

Need a Fix? Try a PTF

[System iNetwork](#)

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The Mona Lisa, the Eiffel Tower, the System i. Many would argue that these are among the world's greatest masterpieces. Although you may be blinded by their brilliance, do remember that perfection requires proper maintenance. i5/OS, for example, preserves its inner divinity through Program Temporary Fixes (PTFs).

Contrary to the name, the fix isn't always temporary or just for programs. A PTF is deliverable code used to repair a problem identified after the code has been released for public use. A PTF is also known as an update or patch. It resolves any i5/OS bugs listed in an Authorized Problem Analysis Report (APAR) by specifying the PTF that contains the necessary updated code. [Figure 1](#) shows an example of an APAR from the IBM website.

The three main categories of PTFs are individual, group, and cumulative. An individual PTF is a single fix that tackles one or more specific issues described in APARs. A PTF group is a collection of individual PTFs usually related to a particular product or area, such as Java. One of the most important PTF groups is the HIPER PTF group, which contains PTFs that are High Impact (major issue) or Pervasive (most systems experience the symptoms). Individual or group PTFs are similar to hot fixes for Windows. Finally, a cumulative PTF (cume) is the accumulation of previous cumulative, HIPER, and database PTF groups. The cume is the overall PTF package suggested for every system. A cume for i5/OS is similar to a service pack for Windows. IBM recommends that every system have a minimum of a cume, HIPER, and database group as well as the most current PTFs installed.

Track Existing PTFs

How do you know which PTFs are on your system and whether they are current? At V5R3MO and later, the easiest way to determine the installed PTFs is to use the WRKPTFGRP command (GO PTF option 12). It lists the groups on your system, the highest level of those groups known to the system, and the status of that highest group number. If you press F11, you get a brief description of the group. [Figure 2](#) shows the WRKPTFGRP screen.

Notice that most groups have a naming convention of SF99xxx. The convention remains constant for the supported life of a release before it is recycled. When you order PTFs, you don't have to know the number for the latest level of a particular group, because ordering SF99xxx always gives you the most recent fixes. To the right of the group number, you see the level of the group. Besides the cume, all other PTF groups increase by one when a new level is available. The cume has a naming convention of CYDDDDVRM. The level or label of the cume actually gives its date and release.

C = cumulative

Y = year

DDD = days into the year

VRM = version, release, and modification level of OS (not modification of Licensed Internal Code — LIC)

For example, the cume level C8057610 means that it is a V6R1MO cumulative group created 057 days into 2008.

To the right of the level in the WRKPTFGRP screen, you see the status of the groups. The two main statuses are *Installed* and *Not Installed*. Installed means that all the PTFs for that level of the group have been applied to the system. Not Installed indicates that at least one PTF for that level of the group has a status other than temporarily applied, permanently applied, or superseded. (I explain these categories later in the article.) Keep in mind that a status of Not Installed doesn't necessarily mean that the group has a problem; it means that you don't have all the PTFs applied for the highest known level of the group.

To view the PTFs that make up the listed level of the group, select option 5=Display, which shows the individual PTFs that make up the group, along with the status. If a group shows a status of Not Installed, at least one of the PTFs is improperly installed and may be listed as not found, on order only, or damaged. The status of a group typically changes from installed to not installed because of the installation of a shared PTF at a higher level as part of another group. Again, the WRKPTFGRP screen is strictly informational and a Not Installed status does not necessarily mean that a PTF problem exists.

Alternatively, you can use the DSPPTF command (GO PTF option 5) to view PTFs. With this command, each PTF is listed under its product ID — the licensed program product (LPP) for which the PTF was created. The product ID of 57xx999 is for the LIC, which mainly contains MFxxxxx and MHxxxxx PTFs. You can think of MFxxxxx PTFs as microcode PTFs and MHxxxxx PTFs as firmware PTFs. At V5R4M5 and later, DSPFMWSTS is a better screen to show your firmware. The 57xxSS1 PTFs are operating system product PTFs. You can scroll through each product on the DSPPTF screen by simply pressing Enter to get to the next product ID. In [Figure 3](#), DSPPTF shows the PTFs for Java product 5761JV1. If you select option 5 on the DSPPTF screen, you get more details about the PTF, such as the status and date of application.

To determine which PTFs are on your system but not yet applied, you can use a command available in V6R1M0 (WRKPTFGRP, F20) to show the expanded groups and then select F19 to display the list of PTFs not installed. In earlier releases, however, you have to use DSPPTF with *PRINT or *OUTFILE and then search through the results. This process can be very time-consuming and leaves room for human error. A better option is the DSPPTFSTS command written by Carsten Flensburg in "[A Boo-tiful New Tool to Manage PTFs](#)" (October 2005, article ID 51738 at *SystemiNetwork.com*). This is an excellent tool that makes displaying non-applied PTFs easy.

