Optimizing Service Based Networking with Cisco Application-Oriented Networking

The pressure to deliver real-time information across the enterprise is unyielding. Whether because users demand information in a particular format or at a particular time, or because regulatory oversight and corporate governance require a single integrated view, or simply because the pace of business outstrips the ability to deliver IT services at an acceptable cost, the task for enterprise IT is to build an application infrastructure that can scale and evolve, all at costs lower than today. Clearly, one solution is to drive virtualization, which can do wonders at the infrastructure layer. Equally clear is that IT needs a solution to address the problems of managing distributed business processes.

For most organizations, the costs of building and maintaining an application integration infrastructure are huge. And as many IT organizations experience, the ability to evolve an application or business process is often hamstrung by the inability to evolve the application infrastructure as quickly. Increasingly, business processes not just spread across departments, but reach across companies, locations, and technologies. Supporting these processes with a flexible and resilient architecture across heterogeneous technologies and environments is a serious challenge.

Application-oriented networking (AON) bridges heterogeneous software worlds in today's IT network environments. As traditional silos between IT functions and expertise are being eliminated, business processes are more dependent on networked connectivity and functionality. AON technology bridges these gaps by providing application and middleware control points within network devices themselves. Rather than relying on costly and error-prone server components, AON extends the network to understand and control all major middleware protocols, including IBM MQ Series, Tibco, BEA, J2EE, and standard Web services protocols.

With AON, the challenges to enterprise IT are significantly reduced in four respects:

- Reducing overly complex application and middleware infrastructure: Software and application infrastructures are heterogeneous in most companies. The cost and complexity of maintaining and integrating them pressures many companies to consider architectural consolidation. However, this project alone can entail many years and still not lead to a substantive increase in IT or business flexibility. With AON, the network can play the role of the standard intermediary. Beyond reducing the server and software component, AON can normalize messages and content from different application bases and provide centralized administration and management to ensure rapid implementation and change.
- Lowering the cost of business partner integration: Integration with business partners in either the supply or demand chain is a costly proposition. For a large organization, the cost of maintaining a gateway can amount to maintaining a custom software project for each business partner. The cost can also be a barrier for smaller partners forced to "pay to play" or raise the overall cost and maintenance where a company is forced to automate its supply or demand chain on its own. AON can provide the basis for a standard business-to-

business gateway, allowing organizations their choice of integration protocols, or AON can be deployed as a low-cost intermediary at the partner premises.

- Enabling serverless operation to incorporate branches, devices, and partners: The borderless enterprise is forcing IT to discover new ways to incorporate remote operations while reducing costs and maintaining control. As more and more of the business process happens remotely, often in places ill-suited to servers and complex application middleware, the conventional option is generally a complex and custom-built integration project. The AON approach overcomes this challenge by providing a low-cost and low-maintenance platform that can be fully managed remotely.
- Evolving to the service-oriented architecture: Organizations recognize the value in adopting a service-oriented infrastructure in providing reusability and a lower cost of integration, but the resources needed to maintain current software and infrastructure are intimidating. IT would like to move forward incrementally, without the discontinuity implied by a new architectural approach. The AON approach, taking advantage of the existing network infrastructure, can provide this incremental platform. Because AON understands and can control the vast majority of application middleware protocols, IT gains a common control mechanism across the extended enterprise. Table 1 outlines several applications of the AON technology against alternative approaches.

Table 1. Sample AON Deployments and their Conventional Alternatives

Deployment	Explanation	Conventional Approach
Extended messaging infrastructure	Extend reach of existing application infrastructure to include non-server-based locations (including RFID)	Deploy servers and custom application code in every required location. May need to build specialized device integration code.
Service chaining (internal) or protocol bridging	Provide common message mediation layer between organizations and departments using different application infrastructures	Commit to a single middleware platform across an entire enterprise. Build custom message tracking, accounting, and conversion. Manage conversion to common software platform across the Enterprise.
General mediation and control layer	Mediation and control between applications and network operations	Custom and costly integration work, uniquely built, rather than a flexible infrastructure.
Message delivery (across supply and demand chains)	Use small footprint to extend secure messaging infrastructure from hub to branch	Generally no cost-effective alternative. Many organizations do not have the expertise or cost structure to support server-based integration.
Service-oriented architecture visibility and control	Monitor, report, and control service-oriented architecture messages (such as SOAP) for technical and business visibility	Use a software-based intermediary, introducing another set of software- and server-based complexities.
Message transformation/ B2B or E2E gateway	Provide a consistent and lower cost interface for business partners	While the function can be provided, the higher cost is borne by the partners or subsidized by the company.

The Cisco® AON Technology enables a variety of different usage scenarios across an application network and is flexible enough to meet today's IT network requirements. Here are some typical deployment scenarios.

