

## **Emergency Management Services in Windows Server 2003**

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### **Abstract**

Windows 2003 will provide a new cool feature called "Emergency Management Services". Emergency Management Services is short for EMS. EMS provides the possibility to remotely administer a not functional version of Windows Server 2003 via a serial cable connection or ethernet with special hardware.

This article is based on Release Candidate 2 (Build 3763) available at <http://windowsbeta.microsoft.com> for registered Beta-Testers.

Source: Windows Help and Support Center (search for EMS)

### **Introduction**

#### **Emergency Management Services overview**

Emergency Management Services is a new feature included in the Microsoft Windows Server 2003 family. You can use this feature to perform remote-management and system recovery tasks when the server is unavailable through the network or other standard remote-administration tools and mechanisms. Emergency Management Services is available for x86-Itanium-systems.

When a server is operating normally, you can manage it remotely by using a variety of administrative tools that are provided in your Windows Server 2003 operating system. Using these tools to access and manage the server is referred to as in-band management. It usually requires a network that is fully available.

When the network is unavailable, you can use Emergency Management Services to access and manage the server. You do so through an out-of-band connection. This method does not require operating-system network drivers. In addition, you can use an out-of-band connection to troubleshoot the server when it is not fully initialized and functioning. You can do this without being physically present at the computer. When the appropriate out-of-band hardware is in place, the server requires physical access only when hardware must be installed or replaced. Emergency Management Services also eliminates the need for a keyboard, mouse, monitor, or video adapter on the remotely administered server. Emergency Management Services is functional with or without a video card.

With Emergency Management Services, you use a terminal text mode instead of a GUI. As a result, you can use Emergency Management Services with serial connections and current out-of-band infrastructure (including terminal concentrators and terminal emulators).

Emergency Management Services features are fully or partially available when the operating system loads, when it is active (setting up and starting up), and when it is in distress (responding improperly or experiencing a Stop error).

#### **Configuring serial port hardware settings**

The serial port is the most common out-of-band hardware interface. Emergency Management Services uses COM1 by default.

To prepare serial ports for out-of-band communication, you must first verify that motherboard serial ports are enabled. This is important if you have not already attached serial devices to determine whether the ports are working.

Serial ports allow the configuration of specific hardware resources such as input/output (I/O) addresses and hardware interrupt requests (IRQs). Depending on your system firmware, serial port resources might be user configurable, or they might have Enabled or Disabled as the only choices available. You should configure the appropriate port so it is enabled and at the default settings for a given COM port.

