Writing Sample

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Chapter 1. Introducing IBM’s Interactive Network Dispatcher

This chapter gives an overview of Interactive Network Dispatcher and includes the following sections:

What is Interactive Network Dispatcher?

IBM's Interactive Network Dispatcher is the next generation of server load balancing software. It boosts the performance of servers by routing TCP/IP session requests to different servers within a group of servers; in this way, it balances requests among all servers. This routing is transparent to users and other applications. Interactive Network Dispatcher is useful for applications such as e-mail servers, World Wide Web servers, distributed parallel database queries, and other TCP/IP applications.

When used with your servers, Interactive Network Dispatcher can help maximize the potential of your site by providing a powerful, flexible, and scalable solution to peak-demand problems. If visitors to your site can't get through at times of greatest demand, Interactive Network Dispatcher can automatically find the optimal server to handle incoming requests, thus enhancing your customers' satisfaction and your profitability.

Interactive Network Dispatcher consists of two functions that can be used separately or together to provide superior load-balancing results:

You can use the Interactive Session Support (ISS) function by itself to balance the load on servers within a local area network using an intelligent round-robin approach or a more advanced user-specified approach. Load balancing is performed at the machine level. ISS can also be used to provide server load information to a Network Dispatcher machine.

When used for load-balancing, ISS requires a domain name server to map domain names to IP addresses. When used to provide server load information, a name server is not required.

You can use the Network Dispatcher function by itself to balance the load on servers within a local area network using a number of weights and measurements that are dynamically set by Network Dispatcher. This function provides load balancing at a level of specific services, such as HTTP, FTP, and SSL. It does not use a domain name server to map domain names to IP addresses.

Using ISS and Network Dispatcher together allows you to balance the load on servers within both local and remote networks.

For more information on the ISS and Network Dispatcher functions, see "What are the functions of Interactive Network Dispatcher?" on page 3.

Interactive Network Dispatcher is used on IBM's alphaWorks Web site with resulting throughput that is almost four times faster than the previously used domain name server approach. Interactive Network Dispatcher has also been used to optimize server usage for a number of high-volume sites, including:

- 1996 Summer Olympic Games
- Wimbledon Tennis Tournament
- French Open Tennis Championships
- Masters Golf Tournament
- Deep Blue versus Kasparov Chess Match
- Australian Open

During the 1996 Summer Olympics in Atlanta, Interactive Network Dispatcher routed requests among nearly five dozen hosts in five locations around the world. At peak times, the site received 17 million hits per day, including RealAudio requests lasting an hour or more, as well as requests for graphics images and other very large files. During the two weeks of the Games, the site received between 180 million and 190 million hits, the largest number of hits in the history of the Internet. Through it all, Interactive Network Dispatcher handled the traffic smoothly.

Why do I need Interactive Network Dispatcher?

The number of users and networks connected to the global Internet is growing exponentially. This growth is causing problems of scale that can limit users' access to popular sites.

Currently, network administrators are using numerous methods to try to maximize access. Some of these methods allow users to choose a different server at random if an earlier choice is slow or not responding. This approach is cumbersome, annoying, and inefficient. Another method is standard round-robin, in which the domain name server selects servers in turn to handle requests. This approach is better, but still inefficient because it blindly routes traffic without any consideration of the server workload. In addition, even if a server fails, requests continue to be routed to it. For more information on approaches to managing server workload, including animated examples, go to the following URL:

http: //www.ics.raleigh.ibm.com/netdispatch/examples. htm

The need for a more powerful solution has resulted in Interactive Network Dispatcher, which offers numerous benefits over earlier and competing solutions:

Scalability

As the number of client requests increases, you can add servers dynamically, providing support for tens of millions of requests per day, on tens or even hundreds of servers.

Efficient use of equipment

Load balancing ensures that each group of servers makes optimum use of its hardware by minimizing the hot-spots that frequently occur with a standard round-robin method.

Easy Integration

Interactive Network Dispatcher uses standard TCP/IP protocols. You can add it to your existing network without making any physical changes to the network. It is simple to install and configure.

Low overhead

Interactive Network Dispatcher needs only to look at the inbound client-to-server flows. It does not need to see the outbound server-to-client flows. This significantly reduces its impact on the application compared with other approaches and can result in improved network performance.

Non-Invasive technology

Interactive Network Dispatcher does not modify any packets, nor does it require any modifications to the operating system on which it runs.

What are the functions of Interactive Network Dispatcher?

The two functions of Interactive Network Dispatcher are Interactive Session Support (ISS) and Network Dispatcher. Interactive Network Dispatcher gives you the flexibility of using these functions separately or together depending on your site configuration. This section gives an overview of the ISS and Network Dispatcher functions. For configuration examples, go to "Which function should I use: ISS, Network Dispatcher, or both?" on page 4.

Overview of Interactive Session Support (ISS)

You can use the ISS function with or without a TCP/IP domain name server:

- If you are using ISS for load balancing, a domain name server is required. Using this approach, ISS runs on a name server machine. A client submits a request to the domain name of an ISS pool at has been set up by an administrator. ISS then resolves the name to the IP address of a server in the pool, and routes this IP address to the client.

- If you are using ISS to collect server load information, a domain name sewer is not needed. The ISS monitor collects server load information from the ISS agents running on the individual servers and forwards it to the Network Dispatchers. Network Dispatchers use this load information, along with other sources of information, to perform load balancing.

ISS periodically monitors the level of activity of a pool of servers and detects which server is the least heavily loaded. It can also detect a failed server and route traffic around it. Once every monitoring period, ISS ensures that the information used by the domain name server or the Network Dispatchers accurately reflects the load on the servers. The load is a measure of how hard the server is working. The system administrator controls both the type of measurement used to measure the load and the length of the load monitoring period. You can configure ISS to suit your environment, taking into account such factors as frequency of access, the total number of users, and types of access (for example, short queries, long-running queries, or CPU-intensive loads).

Overview of Network Dispatcher

The Network Dispatcher function does not use a domain name server for routing. It balances traffic among your servers through a unique combination of router and management software. Network Dispatcher can also detect a failed server and route traffic around it.

All client requests sent to the Network Dispatcher machine are routed to the server selected by the Network Dispatcher as optimal according to certain dynamically set weights. You can use the default values for those weights or change the values during the configuration process.

The server sends a response back to the client without any involvement of Network Dispatcher. No additional code is required on your servers to communicate with Network Dispatcher.

The Network Dispatcher function is the key to the management of a large, scalable network of servers. With Network Dispatcher, you can link many individual servers into what appears to be a single, virtual server. Your site thus appears as a single IP address to the world. Network Dispatcher functions independently of a domain name server; all requests are sent to the IP address of the Network Dispatcher machine.

Network Dispatcher brings distinct advantages in routing and balancing traffic load to clustered servers, resulting in stable and efficient management of your site.

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