optional)
  - write data (optional)

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Future Meetings / AOB

- From May, meetings will be 60mins at 10am Pacific every 4th Tuesday, starting Jan 9th
  - Next meeting is 10-Dec at 10am Pacific (18:00 UTC)
- AOB

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Thank You
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