## Display EMS Console with Hyper Terminal

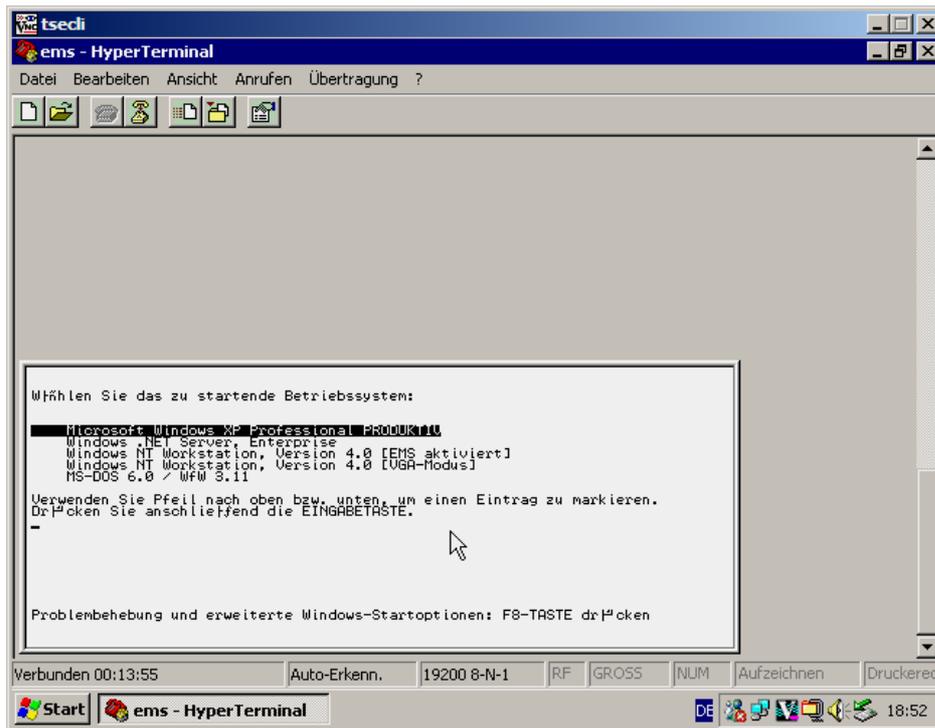


Figure 1: EMS Bootconsole

## Emergency Management Services components

Emergency Management Services consists of components that are standard features of Windows Server 2003 operating systems, and to which console redirection functionality has been added. Emergency Management Services also includes two remote-management consoles that are unique to it.

## Components that support Emergency Management Services console redirection

The components that support Emergency Management Services console redirection include Setup loader, text-mode Setup, the Recovery Console, Remote Installation Services (RIS), loader, and Stop error messages. When the operating system is configured to run with Emergency Management Services, these components will redirect their output to the out-of-band management port and to the video card, if one is attached. Emergency Management Services is available, however, with or without a video card. All Emergency Management Services output is accessible using a terminal emulator.

## Remote-management consoles: SAC and !SAC

EMS provides two remote-management consoles Special Administration Console (SAC) and !Special Administration Console (!SAC). You can access these consoles through an out-of-band remote management port using terminal software that supports VT-UTF8, VT100+, or VT100.

