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System Software Extensions: How They Work (5/93)

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TOPIC ---

This article explains how system extensions (formerly called INITs),
function and sometimes cause problems.

DISCUSSION --

The Trap Dispatch Table

The Macintosh operating system incorporates a feature that allows updating
and modifying incrementally, via the Trap Dispatch Table. The Trap
Dispatch Table contains the addresses of all the Tool Box routines in the
ROMs that actually make the Macintosh work. When a program uses the Tool
Box, it drops the address of the trap (listed in the Trap Dispatch Table)
into the processor, and this activates the trap.

A programmer changes the system software by editing the Trap Dispatch Table
(a process called patching) so that the call goes not to the ROMs, but to a
piece of code somewhere in the system heap. A programmer can alter any
part of the Tool Box's normal behavior using this method.

Example: The Oscar the Grouch extension patches the normal Empty Trash
Traps with one that says, "When empty trash is chosen display this graphic
and play this sound," then it calls the normal empty trash traps.

How Extensions Cause Problems

• Old extensions
  Old extensions cause problems because the information they receive or
  return is out of date. For example, under an older system, the
  unaltered trap returned "Frank" and the extension was programmed to
  return "Frank." But under the newer system the trap returns "Fred."
  When the extension still returns "Frank," every piece of code expecting
  "Fred" will have problems. Likewise, if the system returns "Fred" and
  the extension is still expecting "Frank" the extension itself will
  crash.

• Coding Issues

Sometimes an extension has bugs, and crashes whenever it encounters a
certain set of circumstances. The circumstances can be very rare or
bizarre. Coding errors are a particular problem with shareware.

• Extension Conflicts with other Extensions
  Sometimes two extensions try to patch the same trap. A surprising
  number of extensions can do this and get away with it. When they don't
  they cause a crash.

Turn Off Extensions When Troubleshooting

The thing to remember when troubleshooting is that extensions effectively
REWRITE THE SYSTEM SOFTWARE. When code makes calls, the Finder and even
other extensions don't behave in the same way as they do in the unaltered
system.

If you troubleshoot with extensions ON, be aware that the system's behavior
may be close to random. Nothing may work as you expect it to. You can't
determine with any certainty whether hardware, system software, or an
application failure causes the problem as long as extensions are running.
So TURN OFF EXTENSIONS at the start of any troubleshooting where it is at
all feasible. In cases where it isn't, try to remove or disable all
extensions you can.

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