Which PTFs Do You Need?

After you understand PTFs and know the fixes that you already have, you can determine which ones you need, how to obtain them, and how to apply them to your system. In addition to the latest cume, database, and HIPER PTFs, you should consider installing other group or individual PTFs. Three IBM websites help you determine which PTFs you should apply on your system: the [APAR database](#), the [Recommended Fixes website](#), and the [PTF group website](#).

The APAR database is a good place to search for individual PTFs that address specific problems. Click the release, select the search option, and enter your search string. The search string should include an error message, such as CPF1234, and a key word, such as a command or product involved with the error.

To navigate the Recommended Fixes website, simply select your release and choose an area from the drop-down box that lists the group and individual PTFs for that area. Keep in mind that this site states that the PTFs listed are based on having the latest cume, database, and HIPER PTFs installed. If you select V5R4 and an area of BRMS, for example, it recommends the Backup and Recovery PTF group SF99186 and the latest BRMS service pack SI31638.

The PTF group website shows the available PTF groups for a selected release. After you click a PTF group link, you see the PTFs and licensed programs for that group. If the group has PTFs for licensed programs on your system (other than 57xxSS1 for the operating system and 57xx999 for the LIC), you should install it. You can find your system's licensed programs with the command GO LICPGM and option 10. After you have the suggested PTFs, the WRKPTFGRP screen lists the group numbers. This list makes getting future PTF updates easy because you simply order only the SF99xxx group numbers listed on your WRKPTFGRP screen.

Because the cume, group, and individual PTFs are updated at different times and most PTFs do not have a consistent schedule, you may be confused trying to find the right fix maintenance schedule. Operating systems release new cumes generally once per quarter, HIPER PTFs every two weeks, and the rest of the PTFs at mixed times. Also, some PTFs require an IPL of the system, so your maintenance schedule is also dependent on your operations. A general strategy is to install the cume and groups once per quarter. To use an analogy, PTFs are like oil in a car. They keep things running smoothly, and you should change them every three months. For more information about maintenance schedules, [Click Here](#).

Get the PTFs You Need

You have several options for obtaining PTFs. You can order from the Internet, directly from your system or a support line, or bring them over from another system. If you need an entire cume or several groups, you might

prefer to order them via media to accommodate the large size. Be sure to allow two weeks for delivery.

My preference is to order PTFs to download through the Internet. Click the [Fix Central link](#) to download for same-day service or click Ordering PTFs on media for mail delivery of a disc in approximately 10 business days. To order PTFs on media, simply list the PTF numbers and fill out the order information. For step-by-step instructions for ordering PTFs from Fix Central, see IBM knowledge base document [KB395034813](#).

If you want to order PTFs directly from your system, use the SNDPTFORD command and enter the PTF ID. If the PTF is small enough, you can download it automatically as a save file. The save files from SNDPTFORD have a 15 MB total size limit. However, under additional options in SNDPTFORD, you can change the delivery format to *IMAGE for larger PTFs, thereby downloading a CD image to an IFS directory as a stream file. To order PTFs by telephone, call IBM support at 800-426-7378.

Another method for obtaining PTFs is to send them from another system. If you send an individual PTF, it must be in a save-file format on the source system. To send it, you can use FTP or Management Central's Compare and Update function. For more information about this function, see IBM knowledge base document [KB30390328](#).

Before you install PTFs, be sure to read the cover letter, which specifies whether you can apply the PTFs immediately without an IPL or later with an IPL, whether requisite PTFs exist, and whether you should follow any special installation instructions such as how to end and restart a server to activate the PTFs. You can view the cover letter online. However, if you download the PTFs to your system, you can use GO PTF option 10 (DSPPTFCVR) to read the cover letter. Enter the product ID and PTF number and press Enter. Select option 6 to print or option 8 to display. If you are installing a cume or PTF group, IBM still recommends that you read the cover letters. A cume or group contains hundreds and even thousands of PTFs, but if you follow the cume or group instructions, you have likely taken care of the special instructions.

After you read the cover letter, you can install the PTFs. Don't worry if you already have some on your system — i5/OS is intelligent enough to load only the needed ones.

Ready to Install

If you have a Hardware Management Console (HMC), you must first determine whether you will install and manage your firmware PTFs (MH* PTFs) through HMC or through your operating system (installed through the green screen). The best plan is to keep the installation of firmware PTFs consistent and not to switch installation methods between HMC managed and OS managed. If you are installing firmware PTFs through an HMC, follow IBM knowledge base document [KB408316083](#), "Master Document for Server Firmware and HMC Code Wizard." This document is important because, depending on your system's firmware (flashlevels), you may need an intermediate firmware PTF and HMC code before upgrading.

