

Next Generation Network Series

Network Management

Introduction

As telecommunications continues to evolve, with the integration of wireline and wireless systems and the convergence of voice and data networks, it is increasingly able to support new ways of approaching business problems. Making it all work seamlessly, though, will require next generation network management. This management is not the traditional monitoring and management of network devices, but the complex orchestration and optimization of resources ranging from a variety of end-user devices to wired/wireless access networks to flexible core networks to dynamic, geographically distributed utility computing, storage, content, and applications.

End-Points and Access

Today's IT environment includes a variety of Personal Digital Assistants, cell phones, two-way pagers, wireless laptops, desktops, thin client monitors and even IPTV and set-top boxes. The first management challenge is to perform all of the tasks required to deal with this vast array of endpoint devices.

Identity management, authentication, authorization and access control are key network functions. The network can check for the compliance of end-point devices (ensuring that the latest anti-virus software is installed, for example) in order to control network admission. For VoIP or other real-time services, call admission control is essential to ensure that end-to-end quality of service can be achieved in accordance with service level agreements by ensuring that there are sufficient resources allocated along the path. Digital Rights Management standards and components act as gatekeepers to limit the number of uses or enforce other restrictions on digital goods. Translation and transcoding are also important, to enable the delivery of hi-definition video streams to low-definition mobile devices. Presence and location services, which let you query your mobile device for directions to the nearest pizza parlor, ultimately depend on the interaction between the network and these devices.

Networks

Traditional networks were built with fixed pipes and fixed routing; emerging networks enable bandwidth on demand, route control, packet control and quality of service control. For example, during

periods of higher use, additional bandwidth can be flexibly provisioned. During periods of low use, less bandwidth can be provisioned, saving money. Route control can be used to let customers specify routes, to comply with global privacy laws or for performance or network maintenance reasons. Packet control can be used to filter out packets that are either not a good use of business resources or represent a cyber-attack. And quality of service provides the ability to give priority to real-time traffic, such as voice, over less demanding traffic, such as bulk file transfers.

Servers and Storage

The new generation of virtualized, dynamically allocated, geographically dispersed IT resources has many new functions that didn't exist in the legacy world of static assets. Now, operating systems and applications can be dynamically provisioned as a "bare metal" asset, i.e., a computer server without even an operating system on it. Partition sizes can be reset for virtual servers and storage, application instances can be migrated dynamically from one server to another, or even from one physical location to another.

Putting it All Together

All this flexibility would just be chaos without a control and management layer that optimizes the architecture and configures the resources. Emerging network management techniques will use a closed-loop process that supports full integration and real-time monitoring, something that has implications for end-point devices, access, the core network and the infrastructure, as well as for network-centric applications.

Finally, integrated network management means performance assurance that can be nailed down with Service Level Agreements. Network managers will have a much better understanding of where their resources (bandwidth and compute cycles) are going and will be able to use very fine-grained data to ensure control and enhance agility. Integrated network management will support an enhanced network environment, with asset discovery and event monitoring, root cause analysis, policy-driven management rules, distributed configuration management, embedded workflow and a whole new world of optimization and tuning. For example, the "network" will



be able to sense increasing load on an application, create a new distributed instance of that application, increase bandwidth to end users and also for the backhaul to legacy systems, route transactions optimally to the "best" location for each transaction among all the locations where that application is concurrently running, ensure that the users generating those transactions are who they say they are, and reduce cost globally by utilizing off-peak cycles.

In a way, this is what "intelligence" is about – the ability to sense the environment, determine what to do and act accordingly. The network will be able to sense extra demand appearing in Northern Europe, determine whether to route it to New York or allocate additional resources in Amsterdam, and then take the steps necessary: provision computing resources, organize them into a cluster and change routing tables to send the traffic on its way.

Conclusions

Very few service providers have the kind of end-to-end architecture that will allow the full exploitation of next generation networking. However, AT&T has always recognized the network as its core strategic asset, and has continually invested in its future. It is one of the few companies positioned to leverage its technology and experience in a way that can tie all these components together.

"Tomorrow's network management will move beyond today's to address complex policy-based orchestration and global optimization of everything from the end-point to network-based resources such as distributed storage and servers."

Joe Weinman, Emerging Services VP, AT&T

The next generation network represents both an opportunity and a challenge. It opens the potential for bringing together geographically dispersed resources, supporting them with virtualized utility computing architectures and thereby enabling the new, global grid. Combined with AT&T's service-oriented architectures, new billing models and enhanced management tools, all of the pieces are in place.

The next generation network is almost here.

For more information contact your AT&T Representative or visit us at www.att.com/business.

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