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Java Ring – A Wearable Computer

[1]G.Fenziya Parveen, [2]M.Priyadharsini, [3]K.Deepak,
[1,3]Research Scholar, [2]Assistant professor,
[1,2,3]IT Department, Sri Krishna Arts and Science College, Kuniyamuthur, Coimbatore, India

Abstract: Java ring, a wearable computer offers a ring based jewel. This survey gives the brief description about what the Java ring is all about and the implementations behind this jewel. The survey also gives the brief discussion about the security purposes and application that lies behind the jewel. Though the java ring is not wide spread among the people, many securable applications and features lie behind this java ring. The java ring is an extremely securable java powered electronic token that widely consist of an real-time clock that runs continuously and consist of a rugged packing that is Suitable for many applications. The ring, that is designed fully with the Java card 2.0 standard processor, features up with the highest of 1024 bit modular exponentiation for RSA encryption. The ring is used to store up the secured information's, and the data integrity and clock are provided with the lifetime of 10 years. The device allows it to attach to any accessory of the individual lifestyle such as the wallet, necklace, bracelet, watch or even a finger ring.

Keywords: *I-Button, JVM, Wearable Computer, Blue Dot Receptor.*

I. INTRODUCTION

The java rings were built by the Dallas semiconductor. The sun microsystem's java ring was introduced in the year 1998 at the javaOne conference. The java ring is a finger ring that was built with a small microprocessor with the built-in capabilities for the user. This ring is a sort of a smartcard that can be wearable and yet portable too. This can be simply attached to your accessories like wallets, watches etc., according to individuals lifestyle. This is a stainless steel ring, 16-millimeters (0.6 inches) in diameter. The main jewel of the java ring is the i-buttons, typically called as the "touch memory devices", which was later replaced by the name as i-buttons. The i-buttons runs up with the backup of Java Virtual Machine (JVM) housed up under the stainless steel case. The java ring is the first impressive device that is being brought up by the java card technology.

A. Inside The Java Ring

The wearable computer (java ring) consists of a stainless steel ring, which runs under the small java virtual machine (JVM). The components of java ring are: the java virtual machine (JVM), RAM (Random Access Memory), ROM (Read Only Memory), Real-time clock, i-buttons, and a blue dot receptor. The java ring is a one-million receptor under a single chip. The input and output operations on data can be performed to read and write data by connecting it serially to a serial port adapter. In the other hand, when not connected to the serial port, the memory is managed by storing the data in the Non-Volatile Random Access Memory (NVRAM). This lithium backed NVRAM provides high speed over read or write I/O operations.

II. COMPONENTS-A BRIEF STUDY

A. Java Virtual Machine (JVM)

An abstract computer machine that enables a computer to run on a java program is called as the Java Virtual Machine (JVM). The JVM platform consists of three notations: specification, implementation, and instance. In other words, a JVM can be defined as a piece of software that recognizes the piece of java language and translates it to the byte code.

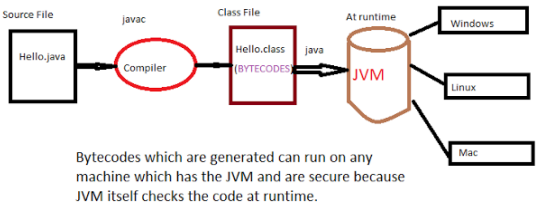

Figure 1: Java Virtual Machine Conversion

B. Random Access Memory (RAM)

The java ring consists Of128kb of RAM space. This consist of a high speed non-volatile static RAM (NVRAM). Data are stored in NVRAM for read/write operations. The data can be erased or rewritten at high speed unlike other devices. Existing 6k can extend up to 134kb of space. This provides rapid zeroization. Zeroization can be termed as the practice of erasing the sensitive parameters like electronically stored data, cryptographic keys etc. [3]

C. Read Only Memory (ROM)

The java ring consists of 32kb of ROM space. The device also consist of a special type of operating system called as the E-Commerce that is being stored in the ROM

which is not supposed to be altered by the user at any time. E-commerce operating system is being stored in ROM in order to perform the operations in the i-buttons.

D. The Real Time Clock

The real time clock is runned by the Crystal oscillator which is driven by 32 kHz. This is being used in the java i-button to operate the time of the day. In other words, the real time clock gives the exact time of the day. This can have a life up to 10 years with the lithium backup. The frequency is not constant and thus it ranges from 10-20 MHz which prohibits the hackers from gaining the information stored in the i-buttons.

E. The I-Button

The i-button is the main jewel of the java ring. The i-buttons are typically called as the "touch memory device". This consists of a one million transistor on a single chip which is being enclosed in the stainless steel can. Every i-buttons are manufactured in a way that they carry a unique 8-byte serial number and carries a guarantee that no two parts will ever have the same number. The java ring uses a 1-wire protocol for communication with the host and the i-button.

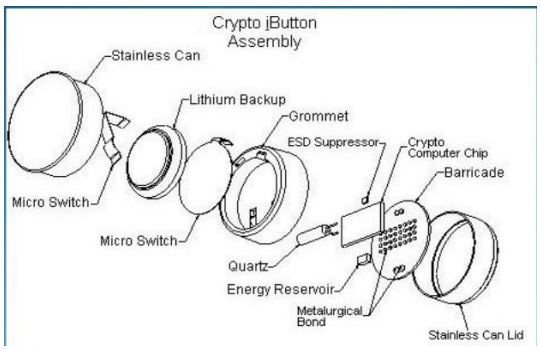

Figure 2: Pictorial Representation of I-Button

F. Blue Dot Receptor

The java ring is snapped to the reader called as the blue dot receptor. This allows for the communication between the host system and the java ring. Whenever the user presses the ring against the blue dot receptor the required application takes place and the corresponding function isprogrammed. This blue dot receptor can otherwise be stated as, the i-button's reader that provides a convenient pipeline into the PC for i-button to PC communications. The i-buttons data can be read or written when in contact by the blue dot receptor provided by the adapter like serial port, USB cable etc.,. It can support up to two i-button connection at once. It is used as an adhesive pad for mounting on to objects.

Figure 3: Blue Dot Receptor Connected To A 1-Wire Adapter

APPLICATIONS

The java ring is used to store secured information's. It can be used to store the credit card numbers, bank balance, secret codes, and is also used to open the doors. The speed of a user driving his car can be controlled by the use of java ring. This could be otherwise termed as the security for the cars. This can be even used to carry any type of URL's. E-cash can be managed by the use of the java ring. Logging into your PC can be made easy by the use of java ring.

ADVANTAGES:

The java ring, thus take many advantages, as the name carries to be a wearable computer. They are very easy and convenient for the users. This can function even under -40C to +70C and yet under the harsher environment. It provides real memory, real power and capacity for dynamic programming. It provides authentication for the user and is made easy for the administrator to store up the highly secured data information's.

DISADVANTAGES:

Though the java ring is highly secure, the cost of the receptor is expensive. Since the i-button has a limited memory, only a little amount of information can be stored, which means the individual might have to carry more than one java ring at a time. High level tools and methods are required to program applications efficiently.

CONCLUSION

Even though the java rings are not widely used around the world, these forms of devices have a number of real world applications inbuilt. The java ring can be compared to a credit or a debit card.That powerful symbolism of Java being embedded in all shapes and sizes and opening doors

to the future now provides the "magic" driving force for the Java Ring. Along with Java Cards, the Java Ring stands poised to open the doors of opportunity for truly personal computing in the information age [4].

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