WIDE AREA NETWORKS STRUCTURAL ANALYSIS PERFORMING SIMULATIONS

We talk a lot about improving software quality most of it centred on things such as bugs and security vulnerabilities. Unfortunately, little of that software quality rhetoric has focused on issues related to network performance and cost.

This oversight is surprising and not at the same time. It's surprising because we've been wrestling with networked applications for well over a decade now and we know all too well how representative the network cost is in the overall IT budget and how poor performance impacts our operations. On the other hand, it isn't very surprising because application development teams and network technicians are known for not interacting as much as they could. Application developers are taught to focus on business-use models, code quality, and project management disciplines. Efficient use of network resources remains a relatively low priority in most of the IT world especially with network technologies evolving to make more and more bandwidth available for the asking. In general the network team accepts the applications demand for bandwidth as a consummated fact without questioning it. The predominant mentality is that "We start from there" or "Our job is to transport whatever the applications demand". The usual situation is such that no one in the network team has or wants to have any say during the application development process.

Considering the percentage represented by the Telecom/network within the typical IT budget it would be reasonable to spec that thoroughly evaluations about the impact of the traffic generated by each application over the network (LAN/WAN) would be taken, even in the early stages of the applications development. The impact in terms of network's cost/performance can even be a major factor defining the feasibility or not of implementing a new application.

Instead, what we usually have seen is the fact that applications may be tested in advance for stability, user acceptance, and CPU utilization, but their behaviour on the network remains an afterthought. No one really knows how they will perform across the diverse LAN and WAN connections they must traverse, how they will impact the numerous other applications traversing those same connections, how efficient in terms of bandwidth utilization they really are (or could be) or how much they will add in the cost of the network, until they go live.

These problems occur not only when implementing brand new applications. Sometimes adding a new feature to an existing application can wind up wreaking havoc in the network. Other times, it's the addition of a new site or new users. Developers often fail to fully comprehend the impact that adding Web-based access to a legacy application can have on both hosted Internet infrastructure and enterprise connectivity.

This situation cannot be attributed exclusively to the lack of interaction between applications development and network operations (although an important part of the problem). The difficulties associated with modeling the impact of a new application over a pre-existent network go beyond. Even having a very oiled team it is difficult to put together all pieces involved in order to properly model the problem. Most people may imagine that it is only matter to properly measure the traffic generated by the new application and extrapolate this traffic throughout the whole structure. Unfortunately reality is a bit more complex.

Even if the new application traffic is measurable and the new application usage patterns can be reasonably identified we still would have to have a clear view of the whole current structure including things such as current traffic (others applications), points of presence, interconnection possibilities (including service providers and technologies), and possible aggregation scenarios to be able to properly identify the more cost effective way to handle the new traffic. A new application with a new traffic volume/pattern may make feasible (In economical terms) the deployment of different technologies, service providers or even a different topology.

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To help companies address this problem WANOPT developed Ariete®. Ariete® is a software able to identify the ideal network structure to support a given traffic volume, being able to simulate several traffic volumes/pattern and establish the correlation between traffic volume and network cost. The model provides the opportunity for fast evaluation of multiple traffic volume/pattern scenarios, delivering verification of infrastructure cost changes by scenario.
Through Ariete® becomes possible to identify the correlation between traffic volumes, infrastructure cost and revenues as they relate to the services offered by the applications. For example, assume that a new service is being considered by the business as an additional service. Ariete® enables the modeling of business cases identifying the correlation between each new application and the associated cost involved in implementing it effectively.
Since in most cases is possible to perform a very quick and accurate analysis, the automation of this process allows for the simulations and results to be compiled within very short time frames. This enables the business to consider several scenarios with clear definitions and documentation of the costs and benefits of each service before implementing it.
By providing such elaborate and accurate information to the business, this process becomes a powerful decision support tool. It makes it possible to:

- Generate simulations showing how different traffic volumes/patterns influence the overall cost of the network structures.
- Establish the correlation between traffic and telecommunications' expenditures.
- Simulate future needs and verify how the network's cost will behave faced with increase in traffic. (Assisting in strategic planning, anticipating needs and problems).
- Negotiate telecommunications budgets establishing a clear correlation between traffic, services provided and the costs incurred with a high level of accuracy