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Route Analytics Enrich Technology Relationships

Operations Strategies, Service Management Strategies

Glenn O'Donnell

Route analytics are finally emerging from niche applications to better leverage relationships for more advanced configuration management, incident correlation, and root-cause identification. By capturing another dimension of complex network topology relationships, IT organizations can more effectively understand the impact of dynamic network changes on business services and operational processes.

Route analytics fill a void in the labyrinth of configuration management needs of large organizations with highly meshed networks. Two small pioneering vendors — Packet Design and Ipsum Networks — dominate this nascent market, but the technology's implications are compelling mainstream management vendors to take action.

The market for route analytics products is currently small (<$5M), mainly because the vendors and their central technologies are embryonic (vendors are one to two years old). The market will expand rapidly (30%-50% CAGR) through 2006, at which time the technologies will be integral to broader network topology discovery and configuration management. User adoption within Global 2000 enterprises is currently near zero, but 20% of the Global 2000 will be using route analytics by 2006/07, and the technology will be ubiquitous by 2009 — largely as an embedded function within mainstream network management products.

HP's OpenView division recently announced an OEM agreement wherein it will resell products from Packet Design. This is the first of what will be many similar announcements from other established vendors. Growth will be accelerated by larger vendors whose partnerships are validating the technology's business value. Partnership or acquisition will be the preferred entry method for larger vendors, since both Packet Design and Ipsum Networks have numerous patents held or pending on the technology and the possible methods for capturing such insight are limited. Unilateral entry by other vendors is not impossible, but it will be difficult.

Infrastructure and application management (IAM) technologies have finally evolved to a point where we are able to understand and leverage many of the complex relationships inherent in IT environments. These technology relationship maps (TRMs) are used to guide correlation products for root-cause incident identification and business impact (see SMS Delta 1146). TRMs are an intrinsic facet to any viable configuration management approach, since relationships help render collections of isolated components into clearly defined service views. Automated TRM discovery is continually developing, building on established products (e.g., physical network topology and client software assets) and now moving into such areas as logical network "overlays," n-tier software relationships within application servers, and organizational context. Emerging requirements for business perspective views (see Delta 2522) will depend on all of these, including network paths.

In the networking domain, topology discovery products are mature. This physical view of the world is undeniably essential, but it is still an incomplete vision of the actual end-to-end relationships for IT services. Many logical overlays to this topology exist, including network routes. This particular overlay is especially confounding for IAM efforts, since normal device-centric discovery mechanisms cannot adequately capture the routes through the network. In small, simple networks, this is of no concern, since the possible path between any two points is usually limited to one choice. Service providers and many larger enterprises often have several path choices.

META Trend: Through 2003-05, real-time status reporting will be demanded in context (e.g., performance versus the SLA — not element level) and include extended metrics (e.g., financial analysis, mean time to restore service) that drive abstraction technology. Through 2005, tools targeting service-level "everything" (reporting, verification, management, etc. — SLx) will remain immature and fragmented. During 2006/07, SLx technology will begin to mature (demanding XML-based data integration), supported by common metrics.

Multiple paths result in good network resilience, but they also present ambiguity about the TRM complexion of service components. IT services exhibit numerous dimensions of TRMs. Full capture of all of these dimensions may never happen, but users should capitalize on each new breakthrough in TRM discovery that offers value. High degrees of operational automation (see Delta 2195) are possible only through proper use of multiple TRMs. By combining the physical view and the logical views of network-based services such as routing, an accurate perspective of network components directly related to a service can be achieved. This is a significant milestone in our quest for broader understanding of automated relationships.

Although these products strengthen end-to-end visibility, the sheer notion of "end-to-end" will remain subjective and sometimes beyond the capabilities of existing technologies. If the two ends are directly related network nodes (e.g., client-server), route analytics — in conjunction with the physical view — will offer a good end-to-end perspective. In n-tier applications, where server-based software is a key link in the service chain, end-to-end visibility will continue to be ambiguous.

Routing protocols such as OSPF (Open Shortest Path First) are pervasive in large networks, constantly monitoring link states and automatically rerouting traffic based on these states (see Figure 1). This type of dynamic routing has been used for years, but most networking professionals still do not fully grasp the optimization of configuration details or how these routes impact services. Tools such as the "traceroute" command line utility help, but are reactive and often describe the path after an event has passed. Simply put, real-time routing information that can correlate to incidents for quicker analysis is needed.

To attain real-time visibility, analytics products must participate in cooperative negotiations between routers. The routing protocols enforce this cooperation, with all routers constantly exchanging information about link states for consensus on how to most effectively reroute around troubled points. Both Ipsum Networks and Packet Design provide appliances that participate in these negotiations between routers. They do not offer route suggestions, but their active participation allows them to always know the routes within the network as well as certain performance details about these routes (e.g., latency, throughput, cost). Their participation also allows them to identify route changes immediately. This simple event is a useful feed into existing event management systems to possibly correlate this low-level event to service incidents.

Integration with event management systems is a major factor in deriving the full value from these products. Route analytics alone provide a useful tool for networking staff, but automated insight into end-to-end service availability and performance requires an appropriate blend of route details and other TRM dimensions. Although full end-to-end service visibility remains elusive, overlays such as routing paths are an important step toward richer TRMs, and likewise toward better automated mapping of business services.

