

Self/Encrypting Drive Market & Technology Report

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Executive Summary

The major conclusions from this report are:

- *It is likely that by about 2017 all HDDs will shift to SED capable units, although estimated security adoption units by 2016 (SED capable HDDs actually used or intended for data security) are only 25% of all HDDs shipped.*
- *By 2016 the high, median and low estimates for security adoption for SED HDDs are 411 M, 315 M and 122 M units.*
- *We project that within 2 years (by 2013) SED capability will be in over 80% of SSDs and likely in almost all SSDs within 3 years (2014).*
- *Although actual SSD SED feature implementation in 2016 is likely to 100% in about 122 M SSDs, the projected actual SSDs from that year used for security and data protection purposes is estimated at less than 18 M units*

Introduction

In July and August 2011, in cooperation with members of the Trusted Computing Group storage working group, Coughlin Associates conducted a survey of a number of interested parties to the use of encryption to provide security in various types of electronic equipment that use storage devices. Those interviewed included storage device suppliers (hard disk drives and solid state drives), systems OEMs, security software companies, storage controller suppliers and others.

Based upon input from the interviews we created a list of drivers for the use of self-encrypting drives (SEDs) as well as factors that limit their use in the market, both historically as well as in the near future. In this report we examine each of these positive and negative factors and look at their historical impact on the SED market and the implications of these factors in the future growth of SEDs, both HDDs and SSDs.

In addition to input from the interviews we also used public information such as press releases, reports and presentations to look at both past projections and factors driving or moderating future growth. We include references and material from these sources as appropriate in this report.

In the course of our analysis we came to realize that there was more than one type of metric for the growth of SED devices. The first metric is the growth of **SED capable devices or SED adoption**. SED capable devices have self-encryption built into the

basic architecture of the device. Data coming into and out of the device are encrypted or can be encrypted if this feature is enabled. The second metric is the growth of **security adoption** using SEDs. The first metric enables the second metric but not all SED capable devices will actually be or are intended to be used for protecting the privacy of data. Thus security adoption will by its nature be slower than SED capability growth.

We base our projections upon a simplified version of the Bass Diffusion Model⁹. This model is a mathematical model that projects growth of a market based upon accelerating and resisting factors. As a result of the interaction of these factors the resulting growth curve has a familiar s-shape. An analysis of the factors leading to s-curve growth is given in the report appendix. In our projection for security adoption we assume that all the SED capable devices sold to date are actually used for or intended to be used for the protection of data. We use historical data on SED HDDs and appropriate growth factors for several HDD markets to project security adoption in each of these markets and by aggregating these projections get a projection of security adoption growth for HDDs. High, median and low estimates for security adoption are based upon high, median and low estimates for total HDD shipments.

Separately we make projections for the growth of SED capable storage devices, arguing that once the demand for these devices in a given market exceeds some threshold value that all HDDs intended for that market will become SED capable devices within some reasonable period of time.

Although the available historical data for SED SSDs is less available we have created a model based upon analogy to the HDD model for both security adoption as well as SED capable storage devices. Note that due to the importance of crypto-erase for making data inaccessible on a SSD, we expect SED capable SSDs to become widespread more quickly than we project for HDDs.

Technology Options for Data at Rest

Self-encrypting hard disk drives were initially introduced by Seagate Technology in 2007. These initial products were called Full Disk Encryption (FDE) drives under the brand name DriveTrust. FDE drives were introduced by Seagate in advance of a SED standard from the Trusted Computing Group (TCG), a consortium of HDD, SDD, electronics, OEM, software and other interested companies whose Storage Working Group was tasked with creating universal standards for storage devices with internal hardware based encryption—often called Hardware (HW) Encryption. Storage devices with HW encryption, where the encryption key never leaves the storage devices and

About the Author:



Tom Coughlin, President, Coughlin Associates is a widely respected storage analyst and consultant. He has over 30 years in the data storage industry with multiple engineering and management positions at high profile companies.

Dr. Coughlin has many publications and six patents to his credit. Tom is also the author of Digital Storage in Consumer Electronics: The Essential Guide, which was published by Newnes Press. Coughlin Associates provides market and technology analysis (including reports on several digital storage technologies and applications and a newsletter) as well as Data Storage Technical Consulting services. Tom publishes a *Digital Storage in Consumer Electronics Report*, a *Media and Entertainment Storage Report*, and a *Capital Equipment and Technology Report for the Hard Disk Drive Industry*.

Tom is active with SMPTE, SNIA, IDEMA, the IEEE Magnetics Society, IEEE CE Society, and other professional organizations. Tom is the founder and organizer of the Annual Storage Visions Conference (www.storagevisions.com), a partner to the International Consumer Electronics Show, as well as the Creative Storage Conference (www.creativestorage.org). He is also a Senior member of the IEEE, Leader in the Gerson Lehrman Group Councils of Advisors and a member of the Consultants Network of Silicon Valley (CNSV). For more information on Tom Coughlin and his publications, go to www.tomcoughlin.com.

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