

# Integrated Backup and Disaster Recovery

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# Old-School Backups

- **Backup**

- Full backup weekly (level 0)
  - takes forever
- Incremental daily backup (level 1)
  - includes up to six days changes
- Sub-incremental hourly backup (level 2)
  - includes up to twenty-three hours' changes
- etc.
- Overheads make level 2+ only rarely faster than level 1

- **Restore**

- Restore latest level 0
- Restore latest level 1
- Restore latest level 2
- etc.

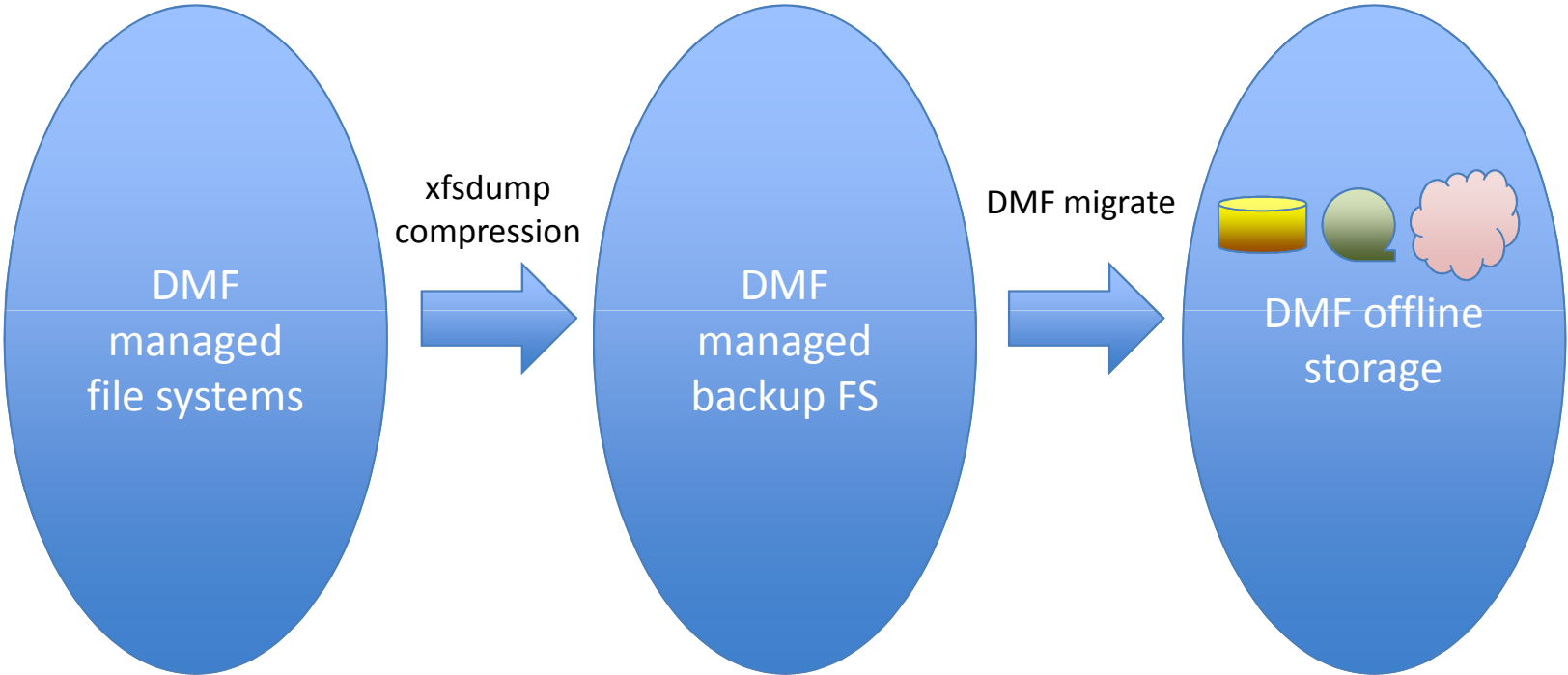
# DMF Backup

- Run **dmmigrate** to push all files to tape
- Run **xfsdump** to back up file system
  - Backs up all files not migrated to tape
  - Backs up all inodes
  - Resulting backup is smaller and faster
  - Many sites don't even use level 1 incremental dumps: they simply run level 0 daily

# Downsides of DMF Backup

- Poor utilization of tapes
  - Retaining 30 days' backups takes 30 tapes, of which only a fraction of each tape is used
- No parallelism
  - Performing parallel dumps requires multiple tapes
- No redundant copies
- Backup to tapes is slow
- Incremental xfsdumps managed manually

# Integrated Backup (Conceptual)



# Integrated Backup Advantages

- Excellent utilization of tapes
  - backups condensed into DMF tapes
- Full backup parallelism supported
  - xfsdump going to disk, not tapes
- DMF maintains redundant copies
  - follows redundancy best practices
- Backup to disk is fast
- Full support of incremental xfsdumps

# Integrated Backup Problems

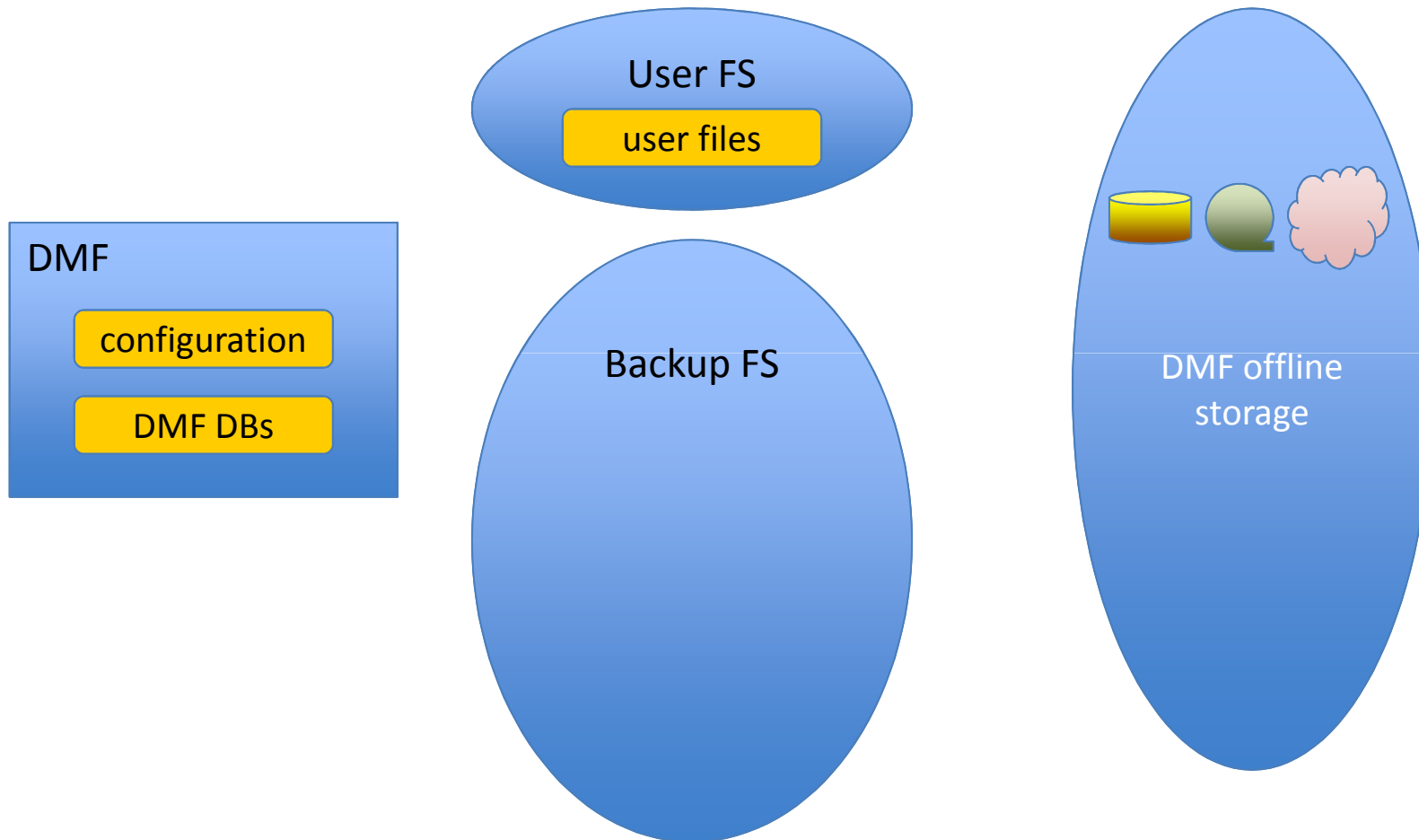
- Relies on fully functional DMF, can't use it for disaster recovery
  - recovering DMF/HA configuration
  - recovering DMF databases
  - recovering system files