To install an entire cume or PTF groups, perform the following steps:

1. Click GO PTF and select option 8 to install a package.
2. Fill in the parameters:
 - a. Device
 - i. If you are installing from CDs, the device is the optical drive, such as OPT01.
 - ii. If you downloaded the PTFs, the device can be *SERVICE.
 - iii. If you FTP'd the PTFs from another system, the device is *SAVF.
 - b. Automatic IPL
 - i. If users are on the system or you don't want to IPL, set this to N to load and mark the PTFs to apply at the next IPL.
 - ii. If you want to IPL immediately after the PTFs are loaded and marked for application, set this parameter to Y.
 - c. Prompt for Media
 - i. The single PTF volume set equals one set of CDs.
 - ii. The multiple PTF volume sets equal more than one set of CDs
 - iii. The multiple volume sets and *SERVICE equal CDs and downloaded PTFs.
 - d. Restart Type - Generally leave this as *SYS.
 - e. Other Options - Set to Y if you want to do one of the following:
 - i. Omit PTFs: Use this option to skip loading particular PTFs, such as defective ones.
 - ii. Different Apply Type Values

1. Set all PTFs delayed.
2. Apply immediate, set-delayed PTFs. Use this option to apply what you can immediately and then set the rest for application at the next IPL.
3. Apply only immediate PTFs.

Usually, your installation parameters resemble those in [Figure 4](#).

After you press Enter, the system loads the PTFs from media or the save file. If there is more than one CD, the system asks you to load the next volume. Reply with a G to GO. On the last volume, reply with an X to EXIT. After you have loaded all the PTFs, the system applies and marks them for application during the next IPL.

You can also use GO PTF option 8 to install individual PTFs, but with this method the PTFs in a loaded state are marked for application. The other option for individual or PTF groups is to use the INSPTF command or the separate LODPTF and APYPTF commands. INSPTF is the command function for GO PTF option 8. I seldom suggest LODPTF for novice or intermediate users because if they forget to load the requisite PTFs, the application fails. A requisite PTF is usually a prerequisite or a co-requisite PTF. A prerequisite PTF is a PTF required for application on the system beforehand. A co-requisite PTF must coexist with the PTF, and it is usually installed at the same time.

After completing the PTF installation process, verify that the loading, marking, and application were successful. You will be unable to complete the PTF application until after an IPL if the PTFs are delayed. The best way to verify the PTF installation is to use GO PTF option 50, as [Figure 5](#) shows. Select the date and time (the default usually shows the last installation attempt).

If one of the steps failed, put the cursor on the error and press F10 for the entire history log with additional messages. You can also press F1 on the error message and then F9 to find the fully qualified job name, user, and number. With the fully qualified job information, issue the WRKJOB command, plug in the information, and press Enter. This sequence of steps gives you the job log of the installation, listing the reasons the PTF installation failed. Fix the errors and try the installation again. If the load and the marking for application were successful, the PTFs are applied at the next IPL unless they were applied immediately.

When performing an IPL to apply PTFs, you should execute a Normal mode IPL to the B side of the system. This action should properly apply and utilize the PTFs. The IPL command would look something like this:

```
PWRDWN SYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B)
```

When the system is IPLing, it applies the Firmware and LIC PTFs while powering down and the operating system and LPP PTFs while powering up. Depending on the size and number of PTFs, your IPL may take longer than normal. The longest steps are usually on C6004301 and C9002967, where the system applies the PTFs. After the system is back up, you can verify that the PTFs applied successfully. One way to do this is to use the GO PTF option 50 and seek a message that says "PTFs installed successfully." If you installed a cum or PTF groups, use the WRKPTFGRP command to show the new group level and a status of installed. If you installed individual PTFs, use the DSPPTF command. Enter the product ID and PTF number, press Enter, and select option 1 for General Information. You should see a status screen similar to the one in [Figure 6](#).

Notice the status of the PTF. A status of *temporarily applied* is normal for a PTF and indicates that the PTF installed successfully. PTFs show many different statuses. In addition to temporarily applied, permanently applied, and superseded, the main statuses are save file only, not applied, and damaged.

Temporarily applied status means that the PTF is applied and used on both the A and B sides of the system. It also means that you can remove the PTF without reinstalling a product or the system. After a temporarily applied PTF has been superseded by a newer PTF, the default is for it to become permanently applied.

Permanently applied status means that the PTF has become part of the actual code, and it is the only copy of the code. For this reason, you cannot remove a permanently applied PTF but would have to reinstall the product to overlay the code.

