

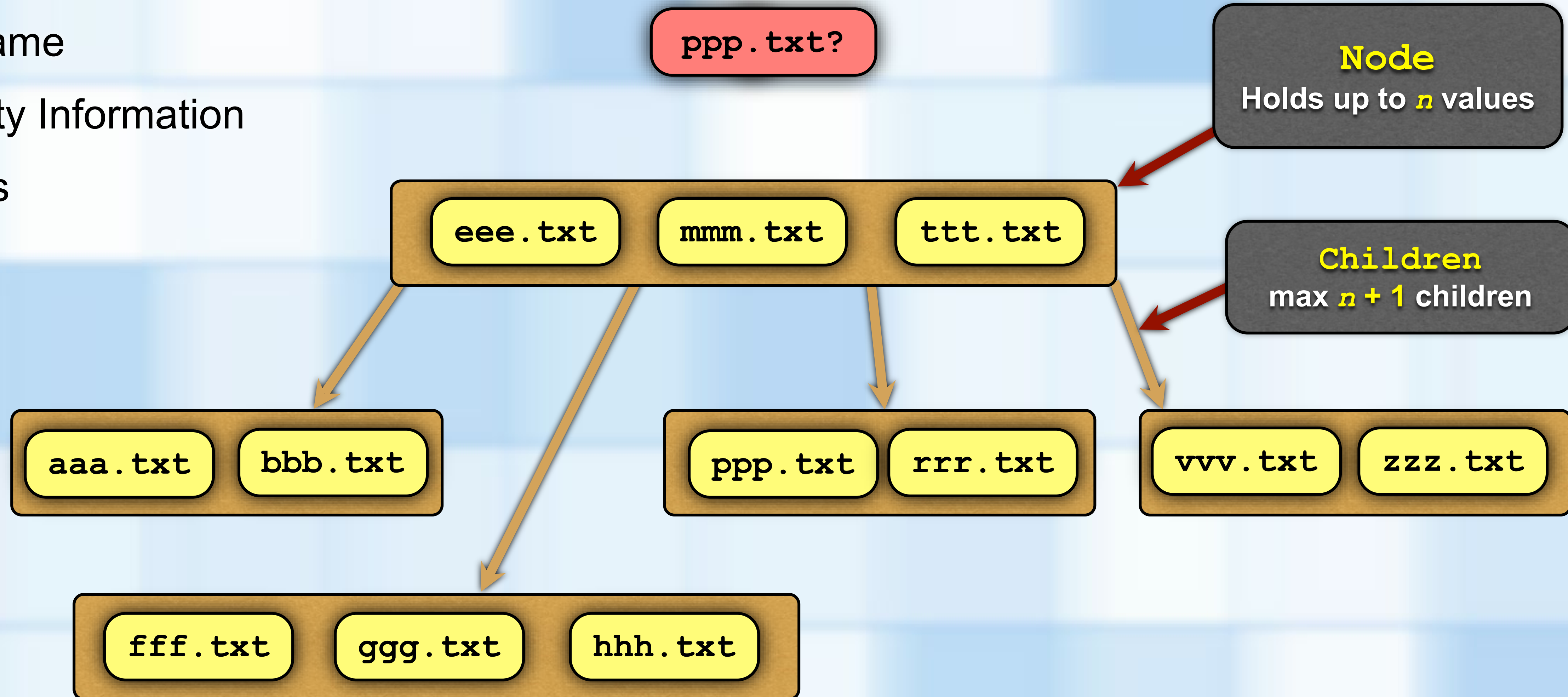
MANAGING EXTERNAL DATA

DIRECTORY MANAGEMENT

- File systems use B-Trees to store sorted attributes

- File Name