# DMF Disaster Recovery Bundle

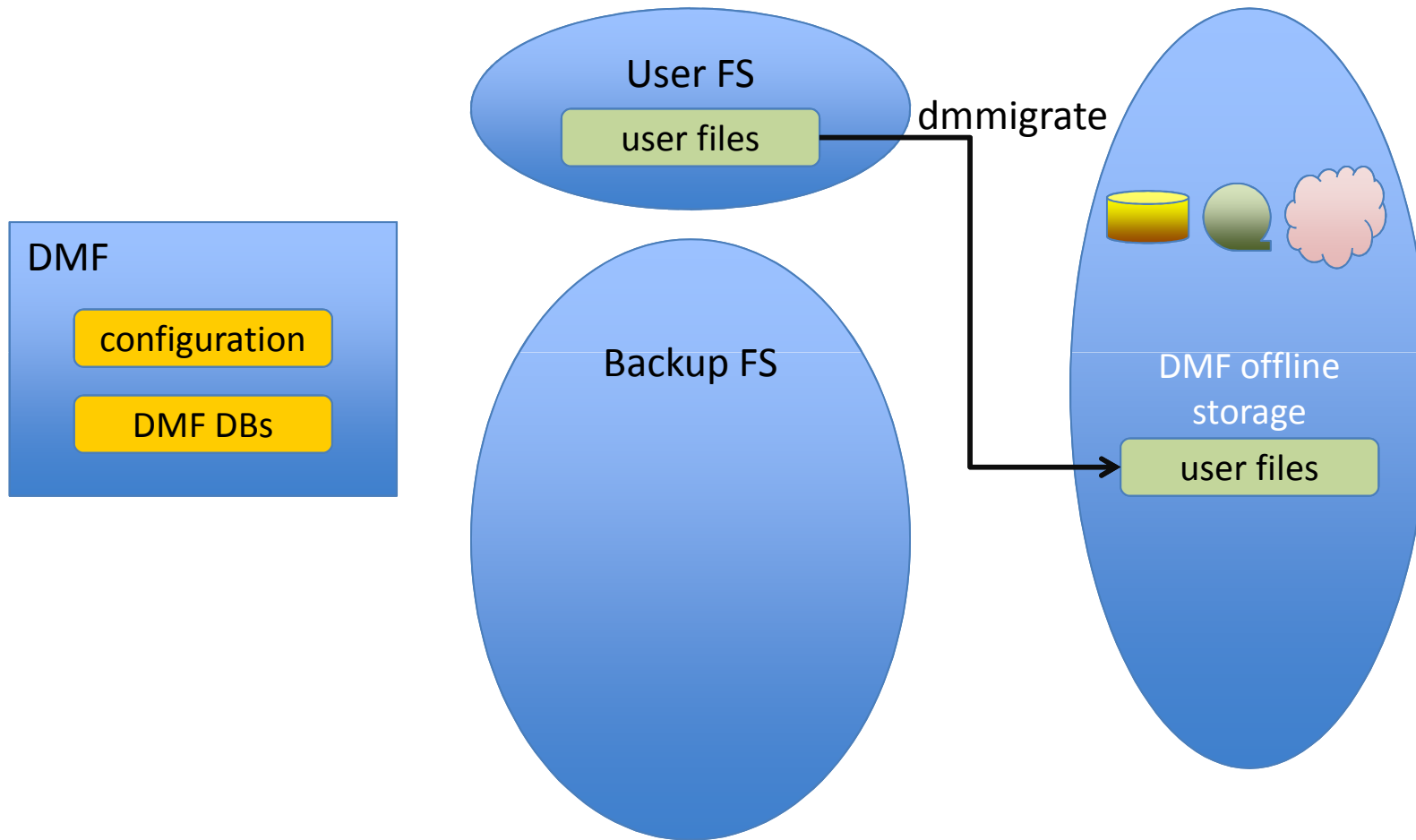
- Filesystem dumps
- XFS dump inventory
- DMF daemon and LS/MSP databases
- Configuration
  - System files (licenses, /etc/fstab, /etc/exports, ...)
  - DMF configuration
  - OpenVault configuration (limited utility)
  - HA / PDMO configuration



