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Benchmarks verifying architecture and system performance.

The Standard Performance Evaluation Corporation (SPEC) is composed of various technology companies, research institutions, and individuals from the computer industry. It develops and maintains several benchmark suites to provide standard metrics that help users to make decisions when purchasing hardware or optimizing software performance.

SPEC's benchmark suites compare and evaluate the performance of different systems and technological components. For example, the SPEC CPU suites test CPU performance by comparing several programs' runtime. SPEC validation procedures verify that benchmark results obey the defined guidelines and standards and check the accuracy of benchmark execution. SPEC issues detailed performance results and metrics for the tested machine. These reports will reference the machine's performance against other systems, providing a relative performance comparison. (Standard Performance Evaluation Corporation)

There are two main commuter architectures to examine and compare system performance. Reduced Instruction Set Computing (RISC) is an architecture designed to simplify the execution of instructions, while Complex Instruction Set Computing (CISC) is an architecture that handles an extensive set of complex instructions. The main characteristic of RISC is simple instructions with registers. RISC professors have a fixed instruction set containing basic operations such as arithmetic, logical operations, and memory access. The significant number of general-purpose registers reduces memory access to organize memory access easily. (Bhandarkar).

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On the contrary, CICS aims for multiple or complex operations in a single instruction, including memory access, arithmetic, and logical operation with fewer-general purpose registers compared to RISC architectures. CISC's direct memory access reduces explicit load and stores instructions through general-purpose registers. However, it increases memory access issues risk.

Although RISC and CISC are designed for different purposes, these two architectures share some similarities. Both architectures can perform various computational tasks such as arithmetic, logical operations, memory access, and shared standard components such as the arithmetic logic unit (ALU), control unit, and memory management unit (MMU). Also, the two architectures support high-level programming languages that translate high-level code into machine instructions, which allows developers to write code like C, Java, or Python.

These two unique architectures are applied to various situations. For RISC, ARM architecture is used in Android-based systems and the Apple iPhone and iPad. MIPS by Silicon Graphics and IBM's PowerPC architecture used in Apple Macintosh from 1994 to 2005. For CISC, Intel x86 in the Apple Macintosh from 2005 to 2020, IBM z/OS system, and Virtual Address eXtension (VAX) by Digital Equipment Corporation (DEC) are primary applications. (Kanade)

It's important to note for me that the term "RISC" and "CISC" represent design philosophies. Therefore, after understanding their unique characteristics between RISC and CISC it will be possible to incorporate features from both architectures to achieve optimal performance for a wide range of applications.

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