

(12) **United States Patent**
Grover et al.

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(54) **PATH RESTORATION OF NETWORKS**

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(*) **Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(51) **Int. Cl.**⁷ **H04J 3/16; H04L 12/56**

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(58) **Field of Search** 370/216, 217, 370/218, 221, 225, 227, 228, 238, 248, 254, 351, 357, 400, 255; 709/238, 239; 340/825.01, 825.02, 825.03, 827

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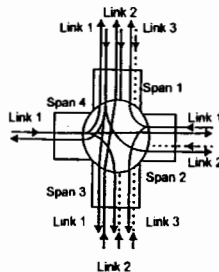
(57) **ABSTRACT**

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A distributed method for creating telecommunications paths in a network, particularly after a span failure. The network includes plural distinct nodes interconnected by plural distinct spans, each span having working links and spare links. Each node has a digital cross-connect switch for making and breaking connections between adjacent spans forming span pairs at a node. At least one of the end nodes of a path to be created broadcasts statelets. Each intermediate node between the end nodes broadcasts incoming statelets in a manner that favours use of restoration paths that eliminate the fewest other paths. Statelets that have traversed spans with greater spare capacity, considering the number of statelets competing to be broadcast along the spans, are preferentially broadcast.

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38 Claims, 29 Drawing Sheets



restoration statelet	ranking from lowest to highest based on the value of a statelet's interference number
span 1, link 1	1
span 2, link 1	2
span 4, link 1	3
span 1, link 2	4
span 3, link 1	5

↔: A bidirectional link