TECHNOLOGY

Distributed Row-Column Decoding For A Mesh Switch

OVERVIEW

Background:
Crossbar switches are employed in network routers, multiprocessor interconnections and programmable logic chips. While their highly regular structure makes them attractive for VLSI and optical implementations, the existing routing models for crossbar switches make them impractical for such applications. Switch using (n x r) cross-points to connect n input terminals with r output terminals rely on a dedicated on-and-off switch between each pair of input and output. This results in an n-input and r-output fabric in which each input has a static fan-out of r and each output has a static fan-in of n. This makes crossbar switches impractical for large values of n and r.

Innovation:
Researchers at the University of Maryland have designed distributed algorithms for establishing paths between the input and output ports in crossbar switching fabrics that make them viable for VLSI and optical implementations. The algorithms avoid the fan-in and fan-out problem by replacing each cross-point with three on-and-off relays and transforming the crossbar switch into a mesh switch. This method, called by the inventor a distributed row-column decoding method, sets the relays for any request initiated by one or more inputs to connect with one or more outputs with the use of only a single turn in each row and no turns within the columns in a mesh switch with n inputs, r outputs, and (3 x n x r) relays. One distributed row-column decoding algorithm uses (n x r) lg r-bit counters. Another one uses only n 4-state sequential circuits.

APPLICATIONS

Circuit and packet switching
On-chip network routers
Multicore computer chips

ADVANTAGES

Congestion-freeunicast and multicast packet switching
Potential for faster networks and routers
Lower cost network servers and routers

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CATEGORIES

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EXTERNAL RESOURCES

PS-2014-100