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Computer Security from External Devices

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Abstract— the portable storage market environment is rapidly changing due to the emergence of USB memory. USB memory is used as a portable storage device by many users. However, due to the high portability of USB memory, there are many problems where personal identifiable information data and corporate confidential affairs are leaked to the public in case of loss, theft, or capture of the portable device. Therefore it is very important to develop various kinds of authentication solutions to protect the confidential information against unauthorized access.

In this paper we present the implementation of system that limit access and manage identity for endpoint protection and data theft prevention from USB and external devices to maintain information security in a corporate environment.

I. INTRODUCTION

With the great advancement of Smartphone's technologies and ever increasing ubiquitous access and advances of storage technologies, the corporate and personal data are becoming more vulnerable. The usage of portable devices like iPods, USB sticks, PDAs is becoming commonplace in our society. Also, businesses are embracing new technologies and integrating with World Wide Web to increase productivity. Therefore corporate data are becoming more mobilized and distributed and hence increasing security risk for enterprises. [1] To maintain a rigid protection against data theft in a corporate or personal environment, employee or user behavior must be handled with a highest degree of care. Therefore it is very important to develop various kinds of authentication solutions to protect the confidential information against unauthorized access. The common way is to take off the USB port from the computer to prohibit the use of USB storage devices [2].

II. PROCESS DESCRIPTION

The main aim of this project is to develop various kinds of authentication solutions which will track record and limits the use of USB devices in a secured environment (network) thus maintains confidentiality and integrity to meet information security standards and protect the confidential information against unauthorized access. We are proposing to keep a centralized database of allowed devices such as USB key board, printer, and mobile devices and mouse etc. based on organization's security standards [2]. Along with centralized database, system should keep a distributed database of devices in each local system, and it should be keep up to date by sync mechanism to let system work if central database is not reachable (system is off line).

The process flow [3] of system is shown in following figure for hardware detection is given by following algorithm:

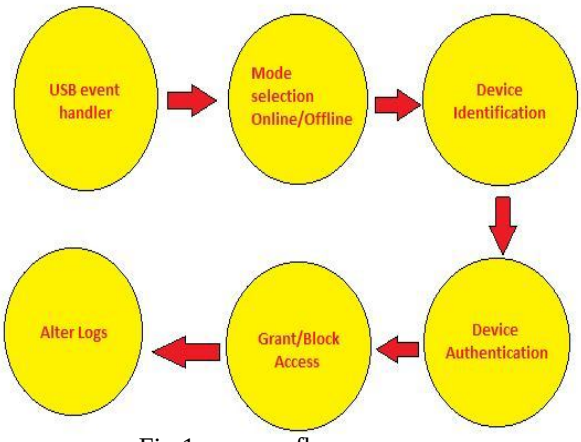

Fig 1: process flow

Following are the proposed algorithm for Data theft prevention & endpoint protection.

A. Device detection

Active the Thread Device =getNewDevice()

DeviceDescriptor d=getDeviceInfo() d.getdeviceId()
d.getVendorId()

B. Mode selection

1) Online detection: Online detection means workstation on which USB device plugged in is connected to network. In this case authentication and authorization will take place from online database [4].

2) Offline detection: This means workstation on which USB device plugged in is isolated or disconnected from network. In this case authentication and authorization will take place from local database maintained by the system [5]

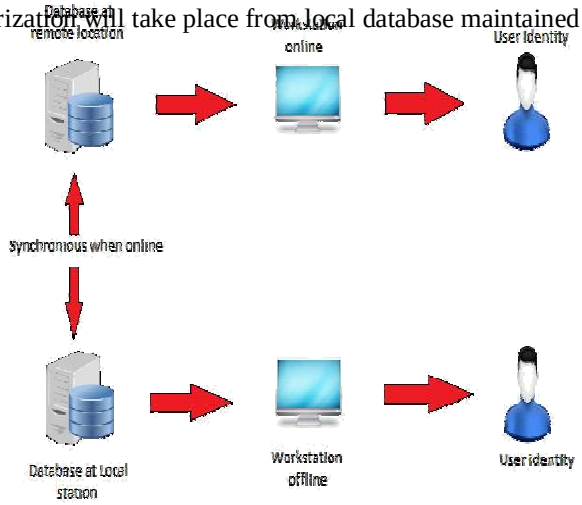

Fig 2: Mode selection.

C. Device Identification

Every USB device comprises a set of VID (Vendor ID) and PID (Product ID). These ID's are 4 characters hexadecimal ID; e.g. a typical VID looks like VID_xxxx and PID looks like PID_yyyy, where xxxx and yyyy are hexadecimal number.[6]

D. Device authentication

Devices are authenticated by a White list (a list of authorized USB devices) located on a remote server database. In online mode devices should authenticated directly from server white list.[4] If device is offline it should keep a local copy of remote white list in encrypted format to authenticate devices and maintain security. This

1) Authentication process is called 2-way authentication.

