



TPF Users Group Fall 2007

Main Title: **z/TPF File System Update**

Sub-title: **Preview of Works in Progress**

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Venue: DBDF Subcommittee

AIM Enterprise Platform Software

IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

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Topics

TPFCS database integrity enhancements
Loading files along with programs



TPFCS Database Integrity Enhancements

Provided by new ZBROW COL subfunctions

- Import a TPFCS capture tape from another system
- Scan a TPFCS capture tape and list the collections on it
- Restore an existing collection from an imported capture tape without having to create a new name
- Dump in EBCDIC the DASD record images of a collection
- List the file addresses and record IDs being used by a collection

ZBROW output to file, printer, or paged console

Loading Files along with Programs

Concepts

Loaders methodology

File system innovations



Concepts

Programs may depend on the format and content of data files (e.g. configuration files).

Program updates may require corresponding file updates.

Good manageability can be achieved by logically bundling versions of programs together with the corresponding versions of the files they require.

Version control for such files must be transparent to the programs which use them.

Loaders Methodology

The image loader (TPLD) loads programs to a program base.

- Extend to also load files to program base unique directories in TFS
- Target locations and permissions specified in input deck

The online loader (OLDR) manages programs in loadsets.

- Extend to also allow files in loadsets
- Files deployed to TFS at load time
- Target locations and permissions specified in input deck

Coping with Multiple Versions

OLDR arranges for multiple versions of programs to be managed transparently.

- Access is determined by activation number.
- Selective activation allows additional control.
- Accepting a loadset replaces the base versions.

Equivalent management of multiple versions of data files is clearly required.

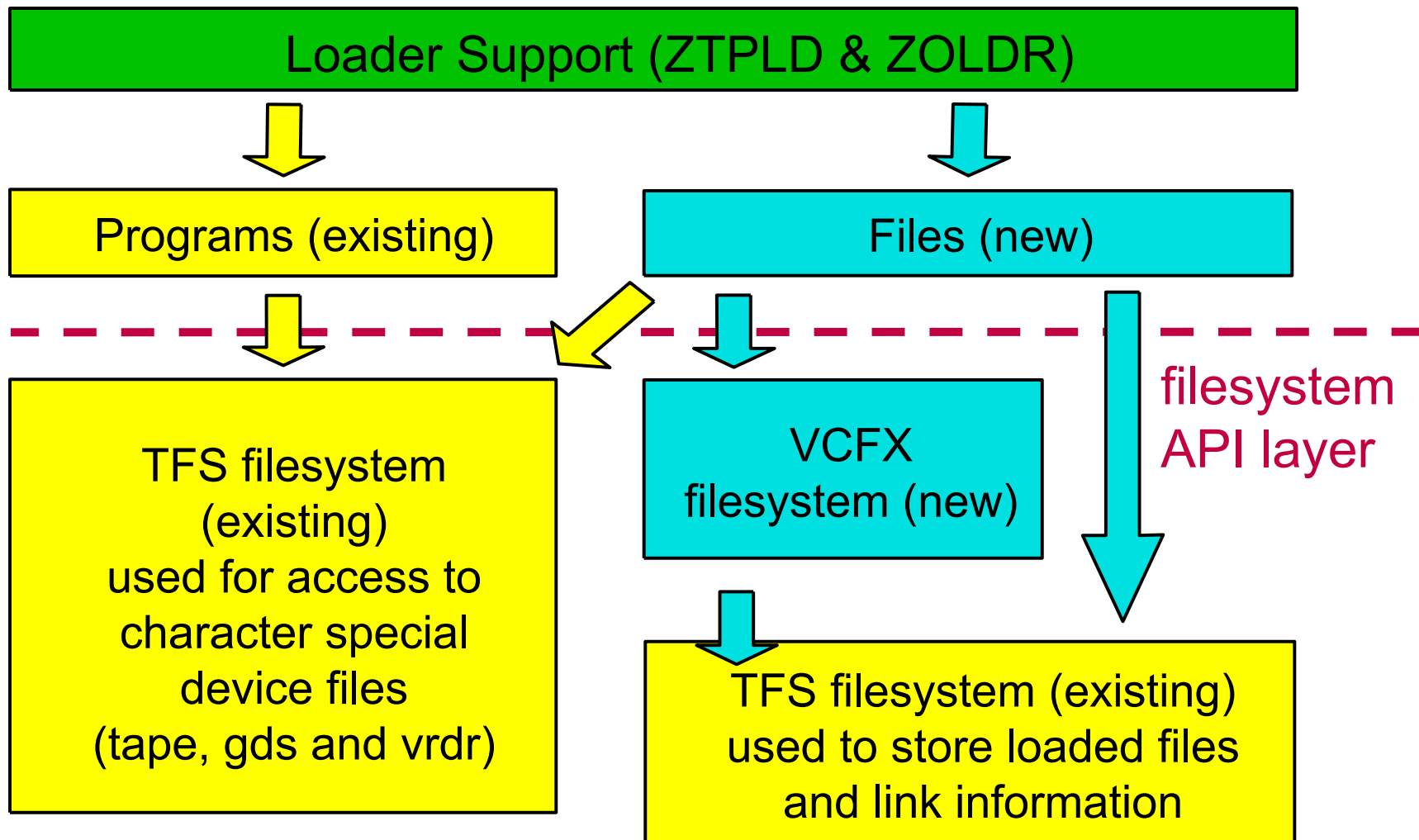
- OLDR extensions permit unified control.
- VFS provides the critical leverage.

