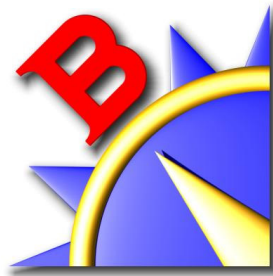


TECHNICAL WHITE PAPER:
UNDERSTANDING USB FLASH DRIVES
AS PORTABLE INFRASTRUCTURE



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EXECUTIVE SUMMARY

The purpose of this white paper is to briefly discuss seven important topics everyone in business needs to know about USB flash drives. More importantly, this white paper is meant to challenge current business thinking that treats small portable devices as big security problems disguised as toys or high-tech gadgets. USB flash drives provide many valuable and productive functions in business. Managers need to look beyond short term concerns, rollup their sleeves, and make USB flash drives apart of their IT landscape. Just like wireless networking, managers must consider USB flash drives as the driving force behind a new, portable infrastructure.

WHAT ARE USB FLASH DRIVES?

USB flash drives are small, portable electronic memory devices that resemble small plastic sticks or key chains. They have standard USB connections enabling you to easily connect the devices into most personal computers and laptops. Power for the devices is supplied through the host computer via the USB port.

The primary purpose for these devices is to store information. They work on the principle of saving electric charges in a binary form representing digital data. USB flash memory device are also non-volatile meaning that the stored data remains stable almost indefinitely. Manufactures claim that flash drives can last 10 or more years and sustain over 300,000 write cycles before failure.

HOW DO USB FLASH DRIVES COMPARE TO TRADITIONAL STORAGE DEVICES?

USB flash drives compare well against traditional storage media. For instance, compared to floppy disks, flash drives are sturdier and provide more storage, in a smaller footprint than floppy disks. They also require no physical drive to work. Plus no moving parts to break.

Optical storage is less expense in terms of cost per megabyte but just like floppy disks, optical media requires dedicated drives to read and write information. Also, optical media is sensitive to surface scratches and must be handled carefully. USB drives are much more rugged. With USB flash drives you can drag and drop data files to write information. With optical storage you must use specialized hardware (CD burner) and application software to write information.

Tape and zip drive storage devices are useful for archiving data from 1 to

over 100 gigabytes. But just like optical storage and floppy disks, tape and zip media requires dedicated drives that can fail. With different formats and devices, Tape and zip media and are not easily exchanged between computers. With USB flash drives its plug and play with any modern computer.

WHAT VALUE DO USB FLASH DRIVES PROVIDE TO BUSINESSES?

USB flash drives are packaged by manufacturers in a variety of forms ranging from simple plug and play memory sticks, to specialized MP3 players, to advanced data-protected versions requiring either a password or fingerprint authentication for activation. The business applications are also diverse and fall in one of six categories:

User authentication – USB flash drives enable highly secure, two-factor authentication (hardware-based plus password). Advanced models support public key infrastructure (PKI) security including hardware-based private keys and hardware “tokens” stored in hidden or inaccessible locations on the flash memory device. USB flash drives are often used to supplement or replace “smart cards”. Compared with smart cards, USB flash drives are much less expensive and do not require a dedicated reader attached the computer for authentication.

File security – USB flash drives provide enhanced data security including file encryption and electronic digital signatures or certificates. USB flash drives protect your digital certificates by providing a safe media for long-term storage and transfer. Specialized software provides efficient document signing, data encryption, and custom PKI integration.

Data transfer, backup, and archive – USB flash drives are excellent media for saving, protecting, and transferring your data. Combined with built-in hardware security, USB flash drives provide unparalleled data storage and transfer. With storage capacity exceeding 2GB, USB flash drives can store entire corporate databases for safe, secure, and rapid emergency re-installations.

Portable office and specialized application software - USB flash drives provide many new and exciting business applications. For instance, up and coming office products such as OpenOffice, FireFox web browser, and Thunderbird email client are very USB “friendly”. Each product offers alternative versions that easily run on USB flash drives without any re-installation once attached to a computer. Other cutting edge applications are also emerging. Documentation “key chains” containing engineering specifications are attached to products during manufacturing. A person’s entire medical record is saved to USB flash devices for easier portability and long-term storage. Briefcase applications improve file synchronization between Microsoft Office applications and USB flash drives. “Portable User Desktops” enable IT

managers to configure standard Windows Desktops for complete portability. No matter what computer you are working on, your desktop, documents, shortcuts - all information remains the same.

Intellectual property protection – USB flash drives help protect software from illegal copying. Developers can easily program software to check for hidden hardware-based tokens (stored on the USB flash device) prior to running or activation. Unlike installing software from a CD-ROM, a flash drive application runs in place, remaining exclusively on the protected hardware device.

Alternative system software – USB flash drives make using alternative computer operating systems such as Linux much easier. Instead of installing two operating systems or overwriting Windows, you plug in the USB flash drive and reboot to a new operating system.

WHAT SHOULD YOU LOOK FOR BEFORE PURCHASING A USB FLASH DRIVE?

