

Descending Requirements Search for DisCSPs

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Abstract. A new search algorithm, Descending Requirements Search (DESRS), for Distributed CSPs is proposed. The algorithm is composed of two independent phases. In the first phase, agents form a binary hierarchy of groups. The distributed partition algorithm uses a heuristic that prefers to join neighbors that are strongly constrained, into groups. This is done concurrently at all levels of the hierarchy. In the second phase, concurrent independent backtracking search processes grow partial assignments along a hierarchy of agent groups, each agent participating in multiple search processes. The order of assignments is partially determined by the hierarchy of groups. Independent partial solutions are grown by agents, each partial solution is sent higher up in the hierarchy, ultimately resulting in the top-level agent producing a solution, or in some agent producing an empty *Nogood*. The new algorithm is evaluated experimentally on randomly generated DISCSPs. Both run-time performance and network load of DESRS are better than Asynchronous Backtracking (ABT). The runtime performance of DESRS is similar to that of the best concurrent search algorithm CONCDB, on medium sized problems.