- In the remote office or business-to-business (B2B) spoke: Cisco AON devices can be deployed as an infrastructure consolidation device. A single device can provide all the services required by the branch office to effectively communicate with the central office. The Cisco AON solution enables these services by bridging disparate applications and optimizing network usage at the application level. Additionally, the Cisco AON Management

Console provides centralized management of a distributed branch-office deployment of application and business policies.

- At the enterprise edge: Cisco AON technology can act as an application-security gateway or a B2B gateway. In this context, it can intercept and analyze traffic in message formats such as Extensible Markup Language (XML). As a B2B gateway, Cisco AON helps enable a transparent interface with trading partners by providing security, protocol bridging, and message validation and transformation services.
- At the enterprise core: Cisco AON provides transparent interapplication communication and application message delivery; it provides a network-embedded communication bridge between protocols and applications. Cisco AON optimizes application delivery by offloading application infrastructure functions such as message-level load balancing to the network, where they can scale effectively, and by enabling intelligent application message routing at the network level.

AON Technology Benefits

There are several distinctive benefits of deploying AON technology:

Complement existing core application and messaging infrastructure: Because most organizations have a variety of different middleware implementations and a host of different applications, AON technology can complement these by playing a powerful intermediary role. The AON network can offload commodity software functions like security, authentication, and messaging routing, doing this more efficiently than in its server-based alternative. Beyond that, AON can manage protocol transformation and protocol bridging as a standard function. Like large customer software projects—but without the long development cycle and high price tags—AON is able to provide stateful service and message chaining, giving organizations a new capability for accelerating time to production.

- More flexible application infrastructure with AON's multiple modes of operation: AON technology can be deployed anywhere in the infrastructure across the extended enterprise—at the core, at the edge, or at business partners—and be provisioned, managed, and controlled centrally. Extending integration of business processes and application security becomes more like providing network connectivity and not a major integration investment. AON provides a multilingual and multiplatform way to extend business processes simply and with high security, wherever the network itself can go. Finally, AON can operate "out of band" to track, capture, and report on application and process events across the infrastructure. This ability to monitor existing infrastructure makes possible new business processes and decision-making without the need to rework application code.
- AON can eliminate or complement server-based infrastructures: In the world of Web 2.0 and the borderless enterprise, there are many different environments that need to operate as part of the extended enterprise. AON technology can be deployed in environments where servers dare not go, for either cost or reliability reasons. On loading docks, at point-of-sale, at bedside, or even at a customer site, AON solutions can provide the highly secure transaction and communication infrastructure traditionally limited to large-scale server-based application environments. Likewise, as companies evaluate ways to harden IT infrastructures and raise efficiencies, they can take advantage of AON's ability to offload specialized software processing while delivering the reliability and performance provided by

the existing network. AON technology can help transform an existing IT infrastructure into a powerful virtual engine ready for whatever business throws its way.

- Complement to traditional application network infrastructures: AON was designed for integration with existing IP networks and networking. Unlike other appliance solutions, AON is a completely network-integrated technology that processes, controls, and manages messaging flows while integrating with all existing packet-related technologies. For example, the Cisco AON solution is fully QoS-compliant and works transparently with other Cisco technologies like load balancers, Web acceleration devices, and caching devices. Together with Cisco Application Network Services (ANS) solutions, Cisco AON makes Cisco networks more than just application-ready, but fully application fluent, melding the power and control of the Cisco network with the broad capability and business relevance of today's application and software infrastructures.

Comparing Cisco AON and the Cisco ACE XML Gateway

Cisco AON enabled networks provide a superset of the application-level protocol switching and mediation services, above and beyond XML processing. AON technology is focused on enabling intelligent application message processing in the network, in a highly secure fashion, based on policy definitions driven by business requirements. With both mediation and integration as key features in the AON network, its business value is to deliver application traffic interoperation by policy-defined message processing. The Cisco Application Control Engine (ACE) XML Gateway solution is a complementary technology that can interface with Cisco AON to expand its XML processing capabilities.

Whereas Cisco AON provides a message-processing intermediary, the ACE XML Gateway delivers an integrated XML firewall. It ensures that XML messages securely and efficiently reach their intended targets, including the Cisco AON devices. It provides the critical protection needed at each interface between un-trusted and trusted zones. With a comprehensive XML threat defense system, it protects against identity, content-based, personnel, response-compliance, message-transport, and XML denial-of-service (DoS) attacks.

AON and ACE XML Gateway offload capabilities from software and applications into the core infrastructure. Cisco AON focuses on network-based execution of middleware functions and application infrastructure logic; Cisco ACE XML Gateway offloads and accelerates XML processing and security. Together, the solutions provide application-layer networking that delivers high performance and highly secure processing for the borderless enterprise.

Conclusion

Network based applications and services have become core business drivers for enterprises and service providers with critical operational needs. Cisco AON technology provides control and optimization of the application traffic at the network packet level in an extendable and scalable fashion.

For More Information

For more information about Cisco AON solutions, visit http://www.cisco.com/go/aon or contact your local Cisco account representative.

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