Do not shop on price alone. Not all USB flash memory devices are created equal. Prior to purchasing, organizations should adequately evaluate the USB flash drive's capabilities in relationship to their specific needs and budget. Look for existing software development kits and actual product examples. Also, contact the manufacturer or a product specialist for detailed specifications.

Browsercraft <http://www.browsercraft.com> offers free advice and provides custom USB flash drive solutions. Unlike retail or OEM outlets, Browsercraft is a professional services company. Expect no royalties, no hardware markups, and no "per device" fees. Browsercraft also bundles valuable "ready to go" applications with its professional services. Chances are many of the business applications outlined in this white paper are available for little or no licensing charge. Consider contacting Browsercraft or downloading their comprehensive USB flash drive software development kit for evaluation.

WHAT IS THE EXPECTED GROWTH FOR USB FLASH DRIVES?

USB flash drives are rapidly growing in popularity. Analysts predict that total units sold will increase from approximately 50 million in 2004 to upwards of 120 million in 2005, a three fold increase in one year. Here is the complete forecast as provide by the *USB Flash Drive Alliance*:

¹USB Flash Drive Worldwide Forecast: Revenues, Units and Capacity 2004-2008

Gartner Dataquest* www.gartner.com	USB Flash Drive Revenues	USB Flash Drive Units	USB Flash Drive Average Capacity
2004	\$1.4 B	45.6 Mpcs	Not available
2005	\$2.1 B	67.2 Mpcs	Not available
2006	\$2.3 B	84.6 Mpcs	Not available
2007	\$2.7 B	92.5 Mpcs	Not available
2008	\$2.9 B	98.2 Mpcs	Not available
Semico Research www.semico.com	USB Flash Drive Revenues	USB Flash Drive Units	USB Flash Drive Average Capacity
2004	\$1.7 B	59.5 Mpcs	213 MB
2005	\$3.3 B	120.3 Mpcs	359 MB
2006	\$5.5 B	174.6 Mpcs	606 MB
2007	\$9.1 B	200.0 Mpcs	1,023 MB
2008	\$9.1 B	220.0 Mpcs	1,727 MB
Web-Feet Research** www.web-feetresearch.com	USB Flash Drive Revenues	USB Flash Drive Units	USB Flash Drive Average Capacity
2004	\$1.8 B	56 Mpcs	312 MB
2005	\$3.4 B	100 Mpcs	429 MB
2006	\$4.5 B	149 Mpcs	563 MB
2007	\$5.6 B	189 Mpcs	789 MB
2008	\$6.8 B	242 Mpcs	1,110 MB

¹ Gartner Dataquest Preliminary Estimates, Joseph Unsworth, April 2004. Data is preliminary and does not include USB flash drives that were used in conjunction with audio players or digital cameras. Web-Feet Research data includes both USB flash drives and USB FISH (card) combined. *USB flash drive revenues are rounded to the nearest hundred million.*

IF USB FLASH DRIVES ARE SO POPULAR, WHY ISN'T MY ORGANIZATION USING ANY?

Surprisingly, with over 50 million units sold in 2004 alone, USB flash drives are just now making headway into corporations. This delay is easily understood for two reasons. First, just talk to IT managers and you will hear one common theme - security. With all this power and portability built in a very small size package, IT managers are naturally concerned - and rightfully so! A single USB flash drive could capture a financial database, an entire software library, or a company's entire email list.

The other reason organizations are cautious has to do with the flood of new miniature computing devices arriving everyday. USB flash drives, iPods, wireless phones, Blackberry devices are all "under the radar" of IT managers. Rather than incorporating these devices into an existing IT infrastructure, it is easier to bury your head in the sand and ignore the problem altogether.

Unfortunately, employees are not waiting for a top down decision. They bring these devices to work everyday. These portable devices will continue to accumulate at an accelerated rate and organizations must aggressively attempt to address the situation now, not tomorrow. Security solutions exist today to "lock down" all portable media or permit only specific connections based on user, device type, time of day, or device serial number. At Browsercraft, we recommend developing an integrated security and business plan that effectively extends IT infrastructure to include USB flash drives. Organizations can simultaneously build productive USB flash drives solutions without compromising security. Give us a call we can show you how.

I HAVE A LAPTOP. WHY DO I NEED A USB FLASH DRIVE?

It is not a matter of "why" but "when". Yes, many business applications for USB flash drives operate just as easily on a laptop or desktop computer without an attached USB device. You need to adequately access your requirements, weighing alternative approaches against the determined value. If in doubt, talk to a product specialist. If you decide to hold off just wait - one day *you will want* the convenience, security, and portability to place your entire office in your pocket.

Browsercraft is a web technology company specializing in providing portable, secure, and productive solutions. Our software tools help organizations focus resources, collaborate, and share information through new and exciting emerging technologies. Combined with our comprehensive professional services, Browsercraft provides high value solutions that break new barriers in worker productivity. For further information please visit us on the web at <http://www.browsercraft.com>