

**United States Patent** [19]

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[54] **METHOD FOR PRECONFIGURING A NETWORK TO WITHSTAND ANTICIPATED FAILURES**

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[58] **Field of Search** ..... 395/182.02, 182.01, 395/181; 370/16, 216, 219, 220, 227, 228, 248, 353; 379/221, 273; 371/20.1, 20.2; 340/825.01, 827; 364/269.2, 285.1

[57] **ABSTRACT**

A method for restoring traffic in a network. 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. Step 1: For each of at least two possible span failures, (a) find the number of restoration routes available in case of the occurrence of each span failure, (b) determine the resources used by each restoration route, and (c) determine the amount of flow to be restored for each span failure. Step 2: find, in a computer, the amount of flow  $F^p$  to be restored along each restoration route that minimizes total unrestored flow for all possible span failures identified in step 1. Step 3: form connections at each digital cross-connect switch in the network along each restoration route before occurrence of one of the possible span failures identified in step 1 to permit the amount of flow  $F^p$  determined in step 2 to be carried by each respective restoration route upon the occurrence of one of the possible span failures identified in step 1.

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**12 Claims, 7 Drawing Sheets**