File System Innovation

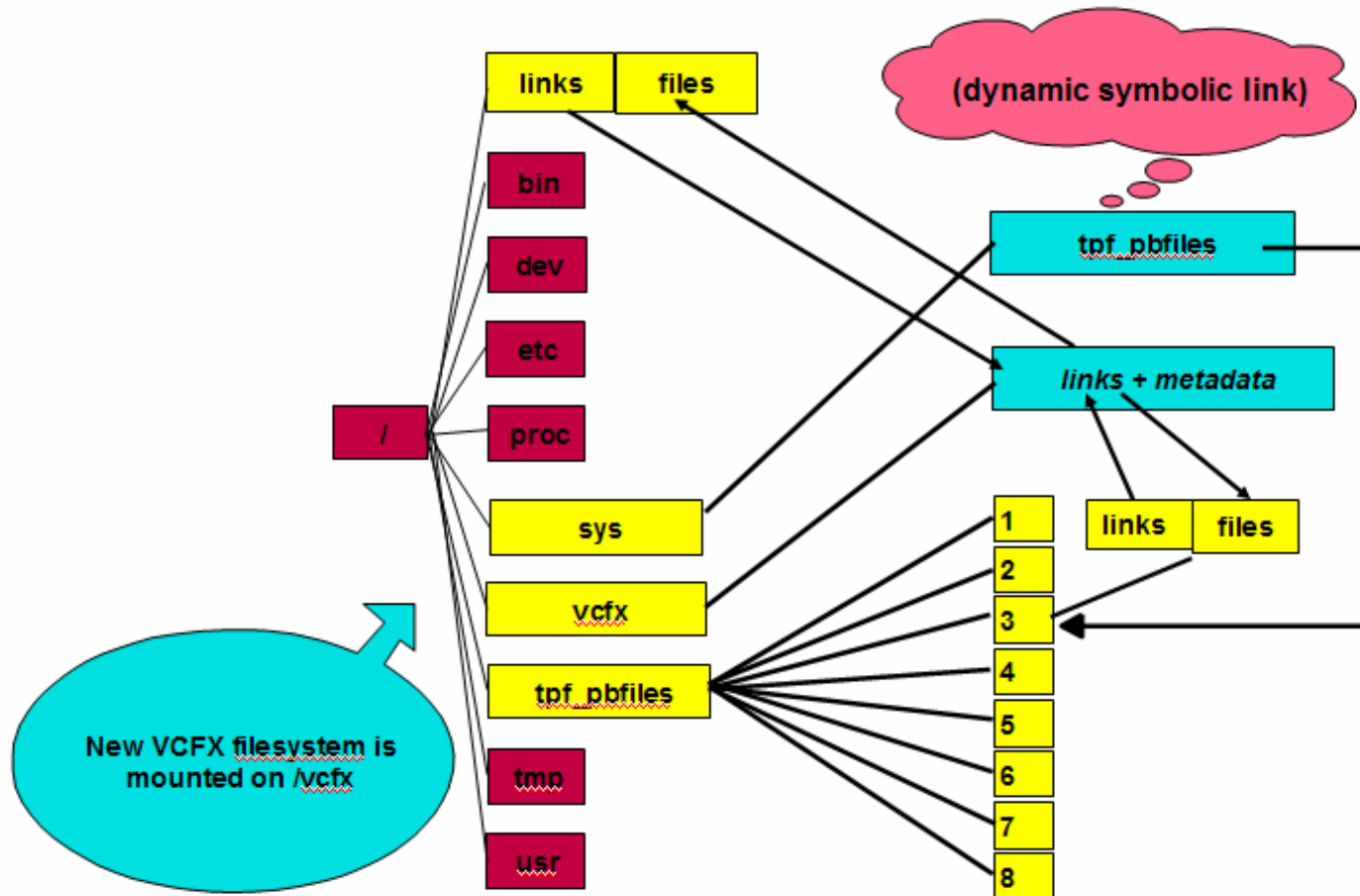
Version Control File Index (VCFX)