### SAC Console when Windows is running remotely

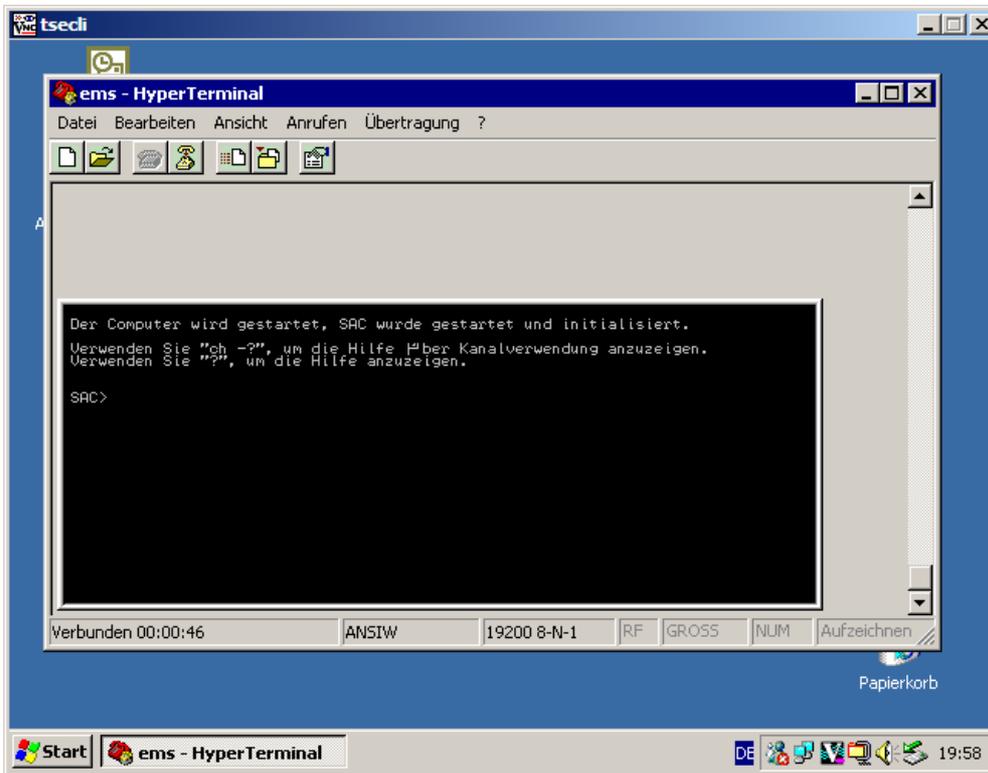


Figure 2: SAC

### Special Administration Console (SAC)

Special Administration Console (SAC) is the primary Emergency Management Services command-line environment hosted by Windows Server 2003 operating systems. It is separate from the command-line environment and provides different functionality.

Because SAC is available early in the boot process, you can use it to manage the server during normal system operation and initiation of most Windows Server 2003 family components. You can also use it when the system is in Safe Mode and during GUI-mode Setup. When Emergency Management Services is enabled, SAC remains active as long as the kernel is running.

SAC provides a set of commands you can use to perform a number of management tasks that help return your system to a normally functioning state. These tasks include:

- Restarting or shutting down the server.
- Viewing a list of processes that are currently active.
- Ending processes.
- Setting or viewing the Internet Protocol (IP) address of the server.
- Generating a Stop error to create a memory dump file.
- Starting and accessing command prompts.

## !Special Administration Console (!SAC)

!Special Administration Console (!SAC) is an auxiliary Emergency Management Services command-line environment that is hosted by Windows Server 2003 operating systems. It also accepts input and sends output through the out-of-band port. !SAC is a separate entity from both SAC and Windows Server 2003 family command-line environments. After a specific failure point is reached, Emergency Management Services components determine when the shift should be made from SAC to !SAC. !SAC becomes available automatically if SAC fails to load or is not functioning.

!SAC provides a subset of SAC commands you can use to restore system functionality during a failure. Its two primary functions are:

- To redirect Stop error message text.
- To restart the computer if SAC becomes unavailable.

## Windows command-prompt channels and Emergency Management Services

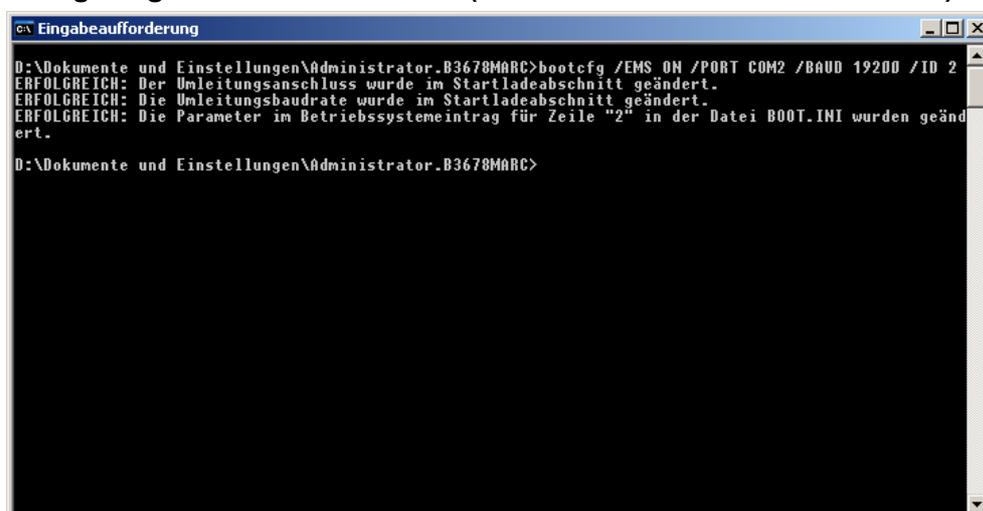
The Special Administration Console Helper service (Sacsrv) is a user-mode service you can use to create Windows command-prompt channels when you type cmd at the SAC prompt. With the command-prompt channels, you can use in-band tools on a remotely administered server when an in-band connection is not available.

