White Paper

KEMP LoadMaster Support for Windows Terminal Services

KEMP TECHNOLOGIES, INC.

KEMP Technologies LoadMaster Application Delivery Controller and Server Load Balancer appliances provide full support for Microsoft Windows Terminal Services (WTS). The LoadMaster WTS capabilities helps organizations maximize the efficiency and effectiveness of their networks. KEMP delivers this at an affordable price.

The LoadMaster resource monitoring provides data on both server memory and CPU, ensuring users experience the most efficient load balancing possible across each server. LoadMaster integrates seamlessly with WTS Session Directory – providing a reliable “re-connect” when a remote desktop connection to the server has disconnected. LoadMaster also provides RDP-based Layer 7 persistence that incorporates client session reconnect, which can be utilized without the need for the Session Directory service to be installed. This helps simplify IT infrastructure, and provides cost savings benefits.

LoadMaster enables WTS users to maintain persistence, as well as perform resource monitoring for Window servers running multiple services. The LoadMaster resource monitoring feature provides data on both server memory and CPU, ensuring users experience the most efficient load balancing possible across each server. Additional benefits from LoadMaster load balancing WTS include, service checking for servers running Microsoft WTS, and extended capabilities for the increasing segment of remote workers.

LoadMaster products are "RDP-aware", meaning they can intelligently load balance between Terminal Servers, and integrate with TS Session Directory.

Application Delivery Controllers

Application delivery solutions were built to address the challenges associated with website infrastructure complexity, performance, scalability and security. They may be known as application delivery controllers (ADC), application delivery controllers, server load balancers (SLB), application front-end devices (AFE), application traffic managers, and web front-ends, content switches and application switches. In order to avoid confusion, this paper will focus on datacenter solutions, and refer to application delivery solutions as application delivery controllers. Today’s application delivery controllers actually evolved from server load balancers that were first introduced in the late 1990s.

ADCs provide the ability to direct Internet users to the best performing, most accessible servers. Should one of the servers (or applications on that server) become inaccessible due to any type of failure, the ADC will take that server off-line, while automatically re-routing users to other functioning servers. This process is essentially seamless to the user, and critical to servicing the customer.

During the past five years, application delivery has emerged as one of the most important technologies in solving the problem of performance and accessibility for Internet-based applications.

In addition, by using various load balancing algorithms, an ADC can distribute users to servers that offer the best possible performance. The ADC can dynamically interrogate key server elements such as the number of concurrent connections and CPU/memory utilization.

To further enhance, and secure the user experience, more-advanced ADCs provide SSL offload/acceleration. SSL acceleration in the ADC enables you to offload the SSL handshake and encryption/decryption processes from the servers. This offloading dramatically increases the servers' performance, while decreasing the time and costs associated with the server's SSL certificate management.

The application delivery market is divided among two ADC vendor groups. High-end vendors such as F5, Cisco, and others which often cost over $100,000, after you get the redundancy and options you need; and the "value" ADCs vendors such as Kemp, where a full high-availability pair of loadmaster products start at under $5000.

KEMP LoadMaster's unique WTS support

Kemp Technologies LoadMaster supports any TPC or UDP port/protocol combinations. Before LoadMaster, if you wanted to do connection load balancing based on more than a simple number of current network connections, you had to write a script that calculated the load of each host that was accessible via HTTP by the load balancers. The script ran on each host, and generated a number from 1 to 100. Then the load balancer would check http://host1/myscript, http://host2/myscript to determine which server should receive the new load.

This was not the most ideal solution, but it was flexible, since you could use any perfmon counter, WMI interface, EXE, etc. to generate the numbers. For example, you could create a script that ran several checks for websites, and sample database queries. If everything came back as expected, it would generate a load number. If any aspect failed, the script generated a value which would tell the load balancer that server 1 was "full," thus preventing new connections to the broken server.

You could configure them to balance user traffic to Terminal Servers and listen to port 3389, and even install IIS on your servers to create load balancing algorithms. This worked except for one thing; if a user with an existing disconnected session reconnects, there is no way for the load balancer to know about that existing disconnected session, so the user is routed to the least-busy server. Chances are they'll be sent to a different server, thus starting a new session even though they already had an existing session.

