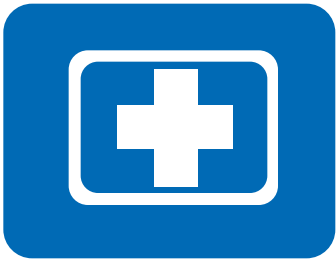**ADVANTECH**

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Advantech Emergency Secondary OS:

- A secondary OS and set of utilities that help in remote system diagnostic and repair

- Linux-based eSOS is totally ROM-based and does not require additional hardware

- eSOS is completely separate from primary OS and software, and therefore immune to its problems

- Even with many hardware problems, eSOS may still be able to boot

- Upon crash, watchdog timer first attempts regular reboot and then boots into eSOS

- eSOS utilities perform automatic diagnostics and generate log

- Log and contact information are emailed to system administrator

- System administrator can log in via telnet and ftp to analyze the situation and perform repairs

- Remote system repair, restore, or complete re-install

- If remote repair impossible, system administrator may be able to determine repair parts required

Advantech eSOS
An Emergency Secondary OS For System Recovery

One of the primary advantages of embedded systems is their reliability. They usually run 24/7 without any need for maintenance, and that is what many mission-critical embedded applications require. Unfortunately, unanticipated problems can still happen and then it is of crucial importance to quickly determine what went wrong.

What happens when a system goes down? Sometimes maintenance staff is at hand and can assess and repair the problem. Or there might be replacement hardware. Other times, a failing system is in a remote location without ready access. What can a system integrator do? Using IPMI (Intelligent Platform Management Interface) or other remote monitoring utilities can help, but they are not always efficient or feasible. In many cases, a better answer is Advantech's eSOS system rescue embedded software utility.

Advantech eSOS To The Rescue!

eSOS is a small Linux-based secondary operating system that is stored in the ROM of the embedded system hardware. eSOS is therefore completely separate from the primary operating system and software, and unaffected by any problems the main OS may encounter. Even if the crash is caused by hardware problems, eSOS may still be able to boot and provide clues as to what caused the crash and how it can be repaired.

How Does eSOS Work?

If there is a crash, the system's watchdog timer will start a countdown and then automatically attempt to reboot. If a regular boot fails, the system will boot into eSOS, which consists of both a bootable OS and a variety of pre-defined diagnostics and repair utilities. Once eSOS is booted, it then performs extensive hardware analysis on its own. This includes hardware monitor information such as CPU temperature and voltage, ambient temperature, fan speed and voltage, etc. eSOS then examines and records system configuration data such as buffer type and size; PIO, DMA, UDMA modes; cache settings; drive interfaces;
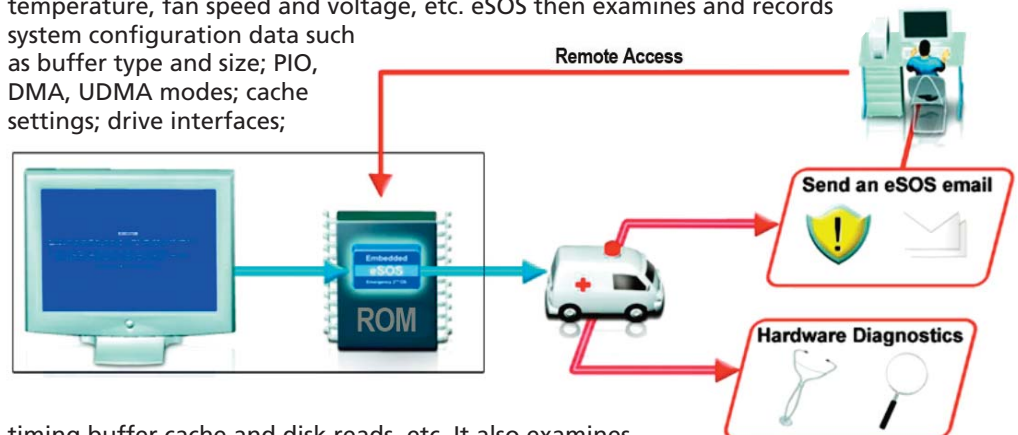
timing buffer cache and disk reads, etc. It also examines general system info such as date, time, CPU, memory and so on. All of this data is captured in a log file. eSOS then automatically alerts the designated administrator via email and sends the log with the collected data.

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eSOS Configuration

```
##System setting
machine_id="eSOS A(
dhcp_action="1"
local_ip="172.16.7.20
local_netmask="255.2
local_dns="172.20.1.1
local_router="172.16.7

##E-Mail notify setting
mail_fun_action="1"
machine_mail_addres
mail_server_address=
login_name="gehc"
login_passwd="gehc1:
subtitle="eSOS demo"
alert_mail_address="g

##Remote execute AF
remote_run_action="1
remote_ftp_addr="ftp.
remote_ftp_user="use
remote_ftp_passwd="
```
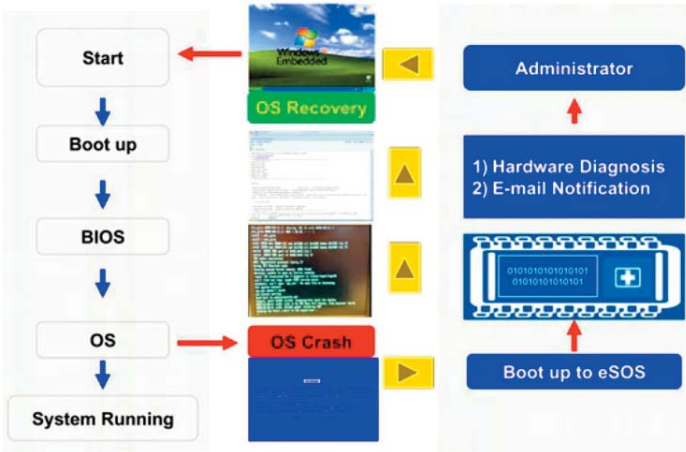
For more information:
www.advantech.com
ECGInfo@advantech.com
1-800-866-6008

System Recovery With Advantech eSOS:

The diagram below shows a normal boot process, and one where the primary OS crashes. If the system crashes or encounters a halt (such as a "blue screen") during operation, the watchdog timer will first attempt a normal system reboot. After three failures to boot normally, the system will then boot into the BIOS-based eSOS secondary OS. Advantech's Bootsafe Tech firmware causes a Ubuntu-based Linux image to load and boot into recovery mode. The system then runs a variety of diagnostics routines to collect general information into a log file which is then automatically emailed to the administrator.

The system administrator can then peruse the information and log in to the crashed system via telnet or ftp or both. S/he can attempt to fix the problems if it is software, or determine what repair parts (such as a fan) may be required and coordinate delivery to the site. If local eSOS tools are insufficient to repair the problem, additional repair tools can be uploaded via ftp. These could be ghost.exe or a full Windows system restore file to restore or recover the OS. This means that even if the primary OS is not recoverable, an entirely new OS image can be uploaded and installed. Once that is loaded, the OS and applicatin software can be restored and the system is back to normal.

eSOS is configured via a simple settings file that contains a variety of instructions and parameters.

eSOS System Requirements
Current requirements are that the system is X86-based, has a 16MB SPI ROM and runs either Microsoft Windows XP Professional, XP Embedded, or Windows Embedded Standard. Initial eSOS support was implemented on Advantech's PCM-9361 Single Board Computer and on the SOM-5761 Computer on Module. Advantech is adding eSOS support on a variety of Intel Atom-based mobile platforms (industrial motherboards, Computer on Modules, single board computers, and PC/104 systems). Support (including other OS support) can also be provided on a project-by-project basis.