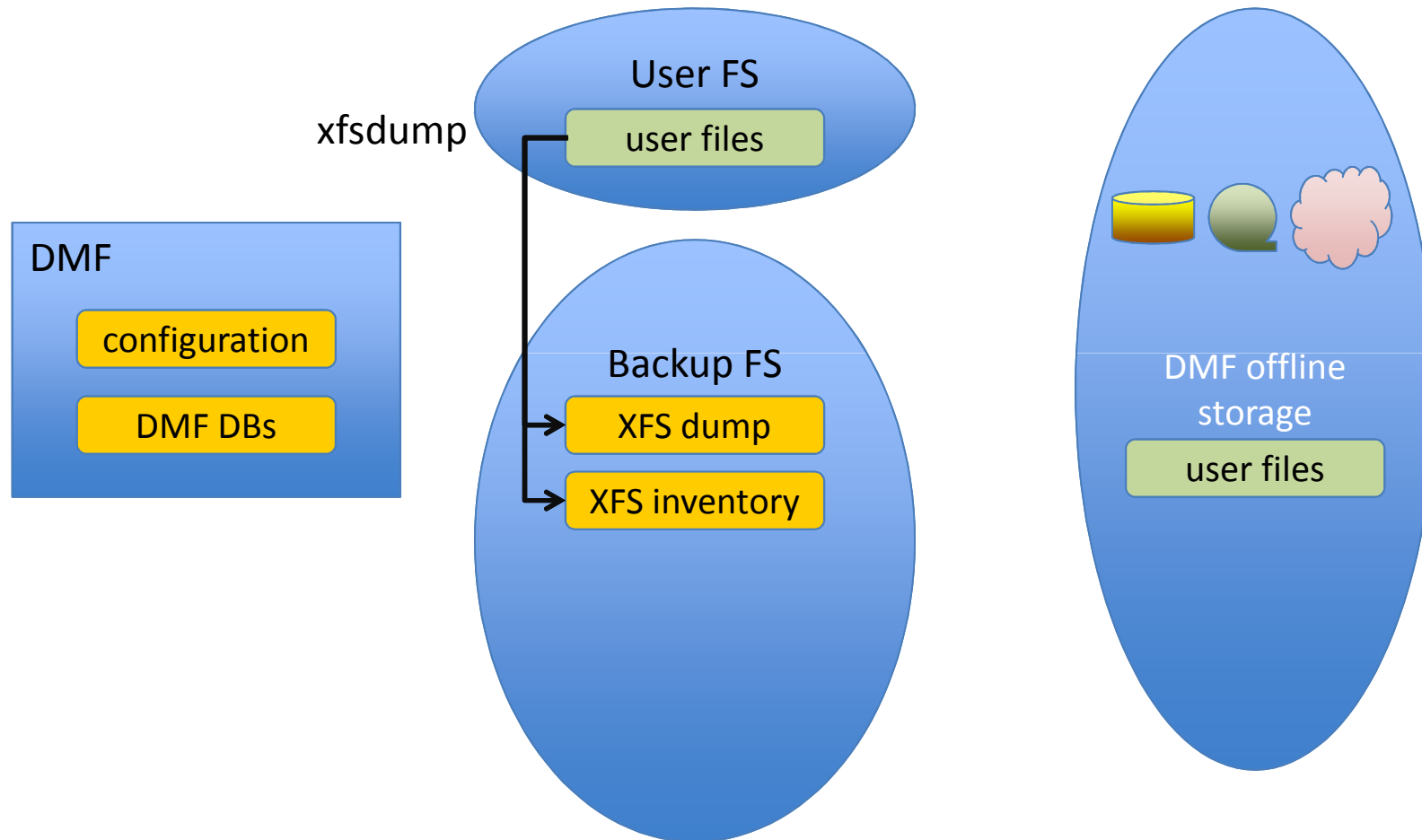
# Creating the DR Bundle



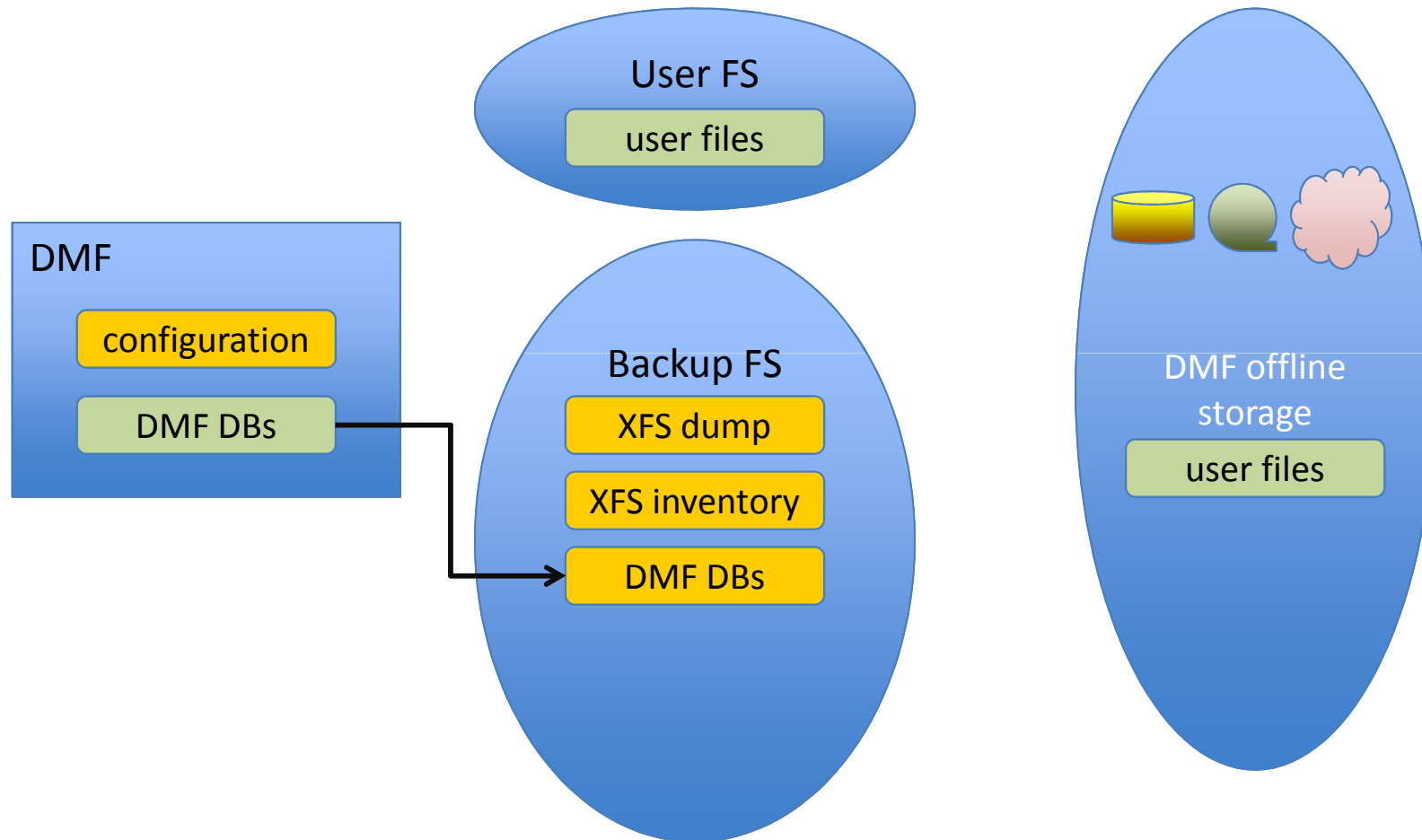
# Creating the DR Bundle



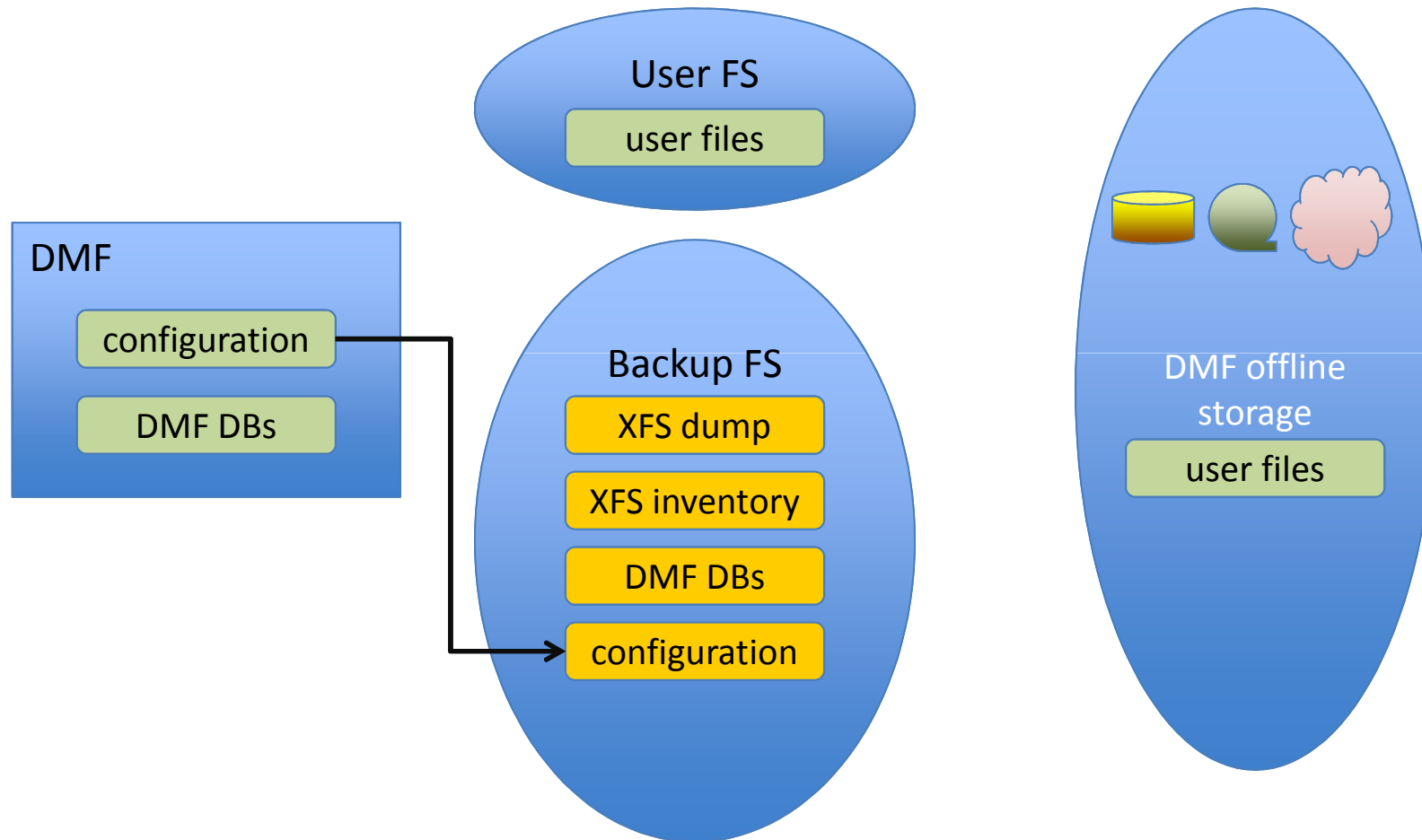
# Creating the DR Bundle



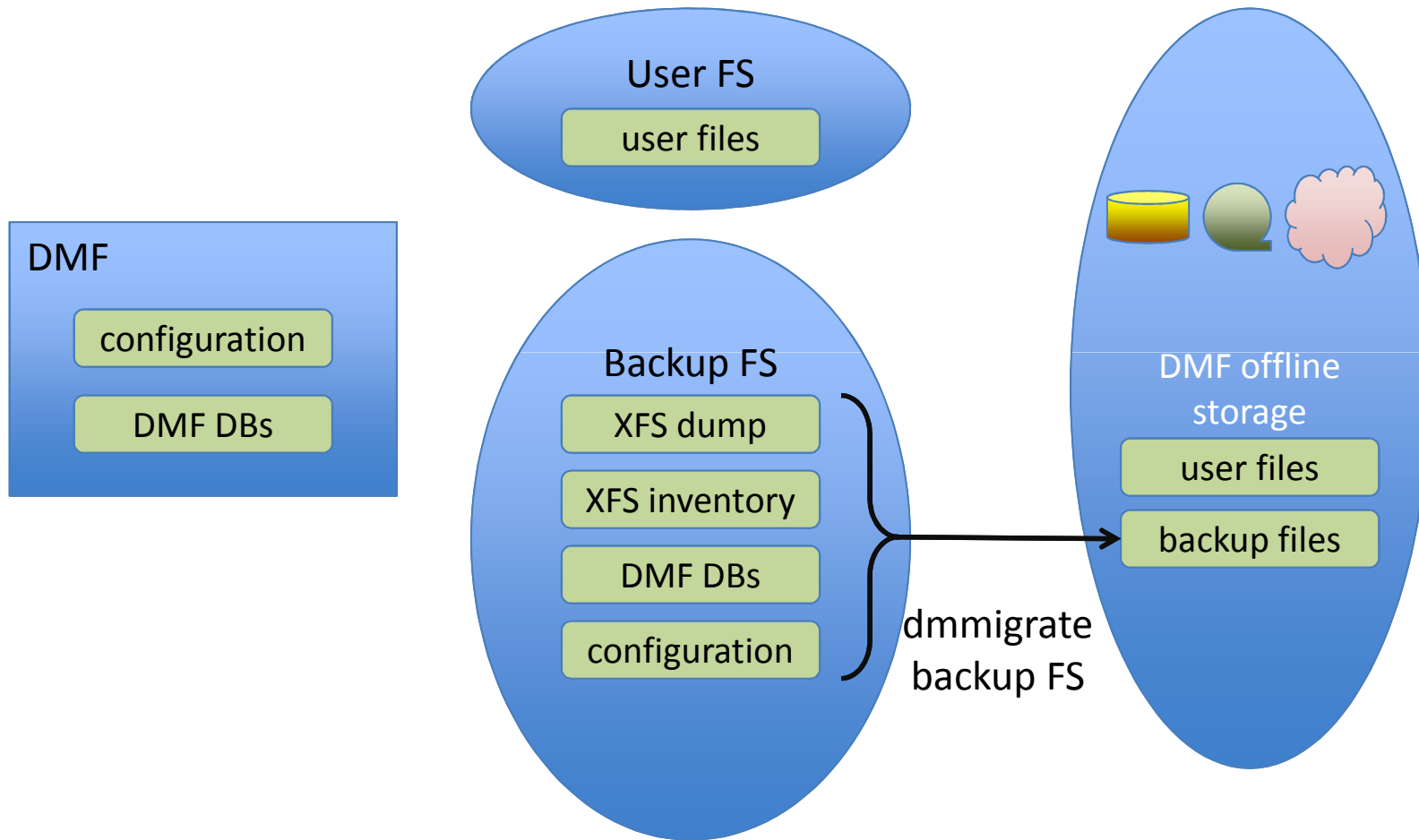
# Creating the DR Bundle



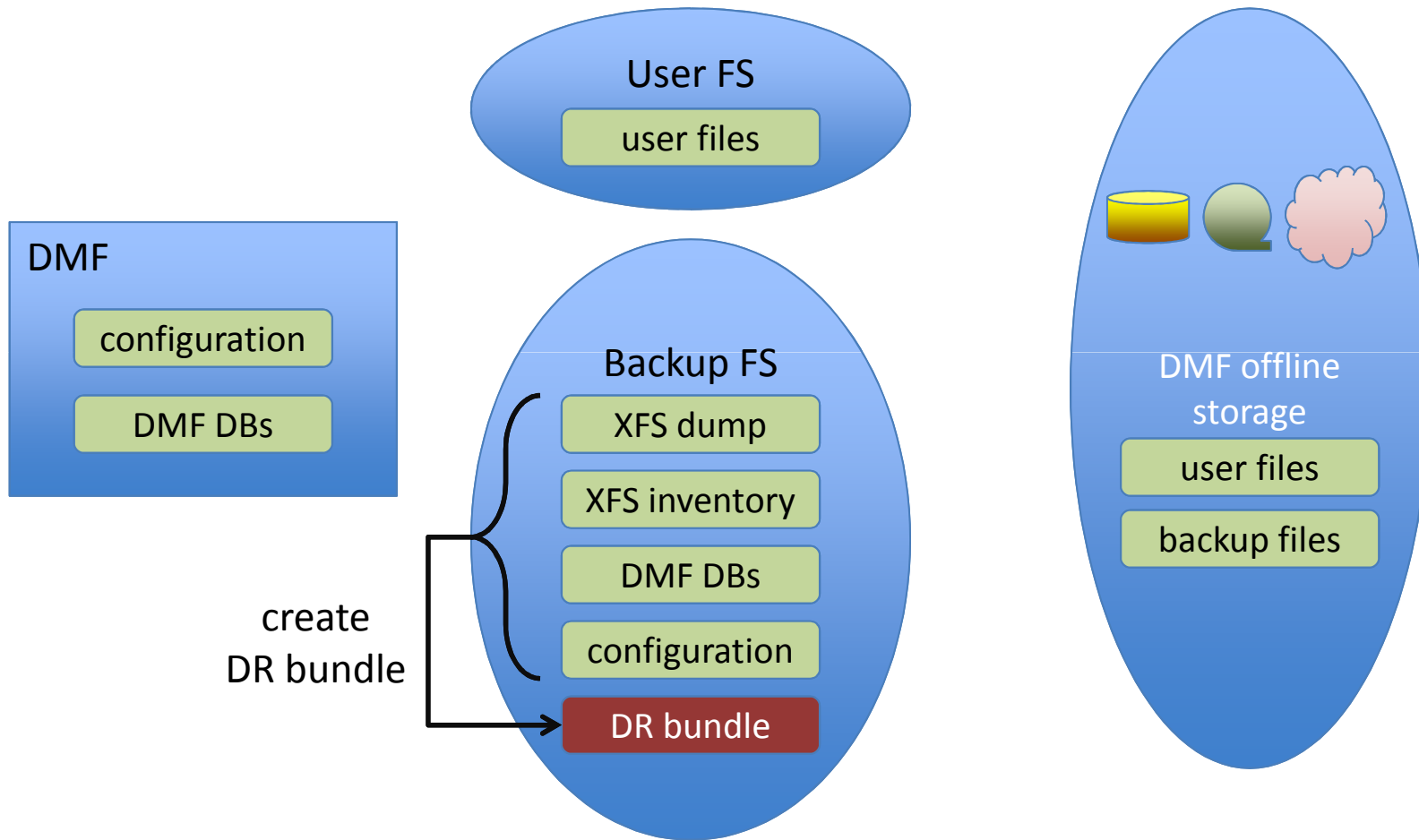
# Creating the DR Bundle



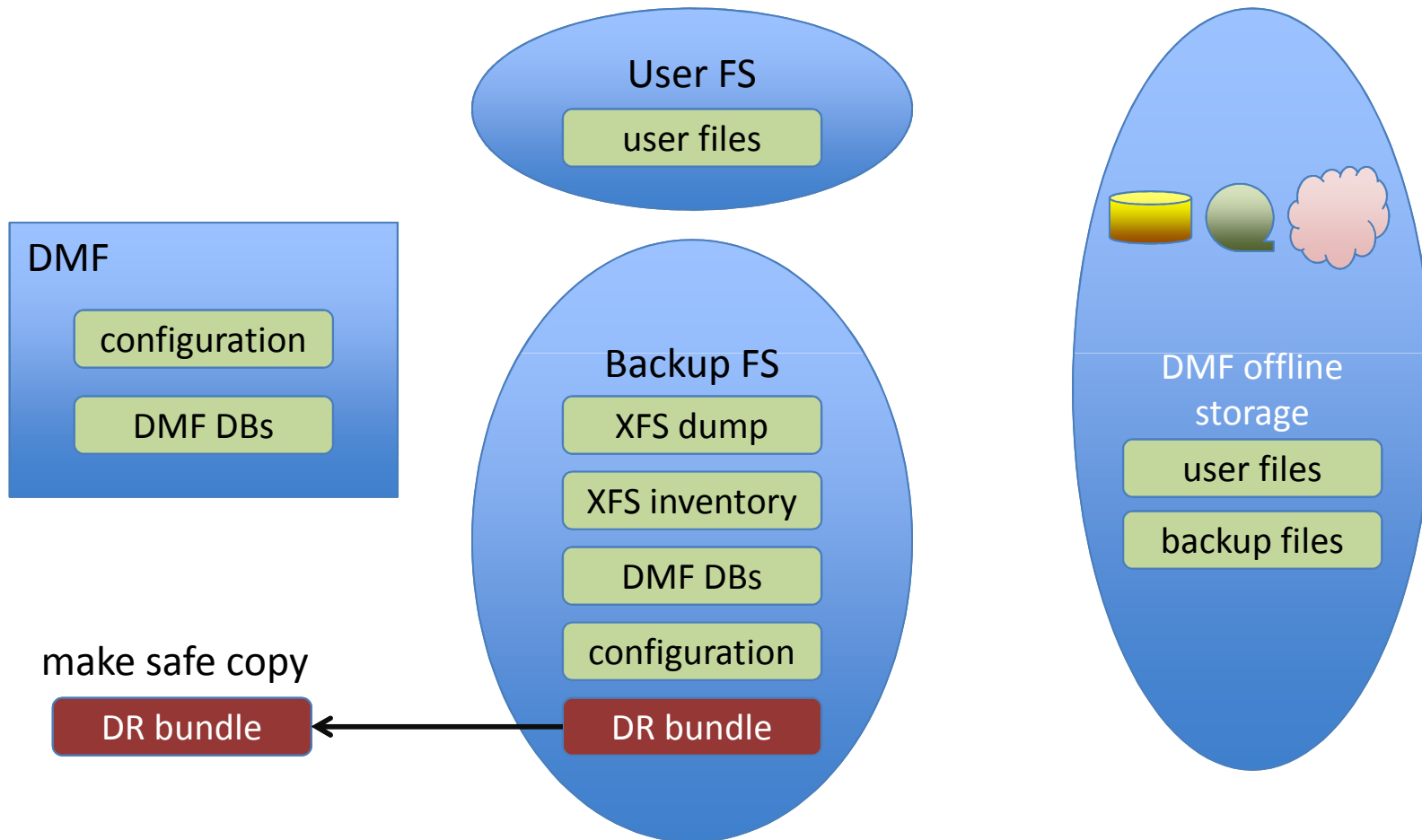
# Creating the DR Bundle



# Creating the DR Bundle

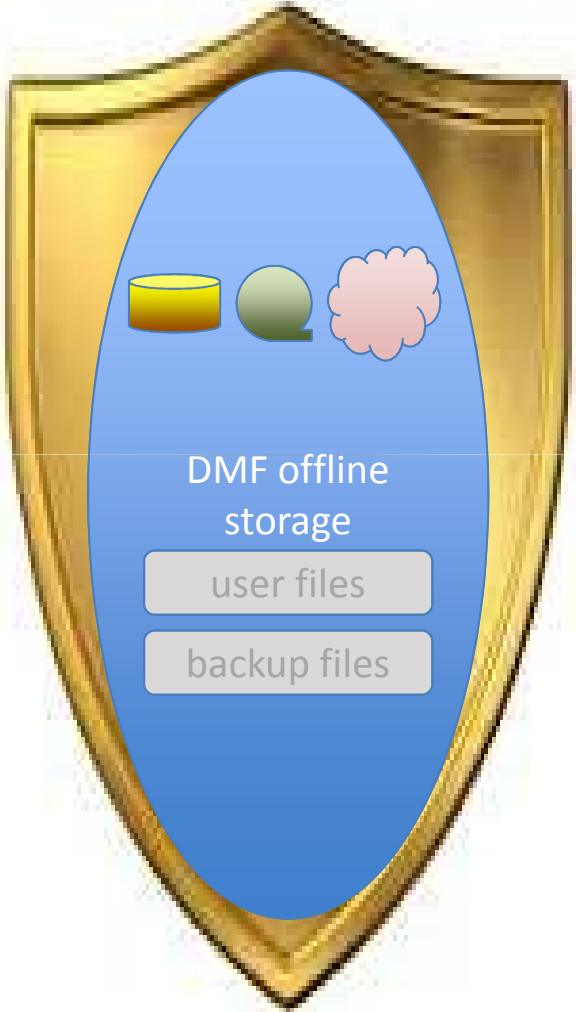


# Creating the DR Bundle

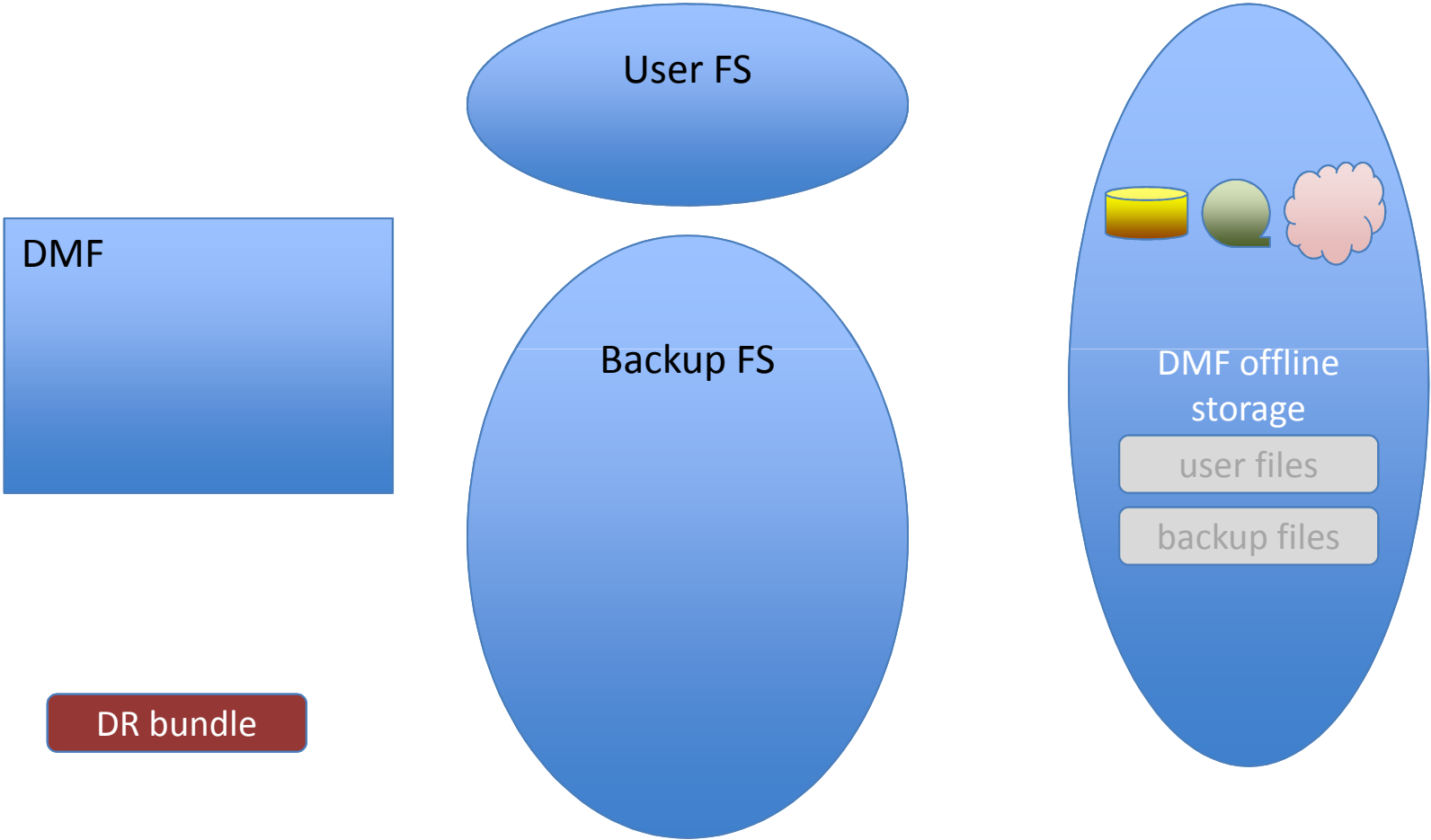




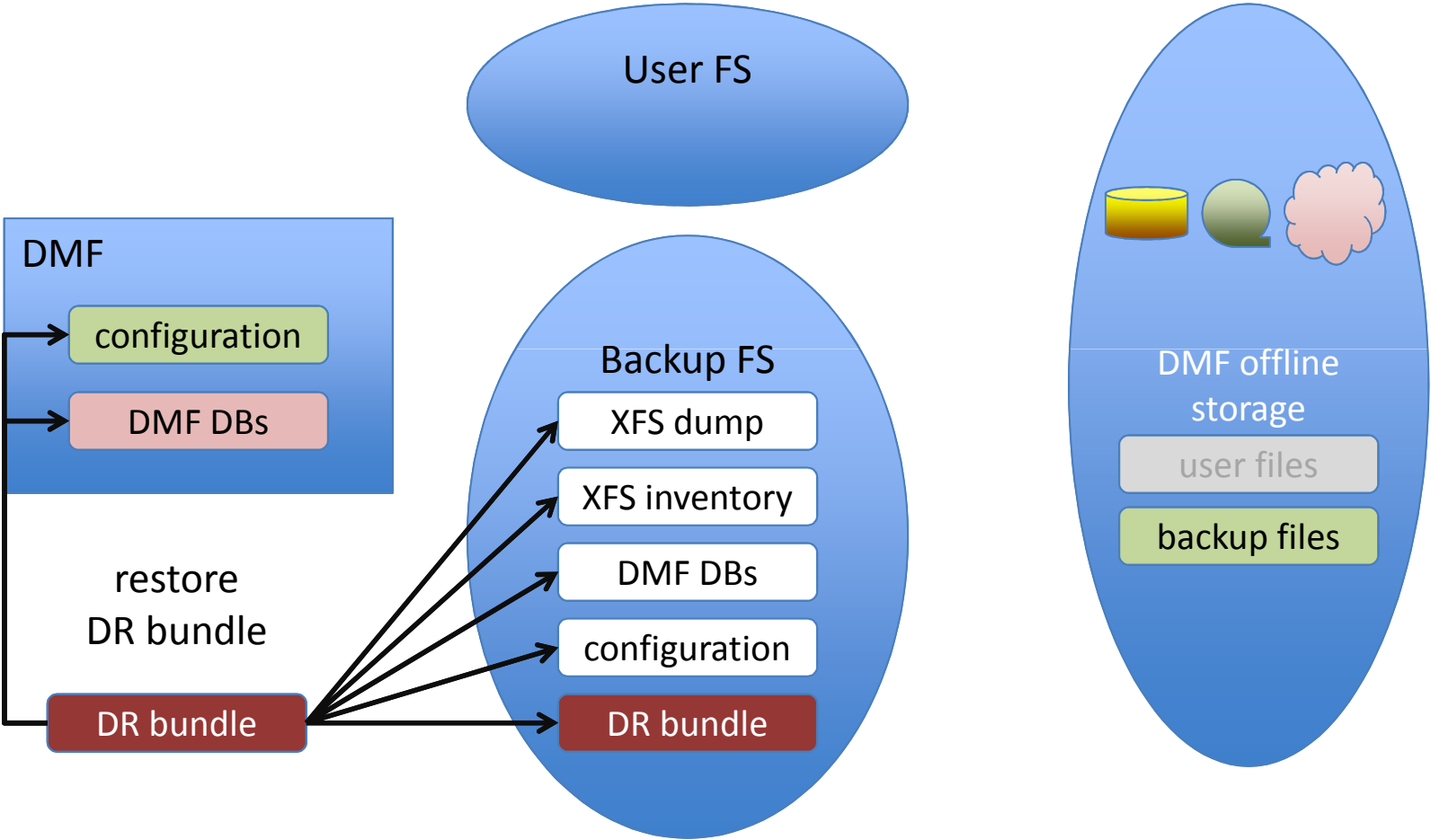
# Recovering From Disaster



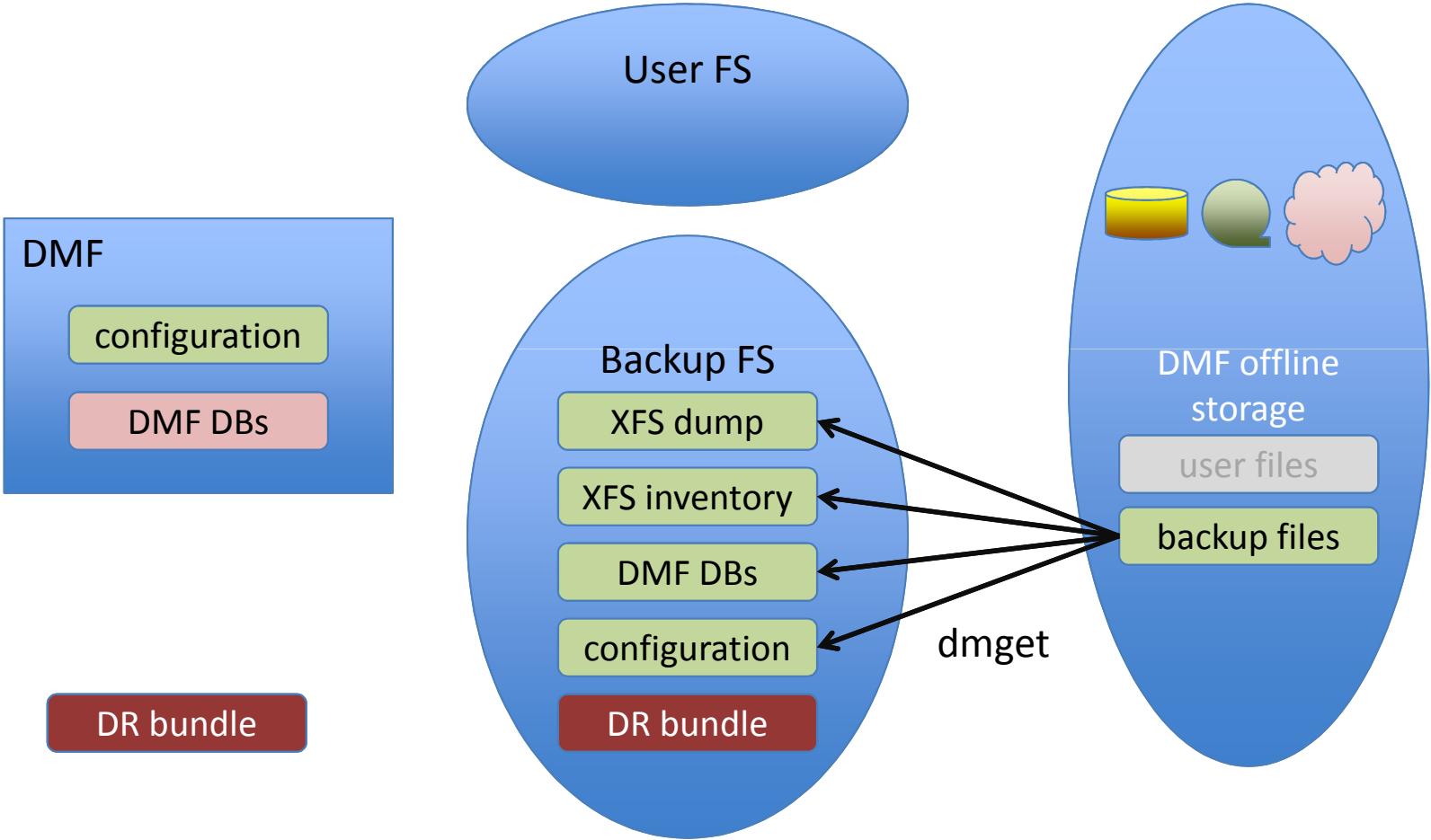
# Recovering From Disaster



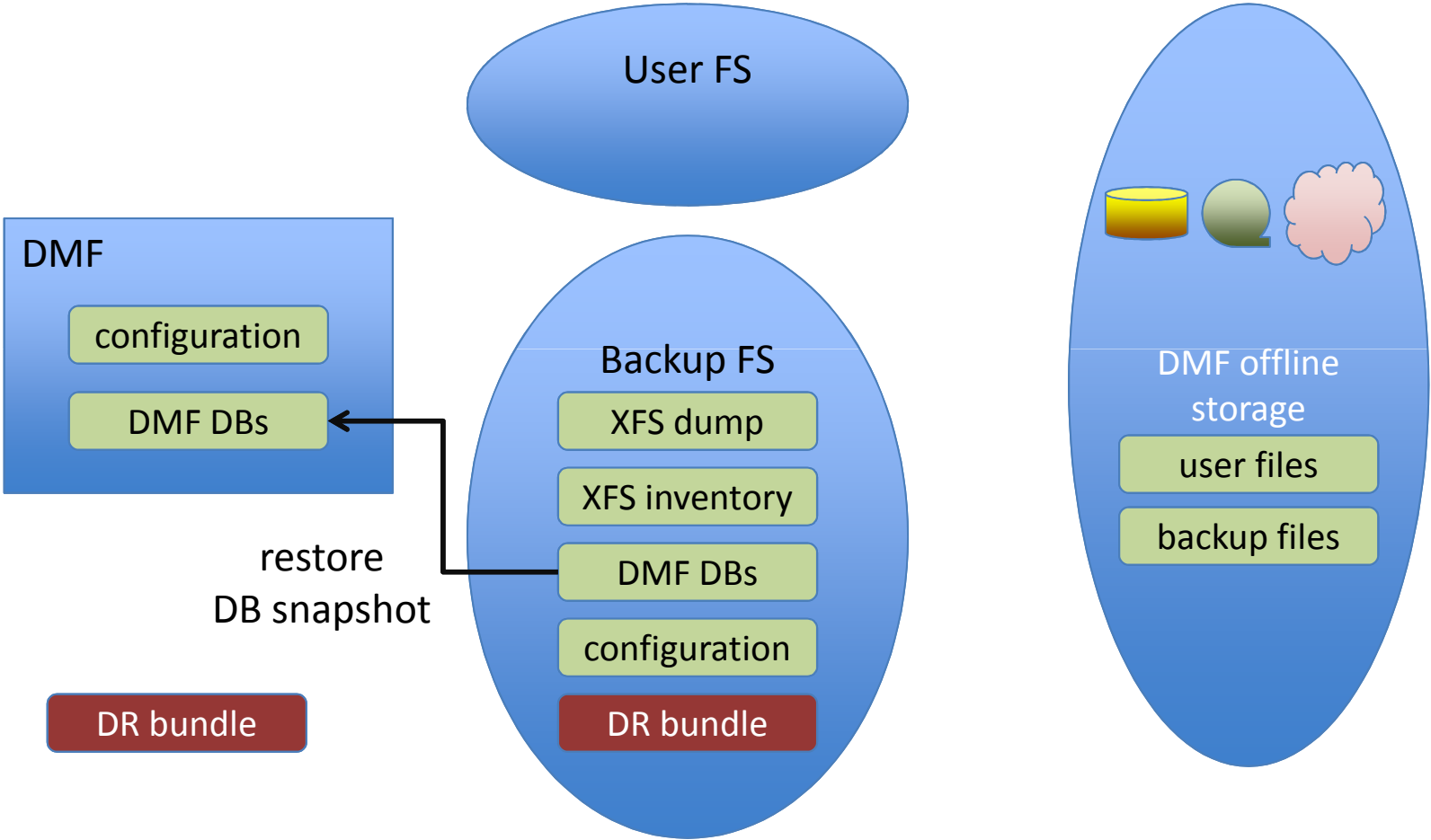
# Recovering From Disaster



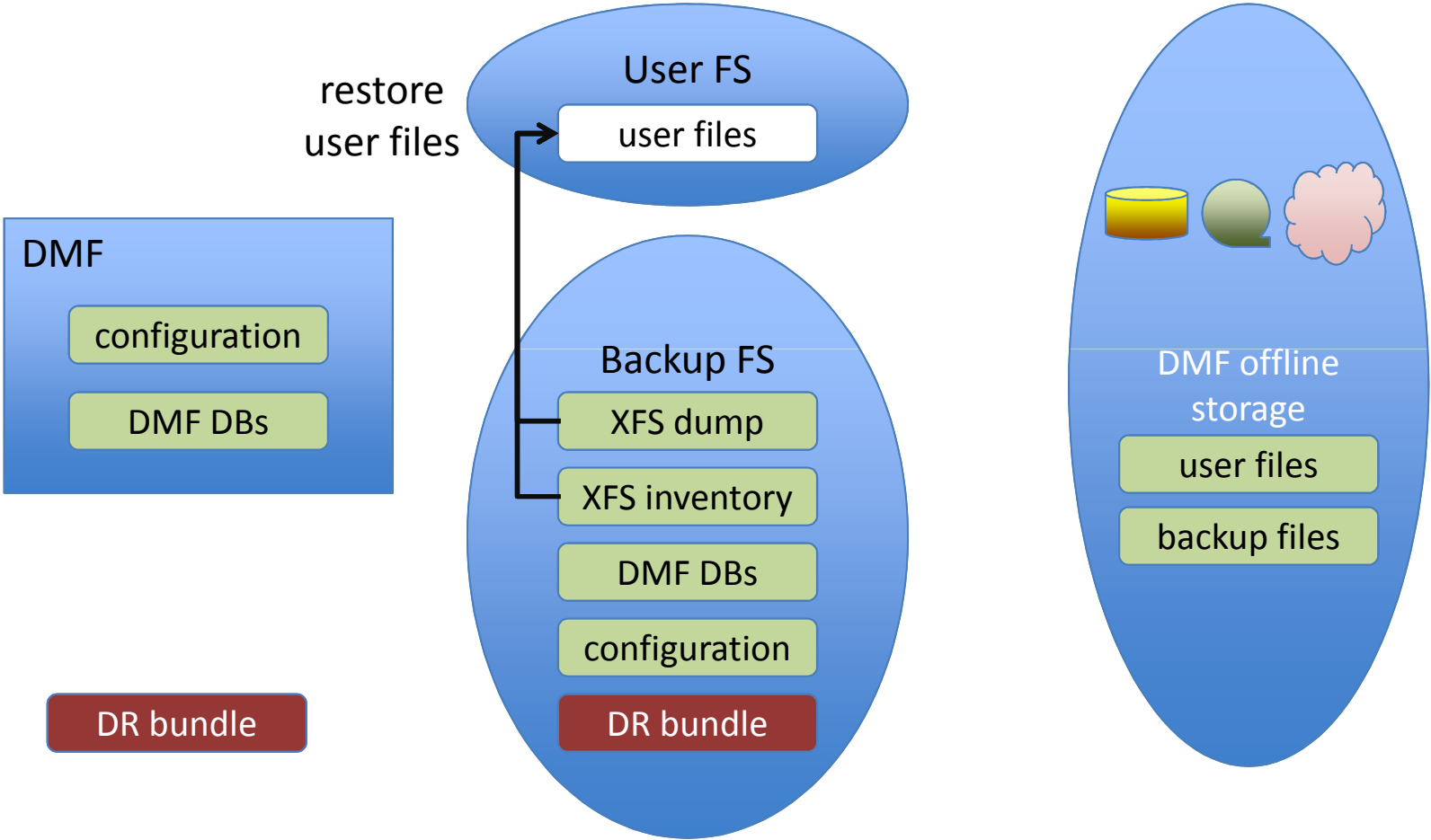
# Recovering From Disaster



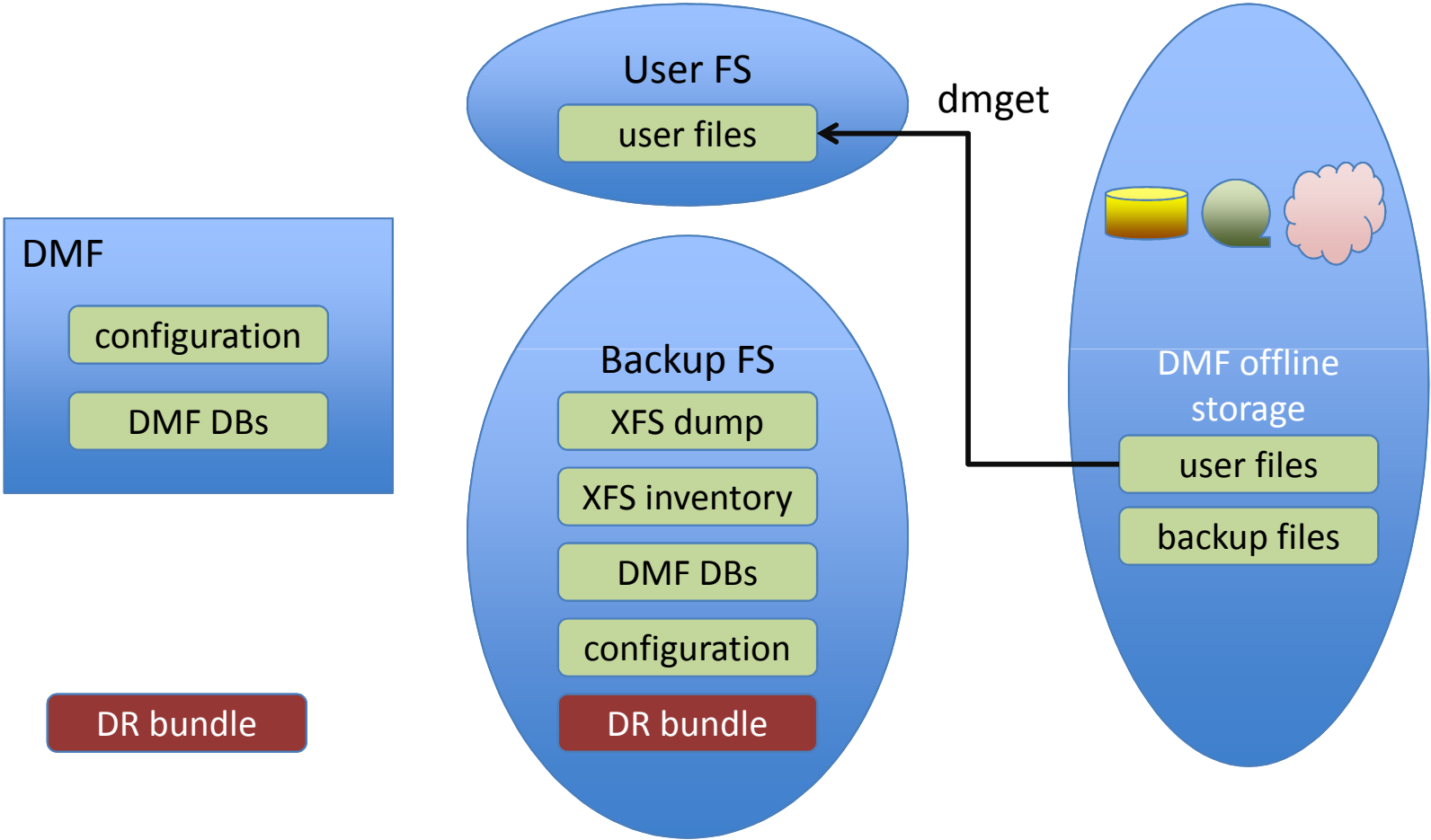
