How to calculate the proper number of tests for measurement?

Written by Максим
Wednesday, 31 March 2010 13:43 - Last Updated Wednesday, 31 March 2010 15:19

Given number of agents, how much tests should we create in order to reliably measure the performance of network in all needed directions?

If you need to run tests in full-mesh mode, then total number of tests should be equal to number of links between nodes:

<Number of tests>=N(N-1)/2

Where N is the number of nodes.

Many networks have explicit or implicit traffic concentration points, which are much less in number than total number of nodes. So it is worth to avoid running tests between nodes, which have small or no traffic between them. For example, in star topology, only the central node should have "active" agent, where terminal nodes could be considered "inactive" and have agents configured to run in "coupled" (responder-only) mode.

In this case, number of tests for full-mesh network should be corrected by subtracting number of "holes" (missing direct inter-nodal links) defined by "inactive" network elements:

<Number of tests>=N(N-1)/2-I(I-1)/2=(N-I)(N+I+1)/2

Where N is the total number of nodes, I – number of "inactive" nodes.

If we use A=N-I as a number of "active" nodes (traffic concentration points), we have:

<Number of test>=A(2N-A-1)/2

In extreme case, when network has explicit star topology with single center, we have:

<Number of tests> = N-1

Result should be multiplied by number of managed classes of service C. i.e. universal formula for number of tests for the network with N total nodes, A active (concentration) nodes and C classes of service should look like

<Number of tests> = A*C*(2*N-A-1)/2