- Special purpose memory resident file system
- Connects base file names to active versions
- The base file name is a link to a VCFX entry
- Each VCFX entry is a link to a specific file version
- Metadata is cached in the inodes of the links
- Enhanced lookup logic chooses the version (link) appropriate to the caller's activation number

Loaders Use of File System



New Directory Structures



Example

Step 1: Image loader deploys base versions

- TLDR input deck contains pgm1.so and file.dat.
- ZTPLD loads PGM1 to program base 3 and file.dat to /tpf_pbfiles/3/.../file.dat through the symbolic link /sys/tpf_pbfiles.

Note: /.../ represents a series of 0 or more subdirectories specified in the loader input deck.

- PGM1 accesses the file using its base name /sys/tpf_pbfiles/.../file.dat

Example

Step 2: E-type loader introduces new versions

- OLDR input deck defines LOADSET1 containing pgm1.so and file.dat.
- ZOLDR LOAD deploys the contents of LOADSET1
 - PGM1 is loaded into #OLD records
 - Complex-wide unique counter is incremented, becoming (say) 14
 - file.dat is deployed as /tpf_pbfiles/3/.../file.dat/.14
- ZOLDR ACTIVATE makes the new versions usable
 - Activation level is incremented, becoming (say) 6
 - PGM1 is loaded into CRPA and a new PAT entry is created
 - VCFX linkage is established for file.dat
 - /vcfx/tpf_pbfiles/3/.../file.dat/.0 → /tpf_pbfiles/3/.../file.dat/.0
 - /vcfx/tpf_pbfiles/3/.../file.dat/.6 → /tpf_pbfiles/3/.../file.dat/.14
 - /tpf_pbfiles/3/.../file.dat is renamed /tpf_pbfiles/3/.../file.dat/.0
 - /tpf_pbfiles/3/.../file.dat → /vcfx/tpf_pbfiles/3/.../file.dat/.0

Example

Step 3: PGM1 opens `/sys/tpf_pbfiles/file.dat`

- Symbolic links lead to `/vcfx/tpf_pbfiles/3/.../file.dat/.0`
- VCFX lookup chooses a symbolic link from the set contained in `/vcfx/tpf_pbfiles/3/.../file.dat`
 - If activation level ≥ 6 , choose `/vcfx/tpf_pbfiles/3/.../file.dat/.6` → `/tpf_pbfiles/3/.../file.dat/.14` (LOADSET1 version)
 - Otherwise, choose `/vcfx/tpf_pbfiles/3/.../file.dat/.0` → `/tpf_pbfiles/3/.../file.dat/.0` (base version)

Example

Step 4: E-type loader introduces more new versions

- OLDR input deck defines LOADSET2 containing pgm1.so and file.dat.
- ZOLDR LOAD deploys the contents of LOADSET2
 - PGM1 is loaded into #OLD records
 - Complex-wide unique counter is incremented, becoming (say) 39
 - file.dat is deployed as /tpf_pbfiles/3/.file.dat/.39
- ZOLDR ACTIVATE makes the new versions usable
 - Activation level is incremented, becoming (say) 13
 - PGM1 is loaded into CRPA and another new PAT entry is created
 - Additional VCFX linkage is established for file.dat
 - /vcfx/tpf_pbfiles/3/.../file.dat/.13 → /tpf_pbfiles/3/.../file.dat/.39

Example

Step 5: PGM1 opens /sys/tpf_pbfiles/.../file.dat

- Symbolic links lead to /vcfx/tpf_pbfiles/3/.../file.dat/.0
- VCFX lookup chooses a symbolic link from the set contained in /vcfx/tpf_pbfiles/3/.../file.dat
 - If activation level ≥ 13 , choose /vcfx/tpf_pbfiles/3/.../file.dat/.13 → /tpf_pbfiles/3/.../.file.dat/.39 (LOADSET2 version)
 - Else if activation level ≥ 6 , choose /vcfx/tpf_pbfiles/3/.../file.dat/.6 → /tpf_pbfiles/3/.../.file.dat/.14 (LOADSET1 version)
 - Otherwise, choose /vcfx/tpf_pbfiles/3/.../file.dat/.0 → /tpf_pbfiles/3/.../.file.dat/.0 (base version)

Summary

Loaders will be able to perform equivalent actions on programs and files.

- ZTPLD will load files to program base unique directories in TFS.
- ZOLDR will load, activate, exclude, reinclude, accept, delete, etc. files in loadsets.
- ZIMAG will copy program base unique files from the source image directory to the target image directory.

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