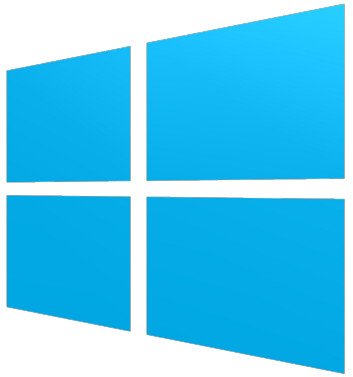
Follow the slides: goo.gl/bvmYgb

Privilege Escalation in Windows OS

by Zohaib & Vlad



What is Privilege Escalation?

An act of exploiting a bug, design flaw or configuration oversight with the goal to gain elevated access to application resources

- Gives the ability to perform unauthorized actions in software, web apps, operating systems

What is Privilege Escalation?

Vertical

Accesses to functions that are reserved for higher privilege users or applications.

- gaining administrative privileges
- Jailbreaking Devices
- Lock Screen Bypass

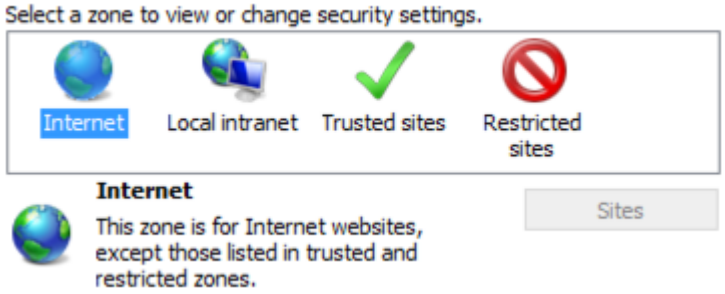
Horizontal

Accesses functions that are accessible by other normal users.

- Accessing accounts on the same user level
- Stealing usernames/passwords

Vertical: Cross-zone scripting

A web browser exploit that takes advantage of a **zone-based vulnerability**



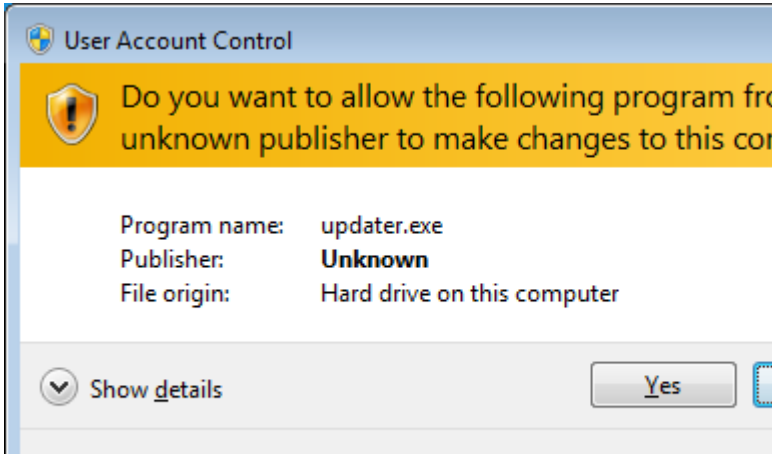
`http://windowsupdate.microsoft.com%2f.example.com/`

Windows Permission Structure

- root is “Local System” Account
- Windows UAC (User Account Control)
  - disabled admin account, instead uses UAC
- “sudo” is “runas” to run with privileges

Types of Accounts:

- Local User
- Domain User
- The LocalSystem



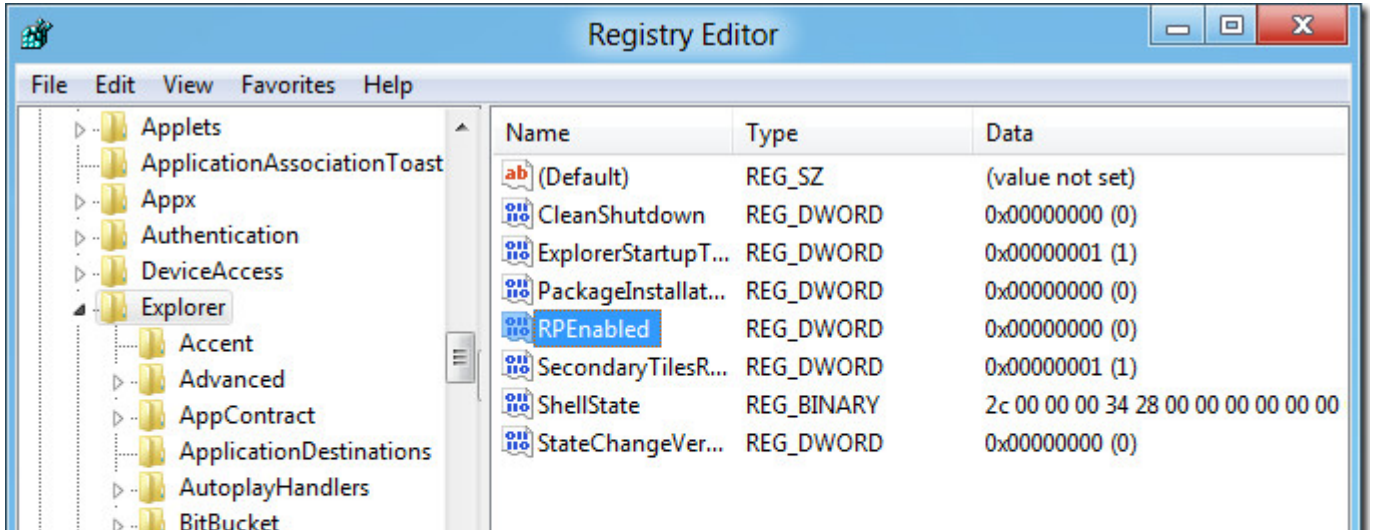
Windows with User Access Control

- All users run as an unprivileged user by default, even when logged on as an Administrator.
- Once running, the privilege of an application cannot be changed.

- Users are prompted to provide explicit consent before using elevated privilege, which then lasts for the life of the process.

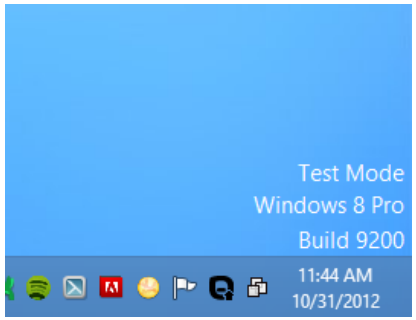
Windows OS Privilege Escalation

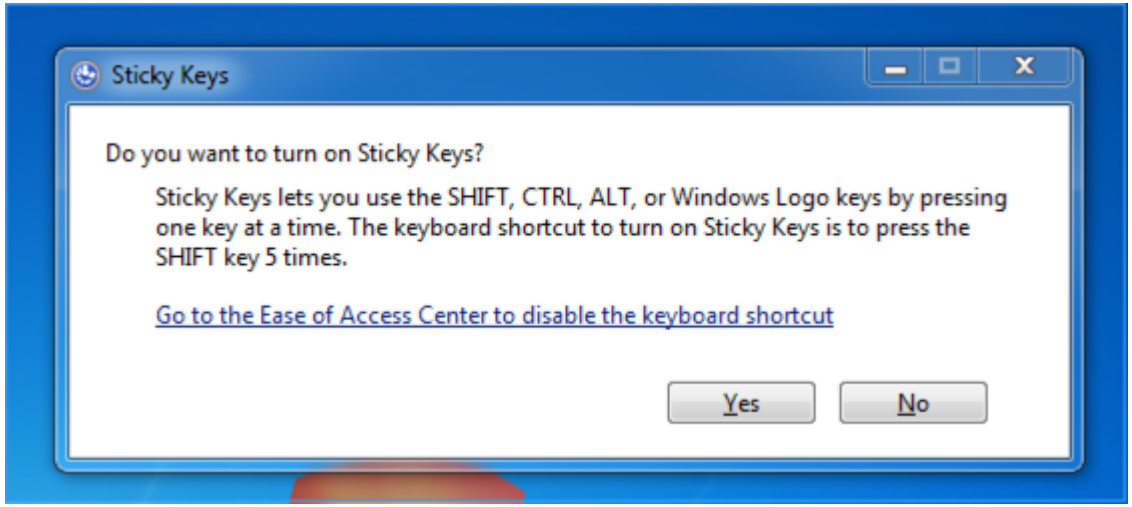
- replacing “screensaver” binary
- scan the registry for
  - logon Information
  - network credentials
  - private keys
  - Many different tools that will do this task for you