Another benefit of route analytics is better awareness of routing behaviors for overall configuration management. Routing is naturally a complex subject. Proper configuration is often a mystery, and errors can cause catastrophic network failures. These convoluted issues often frighten network managers into maintaining network routes using default configuration attributes. Although this is often the safest approach, it is far from optimum. User-friendly configuration tools, with sanity checking and visibility into the results of configuration changes, have been sporadic and weak. New methodologies and configuration management products based on these methodologies (see SMS Delta 1133) are emerging to help fill this void. When use of these products is combined with route analytics, a fuller capability to optimize routing will materialize.

It is notable that both vendors employ an appliance for the packaging of their solutions. This function can certainly be offered as software that is loaded onto a general-purpose computer, but the appliance model offers many benefits (see SMS Delta 1054). The most significant benefit is raw simplicity. The appliance is installed with little startup configuration and therefore presents rapid time to value.

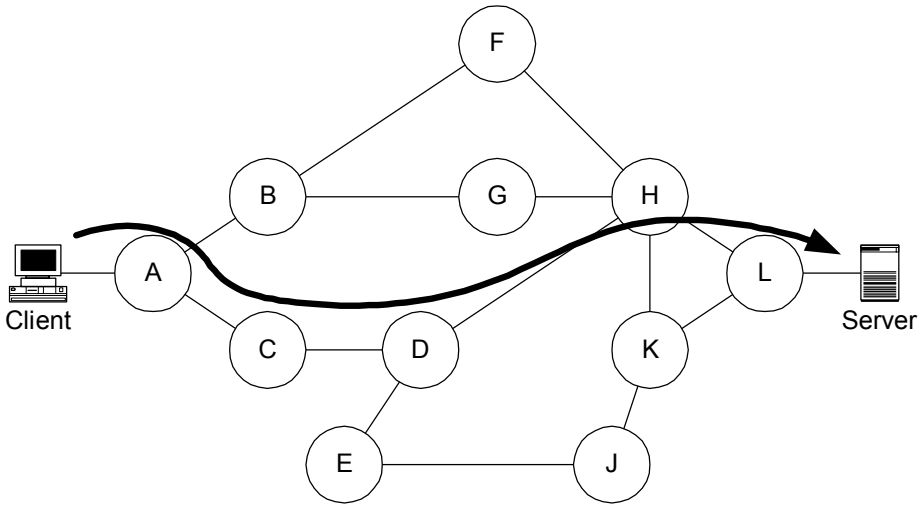
Bottom Line

For larger organizations, new route analytics products present better insight into network-routing characteristics and enable enhanced relationship identification for mapping of services to infrastructure components. Superior business service management and optimized configurations are possible with proper inclusion of these products in management tool portfolios.

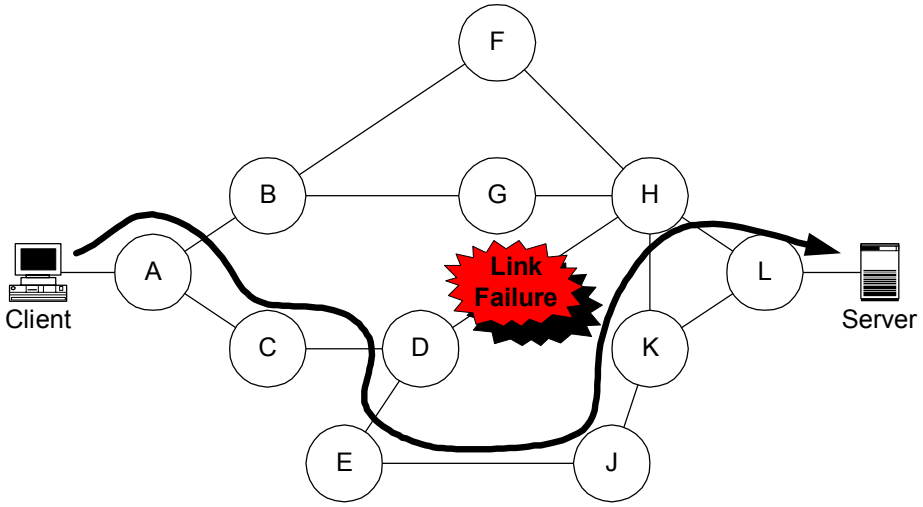
Business Impact: Enriched technology discovery bolsters IT services and saves operational costs.

Addendum

Figure 1 — Dynamic Routing for Network Resilience



Default Route: A - C - D - H - L (20 ms latency)



New Route: A - C - D - E - J - K - H - L (85 ms latency)

Routing protocols such as OSPF ensure reliable paths across the network. In the above hypothetical example, many possible routes exist between the client and the server, but only one path will be used at any time. When a link fails or presents a performance bottleneck, an alternate path is automatically chosen. End users usually do not notice such route changes, but sometimes end-to-end performance degradation will result. The diagnosis of such problems can be difficult without good visibility into routing decisions made by the network.

Source: META Group