

LITEONI[®]

**Optimizing Storage within Unified Threat Management (UTM)
Appliances**

What is Unified Threat Management?

Unified Threat Management (UTM) is an approach to information security where a single hardware or software installation provides multiple security functions simplifying the infrastructure. UTM enables companies to fully utilize a mobile workforce, cloud services, and other emerging technologies for a competitive advantage. At the same time, it reduces the risks posed by ransomware, phishing, and other evolving cyber security threats.

Traditionally, unified threat management combined network security, email security, and web security together in a single solution. More recently, it included wired and wireless networking to its baseline set of capabilities. Today, leading UTM solutions have also added integrated endpoint, sandboxing, and other security functions along with additional networking extensions and cloud-based management.

According to IDC Worldwide Quarterly Security Appliance Tracker Q4 2018, the UTM market is both the largest and fastest-growing security appliance market. This segment accounted for over \$220 million more in revenue for 4Q18 than in 3Q18. Despite being the largest overall segment, UTM grew by 19.7% year over year and now accounts for 50.9% of the worldwide security appliance market in 4Q18.

LITE-ON SSDs have been deployed in leading UTM Appliance suppliers in multiple generations. LITE-ON has been working with leading UTM Appliance suppliers for years to make sure that LITE-ON SSDs have the right design, endurance, and reliability in a UTM environment.

What are the storage options for UTM Appliances?

In previous generation of UTM Appliances, suppliers have chosen to use HDDs (hard disk drives), eMMCs, or SSDs. Over time, as UTM Appliances are deployed into data centers, suppliers began to see the benefits of the SSD over the other two storage media options. UTM Appliance suppliers have mostly rejected a hard drive solution because it would make their appliance too bulky and heavy. Hard drives are also not suitable due to the enormous amount of heat generated and its susceptibility to damage due to shock and vibration. They also decided against an eMMC solution because they have to be mounted on the motherboard and wouldn't be easily replaced if it malfunctions.

The following table highlights some of the obvious advantages of SSDs compared to other storage media options in UTM Appliances.

	SSD	HDD	eMMC
Performance	Best	Average	Poor
Physical Size	Many Form Factors to offer. 2.5" or M.2. Fits in UTM Appliances of all sizes.	3.5" or 2.5" sizes. 3.5" is too big. 2.5" can only fit in large UTM Appliances.	Small
Storage Capacity	Wide Range Capacity	Only Larger than 1TB	Limited capacity sizes
Serviceable	Yes (Swappable)	Yes (Swappable)	No (Mounted on Motherboard)
Reliability	Best	Average	Average

In the current generation of UTM appliances, suppliers have mostly switched to deploying SSD as the storage media of choice.

The Challenge

In 2015, a leading UTM appliance vendor needed a reliable storage media for the life cycle of their router products, to store usage logs. The firm had a list of requirements: 1. The storage media must be compact and light enough to be installed within a router. 2. The storage media must be serviceable, as needed. 3. The storage media must be consistently written with logs from the firm.

There are several challenges for SSDs in UTM Appliances. UTM Appliances come in different classes and the challenge is to find the right class of SSD for the right class of UTM Appliance. For low-end UTM Appliances, the most common workloads are logging access data for future access during a security event. The low-end UTM Appliance would support fewer devices, which translates into less network traffic and therefore less logs to write into the SSD.

For high-end UTM Appliances, in addition to logging access data, the workload could include HTTP caching and virus scans. This would require more storage on the UTM Appliance. The high-end UTM Appliance would support much more devices, which translates into a lot more network traffic and therefore also more data to be written into the SSD.

The Solution

In order to find the most suitable SSD, the UTM firm decided to work with LITE-ON given their storage expertise and extensive support throughout their product's life cycle. LITE-ON analyzed the router's design and targeted workload before mass production. LITE-ON continued to support the firm through the qualification and integration process. Once the UTM appliance entered the mass production stage, LITE-ON also worked with the firm to track actual workload and analyze RMA service returns.

During the design phase, LITE-ON provided valuable advice in mechanical and software designs. For mechanical designs, LITE-ON recommended considerations for serviceability, protection, and heat dissipation. For larger UTM Appliances, LITE-ON recommended air flow from fans to maximize SSD performance and avoid thermal throttling. LITE-ON also advised that the software designs of the operating systems on the UTM appliances should consider writing data sequentially and include trim commands. These software features would maximize the life of the SSD. Each UTM appliance had a specific target workload and by using proper calculations, LITE-ON engineers were able to provide the best SSD with the right endurance profile for each of the firm's UTM appliance.

The UTM appliance's workload translate into constant writing to the SSD NAND flash, and not one SSD would be suitable for every class of UTM appliances. If an SSD is over-spec then the customer would be paying too much per drive and the SSD drive would be under-utilized, but if an SSD is under-spec, then the SSD drive would not survive the warranty period and replacement would be costly.

LITE-ON controls the hardware design and firmware source code of our SSDs, which enabled us to solve any issues that came up during the qualification and integration stage of the SSD. All the lessons learned during this stage was applied towards the next generation, thus improving the process in future. LITE-ON also continued to track workloads to make sure the selection of the SSD during the design phase were still valid.

Once the UTM Appliances entered the mass production stage, LITE-ON continued to track workloads, as provided by the client, to ensure that the design targets were met. Any returns or RMAs were analyzed, and any lessons learned were applied to the next generation SSD. In the long run, we were able to create a positive feedback loop with the client, so that the integration of future generation SSDs were seamless. Thus, saving money and resources for the client. For over 3 years LITE-ON has been the single source vendor for this UTM provider and continues to support their storage needs.

For more information, please visit www.liteonssd.com.



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LITE-ON Storage provides agile, flexible PCIe and SATA solid state drives to meet the needs of businesses of all kinds. Our SSDs are designed and developed completely in house and are fully customizable to meet each client's unique data management needs.

LITE-ON Storage is a global leader in the design and manufacture of SSDs and embedded flash products. Contact us at www.liteonssd.com to learn more about boot solutions for maximizing system performance and security in hyperscale environments.