Windows OS Privilege Escalation

- exploit design flaws
  - find processes that run as SYSTEM using GUI or tools



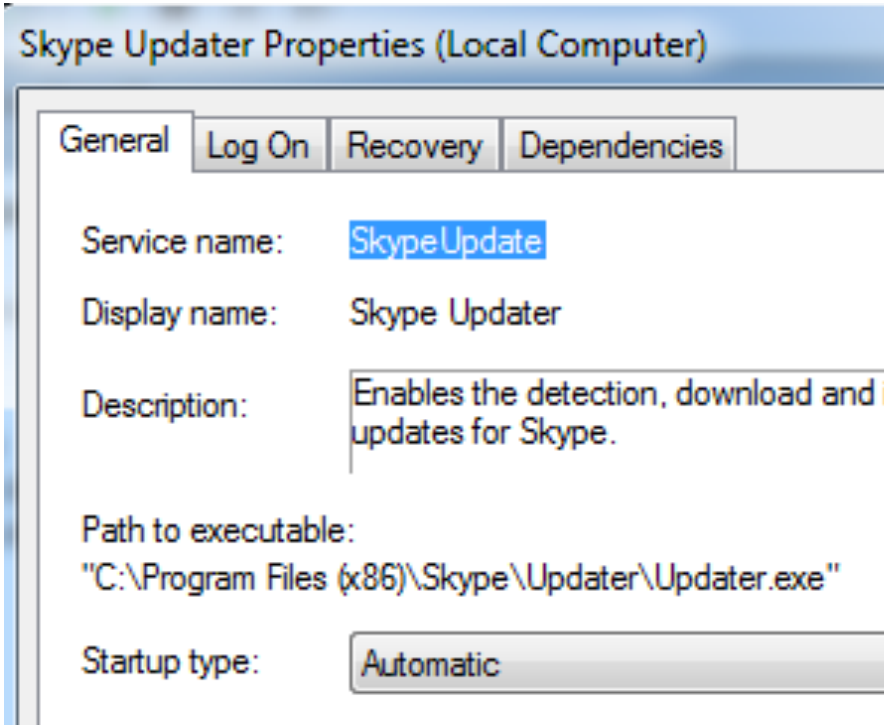


- retrieve user hashes
  - Retrieve a user hash from Local Security Authority Subsystem Service (LSASS)
  - Corrupt the memory and use the hash

Windows OS Privilege Escalation

- missing autorun programs

- service quoting



Windows OS Privilege Escalation

- **Internet Explorer Elevation Policy**

Integrity Access Level (IL)	System Privileges
High	Administrative (Proc
Medium	User (Process can cr
Low	Untrusted (Process c

Value	Result
3	Protected Mode silently launches the broker as a medium integri
2	Protected Mode prompts the user for permission to launch the p integrity process.
1	Protected Mode silently launches the broker as a low integrity pr
0	Protected Mode prevents the process from launching.

Compromise IE

Start a server on localhost

Windows OS Privilege Escalation

- services run under Local System or with Elevated flags through stolen access tokens

Recent Vulnerability Demo

Security Tokens in Windows

- **Access Token**
- **Impersonation Token**
- **Impersonation**

Impersonation level
SecurityAnonymous
SecurityIdentification
SecurityImpersonation *
SecurityDelegation

Exploit Details

- Allows to run services and programs with Elevated privileges
- Severity Rating: **“Important”**

- Proof of Concept: Disables UAC popup

- The token may allow you to:
  - inject DLLs into system processes
  - start up ASPNET / IIS server processes
  - get access to LOCAL SYSTEM

Writing an exploit

- Find an auto-elevated executable
  - Such as **“ComputerDefaults.exe”**
  - These executables set up a cache point in the registry (**regsvr32.exe**)
- Look up Application Compat DB: **sysmain.sdb**
- Capture the **“Impersonation Token”**
  - by using the vulnerability in the cache system
- Start a new process using **“runas”**
- Assign its impersonation token using **“SetThreadToken”** and it set a **“SecurityImpersonation”** level

Google's Project Zero

- Aims to improve the security of any software
- Locating and reporting large number of vulnerabilities
- Issues are filed in an external database which is initially reported to vendor
- 90-day policy

Disclosing the vulnerability early

MUST READ: We tried Microsoft's HoloLens AR headset

Google posts Windows 8.1 vulnerability before Microsoft can patch it

Source: Engadget

SECURITY microsoft, windows 8.1

Google outs unpatched Windows 8.1 vulnerability, and debate rages on both sides

Source: PCWorld

Disclosing the vulnerability early

- Who do you think is right in this issue Google or Microsoft?
- Do you think 90-days is fair for vulnerability disclosure?
- How much time should a vulnerability patch take? (90-days, 180-days?)