- Security Information
- Quotas

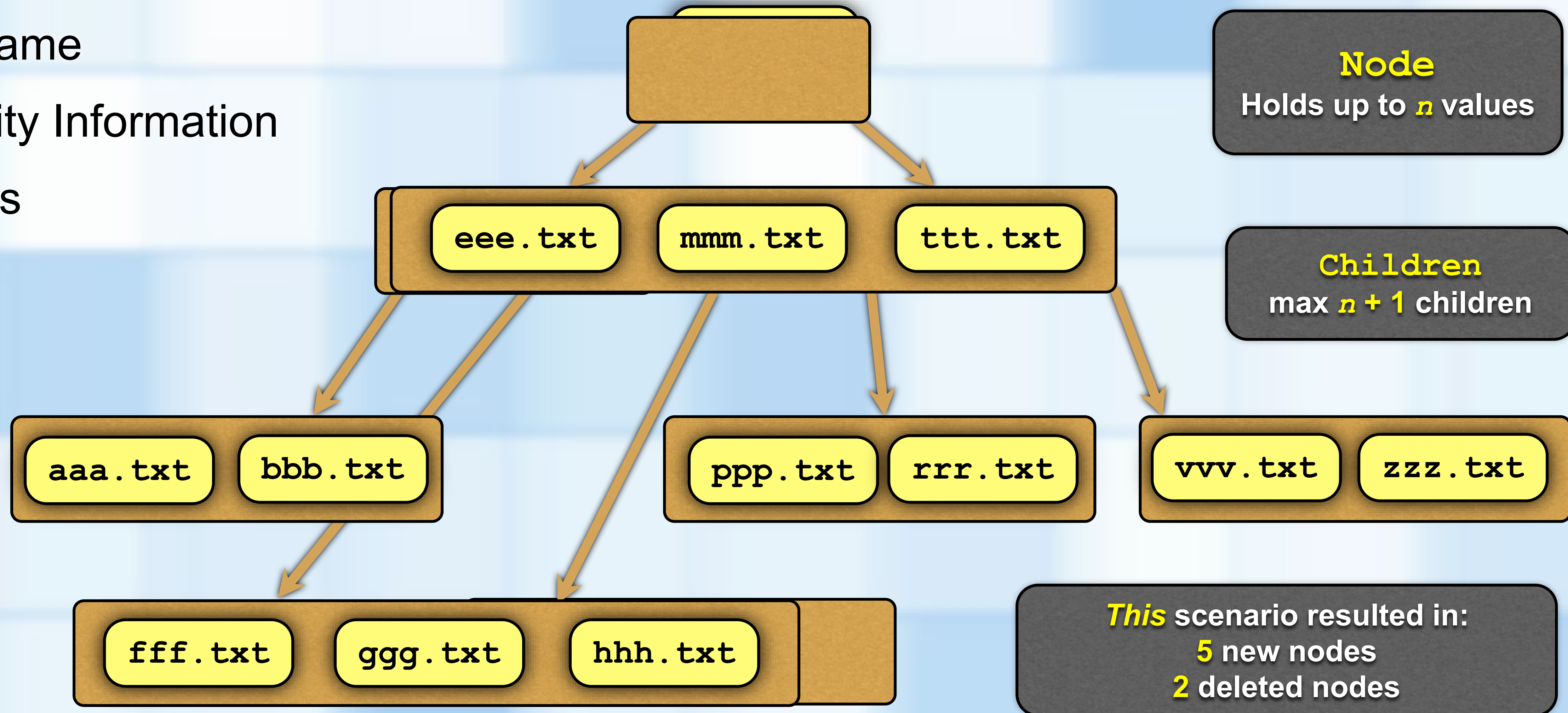
aaa.txt
bbb.txt
eee.txt
fff.txt
ggg.txt
hhh.txt
mmm.txt
ppp.txt
rrr.txt
vvv.txt
zzz.txt