Windows Server 2003 Session Directory

With the release of Windows Server 2003, Microsoft introduced Session

Directory - a simple Access database running on one of the Terminal Servers that maintains a list of all active and disconnected sessions on all servers. The Session Directory interacts with the load balancer via a "routing token." However, this means that the load balancer must know about the Session Directory, so that when a new incoming user authenticates to a Terminal Server (but before the session is started), the load balancer can check to see if that user has an existing session on another server. If so, the session is switched over to the other server.

Session Directory worked well enough, except that only the expensive load balancers supported it. However, that has changed now that KEMP's feature rich, yet affordable LoadMaster Application Delivery Controllers and Server Load Balancers fully support Session Directory.

Windows Server 2008

With Windows Server 2008, Microsoft is introducing a load balancing feature called Terminal Server Session Broker. However, the TS Session Broker in 2008 is almost identical to the Session Directory in 2003. The primary difference being that the 2008 Session Broker can route incoming connections to the least-busy server, in addition to routing users with pre-existing disconnected sessions back to the server running their session.

Why you need KEMP's LoadMaster with WTS support

It turns out that there are some complexities in the TS Session Broker configuration. The most fundamental challenge is that TS Session Broker runs on one specific server. All incoming client connections are pointed to that server so they can be routed to the proper Terminal Server. Unfortunately, this introduces a single point of failure. In order to alleviate the single points of failure, you need to build in redundancy. This requires building two TS Session Brokers, which will need fail-over between them. Failover between the two TS Session Brokers requires you to configure Windows Network Load Balancing (NLB). The problem is that NLB will send traffic to a server as long as that server's IP stack is up, and the NLB service is running. Unfortunately, even if your TS Session Broker service fails, NLB will keep routing users to a down server.

To avoid this problem you need to put in a smart, Layer 7 ADC or server load balancer in front of your TS Session Brokers, so that incoming user requests are always routed to a functioning TS Session Broker server. You can also avoid all the session broker complexity, and use the same Layer 7 ADC or server load balancer in place of the TS Session Broker. This is where KEMP comes in.

