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1. A **torus** interconnect is a switch-less network topology for connecting processing nodes in a parallel computer system. Torus interconnect is a switch-less topology that can be seen as a mesh interconnect with nodes arranged in a rectilinear array of N = 2, 3, or more dimensions, with processors connected to their nearest neighbours, and corresponding processors on opposite edges of the array connected. In this lattice, each node has 2N connections. Torus networks are an attractive topology in supercomputing, balancing the trade-off between network diameter and hardware costs. The nodes in a torus network are connected in a k-dimensional wrap-around mesh where each node has 2k neighbours. Effectively utilizing these networks can significantly decrease parallel communication overhead and in turn the time necessary to run large parallel scientific and data analysis applications. Meshes and torus are common network topologies in supercomputing. A torus network extends the mesh by connecting nodes at opposite ends of a single dimension. These links effectively “wrap around” the mesh. Torus topologies are advantageous as they significantly decrease the network diameter with few added links, in turn decreasing the resources needed for parallel processes to communicate with each other. However, the large number of nodes and links, coupled with the multi-dimensional topology of the torus, makes recognizing and understanding poor network performance exceedingly challenging. This is especially true as the torus dimensions increase - while a 3-dimensional (3D) torus can be intuitively represented in 3D space by cutting its wrap around links, such a representation is not available for the newer 5-dimensional (5D) torus networks. Attempts to visualize these higher dimensional torus networks have focused on the torus structure, using small multiples, aggregation along dimensions, slicing, folding, and 3D views. These visualizations prioritize the Cartesian structure of the network at the potential cost of obscuring other link usage patterns analysts may need to understand the resultant traffic.
2. **Hypercube** networks are a type of network topology used to connect multiple processors with memory modules and accurately route data. Hypercube networks consist of 2m nodes. These nodes form the vertices of squares to create an internetwork connection. A hypercube is basically a multidimensional mesh network with two nodes in each dimension. Due to similarity, such topologies are usually grouped into a k-ary d-dimensional mesh topology family where d represents the number of dimensions and k represents the number of nodes in each dimension. In the specific context of computer architecture, a hypercube refers to a parallel computer with a common regular interconnect topology that specifies the layout of processing elements and the wiring in between them. The etymology of the term suggests that a hypercube is an unbounded, higher dimensional cube alike geometric structure, that is scaled beyond the three dimensions of a platonic cube.