At this place we take decision to block \ allow USB device to communicate with workstation.[4]

IF VID ≠ 0 and PID ≠ 0

List L: List of all white listed USB devices FOR EACH item in L (|L| >= 1), do

IF item [VID] == VID and item [PID] == PID

then

B ←Authorize

else

B ←Un-Authorize Return **B**

E. Block/unblock device

Disable port=1
If B ← unauthorized
Disable port=true
Else
Disable port=false

F. Alter and log Input

VID: Vendor ID of USB Device
PID: Product ID of USB Device
Host Name: Get the host name of computer
Login ID: Get digital identity of user IP Address: Get IP address of computer
Output:
B: Successful/Un-Successful IF VID ≠ 0 and PID ≠ 0
B ← save log Send e-mail or SMS to the
alert
If B ==1 then
Return B ← Successful
Else
Return B ← Un-Successful

III. EMPLOYEE IDENTITY AND ACCESS MANAGEMENT

It refers to the management of identity, their authentication, authorization, and privileges/permissions within or across system and enterprise boundaries with the goal of increasing security and productivity while decreasing cost, downtime, and load on system.

In an organization there is many ways to authenticate an employee uniquely by employee id, full name, face etc., but in digital word same has been done by digital identity [3].

In our implementation we have logged all events. In logging information we have proposed to fetch all possible digital identities (e.g. entities' login ID, Host Name or serial number of workstation etc.) by which we can extract pattern of employee by which he plug in devices (Authorized \ Un-Authorized) and prevent data theft [1].

IV. ACKNOWLEDGEMENS

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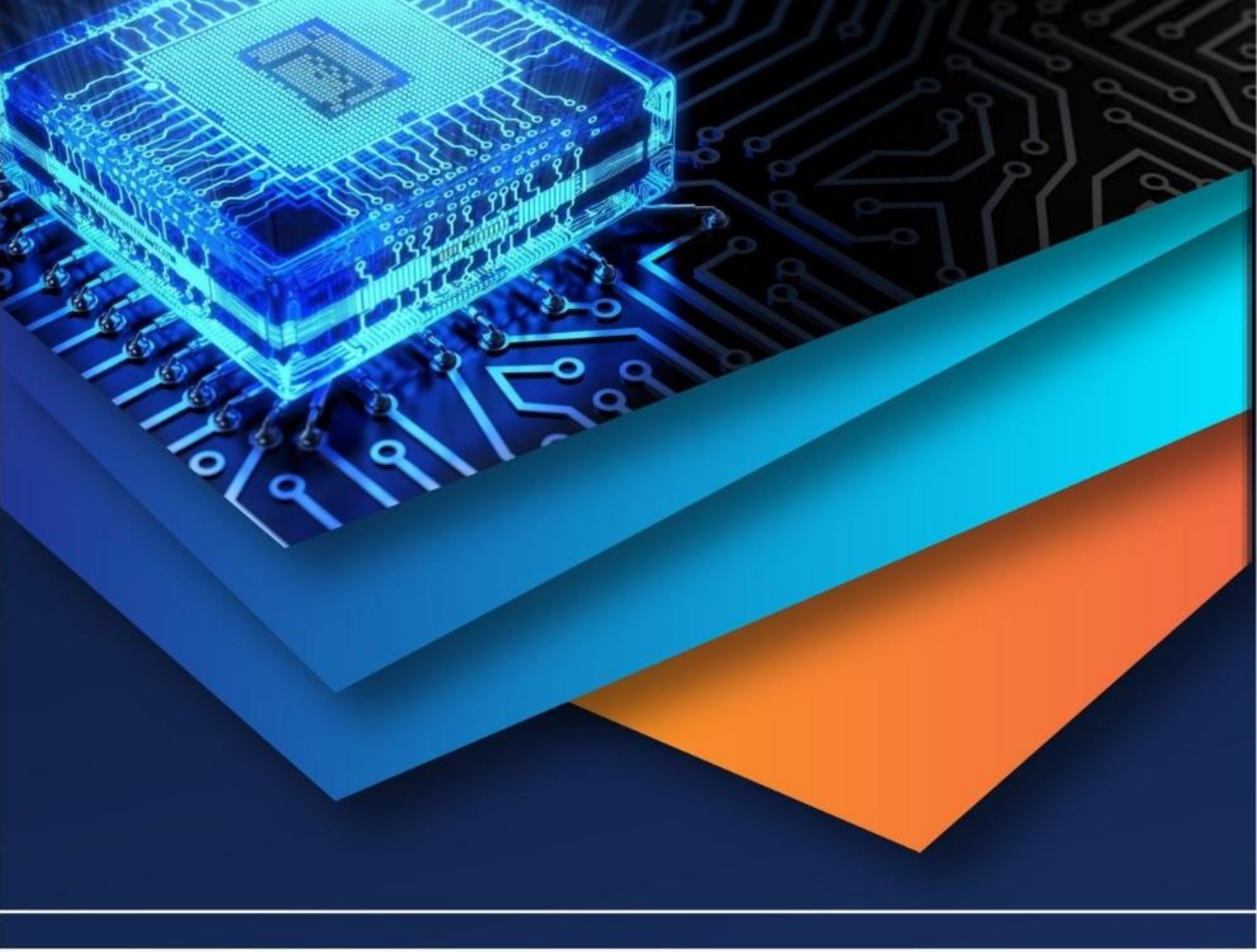

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