For example, when the network is down, you can still run text-based utilities as you would through Telnet. These tools include command-shell utilities such as dir, and text-based console programs such as the boot configuration utility (Bootcfg.exe). You cannot run programs with a GUI such as wordpad.exe.

Access to in-band tools through the command-prompt channels provides extensibility and convenience, it does not guarantee that the tools will perform as reliably as they would when run over an in-band connection; the out-of-band functionality and robustness of Emergency Management Services applies only to SAC. In addition, Windows command-prompt channels require system resources, which might cause SAC to be available but the command prompt to be unavailable.

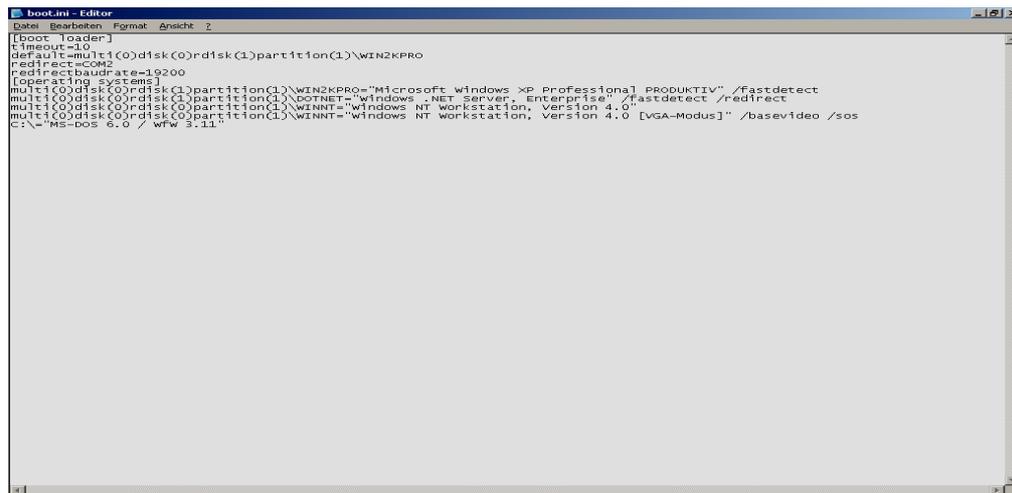
To use a command-prompt channel, you must provide valid logon credentials to a local or domain account, and log on to each command-prompt instance. Press ESC+TAB to switch back and forth between the command prompt channels and SAC.

## Configuring EMS with BOOTCFG (included in Windows Server 2003)



```
c:\ Eingabeaufforderung
D:\Dokumente und Einstellungen\Administrator.B3678MARC>bootcfg /EMS_ON /PORT COM2 /BAUD 19200 /ID 2
ERFOLGREICH: Der Umleitungsanschluss wurde im Startladeabschnitt geändert.
ERFOLGREICH: Die Umleitungsbaudrate wurde im Startladeabschnitt geändert.
ERFOLGREICH: Die Parameter im Betriebssystemeintrag für Zeile "2" in der Datei BOOT.INI wurden geändert.
D:\Dokumente und Einstellungen\Administrator.B3678MARC>
```

Figure 3: Server configuration for EMS



```
boot.ini - Editor
Datei Bearbeiten Format Ansicht 2
[boot loader]
timeout=10
default=multi(C)disk(0)rdisk(1)partition(1)\WIN2KPRO
redirect=COM2
redirectbaudrate=19200
[operating systems]
multi(C)disk(0)rdisk(1)partition(1)\WIN2KPRO="Microsoft Windows XP Professional PRODUKTIV" /fastdetect
multi(C)disk(0)rdisk(1)partition(1)\DOTNET="Windows .NET Server Enterprise" /fastdetect /redirect
multi(C)disk(0)rdisk(0)partition(1)\WINNT="Windows NT Workstation, Version 4.0"
multi(C)disk(0)rdisk(0)partition(1)\WINNT="Windows NT Workstation, Version 4.0 [VGA-Modus]" /basevideo /sos
C:\MS-DOS 6.0 /wfw 3.11
```

Figure 4: Automatic created Entries in BOOT.INI

### Enabling Emergency Management Services with a new installation

You can use an Emergency Management Services embedded installation when you start the computer from the Windows Server 2003 CD if your system supports firmware console redirection and the Serial Port Console Redirection table.

