How does Windows set the %SystemRoot% variable?

Asked 1 year, 9 months ago   Modified 1 year, 9 months ago   Viewed 4k times

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The %SystemRoot% environment variable contains the path to the Windows directory. (e.g. `c:\windows`)

`SystemRoot` is not configured in `Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\Environment`, it is *automagically* set.

Now, typically on Windows 10 this directory has the caseing `C:\Windows` on NTFS disk.

After a script test(*) broke, we noticed:

- With same OS version Windows 10 (LTSC 1809 17763.3887)

- Some boxes use `%SystemRoot% == C:\WINDOWS` (all uppercase, despite the directory on-disk being `C:\Windows`)

- Some boxes use `%SystemRoot% == C:\Windows` (case of dir on disk)

- We cross checked with ProcessExplorer: The casing difference is already present in the environment block of the `wininit.exe` process, so it's not overridden somewhere.

Q:

Is the base for the value of `SystemRoot` read from any specific registry key?

What could explain this difference?

(*): To be clear, the test was broken anyway - thou shall not rely on path casing on Windows.

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asked Mar 2, 2023 at 16:08

Martin
609 ● 4 ● 12 ● 30

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1   One explanation for the difference is it really doesn't matter. Windows in general and paths specifically are not case sensitive, so there is no impact to the operating system or native commands. – Greg Askew Mar 2, 2023 at 18:53

The OS and filesystem case-AWARE but not case-SENSITIVE. Of course, anyone could choose to make a given script be case-sensitive, which as OP said, appears to be what they accidentally did. – mfinni Mar 2, 2023 at 23:32

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1 Answer

Sorted by: Highest score (default) ⇕

It's set in the boot process. It's not set in the registry, because the OS boot process needs to know where to find the registry files (and other OS files) before it can read them from the registry.

https://learn.microsoft.com/en-us/windows-hardware/drivers/devtest/boot-options-in-windows

> Windows boot options are stored in the Boot Configuration Data (BCD) store on BIOS-based and EFI-based computers.

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```
PS C:\> bcdedit.exe /enum | select-string "device|root"

device                  partition=\Device\HarddiskVolume1
device                  partition=C:
osdevice                partition=C:
systemroot              \WINDOWS

PS C:\> $env:systemroot
C:\WINDOWS
```

On older Windows OS, it's probably in boot.ini

edited Mar 2, 2023 at 17:09

answered Mar 2, 2023 at 16:36

mfinni
36.7k ● 4 ● 56 ● 91

1   Thanks. This is exactly it. One machine reports systemroot `\WINDOWS` and the other `\Windows` . Doesn't make a whole lot sense to me, but there it is.
   – Martin Mar 3, 2023 at 7:41