# Recovering From Disaster



# Recovering From Disaster



# Recovering From Disaster



# Starting a Restore

The screenshot shows a web-based backup management interface. At the top, there are navigation menus for Configuration, Storage, Messages, Statistics, Backups, and Help. A user profile for 'Change Password' and 'Log Out' is visible in the top right corner. The main area is titled 'Restore Filesystems' and contains a table of 'Available dumps to restore from'. The table has columns for Date, Filesystem, and Level. The first row is selected, and a 'Restore...' button is visible next to it. A modal dialog box titled 'Restore /dmfusr' is open, showing the selected session details and restore options.

Configuration ▾ Storage ▾ Messages ▾ Statistics ▾ Backups ▾ Help ▾ [Change Password](#) Log Out

Restore Filesystems ▾

Available dumps to restore from

1 - 10 of 37 items			
Date	Filesystem	Level	
No filter applied			
2013-11-15T00:00:01	/dmfusr	1	
2013-11-14T23:05:01	/dmfusr	0	
2013-11-14T00:00:01	/dmfusr	1	
2013-11-13T23:05:01	/dmfusr	0	
2013-11-13T03:42:40	/dmfusr	1	
2013-11-13T03:42:39	/dmfusr	1	
2013-11-13T03:11:02	/dmfusr	0	
2013-11-13T03:11:01	/dmfusr	0	
2013-11-13T00:00:01	/dmfusr	1	
2013-11-11	/dmfusr	0	Restore...

Restore /dmfusr

Selected session:

Source filesystem: /dmfusr  
Date: 2013-11-12T23:05:01  
Dump level: 0  
Session ID: bbcadb29-b262-459a-bd7e-d12f3837c21b  
Method: Integrated  
DMAPI: yes

Select restore options:

Source directory or file relative to the filesystem:  
Leave empty for restoring the entire session:

Destination filesystem: /dmfusr

Destination directory relative to the destination filesystem:  
Leave empty for restoring to the top level directory of the destination filesystem:

Do not overwrite existing files   
Do not overwrite newer files   
Overwrite existing files

Restore... Cancel



# Restore Progress

Configuration ▾ Storage ▾ Messages ▾ Statistics ▾ Backups ▾ Help ▾ [Change Password](#) [Log Out](#)

Restore Filesystems

Log for restore of /dmf/backups/test2

Restore command:  
xfsrestore -D  
-S b75625d1-d36f4365-be41-90b14fc94007  
-f ffo00  
/dmf/backups/test2

xfsrestore: using file dump (drive\_simple) strategy  
xfsrestore: version 3.1.0 (dump format 3.0)  
xfsrestore: using online session inventory  
xfsrestore: searching media for directory dump  
xfsrestore: examining media file 0  
xfsrestore: reading directories  
xfsrestore: 24 directories and 57 entries processed  
xfsrestore: directory post-processing  
xfsrestore: restoring non-directory files  
xfsrestore: restore complete: 0 seconds elapsed  
xfsrestore: Restore Summary:  
xfsrestore: stream 0 /dmf/tnip/dmxfrestore.14803/ffo00 OK (success)  
xfsrestore: Restore Status: SUCCESS

Dump: vjra:/dmfusr at 2013-11-11 00:00:01 (level 1)  
Session: d4ba17ac-eaac-4123-a42d-1a43445fb7  
Media: /dmf/backups/filesystems/12e40d9f-5aba-4331-b966-6ec49c996fcd/dmfusr-20131111\_000000-11-s00.xfsdump.gz

Restore command:  
xfsrestore -D  
-S d4ba17ac-eaac-4123-a42d-1a43445fb7  
-f ffo00  
/dmf/backups/test2

xfsrestore: using file dump (drive\_simple) strategy  
xfsrestore: version 3.1.0 (dump format 3.0)  
xfsrestore: using online session inventory  
xfsrestore: searching media for directory dump  
xfsrestore: examining media file 0

Status of restore processes

1 - 6 of 6 items 10 | 25 | 50 | 100

<input type="checkbox"/>	Destination	Time Started	Time Ended	Status
<input type="checkbox"/>	No filter applied			
<input type="checkbox"/>	/dmf/backups/test1	2013-11-13T06:30:31	2013-11-13T06:30:33	Completed
<input type="checkbox"/>	/dmf/backups/test1	2013-11-13T06:28:11	2013-11-13T06:28:43	Error
<input type="checkbox"/>	/dmf/backups/test3	2013-11-13T06:20:03	2013-11-13T06:20:05	Completed
<input type="checkbox"/>	/dmf/backups/test3	2013-11-13T06:19:57	2013-11-13T06:19:59	Completed
<input type="checkbox"/>	/dmf/backups/test3	2013-11-13T03:43:44	2013-11-13T03:43:46	Completed
<input checked="" type="checkbox"/>	/dmf/backups/test2	2013-11-11T03:13:50	2013-11-11T03:13:50	Completed

- Acknowledge
- Kill...
- Show Log

# Future Roadmap

- Guided disaster recovery
- Backup performance graphs and alerts on long-running backup processes
- Guided dmaudit following filesystem or database recovery
- User-initiated filesystem restore
- Improved dump retention policies