Feasibility of Utilizing RISC-V Processors

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To: MacArthur, CEO
From: Eric Lewis, Technology Advisor
Date: April 9, 2018
Subject: Feasibility of Utilizing RISC-V Processors

Our company is currently planning to replace the processors in our products. One of the proposed options is RISC-V.

► Recommendation

RISC-V is an emerging Instruction Set Architecture that could benefit our company. The open source nature of RISC-V negates any costs involved with obtaining rights to its specifications. This also provides the option for the company to manufacture its own processors instead of relying on an outside manufacturer. This could reduce expenses and gives us more control over how the processors we use function.

► Why not use Intel/AMD/ARM?

Both Intel and AMD processors have seen the release multiple high-risk exploits over the past year. One of these exploits happening on our devices could drastically hurt our company. ARM processors work well for embedded systems, but are less useful outside of that domain. Using RISC-V means our company can use one ISA for all our processors. This means that employees need less training and our in-house software only has to support a single processor. This leads to less problems and more productivity.

► Overall Benefits and Drawbacks

Benefits:
- Many competitors have not adopted RISC-V yet
- RISC-V is designed to be low-power and fast

Drawbacks:

- Less resources available than other alternatives since RISC-V has not seen widespread use yet.

► Custom vs Existing

RISC-V is an open ISA which means our company must choose between developing our own RISC-V processors or use existing ones.

- Pros of using custom implementations:
  - Complete control over processor design
  - Ability to keep design hidden
  - Ability to open design to the public
  - Implementations can be optimized for their use cases

- Pros of using existing implementations:

  - All design work is already handled

  - Manufacturing is handled externally

- Cons of using custom implementations:

  - Teams must be created to design our implementations

  - Manufacturing will have to be handled by our company or outsourced

- Cons of using existing implementations:
  - No choice in our processors being closed or open
  - Processor implementations cannot be designed around our use cases
  - There are only a small number of commercially available RISC-V implementations

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► *Conclusion*

RISC-V is a technology that is still in the early stages of adoption. Our company can stay ahead of the competition by utilizing RISC-V. RISC-V provides countless benefits whether existing or custom implementations are used. RISC-V is a worthwhile investment for the company by putting us ahead and saving us money.

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