

ACPI System Locality Information Table Interface

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1 Introduction

ACPI v1.0b assumes the SMP model and therefore does not provide the operating system (OS) locality information about the system that it runs on. The OS would have to assume SMP even on a NUMA based system.

With the introduction of ACPI v2.0, some additional proximity indications are provided through the `_PXM` control method. However, the `_PXM` method only indicates to the OS that certain device modules are “close”. There is no descriptions of the relative distances among the device modules.

This specification enhances the ability to report to the OS the locality information for NUMA systems.

2 System Locality Information Table Definition

This optional SLIT (System Locality Information Table) describes the distances between all processors, memory controllers, and host bridges. Each module will be associated with a specific locality (could tie with the `_PXM`) which will be equivalent to an SMP node.

The table will give units of distance between nodes. The units of distance will be relative to the SMP or intra-node distance. SMP distances will arbitrarily have a value of 10.

There is a field in the table called *Localities*. *Localities* is the number of localities in the SLIT. It is an unsigned 64-bit integer. The locality indices for each locality range from 0 to *Localities*-1.

The SLIT can be viewed as a matrix of distances, with row *i* of the matrix indicating the distance from locality *i* to every locality (including itself). Each table entry is a 1-byte unsigned integer. To get the distance from locality *i* to locality *j*, read the $i * (\text{Localities}) + j$ entry in the matrix. Except for the distances from a locality to itself, each distance is stored twice in the matrix.

What this means is that the diagonal elements of the matrix, the distances from a locality to itself, which are the SMP distances, are all given a value of 10. The distances for the non-diagonal elements are scaled to be relative to the SMP distance, so, for example, if the distance from locality *i* to locality *j* is 2.4 times the SMP distance, a value of 24 would be stored in table entry $i * (\text{localities}) + j$ and in $j * (\text{localities}) + i$.

If one locality is unreachable from another, a value of 255 (0xFF) will be stored in that table entry. A value of 0 has no meaning, and is reserved. Values 1 through 9 are also reserved.

This will enable the OS to enhance its ability to process the locality information to increase its performance on a NUMA system.

Note:

A SLIT method could also be used at the _SB level in the name space to act similar to _MAT to update the SLIT table at runtime if the distance information changes for some reason.

Table 2-1 System Locality Information Table Format

Field	Byte Length	Byte Offset	Description
Header			
Signature	4	0	'SLIT'. Signature for the System Locality Information Table.
Length	4	4	Length, in bytes, of the entire System Locality Information Table.
Revision	1	8	1
Checksum	1	9	Entire table must sum to zero.
OEMID	6	10	OEM ID.
OEM Table ID	8	16	For the System Locality Information Table, the table ID is the manufacturer model ID.
OEM Revision	4	24	OEM revision of System Locality Information Table for supplied OEM Table ID.
Creator ID	4	28	Vendor ID of utility that created the table. For the DSDT, RSDT, SSDT, and PSDT tables, this is the ID for the ASL Compiler.
Creator Revision	4	32	Revision of utility that created the table. For the DSDT, RSDT, SSDT, and PSDT tables, this is the revision for the ASL Compiler.
Localities	8	36	Indicates the number of localities in the system.
Entry[0][0]	1	44	Matrix entry (0,0), contains a value of 10.
...			
Entry[0][Localities-1]			Matrix entry (0,Localities-1)
Entry[1][0]			Matrix entry (1,0)
...			
Entry[Localities-1][Localities-1]			Matrix entry (Localities-1,Localities-1), contains a value of 10

3 SLIT Control Method

The System Locality Information control method SLIT can be used at the _SB level in the name space to act similar to _MAT to update the SLIT table at runtime if the distance information changes for some reason.