DIRECTORY MANAGEMENT

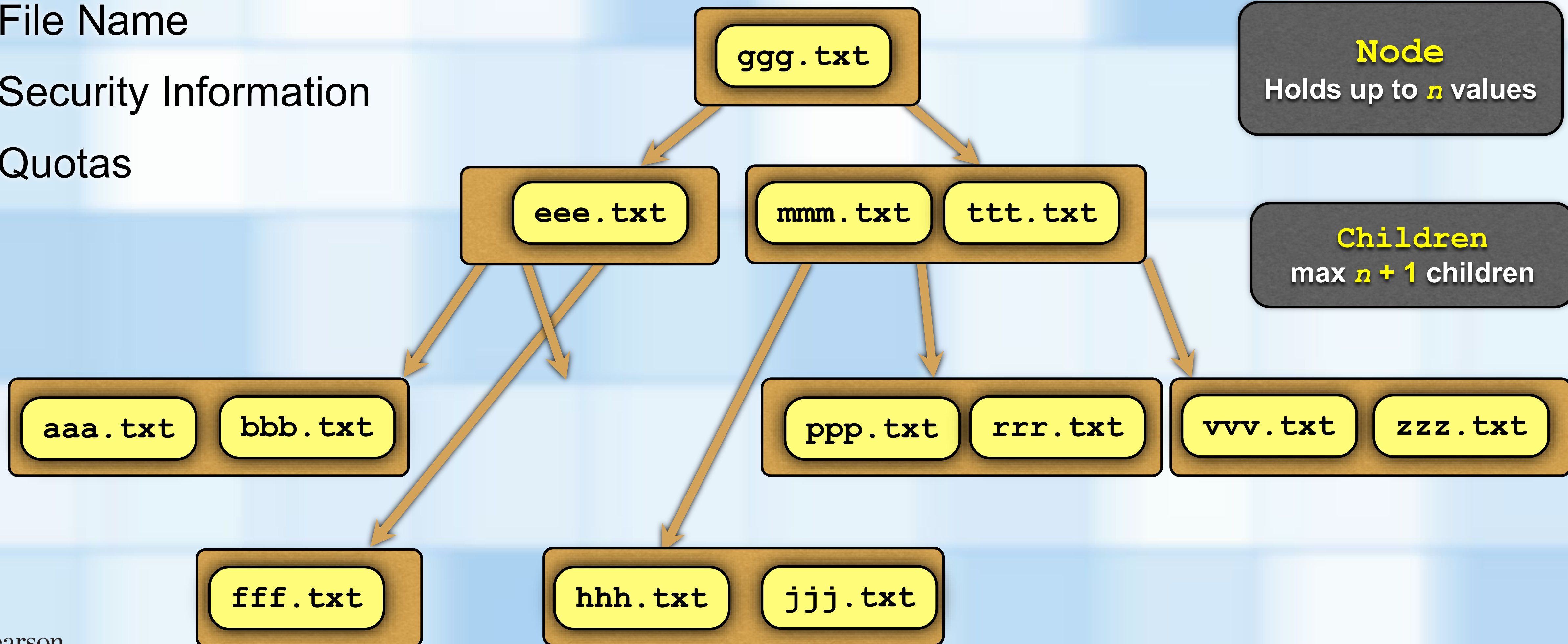
- File systems use B-Trees to store sorted attributes

- File Name
- Security Information
- Quotas



DIRECTORY MANAGEMENT

- File systems use B-Trees to store sorted attributes
 - File Name
 - Security Information
 - Quotas



NTFS \$MFT DIRECTORY ENTRIES

- Two types of \$MFT Records for Folders (directories)
 - B-Tree of files and subfolders is resident in **\$INDEX_ROOT** attribute (0x90)

MyDirectory
--- file1
--- file2
--- file3



Leaf Node in B-Tree



\$MFT DIRECTORY ENTRIES

- Two types of \$MFT Records for Folders (directories)
 - B-Tree of files and subfolders is resident in **\$INDEX_ROOT** attribute (0x90)
 - B-Tree of files and subfolders is external to \$MFT Record
 - **\$INDEX_ROOT** attribute contains basic information (0x90)
 - **\$INDEX_ALLOCATION** attribute stores data runs for file containing B-Tree (0xA0)

Interior Node in B-Tree



INDX RECORDS

- File containing B-Tree Nodes is the *Index Buffer* file
 - Comprised of **INDX** Records - one per node
 - Each record is typically one cluster
 - Record contains **\$FILE_HEADER** attributes for files and subfolders

