Jerry Feldman
Boston Linux and Unix

Presentation prepared in LibreOffice Impress

Boston Linux and Unix 12/17/2014
Background
Overview

•

•

•

• Please feel free to ask questions at any time.
Terminology
Terminology
The File Systems I will talk about

<table>
<thead>
<tr>
<th>File System</th>
<th>Short Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXT2</td>
<td>The venerable Second Extended File System. This was the standard for several years</td>
</tr>
<tr>
<td>EXT3</td>
<td>EXT3 simply adds journaling to ext2</td>
</tr>
<tr>
<td>EXT4</td>
<td>A substantial upgrade in both performance as well as support for larger files. EXT4 currently is the default for Fedora and Debian.</td>
</tr>
<tr>
<td>BTRFS</td>
<td>Btree File System. Adds pooling, snapshots, checksum and multiple device spanning and a few other features</td>
</tr>
<tr>
<td>XFS</td>
<td>XFS is a journaling system developed by SGI. It is currently the default file system for Red Hat Enterprise 7</td>
</tr>
<tr>
<td>ZFS</td>
<td>ZFS is a tree-based file system developed by Sun (Oracle) for use on Solaris. It has been available in Linux for several years</td>
</tr>
<tr>
<td>JFS</td>
<td>JFS is a B-Tree based journaling file system developed by IBM for AIX and OS2.</td>
</tr>
<tr>
<td>ReiserFS</td>
<td>I am including ReiserFS for historical purposes. This is a B-Tree based system that was the standard for SuSE for several years</td>
</tr>
</tbody>
</table>
Why the end user should be interested
Linux vs Windows
Linux vs. Windows
Linux vs. Windows
Linux vs. Windows
Linux vs. Windows
The EXT family

Rémy Card
The venerable EXT2
The venerable EXT2

<table>
<thead>
<tr>
<th>Inode #</th>
<th>Access Control List</th>
<th>Extended Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct/Indirect</td>
<td>Time stamp(3) Access, change, modification</td>
<td>Number of blocks</td>
</tr>
<tr>
<td>Disk Blocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>File Deletion</td>
<td>File generation number</td>
<td>File Size</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>File Type</td>
<td>Group</td>
<td>Number of links</td>
</tr>
<tr>
<td>Owner</td>
<td>Permissions</td>
<td>Status flags</td>
</tr>
</tbody>
</table>

Linux File Systems Comparison  
Dec 17, 2014
EXT3 adds journaling to EXT2
EXT3 adds journaling to EXT2
EXT4 – major upgrade to EXT2/3
EXT4 – New features
EXT4 – New features
EXT4 – Performance Features
BTRFS — The Linux file system of the future
BTRFS - features
BTRFS - features

- 
- 
- 
- 
- 
- 
- 
- 
- 
- 

BTRFS - features
BTRFS – my observation
BTRFS – a couple of issues
More on BTRFS File System Full
ZFS — Commercial File system
ZFS on Linux
ReiserFS – A look back
ReiserFS features
References
References

https://btrfs.wiki.kernel.org/index.php/Main_Page
http://en.wikipedia.org/wiki/Ext4
http://en.wikipedia.org/wiki/Ext2
http://www.linux.org/threads/ext-file-system.4365/
References

http://lwn.net/Articles/342892/
https://rudd-o.com/linux-and-free-software/ways-in-which-zfs-is-better-than-btrfs
https://btrfs.wiki.kernel.org/index.php/FAQ
http://events.linuxfoundation.org/sites/events/files/slides/Btrfs_1.pdf
https://btrfs.wiki.kernel.org/index.php/FAQ#Why_is_free_space_so_complicated.3F
References

http://www.jupiterbroadcasting.com/61572/preventing-a-btrfs-nightmare-las-320/
http://www.linux.org/threads/journal-file-system.4136/