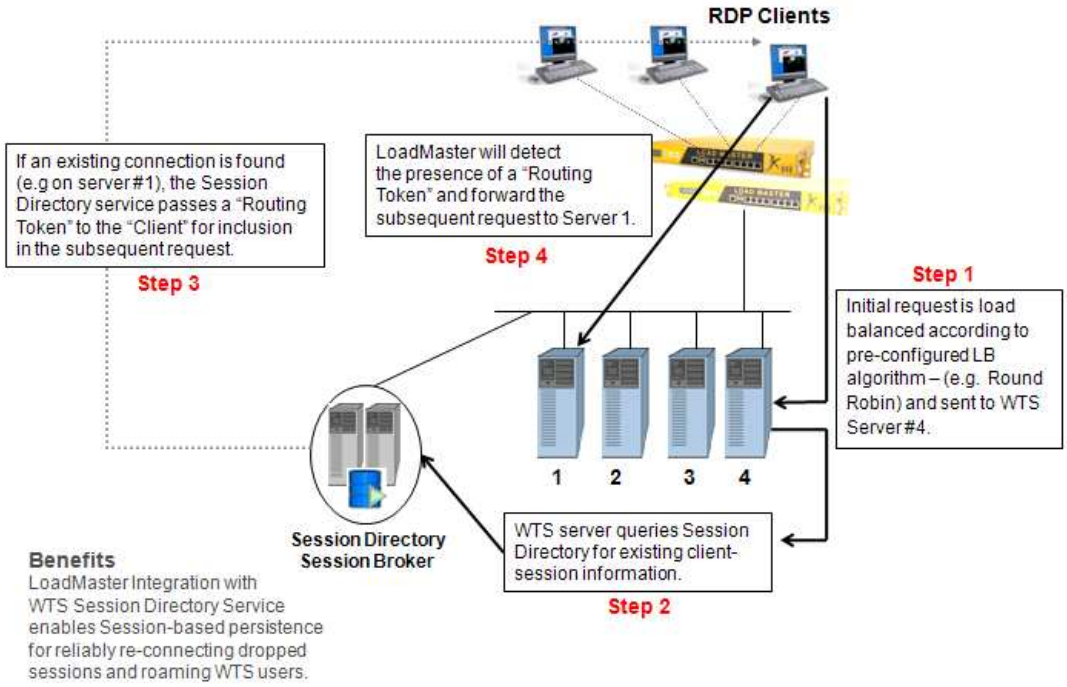


Diagram 1: KEMP's LoadMaster resides in front of TS Session Brokers, so that incoming user requests are always routed to a functioning TS Session Broker server.

KEMP's Terminal Server load balancing capabilities

All of KEMP's LoadMaster products support the routing tokens that allow them to communicate with the TS Session Directory (Windows 2003) or the TS Session Broker (Windows 2008). LoadMaster products are "RDP-aware", meaning they can intelligently load balance between Terminal Servers, and integrate with TS Session Directory.

In addition to working with the Windows features, the LoadMaster can completely replace the Session Broker or Session Directory. In other words, the LoadMaster load balances and routes users to their disconnected sessions without using the TS Session Broker or TS Session Directory at all. This is possible because LoadMaster fully supports RDP. This allows the LoadMaster to conduct Terminal Server health checking by testing whether a server can receive RDP connections. See diagram 2 below.

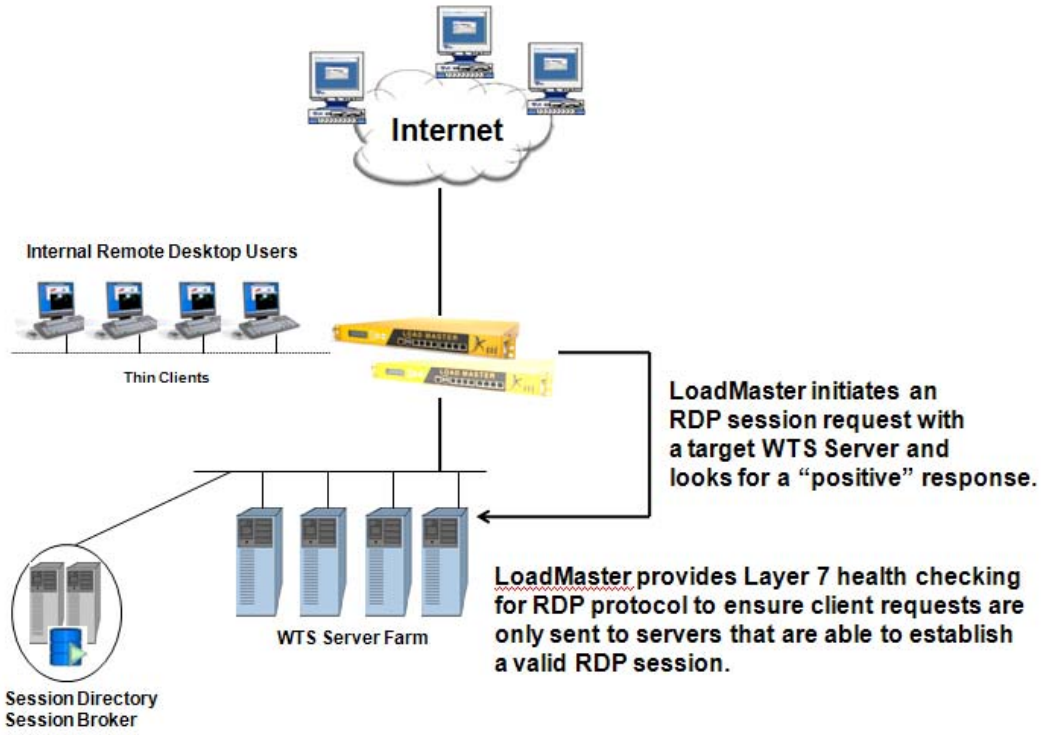
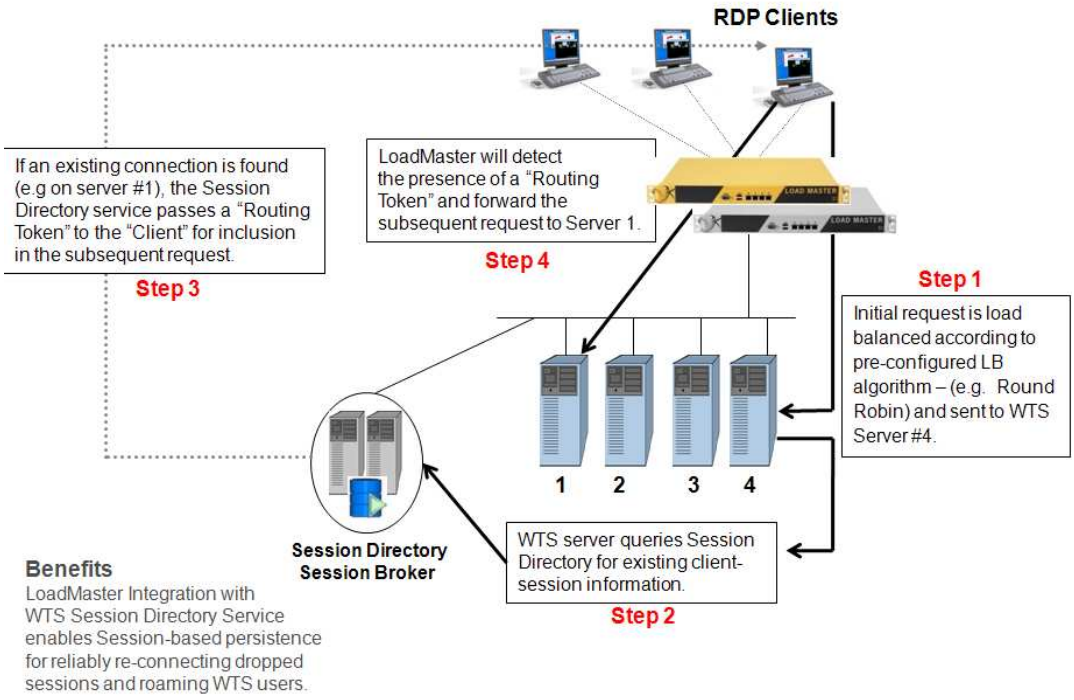


