

UEFI Forum Engineering Change Request (ECR)

Title:

Add RISC-V Hart Capabilities Table (RHCT)

Status:

Draft

Document:

ACPI Specification 6.5.next

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RISC-V Platform HSC (<https://lists.riscv.org/g/tech-unixplatformspec>)

Summary of the change

This ECR introduces a new ACPI table named as RISC-V Hart Capabilities Table (RHCT). This table is required to communicate certain capabilities of RISC-V Hart (hardware thread) to the Operating System.

Benefits of the Change

It is mandatory to have this table defined to support booting an Operating System on RISC-V ACPI based platforms.

Impact of Change

This change will impact RISC-V firmware, different Operating Systems which support RISC-V architecture and also emulation platforms.

Detailed Description of the Change

Changes in **yellow**

Insertions in **green**

Removals in **red**

5.2.36 RISC-V Hart Capabilities Table (RHCT)

This table is used to describe certain features of the RISC-V processors (a.k.a harts). The structure of the RHCT is described in Table 5.181

Table 5.181: RISC-V Hart Capabilities Table (RHCT) Format

Field	Byte Length	Byte Offset	Description
Header			
-Signature	4	0	'RHCT' - RISC-V Hart Capabilities Table
- Length	4	4	Length of entire RHCT table in bytes
- Revision	1	8	The revision of the structure corresponding to the signature field for this table. For this version of the specification, the revision is 1.
- Checksum	1	9	The entire table must sum to zero.
- OEMID	6	10	OEM ID.
- OEM Table ID	8	16	OEM revision of table for supplied OEM Table ID.

- OEM Revision	4	24	OEM revision of the RHCT for the supplied OEM Table ID.
- Creator ID	4	28	Vendor ID of utility that created the table
- Creator Revision	4	32	Revision of utility that created the table
Body			
- Reserved	4	36	Must be zero
- Time Base Frequency	8	40	The frequency of the system counter. This is the same for all harts (processors) in the system.
- Number of RHCT nodes	4	48	Number of elements in the RHCT Node array
- Offset to the RHCT node array	4	52	The offset from the start of the table to the first node in the array of RHCT nodes.
- RHCT Node [N]	-	-	List of RHCT nodes. The Hart Info node should be populated after all other types are populated in this array. See Table 5.182 for possible types of RHCT nodes.

Table 5.182: RHCT Node Structure Types

Value	Description
0	ISA string node. See Table 5.183.
1-65534	Reserved for future use.
65535	Hart Info node. See Table 5.184.

Table 5.183: ISA string node structure

This structure shall provide the ISA string. At least one ISA string node should exist.

Field	Byte Length	Byte Offset	Description
- Type	2	0	0
- Length	2	2	8 + N + P: Size of this structure. Should be padded such that it is aligned at 2 bytes.
- Revision	2	4	For this version of the specification, the revision is 1.
- ISA Length	2	6	ISA string length.
- ISA string	N	8	Null-terminated ASCII Instruction Set Architecture (ISA) string for this hart. The format of the ISA string is defined in the RISC-V unprivileged specification.
- Optional Padding	P	-	Padding to make this structure aligned at 2 bytes.

Table 5.184: Hart Info node structure

This structure shall be provided once for each hart. To match with the processor device in the name space, each structure will have the ACPI processor UID.

This structure should be populated in the RHCT node array after all other types of RHCT nodes are populated since it references other RHCT nodes.

Field	Byte Length	Byte Offset	Description
- Type	2	0	65535
- Length	2	2	12 + 4 * N:Length of this Hart Info Structure.
- Revision	2	4	For this version of the specification, the revision is 1.
- Number of offsets to the RHCT nodes	2	6	Number of elements in the Offsets array
- ACPI Processor UID	4	8	This ID should be the same _UID value of the

			processor(hart) device object in the namespace and should also match with ACPI Processor UID in the RINTC table of MADT.
- Offsets[N]	4 * N	12	Each entry in this array contains the address offset of a RHCT Node relative to the start of the RHCT. For example: The first element in the array can be the offset between the start of the RHCT table and the start of the appropriate ISA string structure for this hart. Each hart shall have at least one element in this array which points to an ISA node. The offset shall not point to another Hart Info node type.