Superseded status indicates that the PTF is not actually on the system but that there is a newer version available. As an example, PTF A releases in January, B releases in February, and C releases in March. After you apply PTF A, it is in a temporarily applied status. If you skip B and put on the most recent PTF C, PTF A becomes permanently applied, PTF B becomes superseded, and PTF C becomes temporarily applied. If you search for PTF

B, you see a status of superseded. This behavior lets you view the general information to find the latest superseding PTF, which is the most recent fix that replaces the current one.

Save file only status indicates that the PTF is in a save file but has not been loaded onto the system. A PTF save file is similar to a zip file on a PC.

Not applied status means that the PTF is loaded from a CD or from a save file but is not actually applied to the system. Using the PC analogy again, this could be similar to saving a zip file to your PC and unzipping it but not actually installing the application yet.

Damaged status means that a problem such as corruption exists with the PTF. In such a case, you need to reinstall it or install a newer superseded PTF.

Fixing the Fixes

You apply PTFs to fix or prevent problems, but what do you do if you have trouble with the PTFs? If you run into an error when installing PTFs, use the GO LICPGM option 50 to view the Install Log. Here are some common problems with PTF installations:

- A PTF may be unable to apply because another PTF is required. This is typical if you downloaded a single PTF or brought it over to your system without its requisites. This situation also happens when you use the LODPTF command and the PTF requisites are not specified, which gives an error on the apply stating that another PTF is required. If you're missing a requisite PTF, order it and its requisite PTFs. Alternatively, it may be easier to order the PTF that wouldn't apply and leave the defaults to get its requisite PTFs.
- If a PTF shows up as damaged, reload the PTF or its superseding PTF. If different PTFs for the same product are damaged, most likely the product itself is defective and should be reinstalled. Use the CHKPRDOPT command to check the product for errors.
- If an abnormal IPL occurs, the system will not apply operating system and licensed program PTFs. To see whether the last IPL was normal or abnormal, issue the DSPSYSVAL QABNORMSW command.
- If you can't IPL the system after applying PTFs, try IPLing on the A side of the system to avoid using temporarily applied LIC PTFs. IPLing to the A side is a circumvention for getting your system up quickly, but you should tackle your PTF problem as soon as possible.
- When applying PTFs, you must IPL the system to the B side. To determine the side of the system you are running on, issue a DSPPTF and press Enter. At the top of the screen, you should see "RELEASE OF BASE OPTION.....##MACH#B."
- The most common error in burning a PTF image to a CD is that you copied the PTF as a data CD rather than from an image.
- Although you should be able to go from the lowest-level cume directly to the highest-level cume without any hassles, I have found that most problems tend to be with systems that are more than nine months behind on PTFs.

At times you may need to remove a PTF if it causes a problem with your operations, if it's an OEM product that hasn't been tested with a PTF on the system, or if it's in error (PE). If the PTF is in error, you can find it in the Preventative Service Planning document "Defective PTFs" (www-912.ibm.com/s_dir/sline003.nsf/sline003home). A different document exists for each version of the operating system, but you can search for Defective PTFs to easily display the one you need.

If a defective PTF listed is on your system, you can fix the PTF by either applying a fixing-superseded PTF or removing the PTF. Remember, you can remove only a temporarily applied PTF. If a PTF is permanently applied, the only easy way to remove it is to reinstall the licensed program, which also wipes out the rest of the PTFs for that licensed program. To remove a temporarily applied PTF, use the RMVPTF command. For example, to remove temporarily applied PTF SI12345 for product 5722SS1, use

```
RMVPTF LICPGM(5722SS1) SELECT(SI12345) RMV(*PERM)
```

If the PTF is not an immediate PTF, you must specify DELAYED(*YES) to remove it during the next IPL. However, keep in mind that a PTF may have requisites. Therefore, if you are inexperienced with PTFs, I recommend that you seek technical support. It is usually a better idea to apply a fixing PTF than to remove a PTF.

Occasionally, the IBM Support Center gets questions asking how to remove or back off an entire cume. The short answer is that you cannot do this easily because there are hundreds or thousands of PTFs and requisite PTFs involved. Cume PTFs span several different products of the system. Some are temporarily applied, and others are permanently applied. The only way to remove a cume is to reinstall the LIC, the operating system, and all your licensed program products. If you are considering this option, seek technical support first because usually a less drastic solution exists.

The Keys

Although i5/OS may seem faultless, it does require proper maintenance. PTFs fix problems or provide enhancements for i5/OS. A cume is a collection of the main PTFs that you need. A basic PTF strategy is to apply PTFs once per quarter, including the same cume, database, and HIPER PTF groups. You generally download PTFs from Fix Central or order them as media from a business partner or IBM Support. You usually install PTFs with the GO PTF option 8 and apply them during an IPL. You use GO LICPGM option 50 to verify that you have successfully completed the PTF installation and that the OEM applications support the level of the PTFs. Ensure that you have a good backup before installing PTFs. If you encounter problems, review the job log or get help.

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