Next Generation Network Series

The Evolving Network

Introduction

The telecommunications network, the central nervous system of our wired and wireless world, is becoming something more; the signs of network evolution are everywhere. The network is no longer just a passive means of transferring information from one place to another; it is the key enabler of new forms of collaboration (such as web conferencing), new business models (such as on-line auctions), new forms of globalization and outsourcing, and new forms of computing.

Data can now be transferred at bit-rates dramatically greater than ever before. Voice and data networks are converging, so that a single integrated platform can replace the specialized private networks of years past. Wireline and wireless access protocols are coming together, so that a reliable network connection is no longer dependent on location. And a "call" is no longer a connection restricted to a single device. Today, a call is coming to mean a continuous voice, data or video interaction with one or more participants, that can be seamlessly handed off between devices. Today's networks are also easier to manage, and allow for better reporting on traffic and usage. Computer services can be delivered using Internet Protocol (IP) technology, which allows for dynamic traffic management and load balancing. All these changes mean the network can support an unprecedented degree of globalization for large enterprises.

What is the Network, Anyway?

The traditional view is to consider the network only as a means of access and transport, a complex but essentially passive assemblage of copper, fiber and switches. In this view, the network's role is simply to move data from one place to another, and it's only expected to deliver two things: speed and reliability.

Even in this role, though, the network is becoming more intelligent and more agile. Networks are like chocolate cakes, built on multiple layers of components and technologies. At every layer, new technologies are increasing flexibility and agility.

At the lowest layer we have the pure physical transport of bits and bytes. This "photonic mesh layer" is something that's becoming reconfigurable with the use of optical components that allow for rapid modification of network routes. One step above, the "SONET layer" is beginning to use technologies such as Virtual Concatenation and Link Capacity Adjustment to enable bandwidth on demand. Bandwidth increments can be provisioned in less than 10 seconds, and customers will only need to pay for the bandwidth they use. Finally, intelligent routing of IP traffic, through technologies such as AT&T's Intelligent Routing Service Control Point and MPLS fast reroute, can add even more flexibility and control.

"The network is not just becoming more agile, but also evolving to become a globally dispersed utility grid which will provide not just content distribution and collaboration, but enable new types of distributed batch and transaction processing."

Joe Weinman, Emerging Services VP, AT&T

In addition, a new, more expansive view of the network is emerging. In this view, the network is evolving into an intelligent repository of content, functions and applications – a distributed computing utility and the foundation for a global computing grid. Network-centric hosting, content distribution, massively multi-player on-line gaming, and software-as-a-service provide glimpses of how the network will evolve. When its full potential is understood, the network can be seen as a vast array of integrated hosting centers, intelligent edge devices, dynamic routing logic and embedded business rules. It can support many computing tasks that once would have been assigned to dedicated processors. In fact, this kind of network can support all kinds of processing activity, from large-scale batch programs for biomedical research to transactional applications for day-to-day business.

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This evolution has been under way for some time. In late 2005, AT&T celebrated its 10th anniversary in the Internet hosting business. In the past decade, AT&T has established thirty Internet Data Centers (IDCs) on four continents. This part of the business has also evolved beyond simple "hosting." The IDCs today provide a large, highly-secure infrastructure for distributed computing. That means companies now have new options for doing business. New distributed architectures, combined with new and emerging business models, are enabling more flexible options.

New Service Opportunities

As an example of the possibilities, consider the use of Radio Frequency Identification (RFID) technology, in which small chips can be used to tag everything from individual items to pallets of goods. RFID systems are very network-centric applications, and natural candidates for distributed processing and utility delivery. Readers collect tag data, edge servers do event filtering and caching, tracking information is transferred across the network, and network-based information services enable improved supply chain management. AT&T's new network-based RFID service will include end-to-end management, from readers to reports, and RFID data can be fed from the network directly to a customer's ERP and supply chain management systems.

Other network capabilities will provide the foundation for complex services built using service-oriented architectures that enable the rapid assembly of modular components.

These components will include functions such as micro-payments, user authentication, natural language translation or presence and location services. Utilizing the network as a computing utility will reduce the time to market for any network-related offerings, such as the delivery of content to cell phones, new services based on seamless mobility, and a broad range of software applications offered as network-based services. The same will be true for offerings such as high performance computing for engineering, scientific and medical communities.

Looking Forward

Virtually any application can run on a network-based architecture; an optimal end-state combines service-oriented concepts with a network-enabled distributed computing environment. The next generation network will mean major changes in the IP services business, with true utility pricing models that enable new kinds of services.

In the end, new technologies allow for new possibilities, but new business models are needed to bring those possibilities to life. The evolution of the network will mean greater flexibility and control, emerging technologies for management, orchestration, and optimization and new pricing models.

Putting all these things together will enable new ways of doing business.

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