Before you begin a CD-based Windows Server 2003 operating system Setup, enable firmware console redirection. You can then remotely view and respond to the prompt Press any key to boot from CD-ROM, which appears when you start the system using the operating system CD.

EMS configures itself during a bootable CD installation by reading the SPCR table. If EMS is enabled, you are prompted at the end of text-mode Setup to allow Setup to automatically configure your system without user input. You must choose this option; otherwise, the next portion of Setup, known as GUI-mode Setup, completes only if you provide input through a local monitor and keyboard. After Setup is complete, you can reconfigure the setting appropriately.

If your firmware does not support the SPCR table, you must fully automate your setup. If your firmware supports the SPCR table, and you want to disable EMS, you can configure Setup using Unattend.txt and Winnt.sif files.

## Unattend.txt and Winnt.sif files

You must have the Unattend.txt and Winnt.sif files if you want to fully automate the remote installation of a Windows Server 2003 operating system.

A sample Unattend.txt file is provided on the Windows Server 2003 CD. You can use the default settings or customize your installations by modifying or adding parameters. When you edit the Unattend.txt files, insert the parameters in the [Data] section, as shown in the following table:

Parameter	Possible values
EMSPort={com1 com2 usebiossettings}	com1 or com2 (where 1 or 2 specifies serial port 1 or 2). This option is valid for x86-based systems only. usebiossettings This is the default value. This parameter instructs the operating system to detect and use SPCR settings. If you use this parameter and an SPCR table is not present, Emergency Management Services is not enabled.
EMSBAudRate=value	The default value is 9600 baud, with the values of 19200, 57600, and 115200 possible, depending on the capabilities of the serial port. This must be used with EMSPort= or the parameter is ignored.

## BOOTCFG Syntax

```
bootcfg /ems {ON | OFF | EDIT} [/s Computer [/u Domain\User /p Password]] [/port {COM1 | COM2 | COM3 | COM4 | BIOSSET}] [/baud {9600 | 19200 | 38400 | 57600 | 115200}] [/id OSEntryLineNum]
Parameters {ON | OFF | EDIT}
```

Specifies the value for EMS redirection.

/s Computer

Specifies the name or IP address of a remote computer (do not use backslashes). The default is the local computer.

/u Domain\User

Runs the command with the account permissions of the user specified by User or Domain\User. The default is the permissions of the current logged on user on the computer issuing the command.

/p Password

Specifies the password of the user account that is specified in the /u parameter.

/port {COM1 | COM2 | COM3 | COM4 | BIOSSET}

Specifies the COM port to be used for redirection. BIOSSET directs EMS to get the BIOS settings to determine which port should be used for redirection. Do not use the /port parameter if remotely administered output is being disabled.

## **BOOTCFG Syntax (continue)**

`/baud {9600 | 19200 | 38400 | 57600 | 115200}`

Specifies the baud rate to be used for redirection. Do not use the `/baud` parameter if remotely administered output is being disabled.

`/id OSEntryLineNum`

Specifies the operating system entry line number to which the Emergency Management Services option is added in the `[operating systems]` section of the `Boot.ini` file. The first line after the `[operating systems]` section header is 1. This parameter is required when the Emergency Management Services value is set to ON or OFF.

## **Conclusion**

This feature is not new in the computer world but new for Windows Server 2003. It is a really cool enterprise feature and enhances the remote administration capabilities of Windows 2003.

## **Related Links**

Windows Server 2003 Homepage  
<http://www.microsoft.com/windows2003>