As more and more data moves online and is accessed frequently, companies with substantial online infrastructure need datacenters where frequently accessed data is available without any downtime. Accessing such data from traditional database infrastructure will create delays and bottlenecks. Web 2.0 based companies have moved such data into another tier of appliances called Memcached servers to host frequently accessed data. This is a way to accelerate web server access to the back-end database tier. Instead of doing a slow DB transaction, the web server tries first to load the object from a ram based cache/storage. If it cannot find the data, it will go to the database. Many web developers currently use this method in small and large sites to increase the number of web transactions/sec while offloading the database as it helps them decrease the response time to user queries. This is part of a family of solutions sometimes referred to as No SQL.

The Mellanox Message Accelerator (VMA) library is a network-traffic offload, dynamically-linked, user-space Linux library which serves to transparently enhance the performance of socket-based networking-heavy applications over an InfiniBand or Ethernet network. VMA focuses on latency-sensitive and throughput-demanding, unicast and multicast applications and is used to accelerate producer applications and consumer applications, and enhances application performance by orders of magnitude without requiring any modification to the application code.

Memcached solutions using the VMA library gain many benefits, including reduced context switches and interrupts, which result in:

- Lower latencies
- Higher throughput
Memcached solutions are fast transaction-based network applications, which require a high rate of request-response type operations over TCP or UDP unicast. These solutions also involve any send or receive to and from an external network entity, such as smartphones accessing Web 2.0 applications, mobile browsers, laptops, etc. They also do caching/data distribution applications, which utilize quick network transactions for cache creation/state maintenance. All these characteristics of Memcached solutions are satisfied by VMA to provide the following:

- Improved CPU utilization
- Minimal buffer copies between user data and hardware – VMA needs only a single copy to transfer a unicast or multicast offloaded packet between hardware and the application’s data buffers.

VMA for Memcached solutions runs on Linux currently and is interoperable with other OSes such as Windows/Linux/VMware/Solaris for non-VMA receive/send side of connectivity.

Transactions per second and latency was measured for set configuration where client accesses Memcached server by several network solutions such VMA using InfiniBand, VMA using 10GbE, traditional 10GbE and GbE.
It can be seen that VMA with InfiniBand provides the highest transaction per seconds compared to other solutions. Mellanox 10GbE with VMA outperforms traditional 10GbE infrastructures by 2X on smaller packets.

**Bandwidth:**

TP/s using 2 processes per memcache server.

Highest bandwidth was achieved with InfiniBand infrastructure and VMA compared to 10GbE and TCP.
Latency:
Latency for Memcached test showed that VMA with IB is 2.3X faster than traditional 10GbE. Memcached solution users can get a response time 20 times faster to their users by using VMA without any modification to their existing Memcached solution.

**Memcached Test (Transactions Latency Under Load)**

![Graph showing latency comparison between different network solutions under load.](image)

**Conclusion**
Mellanox’s VMA and InfiniBand or Ethernet solution can accelerate response time, bandwidths and transaction per second for existing and future Memcached solutions without any modifications.