Diagram 2: The LoadMaster to conducts Terminal Server health checking by testing whether a server can receive RDP connections.

Alternatively, LoadMaster also has a resource agent running on each Terminal Server. The LoadMaster contacts these agents (at a configurable interval) so that it knows which server is the most appropriate for new connections. Furthermore, the LoadMaster can track active and disconnected sessions, so you don't have to deal with the TS Session Directory at all.

LoadMaster's resource-based load balancing contacts each server in the group via HTTP (on any port) looking for a value between 0 and 100. LoadMaster communicates with its agents that run on your servers that generate the values. The agents read a text configuration file that tells it what perfmon counters to look for, and how they should be weighted for the final calculation. This is a flexible solution that allows you to use any perfmon counter, any way you wish, for your load balancing algorithms. If you have certain servers that you want to weight differently, simply put a different text configuration file on them, the agents produces a 0 to 100 value. If you want to use another method altogether for load-balancing, that's no problem.



Get fully-redundant "RDP-aware", Layer 7 Terminal Server load balancing, health checking, and replace the Session Directory – all for under $5000.

All of KEMP's LoadMaster products cost-effectively support WTS. For example, the LM1500 has a list price of under $2500. If you want high availability, or redundancy, you'll want two LM1500s. The first LM1500 is active, and the second LM1500 is passive. If the active LM1500 fails, the passive LM1500 assumes its IP address, and everything continues without interruption.

You can have a fully-redundant Layer 7 Terminal Server load balancing for any perfmon counter, Terminal Server health checking, and replace the Session Directory – all for under $5000.

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