

## Innovative Architectures and Commercial Computers:

### A Summary of the Panel Discussion at NCC 1981.

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The session was held on May 4, 1981 in Chicago at NCC 1981. The panelists were Harvey Cragon, Pat Goldberg, Dave Patterson, Justin Rattner, Dean Earnest and Peter Denning. Krishna Kavi was the moderator. A complete report of the session is available<sup>1</sup> and can be obtained by writing to the Computer Science Department, P.O. Box 44330, U.S.L., Lafayette, LA 70504.

The session consisted of three rounds and in each round the panelists had three-four minutes to present their views. Round 1: In this round, the discussion centered around the question whether von Neumann architectures were adequate for today's computing. The general feeling was that they were quite adequate. Some felt that they might be good enough for today, but due to the advances in language concepts and operating system concepts, the von Neumann machine model might become obsolete. One panelist suggested that if the level of von Neumann machines were not adequate, it was because their levels were too high and not too low. On the other extreme, it was pointed out that the functions users perform were far more abstract than could be directly repre-

1. Kavi, K.M. "Innovative Architectures and Commercial Computers", TR 81-3-2, Computer Science Dept., USL, Lafayette.

sented using von Neumann architecture. "Too much circumcision is necessary to map the functions of users into something as simple as von Neumann architecture." It was also noted that we were not interested in a single language machine and only when someone came up with a multi-lingual high-level language machine should we consider changing the architecture of computers.

Round 2: In this round, the reasons for the lack of innovations in commercial computers were examined. The two most frequently cited reasons were: 1) compatibility, and 2) benefits of such innovations not proven. There was one panelist who felt that compatibility was not the ultimate impediment. If the new architectures produced orders of magnitude improvements in productivity, then one could go through the trouble of modifying the existing software. There were other reasons listed. It was remarked that in some cases the data that substantiates the benefits of certain architectural features existed, but most of the designers were ignorant of such literature. It was believed by a few that the success of a product did not depend on its architecture. Vendor reputation and deliverability of the product on time reliably were the two main criteria in product selection. The discussion then digressed into the need for a new curriculum that provided students with a global knowledge without branding them as either software or hardware people.

Round 3: Suggestions for future research in architecture was the topic of this round. A majority of the panelists agreed that we should spend our efforts in experimental computer science. We

should prototype our ideas, show the feasibility of implementation, collect data to establish the benefits of the new architectures. Industrial cooperation and support was solicited for such research in universities. Other areas suggested included human engineering, hardware support of privacy and security, high-level microprogramming languages and alternate micro-structures to support language interpreters.